

# Business Process Reengineering Role in Electronic Government

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**Abstract.** Business Process Reengineering (BPR) came up as a key concept in the 1990s, with a high impact on management and transactions of private companies. However, it has not been so well accepted in public administration. Nowadays, many projects for changes in government are related to electronic government. According to this, this article discusses the role of BPR in this context, its contribution to this kind of initiative, and if it is a required element to go forward. Also, the difficulties in carrying out the BPR in the particular case of e-government are analyzed, taking into account the characteristics of this kind of project, the stages that are generally involved and the environment in which it is performed. Finally, a basic structure for the development of e-government is provided, specifying the insertion of BPR for reaching a more efficient, effective and foreseeable management of new projects.

## 1 Introduction

Internet has influenced our way of living and working. One of its effects on government is what we call electronic government or e-government. There are many definitions, but in a simplified way it consists of introducing the Internet and computer networks into the actions of government.

However, e-government experiences have shown poor results when compared with those achieved in the private sector. A series of errors are produced, with a high rate of failures [1]. Many difficulties come up from the need of transforming the way in which the activities of the public sector were traditionally executed to take advantage of these new technologies. This forces the use of transformation tools, like Business Process Reengineering (BPR), to carry out the changes.

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Public services require changes starting from the introduction of Information Technology (IT); but its advantages have been poorly taken bearing in mind certain characteristics of the public sector:

- Processes are highly structured: information requirements, methods for processing information and desired formats are known precisely. Also, criteria for decision making are completely understood, with clearly defined and repetitive steps. It is hard to have these old and complex procedures transformed.
- Government is the only one that provides public services. Interaction with government is not a matter of choice. These requisites inhibit the introduction of customer satisfaction criteria, services improvement, quality management, etc.
- In general, the characteristics of the public sector differs from those of other fields. There is less flexibility to carry out modifications, limited culture of change, etc.
- There is a big fragmentation of workflows.
- There are many levels of decision-making and centralized control. All agencies work in an isolated manner, managing their own resources [2].
- In general, political leaders ignore matters related to IT and its capabilities, and delegate them to technical experts [3].

Government faces serious restrictions in carrying out the required transformation related to BPR projects to take advantage of the IT capabilities.

The present work studies the role of BPR in the development of e-government. Different stages are posed and the influence of BPR at each stage is analyzed, particularly for the case of one-stop e-government. Also, a basic framework for the e-government application is considered and the role of BPR is specifically studied in relation to each step so as to assure an effective BPR use.

## 2 Electronic Government

E-government can be defined as any governmental activity based on the use of computer networks. Different types of interactions of the government can be identified: G2C (to Citizens), G2B (to Business), G2G (to Government), etc. Some definitions provide very broad meanings: Lenk and Traummuller [4] consider as e-government any proposal of modernization of the public sector. In a more limited definition used in this work, the term refers just to the administrative processes.

One-Stop Government (OSG), a concept related to e-government, consists of the integration of services from the viewpoint of users (citizens, business and public servers) [5]. Public services are structured according to specific citizens' life-events and business situations. So, new products are generated to satisfy users' demand for flexible access, without the usual distance and time restrictions. OSG requires the complete integration of the usually fragmented public agencies because services are provided from only one access portal.

In the traditional access, it was compulsory for the user to go through agencies following the logics of operative procedures. In the case of OSG, all services are integrated in a unique entrance portal (Figure 1). Not only front-office is affected, but also the processes need to be restructured. OSG requires more coordination

between agencies to integrate processes. BPR is a natural tool to achieve this. However, BPR has not proved to be efficient in government so far.

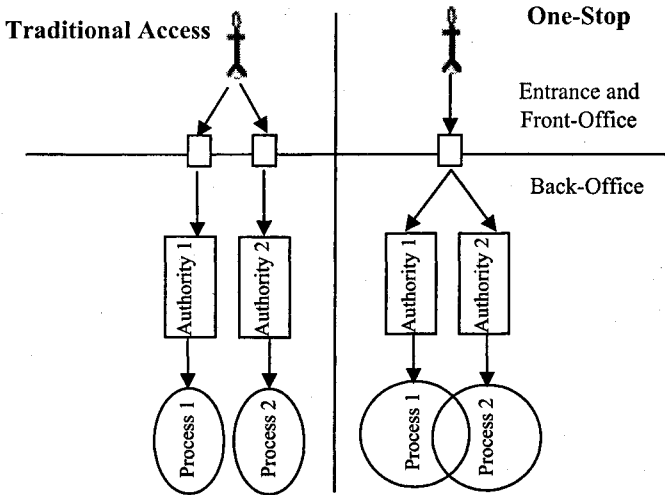


Fig. 1. Traditional access to state-owned services vs. one-stop government

### 3 BPR Difficulties in Government

Due to special characteristics of public processes, the experiences of the private sector with BPR cannot be directly transferred to government. Indeed, some authors argue that a successful BPR is not possible in the public sector [6]. According to Heeks [1], 35% of BPR projects fail completely (they are given up or never implemented), 50% fail partially (main objectives are not achieved) and only 15% are successful. Scholl [7] analyzes BPR practices in government. Table 1 presents the most common difficulties that usually appear in BPR projects in government.

