The CIO on E-Government Service Quality:
A literature review

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Abstract

Nowadays, e-Government is not a new concept, even in developing countries are not in a premature stage. E-government has several aspects, including social, technical, economic, political, public administrative and has become an important tool in the administration as well as management. One of the most important functions of e-government is to provide e-services to citizens and the quality of service which government offers. In the last several years, quality of service in public sector has become an issue of great concern that governments must understand in order to provide the best e-Services from the customers' perspective. This study reviews the literature on e-service quality in public sector with an emphasis on the methodological issues in developing measurement scales- organization quality. The main purpose in this study will indicate Chief Information Officer (CIO) as a key indicator to evaluate e-government service quality.

Keyword: CIO, E-government, E-service quality

1. Introduction

Online service or e-service is a wide concept, which includes services provided by organizations, companies or an individual based on the Internet. If the services are provided by government, it is e-government. If the services are provided by companies, the services are called e-business or e-commerce. If the services are offered by the bank, we have the concept of e-banking.

Service quality is always the first priority from customers, from traditional services to online services. Service quality has a significant influence on many important aspects, there are many prior studies indicating that service quality depends on many factors. According to Yang and Jun (2002), Jun et al. (2004), Yang et al. (2004), Lee and Lin (2005), Sohn and Tadisina (2008) the main dimensions influencing e-service quality are reliability, access, ease of use, personalization, security and trust, and credibility. In 2003, Cai and Jun [6] indicated that website design/content, trustworthiness, prompt/reliable service and communication are four such dimensions, while Parasuraman mentioned that efficiency, system availability, fulfillment and privacy are the main dimensions impacting e-service quality. However, most of these studies focused on information system and service system aspect. A few studies have addressed the perception of organization on evaluation of e-service quality, especially the CIO impact. The conceptualization and measurement of e-service quality under the role of CIO are still at an early phase of development and studies in this field are still somewhat limited and disparate.

E-government is a paradigm shift from traditional government and its evolution happens in stages: initiation starts with web presence, matures to interaction through email or other electronic media followed by development of business logic infused with front end applications finally ending with integration of governmental activities beyond the web interface [11]. Quality of e-government services can be evaluated by user satisfaction and intention of future use.

In addition, nowadays the modern CIOs need be both business strategist and Information Technology (IT) manager [2]. In the information age, when IT touches every key process of business and every digital point of customer experience, the CIO plays a critical role not only in private sector but also in the public sector. The CIO becomes an innovator and cost-cutter, visionary and situation-driven. Organizations that view the CIO as a strategic asset are more likely to create business value through IT and thereby achieve superior business performance [8]. The role of CIOs in the public sector has become increasingly important, especially in the context of e-government service quality.

In this research, the objective is to understand the quality of service offered by the government and to analyze the factors that influence directly to service quality in-depth to find out about the role of CIO regarding evaluation of e-government service quality.

2. Definitions and Nature of Concepts

2.1 E-service

The e-service concept has been used by researchers from the beginning of 2000. There are many definitions of e-service. According to Saanen et al., (1999) E-service can be defined as the electronic provision of services to customers. E-service is a Web-based service delivered through the Internet [22]. An e-service operation is one where all or part of the interaction between the service provider and the customer is conducted through the Internet [25]. An e-service has a "front-end" Web-based systems and "back-end" information systems. Boyer et al. (2002) defined an e-service as follows: "The e-service encounter is the initial landing on the home page until the requested service has been completed or the final product has been delivered and is fit for use". In the context of the public sector, the definition of e-service should be connected to the definition of e-government.

2.2 E-service Quality

Service quality is defined under many different perspectives, based on customer's perspective, service performance, customer expectations and perceptions of service. According to Gronroos, service quality was described as the difference between the expected service and the perceived service. Many prior studies defined service quality as the extent to which a service meets customers' needs or expectations [3, 4], [26]. Srivastava (2011) [23] describes e-government as the use of Information Communication Technologies (ICTs) for improving the access to government services and delivery of value added target processes for the benefit of stakeholders. Service quality in e-government or e-service quality as it is referred to by some researchers is defined as users' overall assessment of quality in the virtual context and serves as one of the key factors in determining success or failure of e-government. It has an impact both on government and citizens [11]. Parasuraman defined service quality as the comparison between customer expectations and perceptions of service [20].

Based on these definitions, service quality can be defined as a measure of how well a delivered service matches the customers' expectations and the collective effect of service performances which determine the degree of satisfaction of a user of the service (ITU).

