E-Government: proposal for an evaluation method

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The purpose of this paper is to present a proposal for evaluating e-government approaches based on a model made up of 10 basic elements (five elements for evaluating the central government or the institutional perspective, and five elements for evaluating specific applications).

Two of these elements were detailed, methodologically planned and applied by an audit team of the Brazilian Court of Audit (*Tribunal de Contas da União* – TCU) from August to November 2005, in a performance audit of the actions of the Brazilian E-Government Programme. The data collecting techniques used in this audit are discussed at the end of this paper in order to identify their advantages and disadvantages for possible adaptations or replacement in future similar audits

There are plans to develop and apply the eight remaining basic elements of the model in order to complete the proposal for the e-government evaluation methodology to be applied by the TCU. For the purpose of providing a better understanding about e-government, an introductory section providing e-gov definitions and describing its features, potential benefits, and types of evaluation was included.

E-Government[1]

Some experts define e-government, also referred to as e-gov, in terms of specific actions, such as receiving information on job offers, applying for Social Security benefits, or paying taxes on the Internet. Others adopt definitions which are a bit more comprehensive and see e-government as the automation of the provision of government services to citizens.
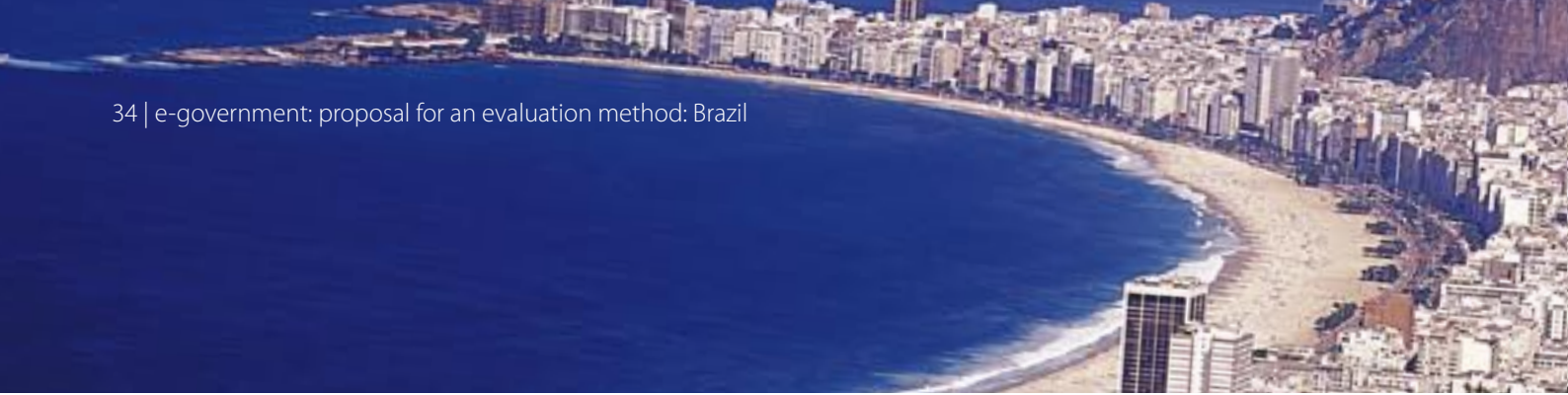
The Gartner Group (2002), a Computer Science institution, defines e-government as the transformation of internal and external public sector relationships through the Internet and information and communication technologies with the aim of optimizing government services delivery, citizens participation, and government processes. Other definitions, such

as those of the US Congress, Commission of the European Community, United Nations, and International Organization of Supreme Audit Institutions (INTOSAI), follow this same line of reasoning. Analyzing the definitions available in the literature on the topic, one can say that most of them link certain characteristics of e-government to possible benefits derived from its implementation. Instead of formulating an additional definition amongst so many already existing ones, this paper lists characteristics and benefits of this communication channel provided by new technologies which differentiate it from other computerized systems.

