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Analysis and evaluation of services in Brazilian sites of e-gov

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Electronic government (e-gov) is related to all forms of communication made through information technology (IT) that can bring a number of benefits to public bodies in a general view. Since it is a technology whose becomes more used in development countries after the massive internet growth, there are still many features that can be exploited for the benefit of the government, the citizens and the businesses that interact through this tool. This study evaluated one of the largest e-gov portals existing in Brazil identifying aspects related to its performance in terms of user's satisfaction related to the offered services. A quantitative survey with a sample involving 1072 responses was conducted. After data collection, a regression analysis of the data was performed in order to evaluate the attributes that most contributed to the citizen's satisfaction. Among these attributes we can mention: to provide quality information, to deliver the expected product and to provide communication options that really work out. As negative results, it was observed that the aspects related to privacy and data security are still underdeveloped.

Key words: E-gov, services, satisfaction, satisfaction assessment.

INTRODUCTION

Governments are increasingly using Internet to communicate and transact with citizens, commonly referred to as electronic government (McNeal et al., 2003).

The positive effects of e-gov which, according to Hoeschl (2003), may be designated as strategic objectives are: improvement of quality, safety and speed of services to the citizen; simplification of procedures and reduction of bureaucracy; advancement of citizenship, democracy of information, transparency and optimization of government actions; education for the information society; ease to access the government; integration of information to the public; increase of jobs in private sector; optimization in the use and application of available resources; integration among the government agencies; closeness to citizen; development of professional public service; improvement of public management models; universal access to information.

The use of Internet in several sectors of society as well as a means of communication and services - which includes the services of e-gov - is, according to Arakaki (2008), a relatively recent phenomenon, mainly in developing countries like Brazil: only in the mid-90s, the first e-gov initiatives took place in the country.

According to Agencia Brasil (2011), personal service is still the preferred form of accessing public services (60% of users); since only 35% use the Internet to seek these

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services, whether at the federal, state or municipal scope. Through this study, some points were found out:

- 91% of people who make use of e-gov were pleased;
- The search for information was the main service sought (90% of them);
- The low internet use is related to concerns about data security (39%), difficult to find services (28%) and inefficiency in returning the requests (28%);
- Nonusers highlight the preference for personal service (48%) and the lack of skill to use the computer;
- Among the most requested services by population, scheduling medical appointments was the most used one (34%).

This research was designed according to the following purpose: to develop a model to analyze the services offered by e-gov sites, based on the citizen's point of view. The study analyzed e-gov services of the State of São Paulo, once this is one of the most important in economic terms in the Brazilian economy (31% of Brazil's GDP). It should be noted that, in Brazil, in the relationship between citizens and the government, the state plays a major role organizing public services that come directly to users, often (for reasons of scale) integrating and articulating the municipal and state services.

This paper presents a theoretical framework that discusses the following concepts: e-gov, e-gov in Brazil and in the State of São Paulo, evaluation of e-gov through quality and functional aspects of marketing, citizen satisfaction about e-gov and it also proposes a model to analyze services offered by e-gov sites. After, the research method used for this study is presented, followed by the results and final remarks.

THEORETICALCONCEPTS

E-gov

The term e-gov is, according to Sanchez and Araújo (2003), to denote the set of activities that the government carry through Information and Communication Technology (ICT); on the other hand West (2004), refers to the online delivery of government information and services through the Internet or other digital media, available 24 hours a day, seven days a week which allows citizens to seek information according to their own convenience and not only when a government office is open.

An e-gov program should, according to Arakaki (2008), contemplate actions broader more than be restricted to projects of government portals to the Internet: it should gather the idea of developing a government to carry out a rapprochement between citizen and the government through the use of ICTs in order to improve services and information offered to all citizens, increasing the efficiency and effectiveness of public management and

the transparency of public sector as well as the participation of citizens.

The e-gov can still be seen as an initiative to modernize public administration, making it the result of the evolution from bureaucratic into management model, which shall prioritize the purposes, which, in this particular case are all the citizens.

This vision of e-gov cited by Arakaki (2008) in which ICTs are a means and not the purpose, it is, to use information technology to modernize the government so that it can offer electronic services that truly meet the needs of citizens and not only make use of the Internet to computerize bureaucratic processes; which is the guiding point to define e-gov study, since the focus of this study is to analyze the citizen's point of view as well as the functional aspects (explained below) involved in e-gov projects and not their technological aspects.