2.3 Chief Information Officer

The Chief Information Officer (CIO) can be defined as the highest ranking IT executive who typically exhibits managerial roles requiring effective communication with the top management, a corporate board perspective in managing information resources, influence on organizational strategy, and responsibility for the planning of IT [21].

3. Literature Review and Analysis

3.1 Dimensions of E-service Quality

Most prior studies have indicated that e-service quality is influenced by information quality and service quality factors, with various domains of measure. These include SERVQUAL, E-Q-QUAL, User-perceived web quality, online service quality, Quality Model for Portal Data, E-Service Quality, Quality aspects in design and use of Web sites, WebQual, Web-based service quality or Consumer Perspective of E-Service Quality, each study can refer different dimensions but common methods among them is using the perception of information system and service system as an approach. Table 1 shows the number of prior studies using information quality and service quality as main indicators on evaluating e-government service quality.

Table 1: E-government service quality dimensions

Studies	Approaches	Dimensions for evaluation
Aldwani and Palvia (2002) [1]	Web service quality	5 dimensions: Technical adequacy, Specific, Content, Content quality, and Web appearance.
Barnes and Vidgen (2002) [5]	Web site quality	5 dimensions: Usability, Design, Information, Trust, and Empathy
Li et al. (2002) [15]	Web-based service quality	6 dimensions: Responsiveness, Competence, Quality of information, Empathy, Web assistance, and Call-back systems
Loiacono et al. (2002) [16]	Website quality	12 dimensions: Informational Fit-to-task, Interactivity, Trust, Response time, Ease of understanding, Intuitive operations, Visual appeal, Innovativeness, Flow-emotional appeal, Consistent image, Online completeness, and better than alternative channels.
Yang and Jun (2002)	E-service quality	8 dimensions: Reliability, Access, Ease of use, Personalization, Security, Credibility, Responsiveness, and Availability
Cai and Jun (2003) [6]	Online service quality	4 dimensions: Content, Trustworthiness, Prompt/reliable service, and Communication
Gounaris and Dimitriadis (2003)	Web portal quality	3 dimensions: Customer care and risk reduction benefit, Information benefit, and Interaction facilitation benefit.
Jun et al. (2004)	Online service quality	5 dimensions: Reliable/prompt responses, Attentiveness, Ease of use, Access, Security, and Credibility.
Yang and Fang. (2004) [27]	Online service quality	10 dimensions: Responsiveness, Reliability, Credibility, Competence, Access, Courtesy, Communication, Information, Responsiveness, and Web site design
Lee and Lin (2005)	Online service quality	5 dimensions: Web design, Reliability, Responsiveness, Trust, and Personalization
Parasuraman et al. (2005) [20]	E- service quality	10 dimensions: Reliability, Responsiveness, Competence, Access, Courtesy, Communication, Credibility, Security, Understanding and Tangibles
Yang et al. (2005)	Web portal quality	5 dimensions: Usability, Usefulness of content, Adequacy of information, Accessibility, and Interaction
Fassnacht and Koese (2006)	Quality of electronic	12 dimensions: Environment quality, Delivery quality, Outcome quality, Graphic quality, Clarity of layout, Attractiveness of

	service	selection, Information quality, Ease of use, Technical quality, Reliability, Functional benefit, and Emotional benefit
Cristobal et al. (2007)	E-service quality	4 dimensions: Customer service, Web design, Assurance, and Order management.
Sohn and Tadisina (2008)	E-service quality	6 dimensions: Trust, Customized communication, Ease of use, Website content Functionality, Reliability, and Speed of delivery.

To measure information quality and service quality, many researchers used the information system (IS) success model proposed by Delone and McLean (1992) [10]. This model explains the IS measures which affect the use of information system in an organization. This model explains "information quality" and "system quality" as the two determining factors influencing "use/intention of use" and "user satisfaction" of a system and ultimately yielding "net benefits" at individual level and organizational level. In 2003, the model was refined by them to accommodate changes brought by rapid growth in the online environment. The success factor "system quality" in the online environment proposed to measure the desired characteristics of an e-commerce system such as usability, reliability, adaptability, and availability, while "information quality" embodied features of web content in the context of e-commerce. A new factor "service quality" was introduced to ensure relationship and care for the users [11]. In the context of e-government service, the government uses several information systems such as web sites, portals, open government/ data, social media for Government to Government (G2G), Government to Businesses (G2B) and Government to Citizens (G2C) communication. Delone and McLean IS success model can be used to explain their impact on users.

