Assessing e-Government Service & Trust: Government to Citizen

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Abstract—Technological advancements have enabled governments across the globe to explore online facilities in offering a range of services to their citizens. One necessary element of offering quality online services is to understand citizens' views and perception towards using such services in contrast with the traditional service methods that they are accustomed to. Therefore, periodical performance assessment of online services is critical to any e-government. In this paper, the authors attempt to explore the underlying factors and various dimensions of e-government service delivery, and propose a performance assessment framework that will assess the quality and trust dimensions of the e-services from citizens' standpoint. A systematic study of the existing performance assessment models such as SERVQAUAL, E-S-Qual and D & M model, has been carried out in establishing the basis for conceptualising a new framework called e-GSQTA (e-government Service Quality and Trust Assessment Framework). The proposed framework will be validated by using the e-tax service offered by the Indian government in subsequent studies.

Keywords-e-government; performance assessment; e-services; quality; trust; e-tax; framework.

I. INTRODUCTION

E-government has been a popular topic and countries across the world are actively investing resources to improve public services. Despite the significant progress made in e-government services, research indicates that citizens as main customers are not fully taking the advantages of such e-services. This may be due to the poor quality of these services and /or lack of public trust in using them. In order to provide efficient and cost effective services and to retain citizens' confidence, governments should have better understanding of how its citizens perceive, use and evaluate the quality of the e-services offered to them. Literature review indicates lack of information in this area and also lack of effective measures to evaluate the quality of e-government services [1].

For governments, as the main service providers, it is important to know what constitutes a high quality e-service within the public domain and to have a clear and structured guidance on assessing its quality on a regular basis. Literature review also indicates the need for further research to interpret and synthesize the work done so far and to propose a comprehensive set of dimensions that determine the quality and effective use of e-services from citizens' perspective. This paper focuses on bridging this gap by proposing a new framework 'e-GSQTA' to conceptualise and assess the quality and trust aspects of the e-government

services.

The paper is divided into five sections. Section II presents previous work on existing e-government service assessment frameworks and trust measurement frameworks. Section III introduces the theoretical framework with associated assessment dimensions. Section IV discusses the methodological approach for the data collection and data analysis on a selected sample of e-government e-services in India. The final section ends up with discussion, conclusion and future research directions.

II. PREVIOUS WORK

Enormous amount of literature on e-service is available which focuses on e-commerce. Most of the studies show that many researchers speak on the e-service quality of e-commerce. Some of the known models for assessing e-service quality are SERVQAUAL [2], E-S-Qual [3], SITEQUAL [4], and E-GovQual [5], etc. Practitioners have been using these instruments for assessing e-service quality of retail and e-banking sectors. Similarly e-government is an area where citizens interact online for e-services; hence for determining the e-service quality, studies used many facets from the above mentioned models. Researchers compare e-commerce and e-government domain as identical since channel of service delivery is same. It is, therefore, necessary to do a comprehensive literature survey of e-service in e-government and e-commerce.

A. E-Service and Classification

E-services are defined by researchers in various ways. Papadomichelaki and Mentzas [5] state that e-service is web services which are delivered through the Internet. In e-service customer's interaction or contacts with service providers is through technology, such as their web sites. Customers have to rely entirely on information technology in an e-service encounter [5]. Zeithaml, Parasuraman, and Malhorta [6] conceptualize e-service as an information service or self-service since the primary value exchanged between the two parties (buyer and seller) is information. Services in e-government play a very important role by becoming the main conduit for a government in reaching out to citizens with specific, dynamic, explicit and implicit needs. In other words, digital government services encapsulate public administration functions by making information available through digital interfaces [7]. A common classification of services in e-government is related to the users: Government-to-Citizen (G2C) services provide full support to citizens, Government-to-Business (G2B)

services to firms, and Government-to-Government (G2G) services to the same or different administration, Government-to-Employee (G2E) [22].

B. Dimensions of e-Service Quality Measurements

As discussed before, most of the models introduced for measuring e-service quality are related to the online shopping, online retailing, and online banking. Now we will emphasize upon more studies related to the e-service quality measurements. Madu and Madu [9] developed a 15 dimensional scale of e-service quality based on better understanding of customer perspective and providing services to meet the needs and expectations of customers [9]. An 11 sub-dimensional scale developed based on the two dimensions of eservice quality [10]. Heim and Sinha [11] developed a process model for assessing and improving service quality by identifying eservice system entities and transactions between those entities and mapping key quality dimensions onto them [11]. Kim, Kim, and Lennon [12] suggested that the different dimensions of perceived service quality are influenced by different antecedents [12]. As mentioned earlier, [3] developed the dimensions for core service delivery and recovery services delivery in e-service quality [3]. Kim, Kim, and Lennon [12] extends the dimensions developed by [3] into a 9-dimensional scale in e-service quality in order to use them for content analysis and evaluation of web sites in the apparel retailing sector.