One of the biggest advantages of e-gov emphasized by Endler (2000) is the decrease in the number of people seeking for and crowding public offices. For the author, the public Internet should provide: (1) reduction of infrastructure and bureaucracy expenses, (2) greater synchronicity in the process achieved by intensive use of information technology, (3) reduction of losses by transport since these can be almost entirely eliminated with the use of secure and stable telecommunication infrastructures, (4) reduction of losses on waiting time, once the service will be at your fingertips, available whenever requested.

In addition to the benefits mentioned above, Sanchez and Araújo (2003) stated that with the interactions between citizen and government agencies through the Internet, the government aims to provide more comfort and faster services to citizens: the Internet improves the quality of public services among other reasons because there is hardly any restriction on accessing time.

Despite the numerous benefits offered by e-gov, many barriers still need to be overcome. In his research, West (2004) identified a number of them such as: the concern of citizens with regard to the privacy and security of government websites, the lack of resources to meet the needs of special populations, the availability of computers and Internet, the need of educating the public about the existence of online services and information, and the cost of the e-gov infrastructure.

Welch et al. (2005) conducted a survey to evaluate how the use of Internet, the satisfaction of citizen with e-gov and the confidence of citizen in government are interrelated, and found out that the reasons for an individual to visit a government site are determined by a set of factors that includes the use of Internet in general, demographic characteristics and their individual needs. The authors also found that the use the citizen makes of government sites probably affects their perceptions about how the e-gov efforts meet their expectations - and the satisfaction of those citizens in relation to the results of e-gov is determined by the level of perception on

competence and effort in relation to factors such as convenience and service efficiency, quality and quantity of information, ease of access and interactive communication.

When examining the successful implementation of e-gov U.S. federal government, focusing on delivering high quality services through the federal agency sites compared to sites in the e-business private sector, Morgeson III and Mithas (2009) could see that the e-gov was not yet providing high quality services to citizens, at least when compared to electronic business sites and, while sites of federal e-gov were lagging behind the sites of e-business in basic measures of functionality and satisfaction, they were superior in customer retention and recommendation of use to other people.

Assessment of E-gov – Functional aspects of quality

Parasuraman et al. (2005) reported that, initially, the web presence and low price were considered the drivers for business success in virtual environments, but issues related to service quality have quickly become essential. Always the consumers fail to complete transactions, the emails are not answered, and the desired information cannot be accessed, the viability of Web channels is compromised. For the authors, to offer high quality service means that managers of companies with Web presences must understand how consumers perceive and evaluate the online customer service.

Iwaarden et al. (2003) conducted a survey in order to identify which factors of perceived quality were most important in relation to the use of websites and the results indicated that the dimensions of quality standards in the services sector were also applicable to the sites: the items identified as the most important in relation to the quality of the sites were tangibility (the site appearance, navigation, search options and structure), reliability (the ability to judge the reliability of the service offered and the organization that runs the service), the responsiveness (the willingness to help customers and provide prompt service), assurance (the ability of the site to convey trust, security and privacy security) and empathy (the provision of individualized attendance to clients, including the user's recognition and customization).

Parasuraman et al. (2005) have proposed to conceptualize, build, test and refine a range of several items to measure the quality of service offered by sites, called ES-QUAL, composed of four dimensions and 22 items.

The four dimensions of ES-QUAL scale are as follows:

Efficiency: The speed of access and ease of using the site;
Achievement: To what extend the site promises and fulfills the delivery of applications and availability of items:

System availability: The correct technical functioning of the site;
Privacy: To what extent the site is safe and protects customer information;

The dimensions of ES-QUAL scale were used to make up the model proposed in this study to analyze the service quality of e-gov sites along with other elements discussed below.
For Kumar et al. (2007), the final goal of e-gov programs should be recurrent and frequent use of online services by citizens, not only to obtain information but also to interact and transact with the government and, in order to increase the frequency of use, governments must measure and monitor citizen's satisfaction with existing services. Therefore, the authors proposed a conceptual model in which the characteristics of users and the design of the site were considered aspects influencing the adoption of e-gov, while service quality affects citizens' satisfaction, which leads to recurrent use of e-gov services and contributes to their adoption.