Many researchers have focused on how ICTs improve the efficiency and effectiveness of a system. One of the most famous models was proposed by Davis [9], called Technology Acceptance Model (TAM). TAM is an information systems theory that explains how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. TAM focused on the influence of perception and emotion toward technology use, particularly the new technology adoption behavior of users. The model establishes the relation of end users' perceived usefulness (PU) and perceived ease of use (PEOU) of a technology enabled system with users' behavioral intention to accept it. PU was defined by Davis as "The degree to which a person believes that using a particular system would enhance his or her job performance" and PEOU as "The degree to which a person believes that using a particular system would be free from effort". Delone and McLean IS success model and TAM are very useful and important to evaluate information quality and service quality, two main indicators on e-government service quality.

According to Nguyen [19], the quality of service depends on not only information quality and service quality but also depends on organization quality. Organization is considered as one of the essential elements of quality. In the context of e-service quality, the organization term is used to indicate the management and support of the organization. It includes all internal processes to deliver e-service to citizens. The above studies have appreciable management implications and worth considering to develop fast, inexpensive, trustworthy and reliable quality service models for e-government.

3.2 Role of the CIO

The CIO position emerged in the 1970s as a result of increased importance placed on IT. In the early 1980s, the CIO was often portrayed as the corporate savior who was to align the worlds of business and technology. CIOs were described as the new breed of information manager who were businessmen first, managers second, and technologist third. It was even postulated that in the 1990s, as information became a firm's critical resource, the CIO would become the logical choice for the chief executive officer (CEO) position [21]. CIOs are now expected to achieve quantum-leap efficiencies, produce previously unheard-of capabilities, create information out of disparate data sets, and provide citizen services

that are so fast, accurate, and user-friendly that the public's trust in government achieves record heights [7].

According to Obi, from the past decades, the roles of CIO are changing. In the 1980s, known as the first generation of CIOs, the main roles of CIO are to manage information systems and information distribution in offices. In the 1990s - the second generation of CIOs, the main role was to implement and make plans for information strategy as a part of management strategies. In the 2000s, the third generation of CIOs appeared with main task focused on "management" and "strategy" as a mediator between ICT and Management departments. Now, the CIO's traditional role, which is one of managing information, IT systems, and cost, has itself transformed to creating new competitive advantage, new products, and new services. The first area of focus for CIOs involving their role is leadership, applied not only in their own IT organization but equally, to the wider enterprise and even beyond it [13].

In the meeting with Indonesian government officers dated Dec, 24th, 2013. They mentioned that leadership is very important indicator in the deployment and successful implementation e-government projects.

The trust measure of a government's success is the value it creates for its citizens, communities and businesses. Now - more than ever - government agencies rely on information technology to help them maximize that value, making their services more efficient, more useful, more responsive, and more accessible. In this new world of technology-enabled transformation, government CIOs play an increasingly important role. Keeping the government's data centers up and running used to be good enough, but now, a CIO's primary challenge is helping other government leaders see what's possible—then driving that vision of transformation through an organization [12]. To face and meet the increasing citizens' demand, the government also has to find new ways to create value for the business, treating users as customers and delivering a superior IT service quality.

In the public sector, government CIO plays a very important role and has been recognized worldwide. Since 2005, in the first International e-government ranking of Waseda institute of e-government, the important role of CIO for e-government implementation was recognized.

The CIO is expected to align management strategy with ICT investment in order to achieve a balance between business strategy, organizational reform, and management reform; hence, the Government CIO is considered by many governments to be one of the key factors in the success of e-Government implementation. In the Waseda e-government survey, the CIO indicator measures firstly for the presence of CIOs in government; secondly, the extent of their mandate; thirdly, existence of organizations which foster CIO development, and finally, special development courses and the degree/quality to which they teach CIO related curricula. In this survey, due to government CIO being a very important indicator therefore, it has accounted 15% in total scores with 25 questionnaires on CIO Presence, CIO Mandate, CIO Organizations and CIO development programs [18]. Based on this survey, the government CIOs being the most likely candidate for making effective decisions regarding the allocation of limited resources, the CIO is expected to integrate management strategy with IT investment in order to achieve a balance between the business strategy, organizational and management reform and improve e-government service quality.

