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Article

E-Service Quality from Attributes to Outcomes: The Similarity and Difference between Digital and Hybrid Services

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Abstract: Our research goal is to offer an e-service quality model based on experience and multidimensional quality and compare its applicability for e-services to find differences and similarities in consumer perceptions and behavioral intentions. Additionally, we seek to compare attributes that compose quality dimensions for hybrid and digital e-services. The study was based on an online survey conducted in July–September 2019 among citizens and foreign residents in the Russian Federation. Respondents had to answer questions concerning a specific e-service brand to capture real consumer behavior. The data of 365 questionnaires were analyzed using the Spearman correlation to determine the relationship between the model components. Customer experience is a valid outcome variable in the e-service model that strongly influences customer satisfaction and repurchase intentions. The model proved to be equally valid for hybrid and digital e-services. The key differences between digital and hybrid e-services lie within the distribution of e-service attributes between quality dimensions. Ease of use and perceived usefulness are the most essential attributes that have a direct influence on customer satisfaction. The findings show the necessity of best practices diffused between different types of e-services and present an opportunity to widely spread research findings between different e-service sectors.

Keywords: e-service; e-service quality; customer experience

1. Introduction

The service sector contributes to the key macroeconomic indicators of the world economy development, produces the largest share of global GDP, leads in the total employment rate, and creates sustainable opportunities for equality and social wellbeing. Currently, the growth of the service sector is driven by digital transformation, the growing penetration rate of Internet and mobile technologies, the emergence of new business models, and the increasing attractiveness of the sharing economy [1–4]. It has led to dramatic changes in service production systems [5] and consumer behavior [6] and the emergence and fast development of electronic services. Electronic service is a general term that refers to services rendered through information technologies via the Internet [7–10]. E-services involve a broad range of activities that use the Internet as a distribution channel (e.g., e-tailing, e-banking, e-travel) and newly emerged digital services. There is no commonly agreed definition of digital service, and authors

refer to digital interaction through Internet Protocol [11], digital technologies [12], and digital data, a combination of digital technologies and physical products [13]. In general, digital services include a set of actions to create, search, collect, store, process, provide, and distribute information and products in digital form, performed through the use of information technologies via the Internet upon the request of consumers. To distinguish between different types of services, we propose to use the term “hybrid services” to generalize e-services based on traditional activities when only a limited number of processes is offered online and the service result is delivered offline. Thus, e-services can be divided into two groups—hybrid services and digital services.

The difference in development dynamics between digital and hybrid services can be illustrated with data from the e-services market of the Russian Federation, which, in 2019, accounted for almost 5% of the national GDP, its growth rate being over 280% in comparison to 2015. Hybrid services (e-finance and e-commerce sectors) comprise 88.7% of the total e-service market. The fastest growing sectors are e-tailing, e-banking, and e-travel. Three digital services sectors (marketing and advertising, infrastructure and communication, and media and entertainment) make up only 4.5% of the total e-services market. The e-services market is mostly consumer-oriented, and the B2B e-services share is 2.7% of the market volume [14], although at least 27% of Russian enterprises use cloud services. However, only penetration rate and audience size enable the evaluation of the development of some types of e-services. For example, e-government services in the Russian Federation have the highest penetration rate of 74.8% of the total population aged between 15 and 72 years, which is very close to the penetration rate of the Internet (87.3%) in 2019 [15,16].

The high growth rate and ease of access make it attractive for companies, fuel competition, and raise the importance of research into e-services quality, which is the source of the open innovation practices in the e-service market as it generates the information necessary for corporate and user innovation, customer involvement, and knowledge exchange between internal and external innovations [17].

Since information quality and digital technologies create the customer value of e-services, it is necessary to integrate information management and quality management concepts and tools. Digitalization changes the nature of e-service quality when a complex configuration of traditional and new “digital” service properties is formed. It stimulates multiple research efforts to build an e-service quality model that explains the relationships between e-service attributes and quality, customer satisfaction and consumer behavior, acceptance, and intentions for use. As stated in the World Economic Forum Report, the phenomenon of “digital consumption”, cross-sectoral diffusion of customer expectations, and the concepts of “solution economy” and “experience economy” shift the focus from the consumer properties of services to their ability to generate benefits for the consumer, solve the consumer’s problems, and offer cognitive and emotional experience—not only in the consumer market, but also in B2B interaction [6]. Research into the e-service quality focuses either on the general e-service or on the specific type of e-service, such as e-travel, e-tailing, or the digital platform. No comparison study of e-service quality models for different types of services has been conducted, so the following question remains unanswered—does the general phenomenon of e-service exist, when applied to quality, experience and satisfaction, or are there significant differences between hybrid and digital services? Hybrid services are supported by offline service delivery, clear regulation rules, and robust business models. They appeal to well-established consumer needs and offer both online and offline expertise. Digital services deliver value and experience online, offer inadequate consumer rights protection, and satisfy intangible needs with intangible quality properties. This means that experience perceptions of quality attributes may significantly vary for hybrid and digital services. Comparison between e-service quality models applied to hybrid and digital e-services could prove or disprove the knowledge and best practices flow between providers of different e-services, allowing us to understand if common quality regulations are applicable for all types of e-services.

Our research is targeted at comparing the performance of the general e-service quality model based on the concept of experience-based multidimensional quality for hybrid and digital e-services in order to find differences and similarities in consumer perceptions and behavioral intentions. The main tasks

of this research are to show approaches to e-service quality, adoption, and continuation models through a literature review and choose a model for the study, to choose the dimensions of e-service quality and assign quality attributes to each dimension, and to test the chosen e-service quality model for digital and hybrid e-service quality by a survey among e-service customers located in different regions of the Russian Federation, including Russian citizens and foreigners residing in Russia. The novelty of the survey design is that it allows for assessing real consumer behavior with a specific e-service brand rather than measuring consumer perceptions of abstract e-services in general.

The paper is structured as follows:

Section 2 (Literature Review) provides a brief description of the recent research into technology acceptance models and e-service quality models and substantiates the integrated e-service quality model based on customer experience and multidimensional e-service quality. The section contains the description of e-service quality dimensions and e-service attributes related to each dimension. Finally, the section provides the research hypotheses.

Section 3 (Methodology and Hypothesis Development) provides details about the design and implementation of the survey.