Characteristics

The Internet has been the predominant communication channel for e-government in general and, more specifically, for providing electronic government services, as opposed to traditional communication channels – telephone, fax, mail. Another common aspect of e-government initiatives is customer focus. In order to achieve their objectives, government organizations concluded that they should develop their e-gov projects based on the actual needs of their customers (citizens, users of public services, companies and other government agencies) and not on the then more conventional strategy of implementing what government considers easier and more rapid or on what it imagines are the needs of its customers. Other identified characteristics are real-time processing, paperless environment, automatic processes, front office-back office integration, and reliance on information technology.

Potential benefits

In e-gov literature, there are different types of possible benefits derived from implementing e-government approaches which can be classified, for learning purposes, in four large groups:

- Better services;

- More efficient government;

- New relations between government and society;

- Other benefits for society.

The main benefits associated with better services mentioned by experts in the topic are: convenience (efficient and equitable access to services and information at any time and location from a single point of access – a portal of government services), time savings, quality and consistency of services provided to customers, information reliability, and choice of service delivery channel.

Although there are not many examples of evaluations focused on efficiency and cost savings that e-gov initiatives can afford to government, these are the biggest drivers for many governments pursuing e-gov. According to Mechling & Vincent (2001), aspects such as self-service by customers themselves, increased reliability, fewer human interventions, and shared databases should supposedly reduce transaction costs, increase productivity, and produce better services in a more secure environment.

The participation of the population in government decision-making processes and the opportunity afforded by e-gov to lend more transparency to government, from the point of view of social control, by making information on government actions and spending available to citizens at large, are part of the new relations between government and society which e-gov can potentially provide.

Apart from the direct benefits afforded by delivering services through electronic means and by preparing the population to make better use of information and communication technologies, Mechling & Vincent (2001) and Meskell (2003) mention economic development as another possible benefit provided by e-government. The less red tape and lower costs involved for small and medium-sized enterprises to do business with government, as well as the possibility of promoting tourist attractions over the Internet using e-gov can foster economic development not only of companies, but also of communities in a given area.

Sectors involved

Although e-government comprises different activities and actors, e-gov literature points out three distinct sectors: government[2], citizens-customers[3] and companies. The acronyms G2C - relationship between government and citizens-customers; G2G[4] – relationship between government and other government agents; and G2B – relationship between government and companies – are well known. These sectors surely have motivations and objectives of their own, but they share certain goals, such as ensuring more efficiency, reliability and quality of services provided by or to them.

Stages

Although e-government initiatives vary from one country to another or from one sphere of government to another, it can be said that all of them share the objective of using information and communication technology to change the perspective of government from one focused on its hierarchical framework, with limited service operation, into one focused on citizens, automated, and capable of providing information and services to citizens-customers, companies, and other government agencies 24 hours a day, seven days a week. For this reason, a standardized scheme can be used to classify them not only according to the sectors involved, but also to their level or stage of development, since, due to different technical, economic and political reasons, it takes time for such initiatives to be implemented to their full potential.

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2 In Brazil, "government" refers to any institution of the Executive, Legislative and Judiciary branch in the federal, state and municipal sphere.

3 Citizen-customer – a citizen of a country and/or user of public services provided by the government of that country.

4 Abbreviations of the English terms Government to Citizen, Government to Government and Government to Business.

We are yet to find a common classification of e-gov evolutionary stages in the literature. However, the most frequently mentioned ones are the e-government models proposed by the Gartner Group (Baum & Di Maio, 2000), which are divided into four phases (presence, interaction, transaction, and transformation); by the European Union (Commission of the European Communities, 2003), comprising four stages (information, one-way interaction, two-way interaction, and transaction); and by the United Nations (UNDESA, 2003), comprising five stages (emerging, enhanced, interactive, transactional and networked presence). Because they are similar in some aspects and complementary in others, we propose, based on an analysis of these models, that e-gov initiatives be classified in five evolutionary stages:

