MEASURING AND MAKING E-SERVICES OF E-GOVERNANCE EFFECTIVE: A CASE DISCUSSION USING SERVQUAL AND PARETO ANALYSIS

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Government across the states wants to speed up delivery of information and services with the use of Information and Communication Technology by means of e-services, which improves the effectiveness of the Governance process. This has created a pressure on Government to make it more useful by providing speeder and convenient facility to the citizen through better e-services. But measuring and making more effective of these services are always a concern for government. In this paper an attempt has been made to make these services measurable and effective through factor and Preto analysis through a case discussion of Common Services Centers (CSC), setup to deliver e-services across the state of Odissa.

Keywords: CSC, E-services, E-governance, Effectiveness, Factor Analysis, Pareto Analysis

INTRODUCTION

E-governance is the use of Information Communication Technology (ICT) by the government, civil society, and political institutions to engage citizens through dialogue and feedback to promote their greater participation in the process of governance of these institutions (Bhatnagar, 2004). For some time there has been widespread acknowledgement that ICT has become the engine that drives the modern organization. Over a period of time information is considered to vital for economic development and Information Technology is a powerful tool for accelerating economic development by providing speeder and reliable information flow between Government and Citizens. E-Governance permits new ways for the participation of citizens and communities for debating (Taylor and Williams, 1994; Rogers and Shukla, 2001; Gupta *et al.*, 2004; Heeks, 2003). So, in recent years many government agencies in developed countries have taken progressive steps toward the web and ICT use, adding coherence to all local activities on the Internet, widening local access and skills, opening up interactive services for local debates, and increasing the participation of citizens on promotion and management of the territory (Graham and Aurigi, 1997). So there seems to have been efforts for providing various e-services in many developing countries since ICT is believed to offer considerable potential for the sustainable development of e-Government and as a result,

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e-Services. (Ndou, 2004). Owing to the rapid global growth in the internet and information technology, many governments around the world have transformed their services from the traditional services to electronic means (Alanezi *et al.,* 2010). The term 'E-service' has many applications and can be found in many disciplines. The two dominant application areas of e-services are E-Business (or E-Commerce): e-services mostly provided by businesses or Non-government Organizations (NGOs) (private sector). Rowley (2006) approach who defines e-services as: "…deeds, efforts or performances whose delivery is mediated by information technology. Such e-service includes the service element of e-tailing, customer support, and service delivery". These definitions reflect three main components-service provider, service receiver and the channels of service delivery (i.e., technology). Government across the countries are busy in measuring and making these e-services effective for better services delivery.

LITERATURE SURVEY

E-government services can play an enormous role in improving e-government efficiency, as well as, increasing citizens' satisfactions. There are a growing number of e-service quality studies which showed more different dimensions for measuring the quality of e-service. Many researchers have realized that the key determinant to the success or failure of e-government projects is the e- service quality (Faris and Vishanth, 2010), Chutimaskul *et al.,* 2008). Even though, the concept of e-service quality is still in its early stage, it has become an important issue in recent years (Lee and Lin, 2005), Santos (2003), Hongxiu and Reima (2009). E-service quality can not only provide organization

competitive advantages in the online environment, but also involves clients in the product process through customer's feedback, and improve clients' relationships and satisfactions Santos (2003). E-service quality can be defined as overall consumer evaluations and opinions about the excellence of e-service delivery in the virtual marketplace Santos (2003). However, Chutimaskul *et al.* (2008), affirmed that many e-governments have been developed without paying full attention to the quality of the e-government services and the requirements of citizens. Papadomichelaki *et al.* (2006) confirmed that the quality of e-government services has become the subject of great concern in the recent years. Therefore, it is very important to ensure quality characteristics to those services such as reliability, ease of use, security and etc Zeithaml, (2002). Research has often referred to egovernment service quality as the degree to which an e-government web site facilitates the competent delivery of efficient e-services to help citizens, businesses and agencies in achieving their governmental transactions (Tan *et al.*, 2008). Quality e-services can provide online organization competitive advantages by improving the organization performance and clients' satisfactions Santos (2003). As a result of that, the quality of egovernment services can play an enormous role in improving e-government efficiency, as well as, increasing citizens' satisfactions. However, E-service quality has received researchers' attentions in the recent years due to its importance Hongxiu and Reima (2009) . The concept of e-service quality is derived from the concept of quality of traditional services. E-service quality can be classified as the key determinants to the success or failure of online organizations (Kim *et al.*, 2009) (Barnes, 2002).