Agrawal [8] introduced a model EGOSQ for measuring online service quality from the users' perspective. Model suggests relationship between service quality and user's perception. DeLone and McLean [13] introduced the information success model which includes system quality, information quality and user satisfaction quality as main dimensions. Studies show that some researchers use the term "process quality" instead of "system quality". Wang and Liao [19] validated D&M IS success model in assessing systems success of G2C e-Government environment in Taiwan. They offer six dimensions: information quality; system quality; service quality; usage; user satisfaction; and perceived net benefit. With this validation it can be concluded that the quality of e-government services can be evaluated by user satisfaction and inclination of future use. Bhattacharya, Gulla, and Gupta [21] studied two main dimensions: system quality and information quality from D&M model. However process quality is not included. This model is good for e-government portal quality assessment. It does not show relationship between quality and trust.

C. The ISO/IEC 9126 Standards For Software Quality

The ISO/IEC 9126 [14] standard developed in 1991 by the International Organization for Standardization (ISO) provided the framework for evaluating software quality by providing the quality characteristics of the software throughout the development process. ISO/IEC 9126 [14] contains six quality characteristics: functionality, portability, maintainability, efficiency, usability, and reliability, which

are used for supporting the quality goals, quality assurance criteria, design review, verification and validation. These characteristics can be deployed for assessing e-government quality. The ISO/IEC 9126 [14] standard is used as a tool to identify the quality considered in each application. The ISO/IEC 9126 [14] standard describes an internal and external software quality. The internal software quality derives from the product itself. The external software quality derives from the behavior of the system of which it is a part, either direct or indirect. Both the internal and external software qualities are prescribed in a quantitative manner. ISO 9241 [15] is another standard for ergonomics of human system interaction. ISO 9241 [15] describes every aspect of usability including hardware usability, software usability, and usability processes. Furthermore, ISO 13407 [14] is the standard for human-centered design processes for interactive system (ISO 13407) [14].

III. THEORETICAL FRAMEWORK

An extensive literature survey and critical studies of the existing approaches on e-service quality, information quality, system quality, and various other e-service related dimensions identified for assessing e-service quality and trust in e-government services are in the proposed study. In this ongoing study we adopt the E-S-QUAL dimensions scale developed by Parasuraman, Zeithaml, and, Malhotra [3] as the measurement of customers' satisfaction on e-service quality in their online purchasing process. E-S-QUAL was developed for measuring e-service quality in business environment but its dimensions can be used for assessing citizen's satisfaction for measuring e-service quality. Similarly study follows another model e-GOVQUAL focusing on reliability and validity though this model includes important dimensions [4]. E-S-QUAL model involves 7-dimensional scale: four core dimensions and three recovery part of the e-service quality [3].

The four core dimensions of E-S-QUAL are: 1) System availability: the correct technical functioning of the site. 2) Efficiency: the ease and speed of accessing and using the site. 3) Fulfillment: the extent to which the site's promises about order delivery and item availability are fulfilled. 4). Privacy: The degree to which the site is safe and protects customer information. The ESQUAL has a recovery service quality scale (E_Rec_S-Qual) for problem resolution. It is only applied when customers have questions or run into problems in eservice process. The three dimension of E-Rec-S-Qual are:

1) Responsiveness: effective handling of problems and returns through the site.
2) Compensation: the degree to which the site compensates customers for problems.
3) Contact: the availability of assistance through telephone or online representatives.

Some of the dimensions like functionality, reliability, information appearance, interactivity, ease of use and trust are considered from e-GOVQUAL [4]. These dimensions are also suggested by ISO/IEC 9126 [14] for software product quality. D&M model [20] includes *system quality,*

information quality, use, user's satisfaction and *perceived net benefit* were used and validated by Wang and Liao [19]. From D&M we consider system quality, and information quality measures. To measure the performance of a system, "system quality" is the most important quality components. This is measured in terms of functionality, reliability, availability flexibility, data quality, portability, integration, and system efficiency [13][20]. Therefore, user satisfaction depends upon the system quality. Concerning the process quality, business processes should be defined, documented and streamlined to improve information flow within the organization [23].

Change in business process may affect the e-services. The information quality refers to the quality of information relating to government activities. It basically contains the measures like accuracy, timeliness, relevance, precision, and completeness. Information Quality is concerned with issues such as the relevance, timeliness, and accuracy of the information generated by an information system [13][20]. Trust element in e-service is based on overall e-service quality. Determination of trust is done by citizen's satisfaction in utilizing e-services, whereas citizen's satisfaction is based upon overall e-service quality.
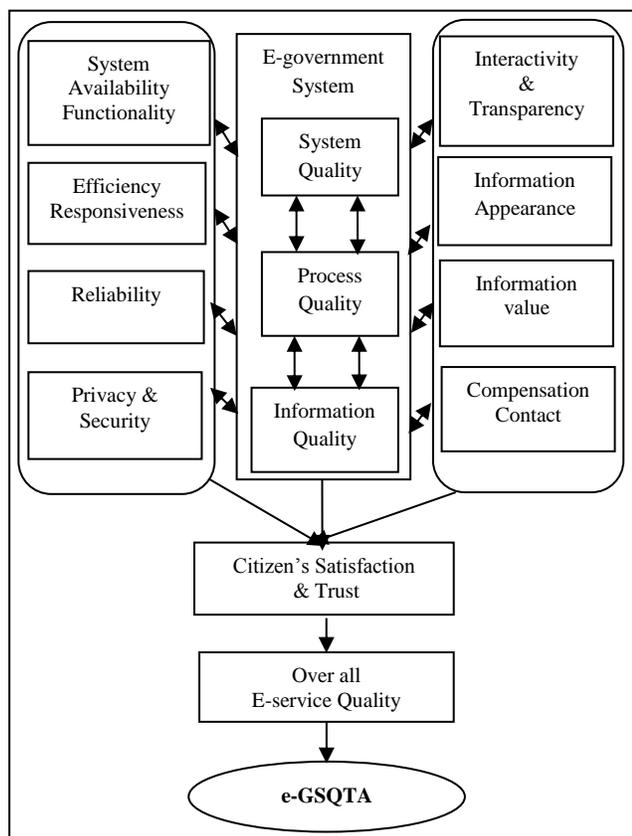
Figure 1. The proposed e-GSQTA framework