- Information presentation – passive presentation of limited and static information, such as a reproduction of an institution's hard copy information brochure;

- Information search – basic information search, links to other related portals, and some official documents relevant to the public. Information provision follows an essentially one-way flow from government to citizens;

- Limited interactivity – forms that can be printed by customers, filled out and then sent back by mail or fax to public agencies. These services can replace a phone call or a visit to a government office;

- Electronic transaction – allows citizens to carry out and complete tasks in two-way interactions, without the need to have any other communication channel with government. Examples: on-line payment of fees and taxes; on-line requests and registrations; participation in government auctions and electronic procurements;

- E-gov integration – redefinition of public services delivery by providing a single point of contact between government and its customers, making government organization totally transparent to citizens. In other words, integrated e-gov seeks to eliminate organizational barriers which promote agency-centric solutions, replacing them with customer-centric solutions.

Evaluation

In order to achieve its objectives, an institution should be aware of its present situation and of internal and external factors which have positive and negative bearing on its actions to achieve such objectives. Evaluation helps managers to see more clearly if the direction chosen by them is consistent with their actions and if there is any need to change their course for achieving their final goals. Evaluations also allow managers to control the progress of a project or programme. For this reason, those in charge of e-gov initiatives, as in any other government project or programme, should measure their results, impacts and benefits in order to justify the political support and financial resources they received. Assessment should be realistic and carried out at appropriate time frames that are useful to government decision-makers.