Section 4 (Results) presents the results of the study. It starts with the short statistical test of differences between hybrid and digital e-services based on the Student *t*-test and Fisher test. Further, it contains a detailed analysis of the correlation between the components of the model for e-services in general and specifically for hybrid and digital e-services.

Section 5 (Discussion) focuses on the explanation of the role of customer experience in the integrated e-service model and its relationship with customer satisfaction and e-service quality dimensions. The section contains a discussion of the relationship between e-service attributes and quality dimensions, which brings unexpected findings and highlights the significant differences between hybrid and digital e-services. The section ends with the revisited e-service model that was proposed in the literature review section and improved distribution of attributes between quality dimensions for e-services in general and digital and hybrid e-services in particular.

Section 6 (Conclusions) highlights the key findings of the study and presents some limitations and recommendations for future research as well.

Section 7 (Managerial Implications) and Section 8 (Practical/Social Implications) show the possible usefulness of the study findings for e-service providers when managing e-service quality and general benefits of the study for open innovation practices and quality of life.

Finally, Section 9 describes limitations and future research opportunities.

The major originality of the study is in the attempt to compare the performance of the e-service quality model regarding e-services in general and hybrid and digital e-services based on the design of the conducted survey.

2. Literature Review

Two traditional areas of research (technology acceptance models and service quality models and theories) influence recent advancements in e-service quality modeling. Service quality models conceptualize quality attributes and outcome variables—customer expectations, satisfaction, repurchase intentions, and word of mouth—while technology acceptance models search for quality attributes and other factors that influence customer behavior—decisions to adopt an e-service and to continue using it.

Based on the ideas of diffusion of innovation (DOI) [18], behavioral theories of reasonable actions (TRA), and planned behavior (TPB) [19], technology acceptance models are focused on technology attributes and other factors that affect the user's decision to adopt a technology. Initially, DOI introduced six technology attributes that influence the technology adoption decision: relative advantage, compatibility with the pre-existing system, complexity or difficulty to learn, testability, potential for reinvention, and observed effects [18]. The Task Technology Fit (TTF) model stressed the importance of the technology compliance with the user's tasks to increase the likelihood

of its use [20]. Subsequent theories of the technology acceptance model specified this technology attribute as “perceived usefulness” and complimented it with “perceived ease of use” derived from the DOI model. In [21], ease of use is defined as the ability of a customer to find information or enact a transaction with the least amount of effort. The TAM [22], TAM 2 [23], TAM3 [24], UTAUT [25], and UTAUT [26] models tried to distinguish between technology attributes and the hierarchy of social, personal, technical, environmental, and organizational factors that influence the decision to use the technology. The national cultural characteristics of consumers are the factors which most recently gained attention [27]. The UTAUT2 theory confirmed that the same technology attributes explain the adoption of e-services [26].

Thus, we can conclude that technology acceptance models are able to answer a question that is not traditionally considered in quality management—which e-service attributes are important for the consumer when making a decision about using a service? Such attributes can be called “starting quality”, when the consumer has no experience of using the service and decisions are based only on expectations.

To explain how a consumer makes a decision to continue using information technology or an information system, the following models were offered—the Information Systems Continuance Intention Model (ISCI) and the Information System Success Theory (ISS) rooted in the Expectation-Confirmation Theory (ECT). These theories assume that satisfied users will continue to use the product or service, and dissatisfied users will stop using it [28]. The ISCI model assumes that the user’s intention to continue using the information system depends on three factors: satisfaction, meeting expectations, and perceived usefulness derived from technology acceptance models. The ISS theory goes further and incorporates ideas of service quality, when system quality, information quality, and quality of services influence together the user’s satisfaction and intentions for use, which brings net benefits to a customer [29].

Along with the ISCI and ISS models, numerous e-service acceptance and continuation models have appeared in the last ten years which investigate the relationship between e-service attributes, e-service quality, customer satisfaction, acceptance, and repurchase intentions, although the correlation between them varies in different models. The weak point of such models is that e-service attributes are usually disintegrated and may affect every outcome variable or even be influenced by them. For example, the E-Service Acceptance Model (ETAM) demonstrates a three-step consequence of e-service attribute influence on customer satisfaction and quality, while both of them influence customer intention to use e-services [30]. The ETAM’s significant omission is that quality and satisfaction are concepts of the same level affected by different e-service attributes, like ease of use, learning, content, support, trust, or design. As suggested in [31], perceived usefulness has a statistically significant effect on the intention to use online platform services, and satisfaction has been found to have a positive effect on the ease of use, as it breaks casual relations between service quality and customer satisfaction. New interpretations of technology acceptance models are offered in [32,33], where the decision of adoption is made towards the specific e-service function, like volunteer recruitment for NGO in Twitter [32] or communication of e-Word of Mouth in Tripadvisor [33].

Technology acceptance and continuation models overlook the customer’s active role in e-service creation, although several models include mediating factors like attitude toward internet purchase, which bridges customer satisfaction and internet purchase intention [34].

Contrarily, e-service quality models are based on the shared understanding of the relationship between e-service quality and outcome variables such as customer satisfaction, repurchase intentions, and word of mouth [10,35,36] (Figure 1).



Figure 1. Conceptualization of e-service quality [36].

The means-end chain theory is an important theoretical background for e-service models [37–40] explaining how customers evaluate experiences—from quality attributes to quality dimensions. It means that in order to explain how a customer makes the decision to continue use an e-service (repurchase intention), we should follow the linear relationship presented in Figure 1.

Limitations of technology acceptance and e-service models are rooted in their technological nature and we should apply service-dominant logic [41] as a general concept when explaining e-service customer behavior. E-service is a result of value co-creation by the provider and consumer, and thus e-service should be seen as a specific customer experience that creates e-service quality and generates customer satisfaction and intention to continue using the service. Customer experience in e-services has been studied as a factor of repurchase intentions [42], firm’s competitiveness [43], and word of mouth [44], but not in correlation with customer satisfaction and e-service quality. At the same time, the emergence of customer experience of using e-services could explain the transition between customer decision to accept e-services and customer decision to continue to use e-services. It leads to the concept of “experienced” quality, whereby customer perceptions of quality are based on real experience and thus experience influences repurchase intentions through satisfaction. In our view, the combination of e-service quality and technology acceptance models with the concept of customer experience may offer a better understanding of customer behavior, from the decision to adopt an e-service to the decision to continue using this service, with a mediating role of customer experience, e-service quality, and customer satisfaction. Such a combination is also based on the idea of the service journey [45].

