*sustainability*

MDPI

*Article*

# Trust in Courier Services and Its Antecedents as a Determinant of Perceived Service Quality and Future Intention to Use Courier Service

**Joanna Ejdys * and Aleksandra Gulc**

Faculty of Engineering Management, Bialystok University of Technology, Wiejska Street 45A, 15-351 Bialystok, Poland; a.gulc@pb.edu.pl

* Correspondence: j.ejdys@pb.edu.pl

Received: 14 October 2020; Accepted: 29 October 2020; Published: 31 October 2020




**Abstract:** Service quality perceived by clients should be a crucial element in the process of co-creating sustainable services. This article aimed to examine relationships between five constructs: the usefulness of courier services, the ease of use of courier services, the trust in courier services, the service quality, and the future intention to use courier services. This 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. 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.

**Keywords:** service quality; trust in service; courier service; ease of use; usefulness; future intention

## 1. Introduction

The courier, express and parcel (CEP) market is booming around the world and particularly in developing countries. It is driven by increasing Internet penetration and the popularity of online trade with the 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 GPD 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 growing customer confidence in online shopping. This affected the structure of the client base, and B2C (business-to-consumer) 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]. Apart from the increasing demand for fast and immediate delivery, online shops frequently look for sustainable logistics solutions, such as recycling and reusing delivery packaging to ensure eco-friendly same-day deliveries that satisfy their customers [10]. In the context of the growing significance of sustainable logistics, Choi et al. emphasised the impact of the quality of logistics services related to online shopping on customer satisfaction and customers' purchasing behaviour [11].

The improvement of service quality is particularly important in the context of designing a sustainable value proposition. Baldassarre et al. (2017) emphasised the need for a user-driven approach in creating sustainable services [12].

Hartono (2020) also pointed to the need to involve users in the process of sustainable service development. Sustainable service is focused on the offerings which fulfil customer needs and make an effort in terms of social performance. Sustainable services should be directed towards the understanding and interpretation of a customer need and expectation. According to Hartono et al. (2017), a sustainable service is related to innovation in serving and delivering offerings beyond usability and functionality [13,14].

Service quality perceived by clients should be a crucial element in the process of co-creating sustainable services, considering user expectations and needs, and allowing service providers to improve them. This approach involves all stakeholders in the process of service creation. 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 [15]. The perceived service quality measures the level, to which a provided service matches customer expectations [16–18]. As a consequence, it affects customer loyalty [19,20]. Many research studies have been concerned the identification of determinants of perceived 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 [21]. It mainly presents 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 [22]. Both the model and the scale indicate trust as an element comprising the determinants of service quality perceived by clients. In the model, credibility is related to trustworthiness, believability and honesty. While in the scale, the assurance means the "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 [23,24]. 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 [25]. 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 [24].

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 customer trust, a service provider should make an effort to reduce perceived uncertainties, fluctuations, and risk during the service provision [26,27]. On the other hand, when customers trust the solutions offered by a service provider, their assessment of the service quality is higher [25,28]. Finally, trust can affect corporate reputation [26] and build customer loyalty [27,29]. 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 [30,31]. Trust plays a critical role in an e-commerce transaction because of the uncertainty and the risk involved [32]. Therefore, various researchers have identified trust as one of the key service quality attributes, considering the e-commerce specificity [8,31,33–35]. Trust was stated to be the most important factor of e-customer satisfaction [36,37] and their repurchase intention [38–41]. As a result, client loyalty, which is based on customer trust and long-term relationship, is considered as the key element affecting the sustainable performance of online shops. Cho and Mai outlined the role of e-trust as a vital element for the sustainable growth of the e-commerce industry [10].

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 [42]. 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 the knowledge, courtesy of employees and the ability to inspire trust and confidence in customers [7]. 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 [43]. 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 [28].

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 a 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 aimed 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. Then, 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) [44–50]. Over time, the concept of trust has been applied to institutions/organisations (institutional trust, organisational trust) [51,52], objects, devices or technology (technology trust) [53–56].

A new promising research area includes the definition of trust in a 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 [57]. The attempts to develop a definition of trust in service were usually based on two approaches, i.e., performance-related (reflecting competence, customisation, reliability, and promptness) and personality-related (emphasising empathy, politeness, and similarity) [58].

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 [59]. 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 [58].

Trust was an object of scientific interest in relation to such services as life insurance [60], education [57], e-commerce [32,61], social media [62], technology consulting [63], the Internet of Things (IoT) [64], m-payment [65], healthcare [66], mobile money [67], online services [47,68,69], and the use of blockchain [70].

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 [71]. 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 [23].

A different approach to defining trust in service was adopted by Ben-Gal et al. [57]. Referring to the model by Dietz & Den Hartog's [72], the authors treated trust as actions (actionable trust) resulting from previous beliefs and decisions [57]. 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 [57].

The development of e-services affects the importance of other factors [73]. 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 provider (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—the greater acceptance of the business-to-customer (B2C) electronic commerce [74].

Chaparro-Peláez et al. analysed trust in e-commerce services in the context of consumer willingness to accept the weaknesses and failures related to the provision of services and their expectations for the improvement and elimination of these failures [61].

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 [67].

Mcknight et al. investigated initial trust, i.e., trust in an unfamiliar web vendor, and developing and testing a trust building model (TBM) [74]. 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 [74].

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 [75,76].

Despite the unquestionable importance of trust, the construct is conceptualised and measured very differently [59]. An overview of the definitions of trust in service and measurement scales is given in Table 1.