Based on the principle that evaluations are important, the challenge facing e-gov initiatives is that of defining a set of indicators and standards for common performance measurements based on the perspective of citizens, companies, and government itself. This set may be used by all government agents as a parameter for comparing initiatives under way, and to allow each agent to manage, as best as possible, the services, processes, and resources used in their respective activities. Five types of e-gov evaluations were identified in specialized literature: classification in evolutionary stages; benchmarking[5]; report against strategic objectives; accountability to central government; and evaluation of government programmes. These five types of evaluation measure the progress and success of e-government initiatives from an institutional perspective, while the evaluation of specific applications measures success based on the results achieved by individual applications, whose main indicators are customer satisfaction and channel usage. Productivity, costs and return on investments are other elements that can be measured, but there are few examples of them in e-gov literature.
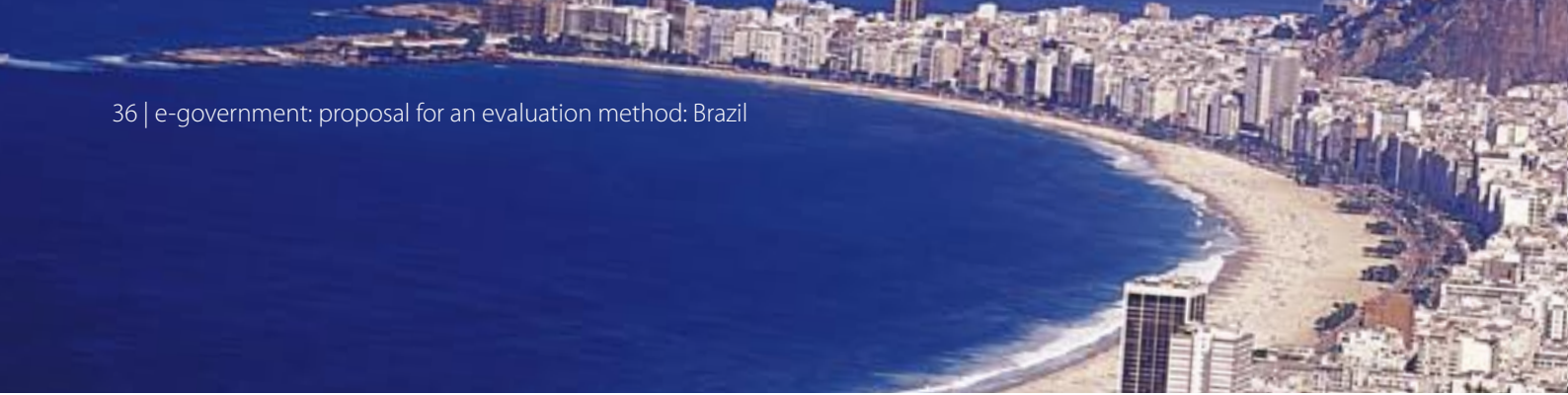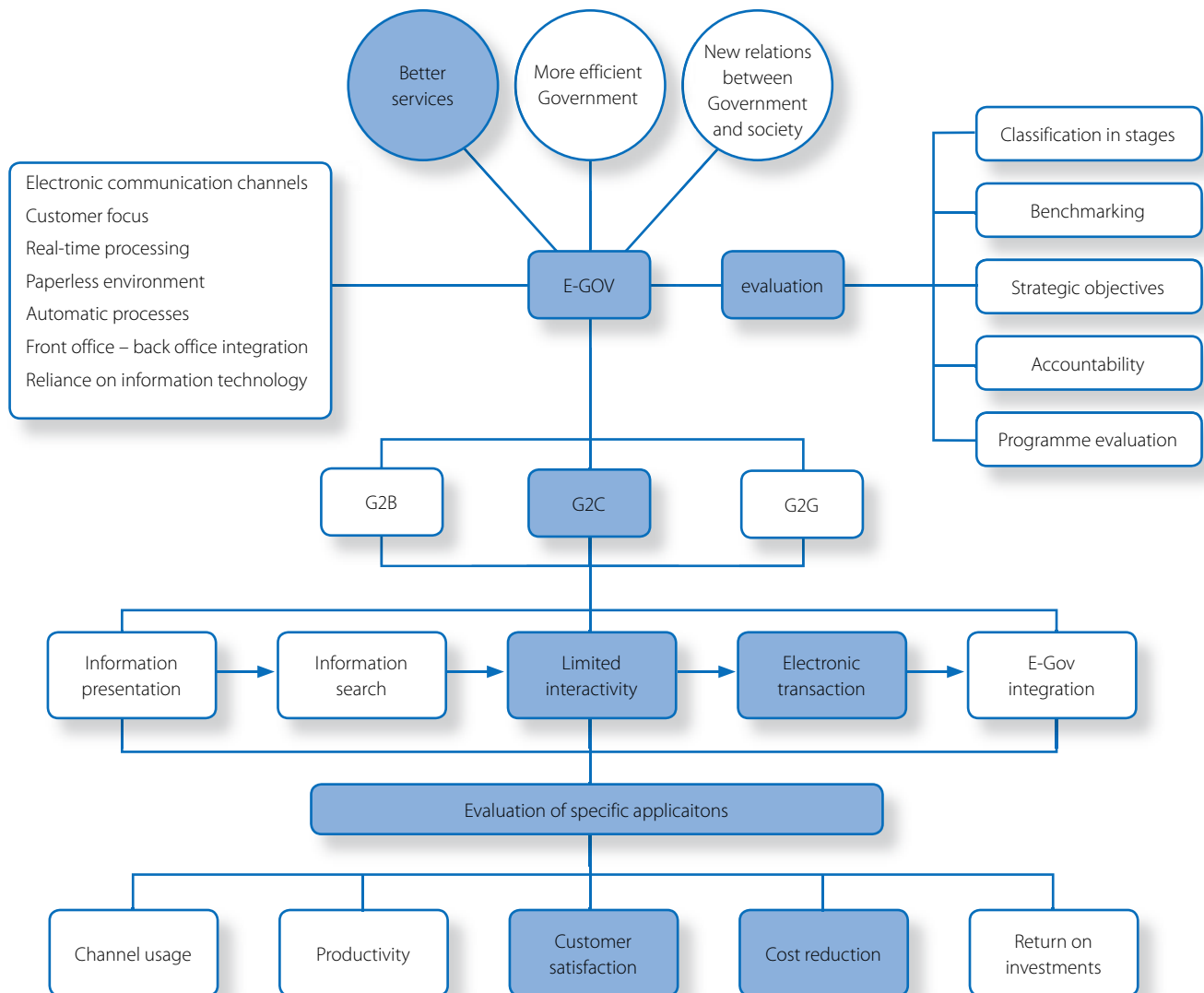
Evaluation model

