

An Unified Framework for Measuring E-Service Quality

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Abstract—Companies continually seek efficiency by utilizing the rapid advances in technology to improve their electronic services (e-services). A perusal of the literature shows varying approaches for measuring e-service quality; these approaches have found little consent among reviewers. Therefore, this study attempts to provide a new framework, a roadmap, as a useful model for researchers to measure user perception of e-service quality. For this model, an extensive study is carried and these study findings indicate that system functionality, procedure, content, user support, and manageability should be included in an empirical research model for measuring e-service quality.

Keywords—*electronic service; e-service quality; framework introduction*

I. INTRODUCTION

Electronic services through the internet have been adopted globally to reduce the cost of operations and improve customer service. However, acceptance of any service is predominantly due to its quality and without comprehensive attention to user acceptability, new services may fail [1]. Quality e-services can provide competitive advantages for online companies by improving performance, increasing productivity, and improving client relationships and thus customer satisfaction and trust [2]. A literature review of the extant e-service quality scales results in a variety of measure dimensions. Unfortunately, these dimensions are conceptualised differently, and there is little consensus for the basics of e-service acceptance [1, 3], possibly because the literature is currently inadequate in providing a conceptual framework of e-service quality [4-6]. As a result, many e-service quality researches developed models which may have omitted the user's interaction with the website [4, 7]. The procedures necessary to navigate through a website for an e-service have become more important as a part of a quality approach. This paper assists such an approach by developing a framework that includes key factors for e-service assessment. This framework provides a useful roadmap to measure users' perceptions of e-service quality.

II. LITERATURE REVIEW

This brief survey of recent research findings on e-service quality is presented in two parts. The first one considers conceptualisation of e-service quality and its components, and

the second explores theory in the form of technology acceptance models that are applicable in the field.

A. E-Service

The e-service concept is increasingly used as an important determinant of a successful online environment [4]. Before considering e-service quality, a definition of the term e-service is useful to ground the discussion. Again, there is little agreement regarding the parameters of e-service, as the field has not yet matured [8]. E-service can be simply defined as providing service to users electronically [9]. More elaborately, e-service is defined as “deeds, efforts or performances whose delivery is mediated by information technology. E-service includes the service element of e-tailing, customer support, and service delivery” [8]. For a company, authors in [10] defined e-service as service that takes place from lurching the main page until the requested service has been completed or received, while in public sector, authors in [9] defined e-service as those public services, including information, interaction, communication and transaction services, that are delivered by electronic media to citizens and people who work with or in the e-government sector. By analysing the e-service literature [8], it is found that researchers conceptualized e-services as self-service or information services, and that e-services are viewed as information services because information is the key value for the user. Authors in [11] distinguished the quality between e-services and self-service. For self-service, a user has to visit a location (e.g. an ATM) to receive the required service, whilst e-service is universally available from the internet. However, in [4], the author disagreed with this difference, claiming all e-services are inherently self-services. E-service, as a concept, has many applications and is located in a number of fields, especially in the forms of e-commerce and e-government. Despite the varying definitions, the researchers agree on the role of technology in facilitating the provision of services to an end user with the objective of improving performance.

B. E-Service Quality

The study of e-service quality is increasingly recognized and management has directed more attention to the issue in the last few years [1, 9]. E-service quality [55] is defined in [12] as the overall consumer evaluations and opinions about the excellence of received e-service in the virtual marketplace. Authors in [13] agreed with this definition, stating that it

constituted “a customer’s experience with the service provider through a given electronic channel without human intervention”. However, there are no well-accepted conceptual definitions or models for measuring e-service quality [9], although, as noted, e-service quality is a determinant of successful or failure for online organizations [2, 5, 7, 14]. Many online initiatives have failed due to insufficient attention to e-service quality [5, 7, 12]. As noted, e-service quality studies have increased, and the majority of the research adopted traditional service quality dimensions [15]. The SERVQUAL scale, which was developed for traditional market services, is a popular choice for researchers in the online environment [1, 16]. In [17], it is stated that the SERVQUAL dimensions can be used in an online environment through the addition of technical factors. Some examples of studies that have adopted and extended the SERVQUAL scale are given in [5, 7, 18-20]. Electronic service quality studies are found in banking, libraries, travel agencies, business portals and online shopping fields [1]. In online banking, four factors influence e-banking service quality: personal needs, site organisation, user-friendliness and efficiency [21]. Authors in [22] suggested four factors relating to online shopping service quality: responsiveness, reliability, process, functionality, enjoyment. Timely response, reliability, and courtesy are three factors proposed in [23] to influence the quality of academic library portals, and regarding online travel, authors in [11] posited four factors: presentation, information quality, trust, and responsiveness. In [6], similarly found factors were usability, usefulness of content, adequacy of information, accessibility, and interaction for business portals, while authors in [1] proposed seven dimensions for measuring e-government service quality: website design, reliability, responsiveness, security/privacy, personalisation, information, and ease of use. In the context of online retailers, [24] designated process quality, outcome quality, and recovery quality. Process quality was deconstructed to identify aspects of functionality, information accuracy, design, privacy, and ease of use, whereas outcome quality was determined by order accuracy, order condition, and timeliness, and recovery quality by interactive fairness, procedural fairness, and outcome fairness.