According to Misra [17], the CIO in public sector exist two models:

- The CIO of pre-Internet era in which the CIO was known as "Electronic Data Processing (EDP) Manager," usually positioned in a section, responsible for "office automation" and reporting to the sectional head as Figure 1.
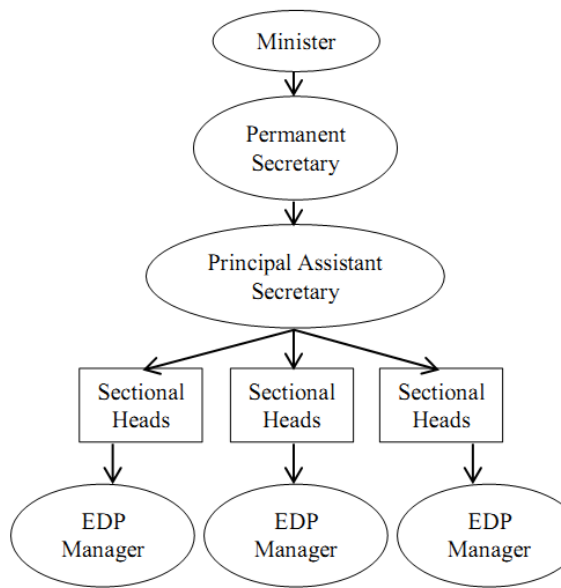
Figure 1. The CIO Model at pre-Internet era

Source: Misra. D.C, 2007

- The CIO of the post-Internet era, in which the CIO heads a division, is responsible for organization-wide introduction and management of information and communication technologies (ICTs) and reports directly to the head of the organization as Figure 2.
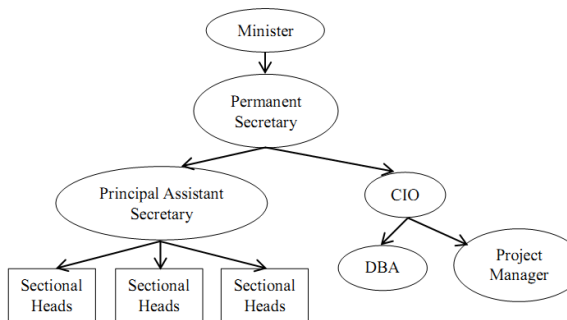

Figure 2. The CIO Model at post-Internet era

Source: Misra. D.C, 2007

According to Karen [14], twenty years ago, technical expertise was the critical variable; today, the CIO must possess the leadership and communication skills to have the potential of doing "business" differently and more effectively. Nowadays, leadership plays a great role in shaping and influencing organization and behavior and which will result on increasing organizational service quality. The role of the CIO

in public sector has become as varied as the business models in place today and shown as:

- The Technology Leader: Traditionally, leaders of IT were drawn from information systems departments in which they were applications, operations, or business analysis leaders and this became one of the main CIO responsibilities.

- The Business Leader: Business leaders from services, manufacturing, or marketing have also transitioned into CIO roles. CIOs have a special role in delivering e-service to users; the users can be referred as citizens, businesses or even government.

- The Strategist and Mentor: The strategist and mentor type of CIO operates in a fashion similar to that of a Chief Technology Officer (CTO) in a high-tech environment. These individuals can be characterized by their focus upon strategic directions for the corporation. These CIOs are typically grounded in strategic thinking and play an active role in the product or service development side as well as the marketing and sales side.

- The Corporate Influencer: The role of the CIO is directly shaped by the type of business environment he must support, and his influence is driven by the characteristics of the business, including their relative maturity levels [24].

In short, CIO is not a single role but a combination of roles. It demands a set of competencies that cover more territory than organizations demand from most other leadership positions.

In the contrast of background, very few studies have been conducted where the leadership impacts to e-government service quality, especially role of CIO on e-government service quality.

3.3 The Influence of CIO on E-government Service Quality

There is very little literature investigating the role of CIO on e-government service quality, but research literature found that in the federal agency

CIO's role was established by law in the Information Technology Management Reform Act (Clinger-Cohen Act) of 1996 in USA and strengthened by the E-Government Act of 2002. The E-Government Act called on CIOs to consult key stakeholders throughout their agencies, including program and project managers, content managers, librarians, public affairs representatives, records managers, and human resources managers. In this Act, the CIOs were told to consider delivering service and information to citizens electronically.

In today's digital information era, when the IT touches every key process of business, Internet impacts all areas of life and role of CIO is combination of roles, the CIOs are not only IT leaders but also business and organization leaders. Therefore, information transmission and deliver the best services with high quality are always the first priority of any leader. This study will propose how the CIOs influence on e-service quality.