The e-government evaluation model proposed by Dias (2005b), graphically depicted in the Figure opposite, summarizes the aspects addressed in the first section of this paper, on e-government. Observing the elements of this figure, one can see the characteristics (electronic communication channels, customer focus, real-time processing, paperless environment, automatic processes, front office-back office integration, reliance on technology) and the potential benefits of e-government (better services, more efficient government, and new relations between government and society), as well as the three sectors involved in e-gov interactions (G2B, G2C and G2G), its five evolutionary stages (information presentation, information search, limited interactivity, electronic transaction, and e-gov integration), as well as the various types of e-government evaluations: from an institutional perspective (classification in evolutionary stages, benchmarking, report against strategic objectives, accountability to central government, and evaluation of government programmes); and the evaluation of specific applications and their main indicators (usage, productivity, customer satisfaction, costs and return on investments). This model was applied as a starting point in defining the focus of the performance audit in actions of the Brazilian E-government Programme, carried out from August to November 2005 by a TCU audit team.
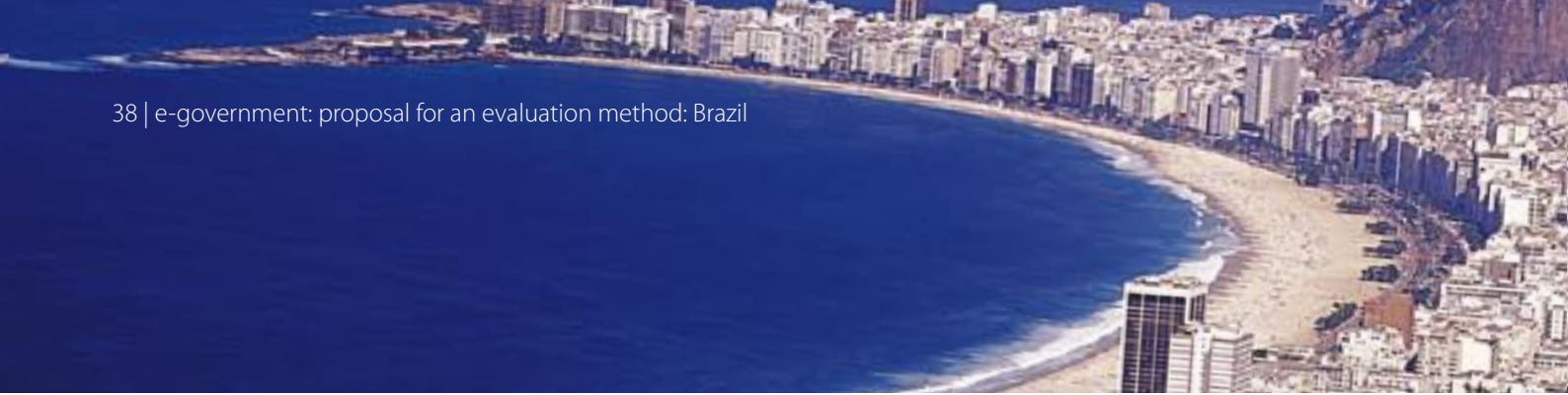
Because the topic of this audit was the provision of electronic public services from citizens perspective and the Brazilian E-government Programme objective is to "expand the supply and improve the quality of the delivery of services and public information through electronic means," the model focused on "better services" as a potential e-gov benefit and, on G2C services as its context. Because the initial stages of presenting and searching for information in e-government are less significant in terms of electronic public services delivery, the stages of limited interactivity and electronic transaction were chosen initially as criteria for selecting the e-gov services in this study.