Assessment of E-gov – Functional aspects of marketing

Marketing strategies should provide a suitable web experience which can be defined as the impression that the consumer has on the online company and this impression is the result of his/her exposure to a combination of virtual marketing tools under the direct control of the manager, which may influence online consumer's behavior (Constantinides, 2002b, 2004).

The web experience is critical to sites that provide e-gov services, and was therefore an aspect explored and considered in developing the model proposed in this study.

There are three major factors that, according to Constantinides (2004), influence the web experience (FIEW) and are directly linked to the success or failure of sites:

Function factors: Their components are usability and interactivity and influence the online consumer's experience.
Psychological factors: concern online confidence. The elements related to on line trust are safe transaction and customer data: clear procedures for payments and refunds, warranties and return policies, and the use of elements that can reduce citizens' uncertainty such as frequently asked questions (FAQ).
Content factors: They are divided into two categories _ aesthetic and marketing mix. The elements that make up the aesthetics communicate the atmosphere of the site, which is important to attract online customers. . The elements that refer to the marketing mix are communication (quality information); procedure (the

online way of tracking order and delivering products has an immediate impact on the willingness of customers to return to the site for future business); presentation (variety of products); price and promotion.

Besides the importance of function, psychological and content factors on the web experience, their components are similar, in many cases, with the dimensions of scale ES-IS discussed above and, therefore, were also considered in the proposed model developed in this research.

The essential differences between the physical and virtual commerce make, according to Constantinides (2002b), that the marketing principles need to be revised in order to suit better the virtual environments. The author stated that the traditional marketing mix consisting of 4 Ps (product, price, promotion and place) is incompatible with the electronic context and proposed a marketing mix for the web that identifies the critical elements of marketing for such an environment, composed by 4 Ss:

Scope: related to strategy and objectives, with the aim of researching the guidelines of decisions in four areas: the strategic and operational objectives of the online project; market definition; the preparation degree of organization for e-commerce, and the strategic role of e-commerce for the organization.

Site: in order to understand the experience with the web, it is questioned what the consumer expects from the site, why he will use the site and what motivates him to return. This element focuses on the interface between the company and the customer.

Synergy: deals with integration aspects.

System: includes technology, technical requirements, services and management.

Among the alternatives of marketing mix models for virtual environments, the model of the 4 Ss (web-marketing model, WMM) is, according to Wang et al (2005), feasible for companies selling online services and more appropriate than the 4 Ps model, besides being used more often.

Due to the major role played by the marketing mix and its appropriateness to the virtual context, the elements of WMM were also considered in a complementary way the proposed model for analysis of services for the e-gov sites developed in this study.

Citizen's satisfaction with E-gov

The purpose of offering a quality service in a virtual environment is to make the citizens satisfied and make them feel increasingly compelled to use it.

To Matsukuma and Hernandez (2007), satisfaction can be understood through its attributes, and thus make strategic decisions with greater certainty. Satisfaction, the authors continue, is an index that allows to know the

customers and, in conjunction with other analyzes, indicate whether the customer is loyal to the company, if he intends to migrate to a competitor or if he wants to leave the market. That research satisfaction may help to predict risk situations and make decisions to avoid them before they happen.

Regarding the electronic context, the biggest challenge, according to Kalakota and Robinson (2002), is to unite emerging technologies to the new business architecture of the company in dynamically changing markets, because that context affects customers' needs and increases their expectations. Song et al. (2011) in their studies found that information and system quality affect the perception of service quality.

Proposition of a model to analyze services of e-gov sites

The dimensions and aspects covered by the ES-QUAL scale developed by Parasuraman et al. (2005), through the model of the 4 Ss by Constantinides (2002a) and the influencing factors of Web experience (FIEW) identified by Constantinides (2004) were used in this study in a complementary manner with the aim of analyzing the services provided by e-gov sites based on the point of view of the citizen – the user of evaluated services.