According to (Lee and Lin, 2005), many online organizations fail as a result of poor e- service quality. Service quality has been recognized as one of the major factors for organization sustainability and one of the driving forces for an organization's achievement (Santos, 2003). Service quality represents the comparison between customers' expectations of how a company or organization should perform and the service performance that customers perceive Parasuraman, Berry and Zeithmal (1985). Measuring quality service and service excellence are important in a competitive organizational environment. The most dominant and extensively used scale for assessing service quality is SERVQUAL Hongxiu and Reima (2009), which was developed by Parasuraman, Berry and Zeithmal (1985). It contains 97 items within ten service quality dimensions Parasuraman, Berry and Zeithmal (1985). Later, in the early of 1988, the authors diminished the dimensions to five dimensions with 22 items (Alanezi *et al.*, 2010). The SERVQUAL- service quality model is one of the widely used tools for measuring quality of the service on various aspects. The five attributes of this model are: reliability, responsiveness, assurance, tangibles, and empathy. Although, SERVQUAL scale was developed in a marketing environment, it has been widely used in an IS context and IT (Landrum *et al.*, 2009). According to Lee and Lin ,2005, many research have successfully employed SERVQUAL in e-commerce context such as (Devaraj *et al.*, 2002; Kim and Lee, 2002; Li *et al.*, 2002; Kuo, 2003; and Negash *et al.*, 2003). As a result of the differences between the methods of measuring service quality in e-government and physical market services, it is very important to reword and reformulate the SERVQUAL scale items

before they are used extensively in the online government context Lee and Lin (2005), Hongxiu and Reima (2009). Even though, the five dimensions of SERVQUAL scale were created in the physical market services, most researchers have used the dimensions based on the SERVQUAL scale for online environment Hongxiu and Reima (2009). Zeithaml (2002), stated that some dimensions of SERVQUAL scale can be used in online environment by adding some technical dimensions. Lee and Lin (2005) identified the main dimensions that have influenced service quality in online shopping by modifying the SERVQUAL. Those dimensions are web site design, reliability, responsiveness, trust and personalization. Moreover, Zeithaml (2000) modified the SERVQUAL scale to consider the e-service environment and identified 11 dimensions including: access, ease of navigation, efficiency, flexibility, reliability, customization/ personalization, security/privacy, responsiveness, assurance/trust, site aesthetics, and price knowledge. Based on these 11 dimensions, Parasuraman, Zeithaml, and Malhotra (2005) developed an E-S-QUAL scale which has E-re service quality and an e-recovery service quality. The E-core service quality includes four dimensions: efficiency, fulfillment, system availability, and privacy. Meanwhile, the e-recovery service quality has three dimensions: responsiveness; compensation; and contact. However, Kim *et al.* (2006) modified the e-S-UAL and e-RecSQUAL scales by adding three dimensions namely: privacy, information, and graphic style and removed the compensation dimension. They developed the aforementioned nine dimensions to measure the service quality of online apparel retailers. Yoo and Donthu 2001proposed a scale called SITEQUAL for

measuring web site quality based on four factors namely ease of use, aesthetic design, processing speed, and security. Cox and Dale 2001claimed that traditional service quality dimensions such as competence, comfort, cleanliness and courtesy were not suitable for online environment, whereas dimensions such as accessibility, communication, credibility, understanding, appearance, and availability were very significant for online environment. A scale called WebQual has been developed by Loiacono *et al.* (2002) to evaluate web site quality, which is composed of 12 dimensions: informational fit-to-task, tailored communications, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, emotional appeal, consistent image, online completeness, and relative advantage. By the same scale name, Barnes and Vidgen (2002) developed WebQual scale for measuring web site quality based on three factors: usability, information quality, and service interaction quality. Additionally, performance, features, structure, aesthetics, reliability, serviceability, security and system integrity, trust, responsiveness, service differentiation and customization, web store police, reputation,

assurance and empathy were identified by Madu and Madu (2002) for web site design. Overall, there are a variety of e-service quality dimensions that have positive and significant impacts on online users' perceived quality Lee and Lin (2005). Alanezi *et al.* (2010) has added two dimension to five SERVQUAL model, i.e., information and ease of use). Considering this requirement, new instrument dimensions are needed for measuring e-government service quality. As per (www.wikipdia.com), Lu (2001) identifies a number of benefits for e-services, some of these are, Accessing a greater customer base, Broadening market reach, Lowering of entry barrier to new markets and cost of acquiring new customers, Alternative communication channel to customers, Increasing services to customers, Enhancing perceived company image, Gaining competitive advantages, Potential for increasing customer knowledge and major cost factors are :Expense of setting up applications, Maintaining applications, Internet connection, Hardware/ software, Security concerns, legal issues, Training; and Rapid technology changes. A comparative literature survey is represented in Table 1.