Amongst the central government methods for evaluating e-gov, programme evaluation was chosen because of its comprehensiveness, as it offers different analysis approaches and different evaluation criteria as well. The evaluation approaches of classification in evolutionary stages, accountability and report against strategic objectives were discarded, since these are limited implementation and control aspects not directly related to the focus of this audit. Benchmarking was discarded because it is more suitable for later steps in the evaluation process. Comparing e-gov initiatives before carrying out self-evaluations is like inverting the natural order of things. In programme evaluation, efficacy, quality and institutional links were chosen as dimensions for this audit.

As this audit was focused on evaluating e-gov services from citizens-customers perspective in communicating with government through the Internet, the best alternative was to adopt methods whose information sources are citizens-customers themselves, as in satisfaction polls. The other methods for evaluating specific e-gov applications found in specialized literature – usage, productivity, cost reduction, and return on investments measures – would provide answers which would be of greater interest to government agencies providing electronic services than to customers of these services. The e-gov customer satisfaction dimensions chosen for this audit, which are defined in the satisfaction evaluation model (Dias, 2005b, p. 90), were ease of location of the web portal; ease of location of the on-line service; accessibility; usability; availability; reliability; personal data privacy and information security; convenience; responsiveness; and timeliness. The methodological strategy of this audit and observations on the data-collecting techniques adopted are described in the next sections.

E-Government Evaluation Model (Dias, 2005b, p. 87)

Better services

More efficient Government

New relations between Government and society

Electronic communication channels
Customer focus
Real-time processing
Paperless environment
Automatic processes
Front office – back office integration
Reliance on information technology

E-GOV

evaluation

Classification in stages

Benchmarking

Strategic objectives

Accountability

Programme evaluation

G2B

G2C

G2G

Information presentation

Information search

Limited interactivity

Electronic transaction

E-Gov integration

Evaluation of specific applicaitons

Channel usage

Productivity

Customer satisfaction

Cost reduction

Return on investments

Methodology and audit strategy⁶

For carrying out the performance audit of actions in the Brazilian E-Government Programme, and before selecting specific electronic public services, it was necessary to restrict the surveyed universe to Brazilian organizations which had actually implemented e-government services when the audit plan was defined. The mapping of e-gov services in the Federal Public Administration (Brazil - TCU, 2004) was consulted for this purpose. Of the 45 organizations examined in this mapping, the ministries of Education, Social Welfare, Health, and Labor and Employment were chosen as possible sources of typical cases to be studied because of their importance and social relevance in the national scenario in the delivering of public services for improving the living conditions of Brazilian people.

Despite specific aspects of each area covered by these ministries, there are marked similarities in their social objectives and in the equitable treatment provided to their beneficiaries, and much more so when their services are provided through the Internet, a context in which all people, once they have access to this communication channel, are treated as anonymous members of a heterogeneous "audience," as we see happening in traditional mass communication. For this reason, the selection of services in different areas was not considered a limiting factor for analyzing the results of this audit. On the contrary, this fact reinforces its results even more.

Based on these elements, a decision was made to select an electronic public service in each social area directly related to the mission of these government agencies, regarded as priorities by their managers, and classified as belonging to the electronic transaction stage. The selected electronic services were the Public Domain Portal of the Ministry of Education; the on-line applications for sickness insurance, paid maternity leave and death grant mechanisms offered by the Ministry of Social Welfare; and the National First Job Programme of the Ministry of Labor and Employment. By suggestion of the coordinator of the Digital Inclusion Technical Committee of the Brazilian E-Government Programme, and because it is an electronic public service used by less privileged social classes, although it is not a benefit, but rather an obligation imposed on all citizens, the Annual Exempt Income Tax Return of 2005 of the Brazilian Federal Revenue Service was included. In this audit, different data-collecting techniques were adopted, both quantitative (questionnaires) and qualitative (documental research; analysis and quality control techniques and tools; interviews; heuristic evaluation and interface tests and focus groups), which will be analyzed in the next section.