Summarizing the arguments presented above, it is possible to justify the choice of analysis tools presented using a number of factors such as:

- For virtual environments, the 4Ss model is one of the most used model and more suitable than the 4 Ps (WANG ET AL, 2005).
- The 4 Ss model was designed for the planning of conventional physical corporations to establish an internet presence (CONSTANTINIDES, 2002a). And this is the reality of the government which was researched.
- Developed to specifically assess the quality of services, the ES-QUAL takes into account specific characteristics of services that differentiate the products and affect their quality ratings.
- Factors influencing the web experiences have, according to Constantinides (2004), a direct relation to the website success or failure.
- The three tools involve functional aspects of assessing e-business, which is the scope of this study.
- The dimensions of the tools are not only similar but also complementary.

The aspects evaluated in each dimension, as well as the models from which these dimensions were extracted, can be seen in Table 1.

As can be seen in Table 1, what is intended to be analyzed is in respect to functional aspects of e-gov evaluation, involving elements of service quality and marketing after the citizen's point of view.

Based on the aforementioned assumptions, the two-

Table 1. Aspects to be assessed.

Dimension	Origin of dimension	Aspects to be analyzed
Efficiency	ES-QUAL FIEW/Functionality	Speed to access the site; Easy to use the site; Easy of interaction in the website; Convenience to use the website; Personalized services; Quality services.
Accomplishment	ES-QUAL FIEW/Content	The site clearly presents the offered services; The site complies with the offered services; The site allows following underway processes.
System availability	ES-QUAL	The site presents no problem of unavailability; The links in the site work properly; The site does not stop (stuck) during use.
Privacy	ES-QUAL FIEW/Psychologist	The transactions require passwords; The site offers security and privacy policies; The site indicates the existence of safety mechanisms.
Site	4 Ss FIEW/Content	The site offer what citizens expected; The site encourages the citizen to return; The site encourages the citizen to use it.
Synergy	4 Ss FIEW/Content	The site provides quality information; The site provides options for communication (e-mail. phone); The options for communication work out; The site has a FAQ.

Source: Elaborated by the author.

factor model of the 4 Ss, scope and system were not considered. The scope was not considered because it concerns the strategy and objectives of the company, it is, the focus of this factor is the organization and not the citizen and therefore not part of the scope of this study. The factor system, in its turn, was not used because it involves aspects directly related to IT as technical requirements, services and management.

METHODOLOGY

E-gov in Brazil and in the State of São Paulo

In 2000, The Brazilian e-gov was designed through a proposal prepared by an Inter-Ministerial Working Group which provided a new cultural paradigm of citizen-focused digital inclusion with consequently cost reduction, improved management and quality of public services, transparency and simplification of government processes, thus rescuing various initiatives of government agencies, especially those related to the citizen and in advanced process of implementation, which allowed the national e-gov program start from a more advanced level.

The e-gov, according to Mora (2005), proved to be an important tool in the process of modernization in Brazil: the United Nations (UN) and the American Society for Public Administration (ASPA) evaluated the stage where the e-gov was among the UN member countries [UN/ASPA (2001)]. E-gov in Brazil has achieved highly positive results and was ranked in 18th place in a sample of 132 countries.

Pinho (2008) presents an article of main aspects of e-gov sites in Brazil, but he conducted only a descriptive study analyzing the main features of the sites. Until this data, using Google Scholar was not detected any quantitative study of e-gov sites in Brazil, the main contribution of this study.

São Paulo is the Brazilian state with the largest population: there are 40 million inhabitants and is among the states with the highest Human Development, responsible for 31% of Gross Domestic Product (GDP) (SAOPAULO, 2012).

According to Diniz (2000), the key points considered by the state government for the success of their e-gov was the integration comprising all levels of government and organizations through IT; critical assessment of IT use in the state, and the establishment of a gradual and integrated policy of making computer more popular, focusing on the effectiveness of state action and simplicity of use and access by citizens.

In order to facilitate the access of citizen to information and public services, the government of the State of São Paulo implemented in

1996, the Program Poupatempo which brings together in one physical place, various agencies and service providers of public nature. In addition to the fixed service offices, there are also mobile units that take the main Poupatempo services to the population residing in cities and neighborhoods far from where they are located. The program provides more than 400 services to people, from which issuance of civil identity card, certificate of criminal records; work papers and driver's license are the most requested ones.