A relevant model was offered by Vatolkina in [46] but we refined it based on the literature review. Firstly, we deleted expected security from the e-service attributes that influence the decision to adopt an e-service because it has not gained sufficient theoretical substantiation. For example, the study of Himanshu Raval and Viral Bhatt, 2020 [47] showed that security and online shopping platform satisfaction have a weak correlation. In [27], we also find that a survey held among Chinese customers showed that perceived privacy surprisingly did not impact the “likelihood to purchase online”. Secondly, based on the literature review [10,21,34–36,48–57], we added the dimension of quality of support (Figure 2) to complement the dimensions of quality of e-service results, quality of e-service process, quality of e-service system, and quality of e-service information. The dimension “quality of support” is aligned with the E-RecS-Qual model [57] and reflects the system of e-service recovery that is not the part of the value created by the e-service but influences both customer perceptions of e-service quality and customer experience.

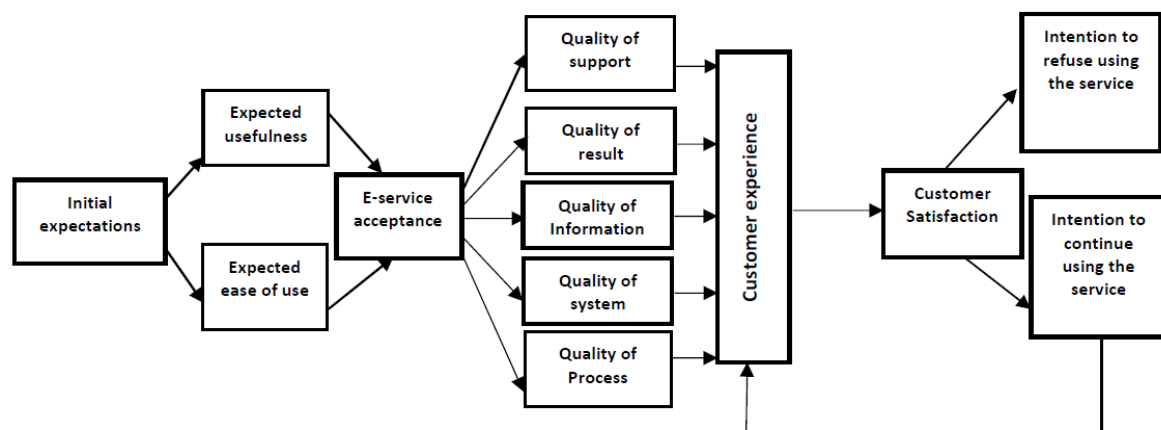


Figure 2. Integrated e-service adoption–continuance quality model.

The integrated e-service adoption–continuance quality model shows that e-service quality influences the consumer experience, which affects consumer satisfaction, leading in turn to the consumer’s intention to continue using the service. Low satisfaction results in a refusal to use the

service in the future. Considering the diversity of e-services, the following question arises: is the model applicable for all types of e-services?

3. Methodology and Hypothesis Development

The literature review revealed that the majority of the e-service quality, e-service acceptance, and continuation models are constructed either for general e-services (like E-S-QUAL) or for specific hybrid e-services (e-tailing, e-library, e-travel) or even for websites (like W-S-QUAL). Just a few studies were conducted for digital e-services like platforms and social media [31,50,51,54]. No comparison between two types of e-services have been conducted to prove that relationships between customer experience, quality, satisfaction, and intention for use are similar for hybrid and digital e-services as well as to prove that e-quality dimensions are similar for digital and hybrid e-services.

Therefore, we devised the following research hypotheses.

Hypothesis 1 (H1). *The relationship between customer experience, quality, satisfaction, and intention for use is similar for both major types of e-services—hybrid and digital services—and could be described with an integrated e-service adoption–continuance quality model.*

Hypothesis 2 (H2). *The e-service quality dimensions and attributes are similar for two major types of e-services—hybrid services and digital services.*

To design the study, we started with the selection of e-service quality attributes corresponding to the five e-service quality dimensions of the model. Based on the study of a systematic review and specific research papers on general e-service quality and website quality models, as well as specific research on e-tailing, social platforms, and e-travel quality models [10,21,34–36,48–58], we concluded that every dimension is composed of several e-service attributes (Table 1).

Table 1. E-service quality dimensions and attributes.

E-Service Quality Dimensions	E-Service Attributes
Quality of e-service result	Functionality Personalization Reliability Ability to save time
Quality of e-service process	Ease of use Security Accessibility
Quality of e-service system	Website or app structure and navigation Website or app design
Quality of e-service information	Quality of website or app content Usefulness of information
Quality of e-service customer support	Timeliness of e-service customer support

To test the relationships between the components of the integrated e-service adoption–continuance quality model, a structured questionnaire for an online survey was developed because the questionnaire is a very flexible data collection tool [59]. The survey was designed using a Likert scale from 1 to 5, where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree. Each question aimed to assess the perception of one of the components of the model. The questionnaire items, their correlation with model components, and descriptions of the quality components are presented in Table 2.

Table 2. Correspondence between questionnaire items and model components.

Model Component	Code	Questionnaire Items	Description of Model Component
Customer experience	EXC1	The overall experience of using the e-service is positive	Experience reflects feelings and knowledge customer gains through interaction with e-service components offered by the e-service provider [60]
E-service acceptance	ADP1	I have frequently used e-service during the last six months	Decision to start using e-service based on expectations of certain e-service usefulness and ease of use
Intention to continue using e-service	INT1	I plan to use e-service in the next few months	Customer readiness to continue using e-service
Customer satisfaction	SAT1	I am satisfied with the quality of the e-service	Level of conformance between service quality and customer expectations
Quality of e-service result	RES1	The e-service provides me with what I want or require	Degree to which e-service results meets customer needs to achieve specific goal
	RES2	I think that the e-service is reliable	
	RES3	The e-service can be adapted to meet my needs	
	RES4	The e-service helps me to save time	
	RES5	I'm satisfied with the quality of the e-service result	
Quality of e-service process	PROC1	The e-service is easy to use	Degree to which e-service co-creation process meets customer needs and expectations
	PROC2	I feel that my personal and financial information I use for the e-service is safe	
	PROC3	I always can get access to the e-service when I need it	
	PROC4	I'm satisfied with the process of using the e-service	
Quality of e-service information	INF1	The e-service website content is of high quality	Degree to which information provided by e-service provider meets customer needs to achieve specific goals when using the e-service
	INF2	The e-service allows me to find the necessary information	
	INF3	I'm satisfied with the quality of information e-service provides	
Quality of e-service system	SYS1	The e-service website has a clear structure	Degree to which e-service website or app design and structure meets customer needs to achieve specific goals when using the e-service
	SYS2	I like how the e-service website or app looks like	
	SYS3	I'm satisfied with the quality of the e-service technical level	
Quality of e-service customer support	SUP1	The quality of customer support is high	Degree to which e-service customer support meets customer needs to use the e-service effectively
	SUP2	The e-service is quick to answer questions about the support	
	SUP3	I'm satisfied with the quality of customer support	
Intention to refuse using the service	REF1	I'm going to refuse to use e-service in the next several months	Customer readiness to refuse to use e-service