**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 [58] | Service provider:<br>• is trustworthy,<br>• keeps my dealings with them confidential;<br>• is honest;<br>• has a great deal of integrity;<br>• has high standards of work;<br>• has principles. | 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) [77] | Sellers:<br>• are honest;<br>• care about buyers;<br>• are trustworthy;<br>• provide good services. | Online auctions |
| Trust is defined from two perspectives: trust in a mobile service provider and trust in technology facilitated by the mobile service provider [69,78] | I trust mobile payment systems as they are:<br>• reliable;<br>• secure;<br>• trustworthy.<br>I trust that mobile payment systems do the job correctly, even if they are not monitored.<br>I trust mobile payment systems. | Mobile payments |
| Authors distinguished two categories of trust: economy-based trust and service provider trust [67] | I trust that mobile money service providers will:<br>• safeguard my personal information;<br>• safeguard my money;<br>• not run away with my money.<br>Using mobile money services:<br>• saves time:<br>• saves cost:<br>• is economical. | Mobile money service |

**Table 1.** *Cont.*

| Trust in Service Definition | Trust Measurement Scale | Service Sector |
| --- | --- | --- |
| Trust in an online vendor as beliefs which include integrity, benevolence, ability, and predictability [63,79] | The online vendor:<br>• is honest;<br>• cares about customers;<br>• is not opportunistic;<br>• provides good services;<br>• is predictable;<br>• is trustworthy;<br>• knows its market. | Online shopping |
| Three factors are proposed for building consumer trust in the vendor: structural assurance (i.e., consumer perceptions of the safety of the web environment), the perceived web vendor reputation, and the perceived website quality [74] | The structural assurance of the web:<br>• The Internet has enough safeguards to make me feel comfortable using it to transact personal business;<br>• Legal and technological structures adequately protect me from problems on the Internet;<br>• I feel confident that encryption and other technological advances on the Internet make it safe for me to do business;<br>• In general, the Internet is now a robust and safe environment for business.<br>Vendor reputation:<br>• well respected by profession;<br>• a reputable firm.<br>Web site quality:<br>• the site worked very well technically;<br>• it resembled other sites I think highly of;<br>• it was simple to navigate;<br>• it was easy to find the information I wanted;<br>• it clearly showed how I could contact or communicate with an advisor. | Legal advice services |

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, keeping 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 [69]. In many areas, relationships between customers and service providers are continuously replaced with various self-service technologies (e.g., in the banking industry) [80].

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 on online transactions should also focus on two dimensions of trust: trust in transaction partners and trust in infrastructure (technology) [81,82]. When it comes to using services based on ICTs in virtual environments, there are always two important players: the service provider and the technology, on which the service was based [78]. 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 [83]. According to Williams et al., trust in technology is a crucial determinant for the uptake of m-payment service by customers [65]. Trust in the government and the Internet were also the main factors contributing to citizen trust in e-government [84].

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 do not only provide more convenience for consumers and business clients, but also offer more personalization options for online

ordering, tracking, and payments [85]. 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 a 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 [86,87]. 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 [88–90]. 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 [91]. 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 [85,92].

Summing up, the rapid development of digitalization and modern technologies have already been 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 the e-commerce branch requires a special research approach to customer trust in modern technologies and multicriterial approach [93]. 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

### *3.1. 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 they will be 'free' from physical and mental effort [94].

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 [95]. Other authors also added a new construct, such as trust, into the traditional technology acceptance model [96,97]. 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 [95,98–100].

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 [101]. Similar results were obtained by Klein, who focused on online communication systems between a doctor and a patient [102].

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 [78]. 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, this reflects the usefulness of the proposed solutions based on the example of online advisory services [74]. 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 the indications of how to contact or communicate with the service provider. Considering the above, the authors formulated the following two hypotheses:

**Hypothesis 1 (H1).** *The ease of use of courier services has a strong and positive influence on trust in courier services.*

**Hypothesis 2 (H2).** *The usefulness of courier services has a strong and positive influence on trust in courier services.*

### *3.2. Trust and Perceived 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 the 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 [63]. The authors proved that system quality, which demonstrated the professionalism and trustworthiness of the financial service, promoted customer trust in the service. The authors provided evidence that customers perceived quality was positively associated with their trust. Similarly, Qureshi et al. proved that trust in the service provider was strongly dependent on the quality of the website offering e-commerce services [103]. Research conducted by McKnight et al. confirmed that site quality was a strong predictor of trust in the vendor [74].

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 [104]. 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 [105]. 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 [106]. Colesca empirically verified the hypothesis that perceived quality positively influenced the trust in e-government services [107]. 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:

**Hypothesis 3 (H3).** *The trust in courier services has a strong and positive influence on perceived courier service quality.*

### *3.3. 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 [108]. 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 [74]. Qureshi et al. observed both direct and indirect relationships between perceived website quality and repurchase intention [103]. Therefore, in this study, the authors proposed the following hypothesis:

**Hypothesis 4 (H4).** *Perceived courier service quality has a strong and positive influence on the future intention to use courier service.*

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

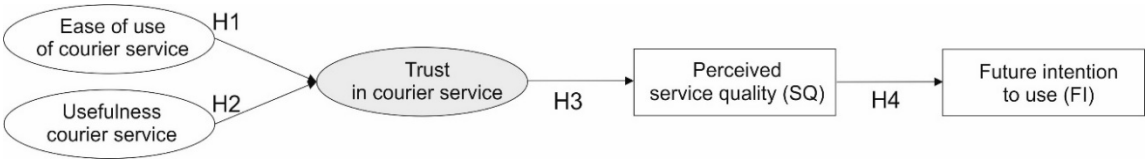



**Figure 1.** Theoretical model.

## 4. Research Methods and Measurement

### *4.1. Data*

This 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.