Table 1: Comparative Literature Survey				
SERVQUAL	**Kaynama & Black (2000)**	**Zeithaml (2002)**	**Janda *et al.* (2002)**	**Alawattegama & Wattegama (2008)**
Tangibles	Design	Flexibility	Information/content	Consumer related information
Responsiveness	Access	Ease of navigation	Security	Business information
Reliability	Content	Access	Access	Factual information
Empathy	Response	Reliability		
Assurance	Navigation	Efficiency	Sensation	General information
	Background	Personalization		
	Personalization	Security/privacy		
		Responsiveness Assurance/trust Site aesthetics Price knowledge		

Generally speaking, the Critical Success Factors can be defined as "the critical areas which organization must accomplish to achieve its mission by examination and categorization of their impacts" (Oakland, 1995). On the other hand, according to Boynton and Zmud (1984), CSFs are those vital construct that must go well to ensure success for a manager or an organization, and therefore, they represent those managerial or organizational areas that must be given special and continual attention to bring about increased performance. Brotherton and Shaw (1996) defined CSFs as "the essential things that must be achieved by the company or which areas will produce the greatest competitive leverage". They emphasize that CSFs are not objectives, but are the actions and processes that can be controlled by management to achieve the organizations goals. The definition given by Boynton and Zmud is more universal which is equally applicable to all sectors.

CASE INTRODUCTION

The CSC (common service center) is a strategic cornerstone of the National e-Governance Plan (NeGP) of Indian Government, as part of its commitment in the National Common Minimum Program to introduce e-governance on a massive scale as a part of e-services. The CSCs would provide high quality and cost-effective video, voice and data content and services, in the areas of e-governance, education, health, telemedicine, entertainment as well as other private services. A highlight of the CSCs is that it will offer web-enabled e-governance services in rural areas, including application forms, certificates, and utility payments such as electricity, telephone and water bills. A number of CSC centers with this concept has been setup in the Odisha, a state of India, these centers are servicing the common man with a objective to provide various services.

Analysis

The objectives of the present study are twofold: First, to measure the e-services using SERVEQ model and secondly apply a factor analysis and Pareto analysis tools for finding Critical Success Factor (CSF) to make these e-services effective. In order to measure the status of e-services of CSCs centers, we visited 8 centers are selected randomly out of 30 centers of western Odissa and verified transactions records, and the response as per SERVEQ model are given in Table 2.

After verification of the record in 30 centers, we concluded that successes of these centers are not up to the mark and objective of the e-services are yet to be fulfill, as there are only two applications which are operational. As the results are not satisfactory, we made a questionnaire to finding critical success factor to make these e-services effective. To find out critical success factors CSF, we found that there may be fifteen factors, which may be responsible for success of these centers.

Table 2: Transaction Records	
Tangibles	No. of Persons Visiting CSC per center per day (Avg.): 10
Responsiveness	No of Transaction Per day per center (avg.):4
Reliability	No of Applications on use: 2 (Electricity Bill payment, Railways ticket Booking), With a success rate 100%
Empathy	
Assurance	

FACTOR ANALYSIS

As discussed above there may be 15 CSF for effectiveness of e-services of e-governance. To find the factors important for computerization a structured questionnaire is prepared containing these fifteen factors. The questionnaire is distributed among 130 customer, out of which fifty six responded fully. The data collected is used for factor analysis for two purposes, to reduce the number of factors and to detect structure in the relationships between variables, i.e., is to classify variables. Therefore, factor analysis is applied as a data reduction or structure detection method (the term *factor analysis* was first introduced by Thurstone, 1931). The rotated component matrix is shown in Table 3. The variables with factor loading more than 0.50 were considered as significant under each dimension. The eigen values of selected factors were greater than 1. Three factors are extracted on analysis and three variables viz. transparency, environment and corporate image is dropped as their factor loading is less than 0.50. It shows that these factors, such as transparency, environment and corporate image have no significant impact of on computerization system. From the factor analysis we got three sub factors according to the importance like primary attributes, Secondary attributes and Tertiary attributes. Table 3 represents the three sub-factors which contribute to the computerization system of the organization.

PARETO ANALYSIS

Pareto analysis is a statistical technique in decision making that is used for the selection of a limited number of tasks that produce significant overall effect. It is one of the most commonly used, and easy to implement method. Pareto analysis is a relatively simple methodology that is used when trying to determine which tasks or factors in an organization will have the most impact (Cervone, 2009). It ranks the data/factors in the descending order from the highest frequency of occurrences to the lowest frequency of occurrences. The total frequency is summed to 100%. The *"vital few"* items occupy a substantial amount (80%) of cumulative percentage of occurrences and the "useful many" occupy only the remaining 20% of occurrences, which is also known as the 80-20 rule developed by the Italian Economist Vilfredo Pareto (Karuppusami and Gandhinathan, 2006). The results of a Pareto analysis are typically represented through a Pareto cart. The chart represents the various factors under consideration in ranked order. The presentation of this chart is in the form of a bar graph in descending order and helps to predict easily which factors are vital, by providing a clear