A specific feature of the questionnaire design is that respondents had to answer questions about a specific e-service brand. Previous studies used questions about any abstract e-service [30,34,49,56] or

abstract e-service of a specific type [27,31,41,43,47,61], so the respondents had to imagine what their decisions or perceptions could be in general. Several studies investigate consumer behavior in relation to specific e-service platforms—like volunteer acceptance of the Twitter platform based on the TAM model [32] or developing and measuring the importance of e-service quality dimensions and attributes for Facebook’s users [51,54].

We expected that our survey design would capture real consumer behavior. In the survey, we offered 20 different options, including international brands popular in Russia, like Booking, AliExpress, Instagram, Youtube, Facebook, Badoo, Qiwi, WhatsApp, and Google as well as strong Russian brands like Wildberries, Yandex, YandexTaxi, YandexDrive, Ivi, Ozon, Avito, and SberbankOnline. Respondents could choose any other e-service brand, so Discord, Afisha, Apteka, Gosuslugi, DeliveryClub, and Steam appeared in the results of the survey.

The questionnaire was created in Google form and invitations to participate in the survey were distributed via the largest Russian social digital platform, “Vkontakte”, at random. The preface to the questionnaire included the purpose of the study, rules of using the Likert scale, and a disclaimer stating that the survey was anonymous.

We collected 365 completed questionnaires from the respondents in the period between July and September 2019. An analysis showed that 350 respondents were residents of 38 Russian cities and 15 were international students from Ukraine, Turkmenistan, Thailand, Iraq, Germany, Georgia, and Northern Cyprus who currently lived in Russia.

Table 3 gives the respondents’ profile. The majority of respondents (68.8%) represent two age groups, from 18 to 24 years and from 25 to 34 years old, where the latter had the highest e-service penetration rate. Among the respondents, 66.3% used e-services daily, including 26% of respondents who used e-services several times a day. Only 7.1% of respondents rarely used e-services (several times or once a year).

Table 3. Participants’ profile in the final survey.

Item	Frequency	Share, %
Gender		
Male	144	39.5
Female	221	60.5
Age		
18 or Under	14	3.8
18–24	86	23.6
25–34	165	45.2
35–44	80	21.9
45–54	15	4.1
55–69	5	1.4
The frequency of using an e-service		
More than once a day	95	26
Daily	147	40.3
Weekly	59	16.2
Monthly	38	10.4
More than once a year	24	6.6
Once a year or less	2	0.5

The survey demonstrated that 43.7% of the respondents chose digital services, and 55.3% preferred hybrid services. YouTube was the digital e-service with the largest audience in the study (18.1% of respondents chose it in the survey). Yandex Taxi (the Russian largest online taxi-aggregator) and Wildberries (the largest online retailer in Russia) were ranked second and third, with 12.1% and 9.6% of the respondents’ choice, respectively. In general, the industry coverage of the selected e-services applied to most of their types (entertainment and media, online retail, online travel, electronic payment

services, transport services, food delivery, event ticket booking, online video, online music and books, social networks, financial services, etc.). This is why the survey results can be applied to the B2C e-services market in Russia in general.

Since the size of the general sample was not set, and it was also impossible to control the chance of re-passing the survey because it was held online, a simple random sampling formula was used for the calculation:

$$n = \frac{t^2 \cdot v \cdot (1 - v)}{\Delta^2} \tag{1}$$

t: the acceptable confidence level is 0.95. At this confidence level, the normalized deviation was 1.96. The total sample of 365 people included 211 and 154 respondents preferring hybrid and digital e-services, respectively. Therefore, the variance equaled $v \cdot (1 - v) = (211/365) \cdot (154/365) = 0.2439$. Hence, sampling error was 5%.

$$\Delta = \sqrt{\frac{t^2 \cdot v \cdot (1 - v)}{n}} = \sqrt{\frac{1.96^2 \cdot 0.2439}{365}} = 0.051$$

4. Results

4.1. Analysis of the Survey Results

To compare the average values of the chosen response options for hybrid and digital e-services, the Student *t*-test was selected with $p = 0.05$. To compare the variance of the response choice values for hybrid and digital e-services, the Fisher test was applied with $p = 0.95$. Table 4 gives the general survey results, indicating the average values, standard deviation, Student *t*-test, and Fisher test values. We identified eight key variables, confirming at least one hypothesis and revealing statistically significant differences between hybrid and digital e-services.

Table 4. Results of the survey.

Code	Question	Mean	Std. Deviation	Student Test	Fisher Test
EXC1	The overall experience of using the e-service is positive	4.515	0.76	0.15	0.01
ADP1	I have frequently used e-service during the last six months	4.32	1.027	0.16	0.90
INT1	I plan to use e-service in the next few months	4.504	0.89	0.38	0.81
SAT1	I am satisfied with the quality of the e-service	4.367	0.8	0.32	0.99
RES1	The e-service provides me with what I want or require	4.378	0.86	0.14	0.51
RES2	I think that the e-service is reliable	4.230	0.95	0.17	0.94
RES3	The e-service can be adapted to meet my needs	4.186	0.97	0.27	0.85
RES4	The e-service helps me to save time	4.378	1.09	0.00	0.00
PROC1	The e-service is easy to use	4.636	0.76	0.06	0.00
INF1	The e-service website content is of high quality	4.384	0.83	0.23	0.08
INF2	The e-service allows me to find the necessary information	4.427	0.81	0.15	0.56
SYS1	The e-service website has a clear structure	4.45	0.87	0.03	0.02
SYS2	I like how the e-service website or app looks like	4.35	0.81	0.08	0.45
PROC2	I feel that my personal and financial information I use for the e-service is safe	3.74	1.13	0.23	0.79
SUP1	The quality of customer support is high	4.17	0.92	0.23	0.24
SUP2	The e-service is quick to answer questions about the support	3.98	1.0	0.00	0.01
PROC3	I always can get access to the e-service when I need it	4.443	0.92	0.01	0.00
RES5	I'm satisfied with the quality of the e-service result	4.197	0.75	0.47	0.51
SYS3	I'm satisfied with the quality of the e-service technical level	4.386	0.85	0.28	0.40
INF3	I'm satisfied with the quality of information e-service provides	4.4	0.86	0.09	0.50
PROC4	I'm satisfied with the process of using the e-service	4.373	0.88	0.01	0.00
SUP3	I'm satisfied with the quality of customer support	4.172	0.82	0.02	0.00
REF1	I'm going to refuse to use e-service in the next several months	1.909	1.4	0.02	0.03