Five hundred and seventy-seven (53.8%) of respondents were women, and 496 (46.2%) were men. Among the respondents, 32.4% 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%).

### *4.2. 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).

**Table 2.** Constructs and items.

| Constructs | Ident. | Items | Mean | Cronbach's Alpha |
|---|---|---|---|---|
| The usefulness of courier services [109–112] | 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 [94,109,111,113–115] | 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 [23,107,115,116] | 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 | |
| Perceived 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 [78,111,112,115,116] | FI | I intend to use courier services more often. | 4.81 | n.a. |

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 Figure 2. GLS is a tool for estimating latent variables in a linear regression model.

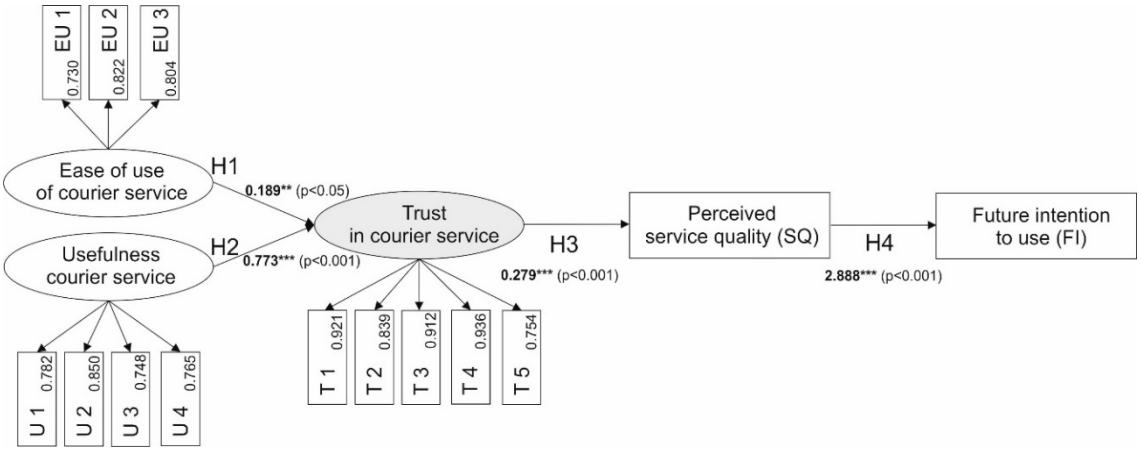



**Figure 2.** Measurement model.

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 [117–120].

**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; *** $p < 0.001$; ** $p < 0.05$; Hoelter—272. Adopted level of the statistical significance was 0.001.

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 the courier service than the ease of use (EU). In the light of the obtained results, trust in the 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 were 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 [101] and Klein [102] 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 [95]. The perceived trust, among other factors, was identified by Hampshire as a key predictor of the perceived usefulness of mobile payment systems [121]. 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 the 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 in other studies [26,122]. 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 [39].

## 6. Conclusions

As consumers all over the world faced pandemic-related constraints, Internet users turned to the more frequent use of online shopping and courier services to order even essential goods. 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 digitalisation of logistics processes with the help of modern technologies, such as the Internet of Things and Big Data Analysis. In addition, the provision of logistics services will be more frequently supported by robotics, automation and self-learning systems especially in the context of smart cities development [123]. Therefore, the success of courier services will depend on the acceptance of new technological solutions by their users.

The main contribution to the management theory is the model presenting the relationship between trust in courier service, perceived service quality and future intentions to use the courier service. 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 services 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.

As far as the contribution to methodology is concerned, the authors elaborated the scale to measure the usefulness, ease of use and customer trust in the context of courier service.

The research results contribute to managerial practice in the field of courier services. The results obtained concerning the relationship between customer trust and perceived service quality can be

used as a source of information to co-create sustainable services. As customer loyalty becomes a key challenge, courier service providers and customers should engage in practice-sharing in relation to the acceptance of modern technologies to enhance the benefits of technology trust.

The research results and interpretation may also be considered by policy makers to correct the reliability of market legislation for addressing both customer concerns and competitive behaviour of players. The analysis of actual customer propensity to repeat the purchase of courier service and service provider reactions can be used to inform policy makers to adjust technology legislation aiming to support the growth of the courier market.

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 perceived service quality. Another limitation is related to the sample, which only involved Polish respondents, making the conducted research national.

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. In the context of the growing potential of machine learning in e-commerce, especially during the pandemic caused by a coronavirus, further research would consider the identification of relevant trust measurement to strengthen customer loyalty. The degree of the technological maturity of courier services and the readiness of consumers to accept them will determine the future development of the sector.

**Author Contributions:** The authors equally contributed to the elaboration of this study. Both authors have read and agreed to the published version of the manuscript.