Table 3: Factors Influencing the e-services Effective		
Primary Reasons	**Secondary Reason**	**Tertiary reasons**
1. No of applications	Cost	Uniform Standard
2. Customer care	Validity	Cost
3. Hassel free transactions	Easy	
4. Awareness	Reliability	
5. Convenient	Secure	

Pareto Analysis Chart
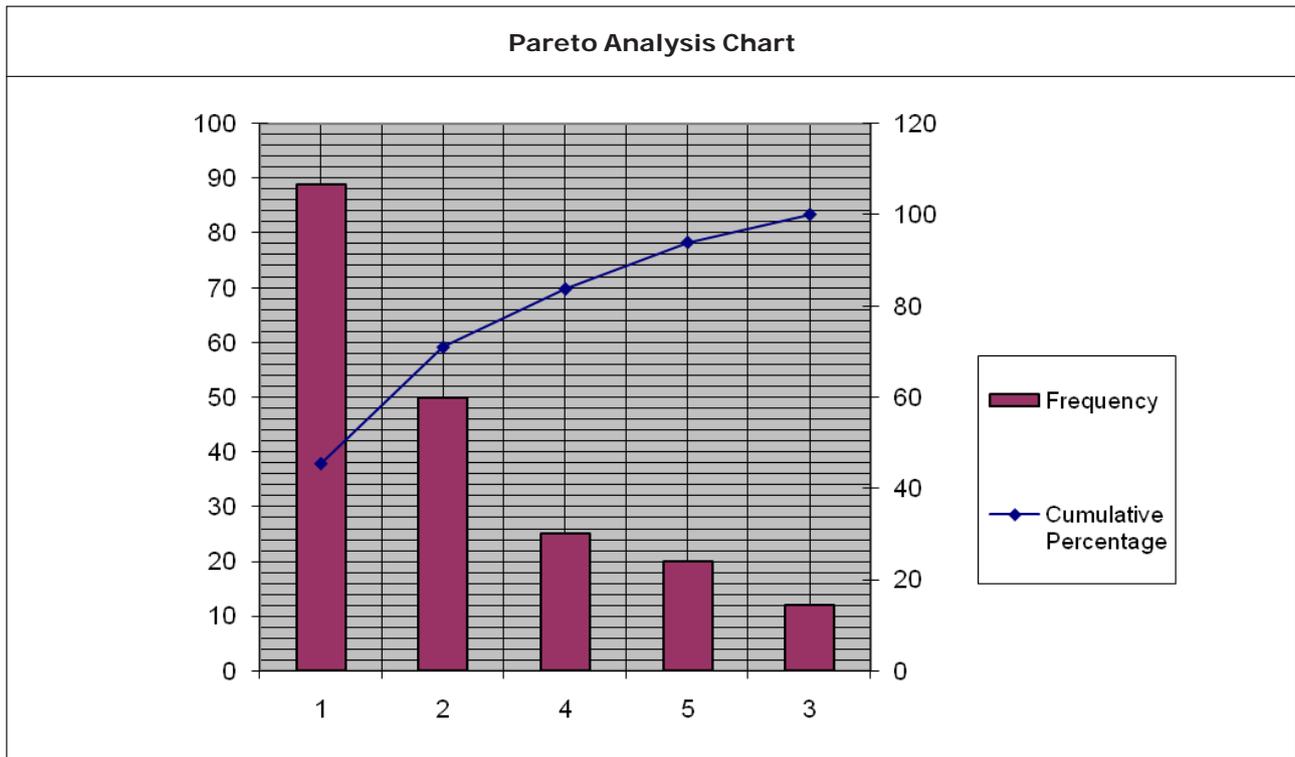
indicator through superimposing a line graph that cuts an 80% cumulative percentage and also helps in determining those factors which have least amount of benefits and vice-versa. Joseph Juran extended this concept and found it to be applicable in a broad array of aspects in everyday life (Cervone, 2009). For example it can be applied in a number of contents such as searching for books on-line in digital library catalog, determining which tasks in a project will have the mostimpact, assessing major causes of customer complaints from products or services, identifying those products or services that account 80% of the profit and many more.

In our case we prepared a questionair and interacted with a total of 196 customers, with respect to the importance of five factors are represented with pareto analysis.

The above analysis show that if Government can take step to provide more no of services in

CSCs centers and the centers owners will take care of customer with proper care, the others factors awareness, hassel free transaction and convient factors responsible for success of these e-services will automatically be taken care and the e-service effectives will increase.

CONCLUSION

The basic objective of e-governance through CSCs-services is to provide better services to the citizens of the states, as reveals from the study that various factors are be responsible to make these centers successful. But focusing simultaneous all these factors may not be always possible due to various constraints. But if the Government can focus on providing more citizen services like Birth registrations, Death registration, land record information, marriage registration, relevant government information then the success of these centers will increase the effectiveness

of E-services intern will have a better E-governance system.

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