The portal of the State of São Paulo is, for Fernandes and Afonso (2001), a model of excellence and, in many ways for example, simplified and friendly graphical interface, speed and ease of access to desired information; moreover, it is much above the portal of the Federal Government. These aspects are of great importance and therefore will be part of the model proposed by this study for analysis of e-gov sites with a focus on the quality of services perceived by the citizen.

The site chosen for analyzes related to e-gov services in the state was Poupatempo (www.poupatempo.sp.gov.br) because it is a very popular and used program in the State of São Paulo. Moreover, it is a program with a fundamental characteristic: this program can be accessed both in physical and virtual environment.

Considering this research, a quantitative study was conducted with a selection of non-probabilistic sample for convenience, allowing researchers a greater understanding of the phenomenon, except for the aspect that the results obtained show restrictions on a broad generalization.

Structured questionnaires (closed questions) with statements using a Likert scale of five points were electronically sent to citizens in the State of São Paulo in a database of selected emails.

The link of Poupatempo was provided in the questionnaire in order to facilitate and improve the analysis made by the respondents.

The choice for the State of São Paulo was due to a number of reasons that should be highlighted: the state of São Paulo has the largest representation in both number of e-gov sites and number of bytes transmitted compared to other Brazilian states; e-gov actions in the state are the most developed (SANCHEZ, ARAUJO, 2003), and the analyzed program (Poupatempo) is well known, which contributed to increase the reliability and feasibility of the research.

A pre-test was conducted, in order to assess the level of efficiency of the questionnaire, with users of electronically services available. This pretest was conducted in the city of Ribeirao Preto, in the State of São Paulo and gathered 54 participants.

The completion of the pretest was invaluable for this study, since problems related to understanding the wording of questions, issues duplicate, besides the difficulty in filling responses could be identified through this pretest.

The first part of the questionnaire was constructed with the aim of characterizing the interviewee. The second part used the aspects related to the dimensions that make up the model conceived to analyze the quality of e-gov sites as shown in Table 1.

The questionnaire consists of 22 claims related to the dimensions of the model proposed in this study, in which the last statement relates to the overall satisfaction of the consumer, "Give a rate to your overall satisfaction with the site (1 to 5)". To measure these variables, the questionnaire used a Likert scale of five points in which 5 was related to the "strongly agree" and 1 for "strongly disagree", since according to Malhotra (2010), the Likert scale is a measurement scale consisting of response categories that make respondents indicate a degree of agreement or disagreement with each statement related to the objects of research.

RESULTS

The invitation to respond to the questionnaire and

contribute to the research was developed and sent by Internet to about 28,000 e-mails in the state of São Paulo, getting 1,088 responses, that is, 3.88% of emails were sent back. From the total responses, 16 were discarded because they show mistakes on filling and on using the scale in the answers. The questionnaire was available on the website for 2 months in 2012, and 1,072 valid responses were obtained.

The data collected in this phase were entered into the statistical analysis software SPSS (statistical package for social sciences) for the application of multivariate statistical techniques.

First, a descriptive analysis was conducted in order to obtain the same profile. According to Landau and Everitt (2004), asymmetry values between -2 and 2 indicate the sample normality. None of the attributes that were analyzed showed a value outside that range and therefore did not affect the normality of the research sample.

The statements that received the highest scores are listed on Table 2. According to the data presented in Table 2, it was found that from the six dimensions used in the model study, only two have their attributes among the best evaluated, which are the efficiency and availability dimensions. Another point that should be emphasized regarding this situation is that among the five best evaluated statements are the three that comprise, in its entirety, availability dimension (the site does not present problems of unavailability, the links work correctly, and the site does not stop (stuck) during use. Thus, we conclude that the attributes related to the availability of the site and its links, as well as speed and ease of access are very important according to the viewpoint of users of e-gov services and, therefore, while well evaluated, should receive attention in managing by their managers.

One aspect to be highlighted, as shown in Table 3, which contains the attributes that received the lowest scores, was concerning the Privacy dimension – the three attributes that make up this dimension are the table in question (transactions require passwords, the site offers political security and privacy, and the site indicates the existence of security mechanisms). Given these scores, we found that the issue of privacy and security, as highlighted by several authors such as Afonso and Fernandes (2001), Hoeschl (2003), Constantinides (2004), West (2004), Welch et al (2005) remains a very important aspect for users and therefore needs to be managed with priority.