**Funding:** The study was a part of the Research Project No. 2017/25/N/HS4/02051, titled Relational model of quality shaping system of courier services in e-commerce funded by the National Science Centre, Poland.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Statistics Portal, Digital Market Outlook. Available online: https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/ (accessed on 24 February 2020).
2. Development of Cross-Border E-Commerce through Parcel Delivery. 2019. Available online: https://www.wik.org/fileadmin/Studien/2019/ET0219218ENN_ParcelsStudy_Final.pdf (accessed on 30 April 2020).
3. Gawryluk, M. Rozwój Rynku Przesyłek Kurierskich, Ekspresowych i Paczkowych (KEP) w Polsce od 2014 r. do 2023 r. Available online: https://media.poczta-polska.pl/pr/465205/poczta-polska-w-2023-roku-rynek-kep-bedzie-mial-wartosc-12-mld-zl (accessed on 12 May 2020).
4. Gulc, A. Courier service quality in the light of scientific publications. In *Economic and Social Development (Book of Proceedings), Proceedings of the 23rd International Scientific Conference on Economic and Social Development (ESD), Madrid, Spain, 15–16 September 2017*; Cingula, M., Przygoda, M., Detelj, K., Eds.; Varazdin Development and Entrepreneurship Agency: Varazdin, Croatia, 2017; pp. 556–565.
5. Micu, A.; Aivaz, K.; Capatina, A. Implications of logistic service quality on the satisfaction level and retention rate of an e-commerce retailer's customers. *Econ. Comput. Econ. Cyb.* **2013**, *47*, 147–155.
6. Jarocka, M. The Issue of Logistics Services in the International Scientific Literature. In Proceedings of the 8th Carpathian Logistics Congress on Logistics, Distribution, Transport and Management (CLC), Prague, Czech Republic, 3–5 December 2018; pp. 508–513.
7. Yee, H.L.; Daud, D. Measuring Customer Satisfaction in the Parcel Service Delivery: A Pilot Study in Malaysia. *Bus. Econ. Res.* **2011**, *1*, 1–10. [CrossRef]
8. Jun, M.; Yang, Z.; Kim, D. Customers' perceptions of online retailing service quality and their satisfaction. *Int. J. Qual. Reliab. Manag.* **2004**, *21*, 817–840. [CrossRef]
9. E-Commerce w Polsce. 2018. Available online: https://eizba.pl/wpcontent/uploads/2019/07/raport_GEMIUS_2019-1.pdf (accessed on 10 May 2020).

10. Choi, Y.; Mai, D. The sustainable role of the e-trust in the B2C e-commerce of Vietnam. *Sustainability* **2018**, *10*, 291. [CrossRef]
11. Choi, D.; Chung, C.Y.; Young, J. Sustainable Online Shopping Logistics for Customer Satisfaction and Repeat Purchasing Behavior: Evidence from China. *Sustainability* **2019**, *11*, 5626. [CrossRef]
12. Baldassarre, B.; Calabretta, G.; Bocken, N.; Jaskiewicz, T. Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design. *J. Clean Prod.* **2017**, *147*, 175–186. [CrossRef]
13. Hartono, M. The modified Kansei Engineering-based application for sustainable service design. *Int. J. Ind. Ergon.* **2020**, *79*, 102985. [CrossRef]
14. Hartono, M.; Santoso, A.; Prayogo, D.N. How Kansei Engineering, Kano and QFD can improve logistics services. *Int. J. Technol.* **2017**, *8*, 1070–1081. [CrossRef]
15. Carrillat, F.A.; Jaramillo, F.; Mulki, J.P. The validity of the SERVQUAL and SERVPERF scales: A metanalytic view of 17 years of research across five continents. *Int. J. Serv. Ind. Manag.* **2007**, *18*, 472–490. [CrossRef]
16. Grönroos, C. *Strategic Management and Marketing in the Service Sector*; Marketing Science Institute: Cambridge, UK, 1982.
17. Lehtinen, U.; Lehtinen, J.R. A Study of Quality Dimensions. *Serv. Manag. Inst.* **1982**, *5*, 25–32.
18. Lewis, R.C.; Booms, B.H. The marketing aspect of service quality. In *Emerging Perspective on Service Marketing*; Berry, L., Shostack, G., Upah, G., Eds.; American Marketing Association: Chicago, IL, USA, 1983; pp. 99–107.
19. Saura, I.G.; Frances, D.S.; Contri, G.B.; Blasco, M.F. Logistics service quality: A new way to loyalty. *Ind. Manag. Data Syst.* **2008**, *108*, 650–668. [CrossRef]
20. Sharma, A.G.; Grewal, D.; Levy, M. The Customer Satisfaction/Logistics Interface. *J. Bus Log.* **1995**, *16*, 1–21.
21. Parasuraman, A.; Zeithaml, V.A.; Berry, L.L. A Conceptual Model of Service Quality and Its Implications for Future Research. *J. Mark* **1985**, *49*, 41–50. [CrossRef]
22. Parasuraman, A.; Zeithaml, V.A.; Berry, L.L. SERVQUAL: A Multiple-item Scale for Measuring Consumer Perceptions of Service Quality. *J. Retail* **1988**, *64*, 12–40.
23. Sekhon, H.; Roy, S.; Shergill, G.; Pritchard, A. Modelling trust in service relationships: A transnational perspective. *J. Serv. Mark* **2013**, *27*, 76–86. [CrossRef]
24. Park, J.; Lee, H.; Kim, C. Corporate social responsibilities, consumer trust and corporate reputation: South Korean consumers' perspectives. *J. Bus. Res.* **2014**, *67*, 295–302. [CrossRef]
25. Marzec, M. Wymiary zaufania w procesie świadczenia usług. *Zeszyty Naukowe Uniwersytetu Szczecińskiego* **2012**, *95*, 37–50.
26. Song, H.; Ruan, W.; Park, Y. Effects of Service Quality, Corporate Image, and Customer Trust on the Corporate Reputation of Airlines. *Sustainability* **2019**, *11*, 3302. [CrossRef]
27. Aydin, S.; Ozer, G. The Analysis of Antecedents of Customer Loyalty in the Turkish Mobile Telecommunications Market. *Eur. J. Mark* **2005**, *39*, 910–925. [CrossRef]
28. Gulc, A. Courier service quality from the clients' perspective. *Eng. Manag. Prod. Serv.* **2017**, *9*, 36–45. [CrossRef]
29. Chow, S.; Holden, R. Toward an understanding of loyalty: The moderating role of trust. *J. Manag. Issues* **1997**, *9*, 275–298.
30. Kim, E.B.; Eom, S.B. Designing effective cyber store user interface. *Ind. Manag. Data Syst.* **2002**, *102*, 241–251. [CrossRef]
31. Madu, C.N.; Madu, A.A. Dimensions of e-quality. *Int. J. Qual. Reliab. Manag.* **2002**, *19*, 246–258. [CrossRef]
32. Lin, C.C.; Ying, H.Y. Chang YF The critical factors impact on online customer satisfaction. *Procedia Comput. Sci.* **2011**, *3*, 276–281. [CrossRef]
33. Zeithaml, V.A. Service excellence in electronic channels. *Manag. Serv. Qual.* **2002**, *12*, 135–139. [CrossRef]
34. Yoo, B.; Donthu, N. Developing a scale to measure the perceived quality of an Internet shopping site (SITEQUAL). *Q. J. Electron. Commer.* **2001**, *2*, 31–46. [CrossRef]
35. Sohn, C.S. *Customer Evaluation of Internet-Based Service Quality and Intention to Re-Use Internet-Based Services*; Southern Illinois University: Carbondale, IL, USA, 2000.
36. Chang, M.K.; Cheung, W.; Tang, M. Building trust online: Interactions among trust building mechanisms. *Inf. Manag.* **2013**, *50*, 439–445. [CrossRef]
37. Zavareh, F.B.; Md Ariffa, M.S.; Jusoha, A.; Zakuana, N.; Bahari, A.Z.; Ashourian, M. E-Service Quality Dimensions and Their Effects on ECustomer Satisfaction in Internet Banking Services. *Procedia Soc. Behav. Sci.* **2012**, *40*, 441–445. [CrossRef]