4.2. Verification of Hypothesis 1. The Relationship between Customer Experience, Quality, Satisfaction, and Intention for Use Is Similar for Both Major Types of E-Services—Hybrid and Digital Services—and Could Be Described with Integrated E-Service Adoption–Continuance Quality Model

The results of the study show that consumers’ perceptions of the e-services quality, consumer experience, and customer satisfaction were at a high level and were rated above 4 points by the respondents. The EXC1 and PROC1 questions (with an average value being 4.515 and 4.636, respectively, and a standard deviation of 0.76 for both) had the highest ratings.

Linear correlation coefficients (r) were calculated to test the relationship between the model components. In contrast to sociological studies [62], values of correlation coefficients higher than 0.5 are not very common; therefore, it is possible to take into account the values that are equal to or greater than 0.3, i.e., characterizing a moderate correlation of features. The correlation with coefficients ranging between 0.5 and 0.8 could be regarded as strong, and when coefficients range from 0.81 to 1.0, the correlation is very strong.

We calculated the correlation coefficients for three clusters—e-services in general, digital services, and hybrid services (Table 5).

Table 5. Correlation relationships of the key components of the model.

Code	Question	EXC1	INT1	SAT1	REF1
		r	r	r	r
EXC1	The overall experience of using the e-service is positive	–	0.45	0.68	–0.06
SAT1	I am satisfied with quality of the e-service	–	0.5	–	–0.04
RES5	I’m satisfied with the quality of the e-service result	0.57	0.39	0.6	–0.12
SYS3	I’m satisfied with the quality of the e-service technical level	0.66	0.43	0.62	–0.11
INF3	I’m satisfied with the quality of the provided information	0.51	0.44	0.52	–0.1
PROC4	I’m satisfied with the process of using the e-service	0.53	0.39	0.53	–0.11
SUP3	I’m satisfied with the quality of customer support	0.49	0.35	0.5	0.05

The data presented in Table 4 show a significant correlation relationship between the crucial components of the e-services quality model. The correlation between the model components was tested for digital and hybrid services specifically (Table 6).

Although our conclusions about e-services in general could be applied both to digital and hybrid services, we can observe some differences. Thus, positive experience has a higher influence on customer satisfaction with hybrid services than with general e-services and digital services. The quality of results is the most important factor of the hybrid service quality, and the quality of information is the least important factor. For digital services, the influence of quality constructs on customer experience and customer satisfaction is higher than for hybrid services and for e-services in general. The most important quality factor is quality of information due to the specific function of digital services. Customer support is the least important factor.

The results of the study show that the relationships between model components are confirmed both for hybrid and digital e-services, and this means that service quality influences the consumer experience, which affects consumer satisfaction, leading in turn to the consumer’s intention to continue using the service.

According to the research results, the strongest relationship is observed between positive consumer experience and customer satisfaction. Consumer experience and satisfaction have a significant impact on the consumer’s intention to continue using the service and demonstrate a weak negative relationship with the intention to refuse the service. This means that both experience and satisfaction play a mediating role in customer behavior. Both experience and satisfaction are outcomes of e-service quality which lead to repurchase intentions. The difference between customer experience and satisfaction depends on the influence of a specific quality dimension.

Table 6. Correlation and regression relationships of the crucial components of the model for the digital and hybrid services.

Code	Question	EXC1	INT1	SAT1	REF1
		r	r	r	r
Correlation Coefficients for the Digital E-Services					
EXC1	The overall experience of using the e-service is positive	–	0.49	0.67	–0.07
SAT1	I am satisfied with the quality of the e-service	0.67	0.42	–	–0.04
RES5	I’m satisfied with the quality of the e-service result	0.6	0.33	0.6	–0.06
SYS3	I’m satisfied with the quality of the e-service technical level	0.64	0.41	0.65	–0.08
INF3	I’m satisfied with the quality of the provided information	0.65	0.47	0.61	–0.04
PROC4	I’m satisfied with the process of using the e-service	0.59	0.39	0.57	–0.11
SUP3	I’m satisfied with the quality of customer support	0.52	0.34	0.48	0.11
Correlation Coefficients for the Hybrid E-Services					
EXC1	The overall experience of using the e-service is positive	–	0.42	0.7	–0.04
SAT1	I am satisfied with the quality of the e-service	0.7	0.46	–	–0.04
RES5	I’m satisfied with the quality of the e-service result	0.55	0.45	0.59	–0.17
SYS3	I’m satisfied with the quality of the e-service technical level	0.55	0.45	0.59	–0.13
INF3	I’m satisfied with the quality of the provided information	0.38	0.44	0.45	–0.13
PROC4	I’m satisfied with the process of using the e-service	0.45	0.41	0.52	–0.08
SUP3	I’m satisfied with the quality of customer support	0.47	0.38	0.54	0.03

Thus, customer experience was proven to be an outcome variable of the e-service quality model, as it shows a significant correlation with customer satisfaction and e-service quality dimensions both for hybrid and digital e-services. It complements previous studies where outcome variables involved satisfaction, repurchase intentions, and word of mouth [36]. This is an important contribution of our study, since it enables us to shift the focus from the technological to the interactive nature of e-services. It is proven also by the differences which we can observe. Thus, positive experience has a stronger influence on customer satisfaction with hybrid services than with e-services in general and digital services. In our opinion, this is the consequence of the more interactive nature of hybrid e-services as they involve delivering customer value offline with interpersonal interactions.