Observations about the data collection techniques adopted

This section discusses the results achieved in using the data-collecting techniques selected for the audit and the difficulties involved in applying them.

Document research

Apart from providing an understanding of the context of both the Programme and the electronic public services, the document research allowed the E-Gov Programme to be assessed in the light of efficacy, quality, and institutional links dimensions chosen for evaluating government electronic programmes. The difficulties involved in applying this technique were caused by the fragmentation of information in various rules and laws, issued by different agencies, and by the lack of a single physical or electronic location to organize the documents generated by the Programme and/or related to it.

Analysis and quality control techniques and tools

The analysis and quality control techniques and tools which are traditionally used in programme evaluations played a key role in providing a detailed understanding of the Programme's context and in organizing and focusing the evaluation of both the E-Government Programme and the selected public services. The stakeholder analysis was useful for identifying the main actors involved as information sources for this audit. The SWOT analysis and the risk diagram, in turn, made it possible to identify the Programme's strengths and weaknesses, and also the risks involved, thereby helping to define the evaluation focus. The planning and findings matrices made it possible to organize relevant information for planning the evaluation of the Programme and of the selected electronic public services and their results. Finally, the expert panel was useful for validating the selected methodological strategy. It was not difficult at all to apply these techniques or tools to support the identification and organization of all audit findings.

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6 The methodological strategy of this audit is based on a doctor's degree thesis project in Information Science at the University of Brasília (DIAS, 2005b).

Interview

Apart from providing a more detailed understanding of the context of both the Programme and the electronic public services, the interviews made it possible for the E-Gov Programme to be assessed in the light of efficacy, quality, and institutional links dimensions, besides the 10 dimensions involved in evaluating satisfaction for specific applications (ease of location of the web portal; ease of location of the on-line service; accessibility; usability; availability; reliability; personal data privacy and information security; convenience; responsiveness; and timeliness). Interviews were held with Programme managers, coordinators of Technical Committees, and managers of the selected electronic public services. The results of some of these interviews were used as inputs for developing a tool for collecting quantitative data. The difficulties involved in using this technique were more associated with the subjective analysis of its results than with actually holding the interviews.

Heuristic evaluation[7] and interface tests

Besides providing inputs for assessing the E-Gov Programme of the federal administration on a smaller scale, the heuristic evaluation and interface tests which were applied to the web portals of the selected electronic public services provided an understanding of the contexts of these services and made it possible to assess them in the light of the 10 above-mentioned dimensions involved in evaluating satisfaction. The difficulties encountered in using this technique were the lack of clarity and/or specificity of some recommendations made in documents generated by the Programme to provide guidance to web portal managers of the Federal Public Administration (FPA), and limitations of the automatic tools used in evaluating subjective aspects. On the other hand, the fact that the team coordinator was familiar with the technique and some of its tools facilitated its application.

In this audit, the greatest contribution of the heuristic evaluation of the selected services websites was the analysis of whether the recommendations proposed in the documents generated by the Programme to ensure an easier access and use of electronic public services were being followed or not. This analysis was based on reports of the CyberSpyder, DaSilva and Wave tools and on a checklist (Dias, 2005b, p. 245), derived from Brazilian E-Gov guidelines and international e-gov literature, available as an appendix to the audit report.

Focus group

The focus group technique was used both with managers of web portals and electronic public services, and with coordinators of Technical Committees of the Programme for the purpose of confronting different views and then confirming or challenging observed facts using other techniques. It was a bit difficult to schedule the interviews according to the availability of all participants. On the other hand, consolidating the notes of three observers of each focus group was an easy task which made it possible to confirm what was said on the occasion, thereby minimizing interpretation errors which could occur if only one observer was present. This was a strength, since a decision was made not to record the group interviews.