C. Theories of Acceptance of New Technology

Researchers use a number of theories to study user acceptance of new technology in information technology and information systems (IT/IS) research. Widely used theories in the IT/IS area are the theory of reasoned action and the technology acceptance model. The theory of reasoned action is a well-accepted model based on factors of intended behaviour [25]. This theory has a conceptual framework that separates beliefs, attitudes, intention and behaviour [26]. An individual’s behavior in the reasoned action theory is predicted by behavioral intention which is determined by attitudes and subject norms. Authors in [25] defined the three components of the theory reasoned action as:

- Attitudes: “an individual’s positive or negative feeling about performing the target behavior”.
- Subjective norms: “the person’s perception that most people who are important to him think he should or should not perform the behavior”.

- Behavioral intention: “the strength of one’s intention to perform the specified behavior”.

The assumption that individual behavior is under volitional control is a limitation for the theory of reasoned action, according to [28], as this was not always the case. Thus, the theory of reasoned action was extended into the theory of planned behavior by adding one major predictor, perceived behavioral control and customer satisfaction [28, 44]. Authors in [29] did not entirely accept the theory of reasoned action and suggested certain exceptions by saying “a behavioral intention measure will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame and/or specificity [29]. The technology acceptance model, developed in 1989, is the most practicable model for explaining the underlying factors that motivate users to accept and use the new technology in information system research [30]. In a literature analysis in [31], it is claimed that the technology acceptance model is central to IT/IS. This model was originally derived from the theory of reasoned action [25, 32]. The theory of reasoned action is extended replacing many of its attitude measures with two technology acceptance factors, namely perceived ease of use, and perceived usefulness, as these two factors will influence the user’s decision to use the technology [30]. Perceived usefulness is defined in [31] as “the degree to which a person believes that using a particular system would enhance his or her job performance” and perceived ease-of-use is “the degree to which a person believes that using a particular system would be free from effort” [30]. The goal of the developed technology acceptance model was to provide the factors that explained user behavior regarding the use of new technology. The original model, TAM1, extended to TAM2 to explain usage intention by integrating social and cognitive factors such as experience, image, job relevance and voluntariness [33]. In [34], TAM2 was extended to TAM3 by adding factors that assist decision makers regarding interventions that can lead to acceptance and use of technology. Researchers in different domains have used various forms of the acceptance model to evaluate the user acceptance of new technology, including e-commerce [35], e-learning [36], internet banking [24, 37], and e-government [38]. However, the main limitation of the initial model is that it does not include social factors that influence the acceptance the new technology [39]. Author in [40] claimed that the conceptual model lacks sufficient rigour and relevance for it to constitute theory in the information system domain. In addition, the technology acceptance model debate has distracted research attention from other significant issues in the field [41].

D. Methodology and Analysis

The relevant literature was reviewed to identify raised issues regarding the relevant models and theories of previous research [1, 2, 42]. The relevant studies were conducted in various contexts, including e-service, online banking, online travel agency, online public library, online retailing, web portal, and online shopping. Table I shows the e-service quality dimensions used in the online environment, the contexts in which they appeared and the frequency of citation.