Thus, the quality of e-services has a greater influence on customer satisfaction, while consumer experience is influenced by the quality of e-service technical level, quality of e-service process, and quality of customer support. This shows that customer satisfaction is a function-driven concept and emerges through a comparison of customer needs and e-service results. This correlates with previous studies where fulfillment/reliability was the strongest factor affecting satisfaction [10]. The added value of our findings is that other quality dimensions assessed in our study also showed that the e-service consumer experience concept reflects the customer’s active participation in the e-service value co-creation process and thus depends on the quality of service delivery process, customer support, and technical level.

4.3. Verification of Hypothesis 2. The E-Service Quality Dimensions and Attributes Are Similar for Two Major Types of E-Services—Hybrid Services and Digital Services

The survey tested the relationship between e-service attributes and e-service quality dimensions (Table 7).

Table 7. Relationship of e-service quality dimensions with e-service attributes.

Code	SAT1	RES5	SYS3	INF3	PROC4	SUP3
	r	r	r	r	r	r
RES1	0.7	0.57	0.58	0.52	0.54	0.48
RES2	0.56	0.5	0.58	0.54	0.53	0.51
RES3	0.48	0.44	0.51	0.49	0.52	0.47
PROC1	0.59	0.53	0.6	0.53	0.59	0.5
INF1	0.56	0.54	0.58	0.54	0.52	0.52
INF2	0.49	0.52	0.56	0.54	0.55	0.43
PROC2	0.35	0.33	0.37	0.37	0.38	0.4
SYS1	0.48	0.55	0.55	0.52	0.57	0.51
SYS2	0.48	0.51	0.55	0.5	0.5	0.51
SUP1	0.5	0.51	0.5	0.51	0.5	0.63
SUP2	0.4	0.47	0.45	0.46	0.4	0.6
PROC3	0.46	0.52	0.62	0.53	0.59	0.52
RES4	0.26	0.32	0.27	0.44	0.38	0.37

The results of the study show that only two e-service attributes have a strong influence on customer satisfaction—usefulness and ease of use. Other e-service properties show a strong influence on quality dimensions, proving the multistage nature of the e-service model. The perception of the e-service attributes appears in the process of e-service value co-creation and emergence of customer experience (Table 8).

Table 8. Relationship between quality attributes of digital and hybrid e-services.

Code	SAT1	RES5	SYS3	INF3	PROC4	SUP3
	r	r	r	r	r	r
Correlation Coefficients for the Digital E-Services						
RES1	0.68	0.59	0.6	0.62	0.61	0.42
RES2	0.53	0.51	0.6	0.58	0.58	0.5
RES3	0.51	0.46	0.55	0.53	0.52	0.45
PROC1	0.63	0.57	0.66	0.68	0.6	0.53
INF1	0.55	0.49	0.54	0.63	0.54	0.5
INF2	0.5	0.5	0.58	0.63	0.65	0.4
PROC2	0.32	0.3	0.31	0.4	0.37	0.34
SYS1	0.5	0.52	0.61	0.5	0.5	0.44
SYS2	0.59	0.6	0.58	0.57	0.53	0.51
SUP1	0.49	0.43	0.47	0.52	0.46	0.58
SUP2	0.32	0.42	0.39	0.42	0.38	0.55
PROC3	0.47	0.57	0.63	0.58	0.59	0.44
RES4	0.23	0.29	0.22	0.39	0.28	0.36
Correlation Coefficients for the Hybrid E-Services						
RES1	0.72	0.57	0.57	0.43	0.46	0.54
RES2	0.59	0.5	0.57	0.51	0.48	0.53
RES3	0.44	0.4	0.46	0.45	0.51	0.5
PROC1	0.56	0.48	0.53	0.39	0.54	0.45
INF1	0.57	0.57	0.61	0.45	0.5	0.53
INF2	0.46	0.53	0.55	0.47	0.45	0.45
PROC2	0.38	0.37	0.4	0.34	0.4	0.47
SYS1	0.47	0.49	0.56	0.53	0.59	0.58
SYS2	0.4	0.45	0.51	0.43	0.47	0.5
SUP1	0.5	0.56	0.53	0.5	0.55	0.68
SUP2	0.49	0.54	0.51	0.49	0.57	0.66
PROC3	0.46	0.48	0.6	0.47	0.57	0.59
RES4	0.37	0.43	0.37	0.53	0.47	0.33

Our study verified the multidimensional structure of e-service quality according to means-end chain theory and multiple previous studies [1,7,10,35,36,39] and allowed us to verify the validity of the following quality dimensions for both hybrid and digital e-services: quality of e-service results, quality of e-service process, quality of e-service information, quality of e-service system, and quality of e-service customer support. This approach to quality dimensions is based on the ideas of the Edvardsson B. [48], ISCI model [29], and E-RecS-Qual model [57] and assumes that the e-service quality dimension should be conceptualized as a specific component of the service and quality attributes specify each of these components. This differs from the multiple studies [1,7,10,35,36,39] where quality dimensions are represented by quality attributes, and this confuses both customers and managers when conceptualizing e-service quality.

5. Discussion

5.1. Integrated E-Service Adoption–Continuance Quality Model

According to our findings, e-service quality dimensions show a moderate impact on the consumer intention to continue using a service, which confirms the means-end chain theory, when a customer starts with a judgment of specific attributes and progresses to perception or more abstract concepts like quality, experience, and satisfaction.

An interesting finding that still places means-end chain theory under question is that e-service usefulness and ease of use have a strong impact directly on customer satisfaction. This reminds us about technology acceptance models and shows that e-service usefulness and ease of use are the most significant attributes not only at the stage of e-service acceptance but also at the stage of using the service. Other consumer attributes require aggregation in quality dimensions in order to have a cumulative impact on customer satisfaction and the decision to continue using the service. Our findings allowed us to revisit the model (Figure 3).