38. Rita, P.; Oliveira, T.; Farisa, A. The impact of e-service quality and customer satisfaction on customer behavior in online shopping. *Heliyon* **2019**, *5*, e02690. [CrossRef] [PubMed]
39. Saleem, M.A.; Zahra, S.; Yaseen, A. Impact of service quality and trust on repurchase intentions—The case of Pakistan airline industry. *Asia Pac. J. Mark. Logist.* **2017**, *29*, 1136–1159. [CrossRef]
40. Aren, S.; Güzelb, M.; Kabadayi, E.; Albkan, L. Factors Affecting Repurchase Intention to Shop at the Same Website. *Procedia Soc. Behav. Sci.* **2013**, *99*, 536–544. [CrossRef]
41. Punuindoong, D.H.F.; Syah, T.Y.R. Affecting Factors over Repurchase Shop Intention at E-Commerce Industry. *Sci. Eng. Soc. Sci.* **2020**, *4*, 77–81.
42. Gulc, A. Determinants of Courier Service Quality in e-Commerce from Customers' Perspective. *Qual. Innov. Prosper.* **2020**, *24*, 137–152. [CrossRef]
43. Ho, J.S.Y.; Teik, D.O.L.; Tiffany, F.; Kok, L.F.; Teh, T.Y. Logistic Service Quality among Courier Services in Malaysia. *Int. Proc. Econ. Dev. Res.* **2012**, *38*, 113–117.
44. Rotter, J.B. A news scale for the measurement of interpersonal trust. *J. Pers.* **1967**, *35*, 561–665. [CrossRef]
45. Rousseau, D.M.; Sitkin, S.B.; Burt, R.S.; Camerer, C. Not so different after all: A cross-discipline view of trust. *Acad. Manag. Rev.* **1998**, *23*, 393–404. [CrossRef]
46. Möllering, G. The nature of trust: From Georg Simmel to a theory of expectation, interpretation and suspension. *Sociology* **2001**, *35*, 403–420. [CrossRef]
47. Mayer, R.C.; Gavin, M.B. Trust in management and performance: Who minds the shop while the employees watch the boss? *Acad. Manag. J.* **2005**, *48*, 874–888. [CrossRef]
48. Schoorman, F.D.; Ballinger, G.A. Leadership, trust and client service in veterinary hospitals. In *Working Paper*; Purdue University: West Lafayett, Indiana, 2006.
49. Song, J.H.; Kim, H.M.; Kolb, J.A. The Effect of Learning Organization Culture on the Relationship between Interpersonal Trust and Organizational Commitment. *Hum. Resour. Dev. Q.* **2009**, *20*, 147–167. [CrossRef]
50. Zand, D.E. Reflections on trust and trust research: Then and now. *J. Trust Res.* **2016**, *6*, 63–73. [CrossRef]
51. Baek, Y.M.; Jung, C.S. Focusing the mediating role of institutional trust: How does interpersonal trust promote organizational commitment? *Soc. Sci. J.* **2015**, *52*, 481–489. [CrossRef]
52. Wicks, A.C.; Berman, S.L. The effects of context on trust in firm-stakeholder relationships: The institutional environment, trust creation, and firm performance. *Bus. Ethics Q.* **2004**, *14*, 141–160. [CrossRef]
53. Lankton, N.K.; McKnight, D.H.; Thatcher, J.B. Incorporating trust-in-technology into Expectation Disconfirmation Theory. *J. Strateg. Inf. Syst.* **2014**, *23*, 128–145. [CrossRef]
54. Lippert, S.K. An Exploratory Study into The Relevance of Trust in the Context of Information Systems Technology. Ph.D. Thesis, The George Washington University, Washington, DC, USA, 2001.
55. Mariani, M.G.; Curcuruto, M.; Zavalloni, M. Online Recruitment: The role of trust in technology. *Psicol. Soc.* **2016**, *11*, 199–209. [CrossRef]
56. Xu, J.; Le, K.; Deitermann, A.; Montague, E. How different types of users develop trust in technology: A qualitative analysis of the antecedents of active and passive user trust in a shared technology. *Appl. Ergon.* **2014**, *45*, 1495–1503. [CrossRef] [PubMed]
57. Ben-Gal, H.C.; Tzafrir, S.S.; Dolan, S.L. Actionable trust in service organizations: A multi-dimensional perspective. *J. Work Organ. Psychol.* **2015**, *31*, 31–39. [CrossRef]
58. Coulter, K.S.; Coulter, R.A. The effects of industry knowledge on the development of trust in service relationships. *Int. J. Res. Mark.* **2003**, *20*, 31–43. [CrossRef]
59. Kantsperger, R.; Kunz, W.H. Consumer trust in service companies: A multiple mediating analysis. *Manag. Serv. Qual.* **2010**, *20*, 4–25. [CrossRef]
60. Agyei, Z.; Sun, S.; Abrokwah, E.; Kofi Penney, E.; Ofori-Boafo, R. Influence of Trust on Customer Engagement: Empirical Evidence from the Insurance Industry in Ghana. *SAGE Open* **2020**, *10*, 1–18. [CrossRef]
61. Chaparro-Peláez, J.; Hernández-García, A.; Urueña-López, A. The Role of Emotions and Trust in Service Recovery in Business-to-Consumer Electronic Commerce. *J. Theor. Appl. Electron. Commer. Res.* **2015**, *10*, 77–90. [CrossRef]
62. Khan, S.; Zairah, A.; Rahim, N.; Maarop, N. A systematic literature review and a proposed model on antecedents of trust to use social media for e-government services. *Int. J. Adv. Appl. Sci.* **2020**, *7*, 44–56. [CrossRef]
63. Wang, Z.; Guan, Z.; Hou, F.; Li, B.; Zhou, W. What determines customers' continuance intention of FinTech? Evidence from YuEbao. *Ind. Manag. Data Syst.* **2019**, *119*, 1625–1637. [CrossRef]