Number of hypotheses and studies has been considered for the development of e-GSQTA. Here, association among various dimensions is being presented and tried to show how e-government service quality and trust are assessed.

- Hypothesis (H1): While using online e-services the system quality in the government Web site affects the citizen's satisfaction. Hence it should be an essential part of e-GSQTA.
- Hypothesis (H2): Organizational processes should be included in an e-GSQTA assessment.
- Hypothesis (H3): While using online e-services the information quality in the government Web site affects the citizen's satisfaction. Hence it should be an essential part of e-GSQTA.
- Hypothesis (H4): E-service quality in the government Web site has a significant effect on citizen's satisfaction. Hence it should be an essential part of e-GSQTA.
- Hypothesis (H5): System quality, process quality, information quality, and e-service quality affects user's satisfaction in the G2C e-Government context.
- Hypothesis (H6): While using online e-services, interactivity, transparency, information value, and contacts are important measures and should be in the consideration since these all are related to e-government system quality dimensions. Hence it should be an essential part of e-GSQTA.
- Hypothesis (H7): Consolidation of e-service quality in e-government is done weighting all depicted measures and their dimensions of e-GSQTA framework. Hence it should be an essential part of e-GSQTA.
- Hypothesis (H8): Perceived usefulness of the government e-services has a positive effect on satisfaction and therefore it is positively related to e-service quality and becomes an important factor in assessing e-government performance.
- Hypothesis (H9): e-government "trust" is positively related to the use, and citizen's satisfaction which is based on the overall weight of e-service quality.

IV. RESEARCH METHODOLOGY

A. Data Collection

The target population includes citizens who had experience with browsing and searching for the information in e-government web portals. Research model is validated through conducting the surveys. Series of interviews took place in India from the users of e-Tax services. A set of questionnaires were distributed among the online e-tax users. Questionnaires were divided into 5- sections which included sib-questionnaires on information quality, e-service delivery, website quality, citizen's satisfaction and trust. This helped author in understanding the citizen's opinions about the existing offered e-service quality. In each section users are asked to rate from 1 to 5 each dimensions of online service quality.

B. Methodology

Collected set of questionnaires will be analyzed using partial least squares (PLS) method [24]. The PLS approach is superior to other structural equation modeling (SEM) approaches for this study because of its flexibility for distributional postulation, and its strength in handling complex predictive models [16]. Smart PLS version 3.0 or advance can be used for the analysis. SPSS 18.0 is used to store the collected data and produce descriptive statistics. PLS would be used to study the validity of the framework's main components and to determine the relationships among the constructs of framework. PLS as an analytical tool, is used in two sequential steps: these are assessments of validity of measurement model and of structural model [17].

V. DISCUSSION AND CONCLUSION

The proposed framework focuses on the main dimensions like system quality, process quality and information quality. There are measures like system availability, functionality, reliability, privacy, security, efficiency, interactivity, information value, compensation, and transparency associated with the framework which determines e-service quality. Various hypotheses introduced show the relationships among various dimensions. The introduced framework e-GSQTA will improve both practitioners and researchers understanding about the quality criteria. The purpose of this paper is to propose suitable framework and dimensions for measuring e-service quality and trust in e-government which will be beneficial for digital society. The proposed framework is based on revising the literature and adapting the E-S-Qual, E-GovQual and ISO/IEC 9126 [18] standards for the studies. The framework includes various dimensions like web site quality, design, reliability, responsiveness, security, privacy, effectiveness, ease of use and citizen's trust. A high quality e-government service is a determinant factor in building trust in the offered e-government services. The Objective of this study was to design a framework e-GSQTA which will help practitioners to assess e-government service quality and also citizen's trust. Next phase of this study will be the verification and validation. India's e-government is offering various e-services in different areas hence validation of the proposed framework is to be done using e-tax services. The objective of choosing this area is based on the idea that e-tax service is widely used by a majority of the citizens. Proposed framework may have some limitations. Cultural political, demographic and governmental issues always vary from country to country. These factors may impact the e-service quality assessment along with trust also. Second thing is, this framework focuses on G2C interaction, meaning that the assessment is done from a citizen's point of view. It does not include G2G interaction.

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