The fact that one of the coordinators of Technical Committees was prolix and senior to the others (indeed he was the boss of many of them) forced the moderator to engage in the difficult task of trying to conduct the discussions in such a way as to allow his subordinates to voice their opinions before their superior. In the other focal groups with web portals and electronic public services managers, the situation was the opposite. The participants were very receptive to the technique, to the point of expressing their opinions naturally, without any reservation, taking advantage of the opportunity to exchange experiences among them. Many of them left with plans to get in touch with other participants to carry on with discussions after the group interview.

Questionnaire

The questionnaire technique was used both with managers of web portals and electronic public services, and with their users, so as to collect different points of view. A disadvantage of this technique in relation to the others, which involve personal contacts between the surveyor and those being surveyed, is the need to apply pre-tests to reduce, as much as possible, errors when the questionnaire is filled out as a result of misunderstanding questions. For preparing the on-line questionnaire and analyzing its answers, it was necessary to rely on the support of an expert in the software used for this purpose. However, there were no problems in making the questionnaires available on-line during the audit period, probably because of good technological infrastructure, and no resistance from managers to having their services evaluated through online satisfaction polls. One of them even suggested that all transactional services available in his portal should be included in the survey.

7   A usability engineering method for finding usability problems in a user interface design. Heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics").

Because the personal records supplied by the Programme co-ordinators were outdated, it was a bit difficult to get in touch with FPA portal managers by e-mail for sending them the link to access the questionnaire. Because the number of registered managers was not high, it was not possible to subdivide the long questionnaire sent to them, as was done with the questionnaires sent to the users of the selected electronic public services.

One of the disadvantages of using online surveys without a predetermined record for defining sample size is that they make it impossible to measure the response rate in traditional ways, since it cannot be known clearly how many individuals could have answered the questionnaire but failed to do so. In this audit, it was considered that receiving over 384 filled-out questionnaires for each service would be sufficient to represent the population of possible respondents related to the services in question, based on a formula for calculating sample size, for populations of 1 million or more, with a confidence level of 95%, a sampling error of +/- 5%, a percentage of 50/50 of the universe in questions with two response options (Dillman, 2000, p. 206). In the case of the paid maternity leave, death grant and Public Domain services, the number of filled-out questionnaires was not considered significant (below 384), and that was why the data collected using this technique was not analyzed for such services.

The users of the remaining services (4,505 people) were very receptive to the online questionnaire and took advantage of the opportunity to communicate with their managers and offer suggestions, praise and criticism, also in relation to the service delivery outside the electronic environment. Of all respondents, 20% (905 people) filled the space reserved for suggestions and criticism and 51% (2,301 people) provided their personal data to participate in possible telephone interviews. Many respondents of the online survey expressed their willingness to take part in telephone interviews to clarify their points of view, but the deadline to complete the audit did not allow this technique to be used.

As mentioned above, the analysis and quality control tools which are usually applied to evaluate social programmes covered all audit findings. The interviews, focus groups and questionnaires contributed to identifying almost all findings, while the document research and the heuristic evaluation (including the interface tests) were more significant in relation to certain topics. Overall, the audit findings were fed by more than one technique, revealing a strength of the proposed methodological strategy, in results triangulation.

Final considerations

Analyzing the advantages and disadvantages of the data-collecting techniques that were used, as explained in the previous section, and the positive results, from the point of view of the audit team, achieved by this performance audit in actions of the Brazilian E-Government Programme, which is still being considered by the Court, it can be said that the methodological strategy proposed for the two basic elements of the e-government evaluation model is adequate and ready to be applied, as was done in this audit, by other teams in similar evaluations[8]. This result will certainly encourage the Information Technology Audit Board to continue to develop methodological strategies for the other eight basic elements of the proposed e-government evaluation model (Figure on page 37).

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8   In order to facilitate its application by other internal TCU teams or external teams, the questionnaires which were developed during this audit and the checklist used in the heuristic evaluation were included as appendices in the audit report, which will be publicly disseminated after being approved by the Court.

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