64. Lee, M. An Empirical Study of Home IoT Services in South Korea: The Moderating Effect of the Usage Experience. *Int. J. Hum.-Comput. Interact.* **2019**, *35*, 535–547. [CrossRef]
65. Williams, D.M.; Roderick, S.; Davies, G.H.; Clement, M. Risk, trust, and compatibility as antecedents of mobile payment adoption. In Proceedings of the Adoption and Diffusion of Information Technology, Twenty-third Americas Conference on Information Systems, Boston, MA, USA, 10–12 August 2017; Volume 34, pp. 1–10.
66. Gonzalez, M.E. Improving customer satisfaction of a healthcare facility: Reading the customers' needs. *Benchmark. Int. J.* **2019**, *26*, 854–870. [CrossRef]
67. Abdul-Hamid, I.K.; Shaikh, A.A.; Boateng, H.; Hinson, R.E. Customers' Perceived Risk and Trust in Using Mobile Money Services: An Empirical Study of Ghana. *Int. J. E-Bus. Res.* **2019**, *15*, 1–19. [CrossRef]
68. Alzahrani, L.; Al-Karaghouli, W.; Weerakkody, V. Analysing the critical factors influencing trust in E-government adoption from citizens' perspective: A systematic review and a conceptual framework. *Int. Bus. Rev.* **2017**, *26*, 164–175. [CrossRef]
69. Park, J.; Amendah, E.; Lee, Y.; Hyun, H. M-payment service: Interplay of perceived risk, benefit, and trust in service adoption. *Hum. Factor. Ergon. Man Serv. Ind.* **2019**, *29*, 31–43. [CrossRef]
70. Hofbauer, G.; Sangl, A. Blockchain Technology and Application Possibilities in the Digital Transformation of Transaction Processes. *Forum Sci. Oeconomia* **2019**, *7*, 25–40. [CrossRef]
71. Johnson, D.; Grayson, K. Cognitive and affective trust in service relationships. *J. Bus. Res.* **2005**, *58*, 500–507. [CrossRef]
72. Dietz, G.; Den Hartog, D.N. Measuring trust inside organizations. *Pers. Rev.* **2006**, *35*, 557–588. [CrossRef]
73. Węgrzyn, G. The Service Sector of a Knowledge-based Economy—A Comparative Study. *Oeconomia Copernic.* **2013**, *4*, 53–64. [CrossRef]
74. Mcknight, D.H.; Choudhury, V.; Kacmar, C. The Impact of Initial Consumer Trust on Intentions To Transact With A Web Site: A Trust Building Model. *J. Strateg. Inform. Syst.* **2002**, *11*, 297–323. [CrossRef]
75. Ahmed, R.R.; Romeika, G.; Kauliene, R.; Streimikis, J.; Dapkus, R. ES-QUAL model and customer satisfaction in online banking: Evidence from multivariate analysis techniques. *Oeconomia Copernic.* **2020**, *11*, 59–93. [CrossRef]
76. Carter, L.; Weerakkody, V. E-government adoption: A cultural comparison. *Inform. Syst. Front.* **2008**, *10*, 473–482. [CrossRef]
77. Chiu, C.M.; Huang, H.Y.; Yen, C.H. Antecedents of trust in online auctions. *Electron. Commer. Res. Appl.* **2010**, *9*, 148–159. [CrossRef]
78. Chandra, S.; Srivastava, S.C.; Theng, Y.L. Evaluating the role of trust in consumer adoption of mobile payment systems: An empirical analysis. *Commun. Assoc. Inf. Syst.* **2010**, *27*, 561–588. [CrossRef]
79. Gefen, D.; Karahanna, E.; Straub, D.W. Trust and TAM in online shopping: An integrated model. *MIS Q.* **2003**, *27*, 51–90. [CrossRef]
80. Meuter, M.; Ostrom, A.L.; Roundtree, R.I.; Bitner, M.J. Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *J. Market.* **2000**, *64*, 50–64. [CrossRef]
81. Ratnasingham, P. The Importance of Trust in Electronic Commerce. *Internet Res. Electron. Netw. Appl. Policy* **1998**, *8*, 313–321. [CrossRef]
82. Teo, T.S.H.; Srivastava, S.C.; Jiang, L. Trust and Electronic Government Success: An Empirical Study. *J. Manag. Inform. Syst.* **2008**, *25*, 99–131. [CrossRef]
83. Ratnasingham, P. Trust in web-based electronic commerce security. *Inform. Manag. Comp. Sec.* **1998**, 162–166. [CrossRef]
84. Wang, T.; Lu, Y. Determinants of trust in e-government. In Proceedings of the 2010 International Conference on Computational Intelligence and Software Engineering, Wuhan, China, 10–12 December 2010. [CrossRef]
85. Five Forces Transforming Transport & Logistics, Trend Book. Available online: https://www.pwc.pl/pl/pdf/publikacje/2018/transport-logistics-trendbook-2019-en.pdf (accessed on 11 May 2020).
86. Mangiaracina, R.; Perego, A.; Seghezzi, A.; Tumino, A. Innovative solutions to increase last-mile delivery efficiency in B2C e-commerce: A literature review. *Int. J. Phys. Distrib. Logist. Manag.* **2019**, *49*, 901–920. [CrossRef]
87. Slabinac, M. Innovative solutions for a last-mile delivery. In Proceedings of the 15th International Scientific Conference Business Logistics in Modern Management, Osijek, Craotia, 15 October 2015.
88. Xu, M.; Ferrand, B.; Roberts, M. The last mile of e-commerce: Unattended delivery from the consumers and eTailers' perspectives. *Int. J. Electron. Market. Retail.* **2008**, *2*, 20–38. [CrossRef]