Still in the Table 3, it is noteworthy that two of the three attributes of dimension "Site" (the site motivates citizens to return, and the site encourages citizens to use it) are among those most poorly evaluated. This result should draw the attention of managers of e-gov sites because, as said by Kumar et al. (2007), the final goal of e-gov programs should be frequent use of online services by citizens for obtaining information, for interacting and

Table 2. Best assessed attributes.

Questions	Total score	Average	Standard deviation
The site has speed for accessing	4.664	4.35	0.70
The site does not stop (stuck) during use	4.515	4.21	0.87
It is easy to use the site	4.452	4.15	0.83
The links work properly	4.271	3.98	0.99
The site presents no problems of unavailability	4.268	3.98	0.97

Source: Elaborated by the author.

Table 3. Attributes with the worst assessment.

Questions	Total score	Average	Standard deviation
The site indicates the existence of security mechanisms	2.715	2.53	1.02
The site provides security and privacy policy	2.700	2.52	1.09
The site allows to follow underway procedures	2.681	2.50	0.98
The site stimulates the citizen to return	2.540	2.37	1.10
The site stimulates the citizen to use it	2.507	2.34	1.14
The transactions require keywords	2.416	2.25	1.06

Source: Elaborated by the author.

transacting with the government. And for this to occur, it is necessary that citizens fell motivated and encouraged to use the sites for e-gov services.

From the 22 attributes surveyed, 14 had score over 3,000 points and average higher than 3.00. Given these scores, we conclude that the vast majority of surveyed attributes was well evaluated by the users of e-gov services.

In order to analyze the influence of the attributes surveyed related to satisfaction of -gov service user, a multivariate regression analysis was performed, using as dependent variable the satisfaction of service users of e-gov Web sites.

The size of the sample met the recommendations of Pallant (2001), which calls for an average of 40 cases per independent variable. This number was met and surpassed, since the study analyzed the data of 1,072 questionnaires correctly answered.

Among the models generated by multivariate regression analysis, we selected the model that showed an adjusted R^2 with significant explanatory power of 73.9%.

Thus, according to the results obtained by means of multivariate regression analysis of the data and the insignificant increase in the coefficient of determination, the overall satisfaction of citizens with the site can be defined by the following equation:

SAT = 0.044 + 0.221 INF + 0.197 ESP + 0.152 COM + 0.149 APR + 0.101 SEG + 0.090 FAQ + 0.087 LNK

In which:

SAT = User satisfaction with e-gov site.
INF = The site provides quality information.
ESP = The site offers what was expected.
COM = Communication options work out.
APR = The site clearly presents the offered services.
SEG = The site signals the existence of security mechanisms.
FAQ = The site has a FAQ.
LNK = The links work properly.

Additional data of chosen model: R = 0.860; R2 = 0.740; R2 adjusted = 0.739
Standard error and estimation = 0.44276

The beta coefficients for each of the attributes are represented in Table 4. The statements that showed higher beta coefficient and therefore represent the greatest impact on user satisfaction of e-gov service site were INF ("The site provides quality information"), ESP ("The site offers what was expected") and APR (" the website clearly presents the offered services"). The beta coefficients of these statements were respectively 0.244, 0.240 and 0.162.

All collinearity tests were performed, notably the test for VIF multicollinearity, and there were no problems in this regard as the highest value achieved in the VIF model chosen was 2.658 (much below 10, the limit value for acceptance).

From the seven attributes considered in the equation for citizen user satisfaction of e-gov services, the dimension Synergy is made up by three ("The site

Table 4. Regression coefficients of model seven.

Model	Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
	B	Standard error	Beta	t	Sig.	Tolerance	VIF
(Constant)	0.044	0.608	-	0.638	0.523	-	-
INF	0.221	0.023	0.244	9.605	0.000	0.379	2.636
ESP	0.197	0.020	0.240	9.733	0.000	0.403	2.482
COM	0.152	0.024	0.158	6.221	0.000	0.376	2.658
APR	0.149	0.019	0.162	7.766	0.000	0.564	1.773
SEG	0.101	0.016	0.119	6.161	0.000	0.649	1.541
LNK	0.087	0.017	0.100	5.223	0.000	0.673	1.487
FAQ	0.090	0.022	0.093	4.067	0.000	0.468	2.139

Source: Elaborated by the author.

provides quality information," "The communication options work out" and "The site has a FAQ"), one is part of dimension Site ("the site offers what was expected"), another incorporates the dimension Accomplishment ("the website clearly presents the offered services"), another is part of dimension Privacy ("the site indicates the existence of safety mechanisms") and, finally, one incorporated in the dimension Availability ("the links operate correctly").