TABLE I. A REVIEW OF E-SERVICE QUALITY DIMENSIONS

Dimension	Research context	References
Website designs/ Web site appears/ Aesthetic design	E-service	[10, 29]
	Online retailing	[25, 32]
	Online shopping	[9, 52]
Reliability	Online banking	[4, 7, 11, 24, 27, 33]
	E-service	[3, 18, 27, 52]
	Online retailing	[9, 33, 48, 53]
	Online banking	[8, 17, 24, 25]
Academic and public libraries	[12, 20, 23]	
Delivery	E-service	[8, 51]
Ease of use	E-service	[3, 10, 27, 52]
	Online retailing	[8, 17, 48, 53]
	Online banking	[12]
Efficiency	Online retailing	[7, 17, 18, 32]
	E-service	[12, 19]
Fulfillment	Online retailing	[7, 17, 18, 51]
	E-service	[19, 32]
Privacy	Online retailing	[7, 17, 18, 32]
	E-service	[19]
Responsiveness	Online retailing	[4, 18, 27, 48]
	Online banking	[17, 19, 33, 53]
	E-service	[7, 20, 24, 25]
	Online travel	[50-52]
Compensation	Online retailing	[7, 17-19]
Contact	Online retailing	[18, 19]
	E-service	[7, 17]
Processing speed	Online retailing	[10, 32]
Security	Online retailing	[10, 12, 52, 55]
	E-service	[17, 20, 25, 27, 48, 51]
Communication	Online retailing	[30, 52]
	E-service	[8, 32]
	Online financial services	[7, 12, 34, 51]
Accessibility	Online retailing	[6, 20, 27, 29, 33, 51-53]
Credibility	Online retailing	[27, 29, 33, 52, 53]
Understanding	Online retailing	[27, 29]
Availability	Online retailing	[19, 29, 32, 51]
	Online banking	[7, 27, 50, 53]
Information	Online retailing	[6, 7, 17, 32]
	Online travel	[4, 51]
	Web portal	[33]
	Online banking	[27, 33]
Courtesy	Academic & public libraries	[23, 52]
	Online shopping	[9, 11]
Customer service	E-service	[12]
Performance	E-service	[25]
Features	E-service	[25]
Service ability	E-service	[25]
System integrity	E-service	[25, 51]
Trust	E-service	[8, 25, 32]
	Online retailing	[4, 18, 24, 50]
Service differentiation	E-service	[25]
Customisation	E-service	[8, 20, 25, 51]
	Online financial services	[7, 51]
Web store police	E-service	[25]
Reputation	E-service	[25]
Assurance	E-service	[25, 55]
Empathy	E-service	[25]
Response time	Online retailing	[4, 32]
Intuitiveness	Online retailing	[32]
Flow	Online retailing	[32]
Innovativeness	Online retailing	[32]
Substitutability	Online retailing	[32]
Interactivity	Online retailing	[32, 51]
	Web portal	[6, 48, 51]

Structure	E-service	[12]
Content	E-service	[2, 3, 6, 8, 12, 27]
Linkage	E-service	[3, 12]
Incentive	E-service	[2, 12]
Convenience	Online retailing	[52]
Competence	Online retailing	[33, 52]
	Online shopping	[48]
Personalisation	Online retailing	[24, 50-52]
Collaboration	Online retailing	[27, 52]
Product portfolio	Online retailing	[48]
Entertainment	Online retailing	[4]
Transaction capability	Online retailing	[4]
System availability	E-service	[7]
Graphic style	E-service	[7]
Order management	E-service	[11]
Functionality	Online financial service	[8, 51]
Usability	Web portal	[6, 17, 51]

The review of the literature produced more than 50 dimensions relating to e-service and its quality. To analyze these dimensions, a content analysis technique was used. A form of data analysis was proposed by authors in [43] as appropriate to analyze written, verbal or visual communication messages. Part of the set of empirical analysis methods for social research, content analysis is recognised for its validity for text analysis [45]. Qualitative content analysis attends to specific topics that explain the meanings of the phenomenon, rather than counting words or identifying objective content from texts [45]. Content analysis is described as “a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” [46]. Using suggestions for content analysis processes from [45, 47], themes that emerged from these dimensions, were identified and categorized. Based on original definitions, each dimension and its constituent items were first described and prepared for data analysis. Each dimension was identified in relation to the others. Each description was read to note any interesting or relevant information, and this was recorded as a brief note on the page. From these notes, themes emerged, and the themes were sorted and categorised by topic. These were again analyzed and compared with the original description to ensure that the dimension was appropriately themed. Several iterations of this process were undertaken to clarify complicated description of dimensions. When this part of the analysis was complete, the theme groups were then perused to find trends or relationships that could be linked as higher themes and these themes were then modeled.