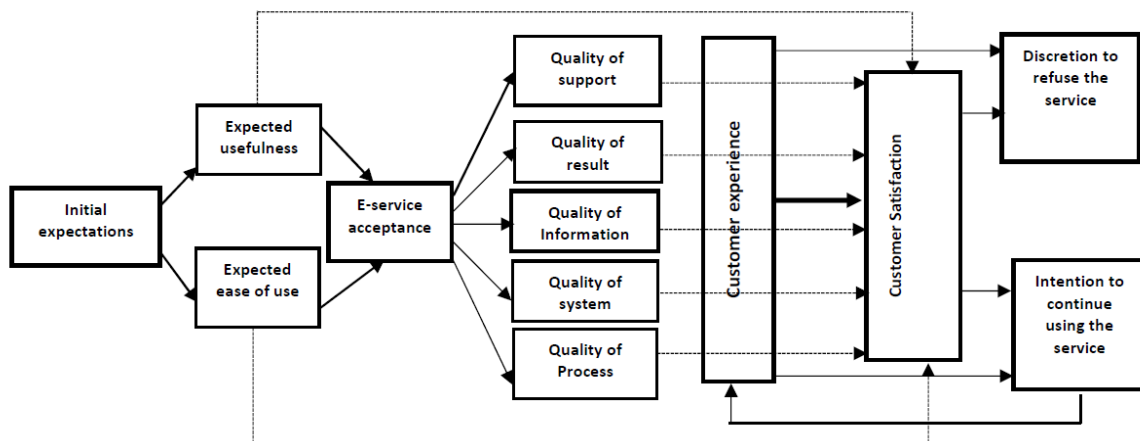


Figure 3. The revisited integrated e-service adoption–continuance quality model.

The important added value of the study is that the relationship between e-service quality dimensions and e-service attributes shows the significant differences for the hybrid and digital e-services. As we stated above, perceived usefulness (RES1) has the most decisive impact on customer satisfaction both for digital and hybrid services. For digital e-services, it has a stronger correlation with process quality than with result quality. This may be because most of the digital services are process-oriented, whereby the customer receives benefits during the process of e-service delivery. For digital e-services, process quality and system quality are the most consistent quality dimensions. Thus, the accessibility and reliability of the e-service are perceived as a part of the system quality dimensions. Ease of use has a strong correlation with two dimensions—information quality and process quality. For hybrid services, the most crucial quality dimension is the quality of the results,

while quality of information is the least important factor. This is determined by the differences in function of information. For digital services, information is the primary service outcome determining the usefulness of the service. At the same time, for hybrid services, system quality is also important because it has a strong correlation with six e-service attributes. Information quality and process quality are less important for hybrid e-services because they are result-oriented, and the service delivery process is entirely associated with the use of websites or mobile applications. Interestingly, security for all types of services shows a moderate correlation with the quality of customer support, which means that security is perceived as a function of the support or help from the service provider.

The analysis shows that perceived security and the ability of the service to save the consumer’s time have the lowest impact on perceived quality and, in our opinion, this requires further research. Similar results can be observed in some other studies. For example, as shown in [47], security and online shopping platform satisfaction have a weak correlation, while ease of use, reliability and responsiveness, assurance, and attractiveness have a significant impact on online shopping customer satisfaction. It is also confirmed in [27] that perceived privacy surprisingly did not impact the “likelihood to purchase online”. As a contrast, the results of the study on the adoption of e-government services made in the United Arab Emirates underline strong positive relations between consumer perceptions of confidentiality and trust and e-government services adoption [61].

5.2. E-Service Quality Dimensions and Consumer Attributes

We suppose that security is an independent attribute that influences the decision to adopt an e-service and intentions to continue using the e-service. However, it does not influence the e-service quality perception and customer satisfaction level. In our opinion, according to the Kano Model [63], security should be considered as a basic attribute (“must be”) that does not affect customer satisfaction but leads to customer dissatisfaction if not present. This means that even if customers perceive that the security of an e-service is high, it has no influence on their intentions to adopt an e-service or continue using it. On the contrary, if the perceived security is low, it will negatively influence the decision and decrease the value of the e-service quality. Hence, the relationship between perceived e-service security and consumer behavior requires further study. As for the perception of time in the context of using e-services, we can assume that consumers take this benefit for granted (also as a basic property, according to the Kano Model), which means that there is no impact on quality perception and satisfaction level.

We present a new relationship between quality dimensions and consumer attributes according to our findings (Table 9).

Table 9. Revised e-service quality dimensions and consumer attributes.

E-Service Quality Dimensions	E-Services Attributes		
	E-Services in General	Digital Services	Hybrid Services
Quality of e-service result			Functionality
Quality of e-service process	Personalization Reliability Ease of use Website or app structure and navigation	Functionality Ease of use Information usefulness	Website or app structure and navigation

Table 9. Cont.

E-Service Quality Dimensions	E-Services Attributes		
	E-Services in General	Digital Services	Hybrid Services
Quality of e-service system	Functionality Website or app design Website and app content quality Accessibility	Reliability Personalization Ease of use Website or app structure and navigation Website or app design Accessibility	Reliability Website and app content quality Ease of use Information usefulness Website or app design Website or app design
Quality of e-service information	Information usefulness	Ease of use Website and app content quality Security	Service helps to save time
Quality of e-service customer support	Timeliness of customer support Security	Timeliness of customer support Security	Timeliness of customer support Security

5.3. E-Service Quality and Open Innovation in Digital and Hybrid Service Industry

Customer open innovation is an inherent element of services as the customer plays the role of value co-creator and actively participates in service delivery and the constant modification process. Open innovation contributes to the constant improvement of service quality [64] only when organizational quality management practices allow us to listen to the voice of the customer and adapt the service in order to meet customer needs [65], which requires market, responsive, and innovation orientation of the organization [66]. The study results show that customer voice includes the perception of customer experience, e-service quality, and satisfaction based on both customer requirements and expectations. The multidimensional nature of e-service quality helps to identify specific customer requirements and expectations about e-service quality dimensions and attributes. This means that every element of e-service quality is subject to open innovation practices and our study reveals how to prioritize innovations according to customer voice. The most important attributes are usefulness and ease of use for all types of e-services, both for the decisions to adopt and to continue to use e-services. This means that the innovations that help to deliver and improve them will have the greatest effect on customer satisfaction and repurchase intentions. Thus, both the service design process [67] and continuous improvement efforts should be focused primarily on usefulness and ease of use. On the other hand, innovations in e-service security and time-saving attributes are also crucial as they are perceived by customers as “must be” attributes.

The study reveals that technical level and quality of information are more important for digital e-services because they are based on self-service and customers were more vulnerable to imperfections in the website design and quality of information provided. At the same time, self-service decreases the opportunity to listen and to understand customer voice so customer open innovation depends highly on the customer feedback and customer support tools employed by the customer provider because it is not enough to find external knowledge—there should be salient innovation [68] and quality management practices [69] as well as a distinctive shift from closed innovation to a proactive open innovation organizational culture [70] that helps to transform customer voice in e-service innovation.