89. Zenezini, G.; Lagorio, A.; Pinto, R.; DeMarco, A.; Golini, R. The Collection-And-Delivery Points Implementation Process from the Courier, Express and Parcel Operator's Perspective. *IFAC-Pap. Online* **2018**, *51*, 594–599. [CrossRef]
90. Chen, Y.; Yu, J.; Yang, S.; Wei, J. Consumer's intention to use self-service parcel delivery service in online retailing: An empirical study. *Internet Res.* **2018**, *28*, 500–519. [CrossRef]
91. Nazarko, J.; Ejdys, J.; Halicka, K.; Nazarko, L.; Kononiuk, A.; Olszewska, A. Structural Analysis as an Instrument for Identification of Critical Drivers of Technology Development. *Procedia Eng.* **2017**, 474–481. [CrossRef]
92. Logistics Trend Radar. Delivering Insight Today. Creating Value Tomorrow. Available online: https://www.logistics.dhl/content/dam/dhl/global/core/documents/pdf/glo-core-trend-radarwidescreen.pdf (accessed on 23 April 2020).
93. Mardani, A.; Jusoh, A.; Halicka, K.; Ejdys, J.; Magruk, A.; Ahmad, U.N.U. Determining the utility in management by using multi-criteria decision support tools: A review. *Econ. Res.-Ekon. Istraž.* **2018**, *31*, 1666–1716. [CrossRef]
94. Davis, F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Q.* **1989**, *13*, 319–340. [CrossRef]
95. Belanche, D.; Casaló, L.V.; Flavián, C. Integrating trust and personal values into the Technology Acceptance Model: The case of e-government services adoption. *Cuad. Econ. Dir. Empresa* **2012**, *15*, 192–204. [CrossRef]
96. Jamshidi, D.; Hussin, N. Forecasting patronage factors of Islamic credit card as a new e-commerce banking service: An integration of TAM with perceived religiosity and trust. *J. Islam Mark.* **2016**, *7*, 378–404. [CrossRef]
97. Alalwan, A.A.; Baabdullah, A.M.; Rana, N.P.; Tamilmani, K.; Dwivedi, Y.K. Examining adoption of mobile internet in Saudi Arabia: Extending TAM with perceived enjoyment, innovativeness and trust. *Technol. Soc.* **2018**, *55*, 100–110. [CrossRef]
98. Ramos, F.L.; Ferreira, J.B.; Freitas, A.S.D.; Rodrigues, J.W. The effect of trust in the intention to use m-banking. *Braz. Bus. Rev.* **2018**, *15*, 175–191. [CrossRef]
99. Ayyash, M.M.; Ahmad, K.; Singh, D. Investigating the effect of information systems factors on trust in E-government initiative adoption in Palestinian public sector. *Res. J. Appl. Sci. Eng. Technol.* **2013**, *5*, 3865–3875. [CrossRef]
100. Alsaghier, H.M.; Hussain, R. Conceptualization of trust in the e-government context: A qualitative analysis. In *Active Citizen Participation in E-Government: A Global Perspective*; Manoharan, A., Ed.; IGI Global: Hershey, PA, USA, 2012; pp. 528–557. [CrossRef]
101. Pavlou, P.A.; Gefen, D. Building effective online marketplaces with institution-based trust. *Inf. Syst. Res.* **2004**, *15*, 37–59. [CrossRef]
102. Klein, R. Internet based patient physician electronic communication applications: Patient acceptance and trust. *E-Serv. J.* **2007**, *5*, 27–51. [CrossRef]
103. Qureshi, I.; Fang, Y.; Ramesy, E.; Mccole, P.; Ibboston, P.; Compeau, D. Understanding online customer repurchasing intention and the mediating role of trust: An empirical investigation in two developed countries. *Eur. J. Inform. Syst.* **2009**, *18*, 205–222. [CrossRef]
104. Fung, R.K.K.; Lee, M.K.O. EC-trust (trust in electronic commerce): Exploring the antecedent factors. In Proceedings of the Fifth Americas Conference on Information Systems, Milwaukee, WI, USA, 13–15 August 1999; Haseman, W.D., Nazareth, D.L., Eds.; Omnipress: Madison, WI, USA, 1999; pp. 517–519.
105. Hsu, M.H.; Chang, C.M.; Chu, K.K.; Lee, Y.J. Determinants of repurchase intention in online group-buying: The perspectives of DeLone & McLean IS success model and trust. *Comput. Hum. Behav.* **2014**, *36*, 234–245. [CrossRef]
106. Weerakkody, V.; Irani, Z.; Lee, H.; Hindi, N.; Osman, I. Are UK citizens satisfied with e-government services? Identifying and testing antecedents of satisfaction. *Inf. Syst. Manag.* **2016**, *33*, 331–343. [CrossRef]
107. Colesca, S.E. Understanding trust in e-government. *Eng. Ecol.* **2009**, *63*, 7–15.
108. Delone, W.H.; McLean, E.R. Information systems success: The quest for the dependent variable. *Inf. Syst. Res.* **1992**, *3*, 60–95. [CrossRef]
109. Chuttur, M. Overview of the Technology Acceptance Model: Origins, Developments and Future Directions. *Work. Pap. Inform. Syst.* **2009**, *9*, 3–37.
110. Venkatesh, V.; Morris, M.G.; Davis, G.B.; Davis, F.D. User acceptance of information technology: Toward a unified view. *MIS Q.* **2003**, *27*, 425–478. [CrossRef]