The heaviest attribute in the equation of user satisfaction was "The site provides quality information," in the Synergy dimension, demonstrating the importance of informative aspect of e-gov service sites', which does not mean that the provision of services electronically can be left in the background. As reported in the survey by the Agencia Brasil (2011), searching for information is the main reason for users' access to e-gov sites.

The attribute with the second highest score in the equation of user satisfaction was "The site offers what was expected," in Site dimension. The importance of this attribute is to provide what the user wants so that it motivates to often use the site, and encourage its use to new users.

The third highest score in the equation of user satisfaction was the attribute "the communication options work out," in Synergy dimension. Another attribute of this dimension also makes up the equation of user satisfaction that is "The site has a FAQ". The importance of the attributes related to Synergy was highlighted by authors such as Constantinides (2002b, 2004) and Parasuraman et al. (2005).

The presence of the attribute "The site clearly presents the services offered," in Accomplishment dimension, of the equation of user satisfaction, demonstrates the need of e-gov service sites to be organized in a clear, easy and intuitive way in order to make users get what they were looking for, consequently showing the user they are fulfilling what they had promised to do.

The importance of the attributes related to privacy and security as repeatedly demonstrated in this research was, once again, highlighted by the presence of the attribute "The site indicates the existence of security mechanisms," in Privacy dimension on the equation of satisfaction for the user of e-gov sites.

As in the case of specific site Poupatempo, when analyzing the attribute "The links work properly" in the Availability dimension, there were some difficulties for assessing it once all the information were not available at the same site. It should be noted that this attribute plays an essential role because it is part of the equation for analyzing user satisfaction.

One aspect that should be emphasized is the low number of attributes related to the efficiency aspect in the equation of user satisfaction, since, from the five best attributes evaluated; only two were in this dimension that has the largest number of related attributes. This fact makes consistent the observations made in this study on the need for improvement in this respect in the service management of e-gov sites.

FINAL CONSIDERATIONS

The main point to be noted is that the proposed model proved to be a suitable tool to analyze the services of e-gov sites and it is also easy to apply.

With the application of the model, important points were highlighted:

- The need to move from an almost entirely informative site to a site which also provides services;
- The importance of existing aspects related to security and privacy;
- Make greater use of resources that can motivate and encourage users to frequently access the site.

The main contributions of this study to the academic area are related to the development of a model that allows us to analyze the services of e-gov sites that adds so innovative and complementary aspects considered important for studies in this area, considering the citizen's point of view, the user of such evaluated services.

Regarding the management area, we can say that this study has contributed for the development of a model easily applied to analyze the services of e-gov sites from the perspective of the their own users, helping them to identify important aspects for the users of e-gov services that might not be getting enough attention from their managers.

Results show that e-gov sites in Brazil presents a one way communication direction; in this sense this study shows that there is a strong effort to develop only the technical aspects.   Aspects like interaction between government and citizens, more quality information may increase the end user satisfaction.

Most available studies on e-gov, many of which have been cited here, focuses on the technical area which mainly involves aspects related to information systems. Thus, there is a need to develop research that focus on other elements contained in the e-gov such as service, quality, satisfaction, image, citizens, businesses and government.

The research developed here could also be applied in other programs in e-gov of the states surveyed as well as programs from other states, cities or countries.

Limitations and future research

The present study employed a convenience sample which can reduce the generalization of obtained results. Future researches may use a random sample to obtain a probabilistic survey; other researches may explore if the proposed model can be applied to other states of Brazil and even other countries and compare the results.

The evaluation of e-gov portals has been conducted using mainly technical indicators in this sense the proposed approach of this study was to use e-business indicators adapted to the case of e-gov and this can be an important path to develop new studies to deal with this aspect.

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