6. Conclusions

The research results imply that the e-services quality model includes customer experience as an essential variable that has a significant influence both on customer satisfaction and intention to repurchase e-services. When customers decide to continue using the e-service, they need to have a positive experience that influences customer satisfaction. This research resulted in a better understanding of the differences between customer satisfaction and experience. Consumer satisfaction

is strongly influenced by the usefulness and ease of use, while consumer experience is influenced by the quality of e-service technical level, quality of e-service process, and quality of customer support. This confirms that both customer experience and satisfaction should be embedded in e-service quality models to illustrate different angles of customer perceptions and behavior. It bridges the gap between customer loyalty management, which is seen mostly as a marketing function, and quality management, which is seen mostly as an operational function.

The hypothesis about the similar relationship between customer experience, quality, satisfaction, and intention was confirmed for hybrid and digital e-services, as well as the multidimensional nature of e-service quality, including the customer support quality, system quality, information quality, e-service process quality, and quality of e-service results. This supports the idea of common theoretical approaches to quality management for all types of e-services regardless of the combination of online and offline strategies and experiences. Future research should stimulate the diffusion of best practices between different types of e-services and provide the opportunity to spread research findings between different e-service sectors widely.

The major difference between hybrid and digital e-services was found in the relationship between attributes and quality dimensions because of the different focus in value generation—process-oriented for digital services and result-oriented for hybrid services.

An unexpected finding is that two e-service attributes (perceived usefulness and perceived ease of use) have a significant direct influence on customer satisfaction. Other attributes show an indirect relationship with satisfaction through quality components. Therefore, research results develop ideas of technology acceptance models and prove that perceived usefulness and perceived ease of use should be the focus of managers at all stages of the consumer lifecycle—from the decision to adopt an e-service to the cyclical decision to continue using it.

Another unexpected finding is that security and ability to save time show a weak correlation with e-service quality and customer satisfaction. We should treat them as essential e-service attributes according to the Kano Model, when they influence dissatisfaction, if not present, but do not influence satisfaction, if present.

The combination of technology acceptance models, e-service models, and the customer experience concept enables us to explain customer behavior, when initial customer expectations are focused on two e-service attributes—functionality and ease of use—but after the consumer has experience of using the e-service, his or her expectations undergo a transformation, and he or she perceives e-service quality through a wider number of e-service attributes combined in five e-service quality dimensions: e-service result quality, e-service system quality, e-service process quality, information quality, and customer support quality. The adoption decision is based only on expectations, and the intention to continue using the e-service is based on the transformation of customer experience into customer satisfaction mediated by the e-service quality and customer experience.

Although this research has offered some valuable insight into studies on e-service quality, there are several limitations that need to be acknowledged. First, the data for this research were collected using only one method—the online questionnaire survey—as this is a common data collection technique, though it is not free from the subjectivity of the respondents. The survey was conducted at one point in time, but, according to the service journey concept, consumer expectations and perceptions evolve over time. The study does not cover social, national, personal, technical, and organizational factors that influence customer behavior. However, the results seem to suggest that the sampling method used has excellent exploratory power.

Second, our study does not consider such outcome variables as customer loyalty or word of mouth, which may bring additional insights into customer behavior. Further research is needed to embed them in the e-service quality model and to explore in detail the multidimensional nature of e-service customer experience.

Third, future research is needed to understand the influence of perceived security on the adoption of e-services and further intention to continue using the e-service, because the existing studies show

contradictory results in terms of the relationship between security, e-service quality perception, and customer satisfaction.

7. Managerial Implication

Our findings are useful for e-service providers as they allow them to model e-service quality and design customer behavior studies and select quality management and loyalty management tools for e-services focusing on five quality dimensions and taking into account differences between hybrid and digital e-services. The findings show that to understand customer intentions, it is not enough to measure customer satisfaction and quality perceptions—customer experience also should be the subject of study. As was proven by the study, satisfaction is function-driven and shows a comparison between customer needs and service results, while experience is process-driven and shows a comparison between customer expectations and perceptions of real events during e-service delivery.

Another managerial implication is the importance of quality attributes for the customer. Our findings show that perceived usefulness and ease of use should be primary attributes delivered and advertised by providers as they have most significant influence on customer behavior both for adoption and repurchase decisions.

The study shows how to use quality management tools for hybrid and digital e-services. Hybrid services should be focused on the quality of service results delivered offline, while digital services' functionality should be embedded in the service delivery process. Customer support should be focused on two quality attributes—security and ability to save time. The role of information quality also significantly differs—for hybrid services, it should be designed to help customers to save time, and for digital services, it should help to easily and safely use a service and deliver value through quality content. System quality also needs adjustment. Thus, personalization and accessibility are more important for the digital and less important for the hybrid services.

An important managerial implication is that the general integrated e-service adoption–continuance quality model is similar for hybrid and digital e-services and best practices could be diffused between different types of e-services.

8. Practical/Social Implications

Practical and social implications can be positive or negative, depending on the level of satisfaction and type of use experienced by the user. The above discussion makes it clear that any new services introduced are meant for users, and they should offer solutions for customer needs and bring positive experiences that improve the quality of every life. Positive impact enhances the use of the e-services and allows us to diffuse best practices in e-services development. Thus, understanding and meeting individual needs and expectations helps to improve the quality of all e-services through growing customer expectations and e-service providers' ability to meet these expectations, which erases the boundaries between innovations and open innovations.

9. Limitations and Future Research

Although this research has offered some valuable insight into the study of e-service quality, there are several limitations that need to be acknowledged.

First, the data for this research were collected using only one method—the online questionnaire survey—as this is a common data collection technique, though it is not free from subjectivity of the respondents. The survey was conducted at one point in time, but, according to the service journey concept, consumer expectations and perceptions evolve over time. The study does not cover social, national, personal, technical, and organizational factors that influence customer behavior. However, the results seem to suggest that the sampling method used has excellent exploratory power.

Second, our study does not consider such outcome variables as customer loyalty or word of mouth, which may bring additional insights into customer behavior. Further research is needed to

embed them in the e-service quality model and to explore in detail the multidimensional nature of e-service customer experience.

Third, future research is needed to understand the influence of perceived security on the adoption of e-services and further intention to continue using the e-service, because the existing studies show contradictory results in terms of the relationship between security, e-service quality perception, and customer satisfaction.

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