111. Venkatesh, V.; Thong, J.Y.; Xu, X. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Q.* **2012**, *36*, 157–178. [CrossRef]
112. Kurfal, M.; Arifoglu, A.; Tokdemir, G.; Paçin, Y. Adoption of e-government services in Turkey. *Comput. Hum. Behav.* **2017**, *66*, 168–178. [CrossRef]
113. Davis, F.D. A technology Acceptance Model for Empirically Testing New and-User Information Systems: Theory and Results. Ph.D. Thesis, MIT Sloan School of Management, Cambridge, MA, USA, 1985. Unpublished.
114. Lee, C.B.P.; Wan, G. Including Subjective Norm and Technology Trust in the Technology Acceptance Model: A Case of E-Ticketing in China. *Data Base Adv. Inf. Syst.* **2010**, *41*, 40–51. [CrossRef]
115. Al-Hujran, O.; Al-Debei, M.M.; Chatfield, A.; Migdadi, M. The imperative of influencing citizen attitude toward e-government adoption and use. *Comput. Hum. Behav.* **2015**, *53*, 189–203. [CrossRef]
116. Lippert, S.K. Investigating Postadoption Utilization: An Examination into the Role of Interorganizational and Technology Trust. *IEEE Trans. Eng. Manag.* **2007**, *53*, 468–483. [CrossRef]
117. Bélanger, F.; Carter, L. Trust and risk in e-government adoption. *J. Strateg. Inform. Syst.* **2008**, *17*, 165–176. [CrossRef]
118. Bentler, P.M.; Chou, C.-P. Practical Issues in Structural Modeling. *Sociol. Methods Res.* **1987**, *16*, 78–117. [CrossRef]
119. Bollen, K.A. *Structural Equations with Latent Variables*, 1st ed.; John Wiley and Sons: New York, NY, USA, 1989.
120. Konarski, R. *Modele Równań Strukturalnych*, 1st ed.; Wydawnictwo Naukowe PWN: Warszawa, Poland, 2010.
121. Hampshire, C. A mixed methods empirical exploration of UK consumer perceptions of trust, risk and usefulness of mobile payments. *Int. J. Bank Market.* **2017**, *35*, 354–369. [CrossRef]
122. Simarmata, J.; Keke, Y.; Silalahi, S.A.; Benková, E. How to establish customer trust and retention in a highly competitive airline business. *Polish J. Manag. Stud.* **2017**, *16*, 202–214. [CrossRef]
123. Szpilko, D. Foresight as a tool for the planning and implementation of visions for smart city development. *Energies* **2020**, *13*, 1782. [CrossRef]


**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2020 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).