III. RESULTS AND DISCUSSION

The factors relating to e-service quality can be assigned to five themes as shown in Figure 1. These are defined as system functionality, content, manageability, customer support and procedures.

A. System Functionality

This theme categorizes the technical functions of e-government websites such as ease of use, system availability,

privacy and security. System functionality is crucial to provide citizens with a reliable service they are willing to use. Several researchers developed their e-service quality models by using factors within the system functionality theme dimensions in this regard [5, 7, 11, 19, 32]. Certainly, the complexity of system feature and the difficulty to use the services weaken the e-service quality as supported in [7], which claims that problems related to technical functioning of the site lead to frustration and possible user exit. Author in [12] also confirmed that problems related to technical functions influence e-service quality directly and negatively.

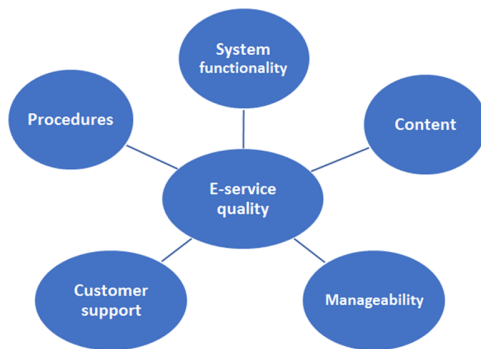


Fig. 1. Conceptual e-service quality framework

B. Content

This category includes all elements related to the content of the site, presentation, format and information. This category includes text, images, audio and video. These dimensions receive considerable attention [5, 7, 48]. There is a considerable body of evidence showing that better information quality influences e-service quality positively [11, 49-51], while inadequate web design influences e-service quality negatively [7]. Authors in [52] found that content is an important factor in measuring e-service quality.

C. Manageability

Manageability [11, 22, 48] relates to efficiency factors of websites, such as processing time and other matters that streamline the website experience. As efficiency underpins the website's usefulness, this theme is interwoven with all other categories. Manageability includes improving processes and improving the user's experience. Failure to deliver a high quality service, failure to deliver service on time and on budget affects project quality [53]. In [53], it is claimed that quality of management provides benchmarking capabilities and comparative assessment of e-services and assists managers to improve the quality of service.

D. Procedures

This theme includes all dimensions for e-service quality of work and activities such as credibility, interactivity, and personalization. Procedure was defined as the quality of planning, execution and maintenance of the system work and activities done by e-service's staff behind the system in order to complete the excellent delivery of e-service. Many studies used a dimension that covers the activities under e-service system in order to consider the area of procedure [5, 13, 51]. Failure to

perform the promised service and failure to interact with the user affect the quality of e-service. Authors in [51] confirmed that visitors and users are more attracted to interactive than static web sites. Activities built into the website are a service to the end user, so ensuring the quality of operation and content leads to a quality experience. In the e-commerce domain, [48] declared that inaccurate order fulfilment and laxity in keeping service promises are primary elements that negatively influence customer satisfaction.

E. Customer Support

This category covers all dimensions that envelop user assistance such as responsiveness and contact. The importance of this category is that it helps the users to perform their e-service smoothly by giving them assistance and providing them the needed information. Many studies include some dimension in their models to cover this area in order to measure e-service quality [5, 7, 11, 54]. Users expect to be able to complete their request or actions properly, to receive personalized attention, to know how their request is proceeding, to have their enquiries answered quickly, to have contact details and to be able to contact an organization representative directly [11]. Website administrators should ensure these expectations are met [11].

F. Summary

There is some crossover with these themes, and elements can be classified in more than one category. For example, processing time can be classified as procedure quality as well as manageability quality. This framework was developed to assist researchers and managers in their decision making by using a classification system for the range of elements that may affect e-service quality.

IV. CONCLUSION

This model can be used as a roadmap for researchers who wish to measure user perception of e-service quality in e-service domains, and for e-service managers and website administrators in assessing the effects of changes to improve their service performance. This novel framework has been produced after reviewing the literature and considering the identified issues. This framework will assist in bringing order to the large number of elements identified as influencing e-service quality, as it takes the user-e-service interface as the nexus for analysis. In addition, this framework will assist developers to understand and evaluate the standards of e-service quality. Future research could consider the relationship between the framework's categories. In addition, researchers can examine these themes in different contexts in order to validate this model.

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