4. Proposed Model and Hypothesis

4.1 Research Model

Many prior studies have adopted information quality and service quality approach to e-service quality and e-government how to provide a more convenient and continuous service to users but there is no research that explores the organization and their effects on public e-services. According to the literature above, this study generated the proposition that the organization internal processes (this study refers as CIO) will significantly affect an individual's perception on e-service quality. Based on this issue, the study will propose research model as figure 3. This study will try to look into the key variance in term the role of CIO. Based on the new trends of ICT and the combination roles of CIO, two variables – IT Leader and Business Leader – are selected, developed and included in the current study.
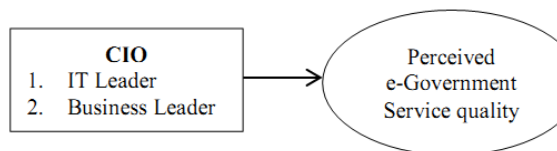

Figure 3. Research Model

Source: Author

4.2 Hypothesis

Based on the research model, and to clarify the relationship between CIO and the quality of services in public sector, a hypothesis will be proposed and summarized: "The CIO positively influences the perceived e-Government service quality."

5. Research Methodology

5.1 Data Collection

To collect the data to verify all dimensions and testing the hypotheses, the survey by questionnaire will be distributed to persons who understand e-service, service quality and especially know the CIO. The list of people receiving the questionnaire based on the mailing list of International Academy of CIO which is held biennially in Japan. To verify the factors proposed in this study, a questionnaire will be sent by direct email or posted online.

5.2 Methodology

The purpose of this research is to find out the influence of CIO to e-government service quality. For this purpose some previous research literature was reviewed to clarify these characteristics. Beside the literature review, this study will use the quantitative approach to test the quality criteria empirically. To test the hypothesis, a methodology called Partial Least Squares (PLS) will be employed in this study to verify the path relationship. The PLS method is a useful alternative to Covariance-based Structural Equation Modeling (SEM) and it can be a powerful method of analysis due to the minimal demands regarding measurement scales, sample size, and residual distributions.

6. Findings and Future Research

6.1 Findings and limitations

E-government definitely brings a lot of benefits for the government itself and to other stakeholders such as citizens and enterprises. The transparency of information makes users become more effective, responsive, interactive, and accountable. Besides, it makes governments (supply side) reduce cost, increases performance, and provides service faster, better and higher quality to both citizens and businesses.

This study reviews many researches that proposed and reported on many approaches for measuring e-government service quality such indicating the impact of information quality, system quality or service quality. Each approach has its own advantages and characteristics or selected different dimensions to evaluate.

However, unlike all prior studies, this study

- Summarizes the e-government service quality approaches

- Helps understand a new role of CIO and the influence of CIO on e-government service quality

- Proposes CIO as a key dimension in organization to evaluate the quality of service

This study is ongoing research, therefore the limitations of research are:

- Research has not collected enough data to test the hypothesis.

- This research has not analyzed the relationship among variables used in the study and also has not tested the model is significant or not.

- Research has also provided the final conclusions on the role of CIO on evaluation e-government service quality.

6.2 Future Research

This study is an ongoing research and aims to demonstrate the influence of the CIO to quality of services as mentioned above, the next step needs to be carried out are:

Firstly, based on the theoretical framework and research model, a questionnaire on CIO will be designed with two dimensions and 10 items. The questionnaire will be measured on a five-point of Likert-scale from 1 (strongly disagree) to 5 (strongly agree). There will be 16 questions in the questionnaire, starting with a cover letter describing the purpose of the questionnaire. To execute the survey, the questionnaire will be translated into Japanese and will be pre-tested by experts. In addition to the items in each dimension, the questionnaire also contains questions regarding the respondent's information such as their age, education, and sex. These questions are beneficial for demographic analysis.

Secondly, questionnaire will be sent to participants by direct email and post online within one month. The raw data will be collected and gathered into an excel file.

Thirdly, PLS is used to check all the variables, factors analysis (manifest variable), model quality (composite reliability, average variance extracted), correlation of latent variables and also structural model with coefficients.

Fourthly, from the results of the third step, the study will test the hypotheses based on the model proposed.

Finally, based on the results, conclusions will be drawn on whether the model will be accepted or not. Also, it will be investigated which dimensions affect the e-government service quality.

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