Table 1. BPR difficulties in the state-owned sector

<i>Attitude</i>	Willingness to apply the radical changes derived from BPR.
<i>Scope</i>	Changes depth. The more drastic the change, the wider its scope.
<i>Extension</i>	Amount of functional areas and entities included in business processes.
<i>Knowledge</i>	Abilities of leaders and team members in charge of BPR.
<i>Leadership</i>	Project leader influence and authority.
<i>Objectives</i>	Definition degree of objectives to be attained with the project.
<i>Institutional Restrictions</i>	Legislation and standards that restrict the development of new proposals.
<i>Resources</i>	Availability of human and financial resources.
<i>Techno centrim</i>	Focusing on technological uses and ignoring other organizational aspects.

*Attitude:* Not everyone accepts the changes posed by the BPR. Unnecessary work is eliminated. There is an on-going conflict between the need of modifying labor

guidelines upheld for a long time and the lack of contribution from affected people. Project BacenSenado [8] is an example of human factor value. The main reason of its failure was the senators refusal to use the system on the grounds that their obligations were decision-making and political relationships.

*Scope:* the more relevant the change, the greater the potential of reaching significant benefits. Many of the innovative IT applications take place on superficial aspects of processes. They are easily accepted because the organizational structure remains intact [9]. In general, the first applications of IT were focused on task automation. Deep changes generate more resistance, but also imply larger benefits.

*Extension:* A business process includes many functional areas and the participation of its stakeholders. BPR projects must be coordinated at a level that is high enough to identify problems and opportunities on a large scale instead of suggesting partial improvements that solve part of the problem or some symptoms. This implies working with a large number of agencies, which increases the difficulties. Each agency has its own special features and objectives. Communication problems arise to break boundaries and generate workflows through several agencies, regulations, and legal limitations to which the government is subjected [10].

*Knowledge:* the Public sector is not used to changing and taking advantage of IT. Then, internal areas that have experience to manage this kind of problems are not usual. Anyway, in the last years, new methodologies and approaches (for example New Public Management) have encouraged the development of specific offices to study these subjects without resorting to external consultants.

*Leadership:* A top-down leadership, which manages motivated people doing non-standard tasks, is required for the BPR. This is difficult when carrying out changes in high administrative positions as a result of elections. BPR efforts can be rejected or abandoned by the new authorities. Even when being continued, BPR is likely to have a different leader, and consequently going forward becomes quite difficult because there may be changes in interests, available resources, etc. BPR implies changes extended in time and risks that must be led by the same person.

*Objectives Definition:* Many BPR projects fail because corporative goals are not taken into account [11]. BPR involves many agencies with different interests and it is hard to arrive to consistent objectives that match all their needs. In this sense, highly fragmented processes and the change of authorities are very significant constraints. In contrast to the private sector, it is very difficult to assess benefits such as customer satisfaction, growth, result improvements, etc. This situation makes it hard to show the BPR benefits and to justify the associated risks.

*Institutional restrictions:* The institutional dimension has a very important role as an inhibitor of innovations. Redesigned processes are affected by restrictions that current legislation imposes. Government bases its behavior on standards that inhibit redesign. Administrative processes are subject to financial, legal, etc. restrictions, that strengthen the adopted bureaucratic structure [9]. Institutional constraints are usually more strict than those in the private sector, thus drastically limiting the possibility of redesign.

*Resources:* Experience shows that BPR generally takes more time than what has been estimated, involves more people and resources than the available ones and always comes up with unexpected problems. There is a series of problems: annual

budgets handling in projects with a larger duration, resources correct estimation, the need of sharing resources among several areas, shared management, etc.

*Techno centrism:* Likely, IT incorporation increases bureaucracy and generates dependence on a specific technology [5]. Many organizations have spent a lot of money on IT to automate existing processes without determining if they were necessary or not. BPR includes IT with the aim of implementing innovative solutions but demanding, as well, changes in organizational level. The risk of not exploring solutions which implies organizational changes is high.

#### 4 The Need of BPR in E-government Framework

Transformation projects in the public sector revolve around e-government and BPR is a methodology to redesign taking advantages of IT capabilities. So, it is interesting to relate both concepts to find out the extent to which using BPR in e-government initiatives is necessary.

Several studies have analyzed e-government implementation based on models with development stages (Table 2). Lisbon European Council [12] identified four levels of e-government evolution. The first level just consists of the information presentation about public services; the second level provides downloadable forms from the website; the third level allows online processing of forms; and finally the fourth level provides integrated e-services and the possibility of making online transactions. Layne and Lee [13] include levels of catalogue, transaction, vertical integration and horizontal integration. Reddick [14] considers only two levels. The first level involves the initial efforts of government to establish online presence, presenting information about its activities on the Internet. The second level is the transactional stage, in which government shows online databases, allowing citizens to interact for the payment of taxes, etc.

**Table 2** Models of e-government levels

MODELS	LEVELS			
<i>Lisbon European Council [12]</i>	Information	Interaction	Interactive	Transaction
<i>Layne y Lee [13]</i>	Catalogue	Transaction	Vert. Integration	Horiz. Integration
<i>Reddick [14]</i>	Information		Transaction	

It is possible to find equivalences between models. The aim is to specify stages that show the degree of e-government progress and the increasing difficulty of its implementation. Nowadays, the number of e-government initiatives of level 1 in any of the models is greater than those of other levels. An important element to be taken into account is the quality of the offered services, which is notorious when transactions are involved. This is related to the increased implementation complexity. The effort required to provide information online is not the same as the effort needed to offer transactional services.

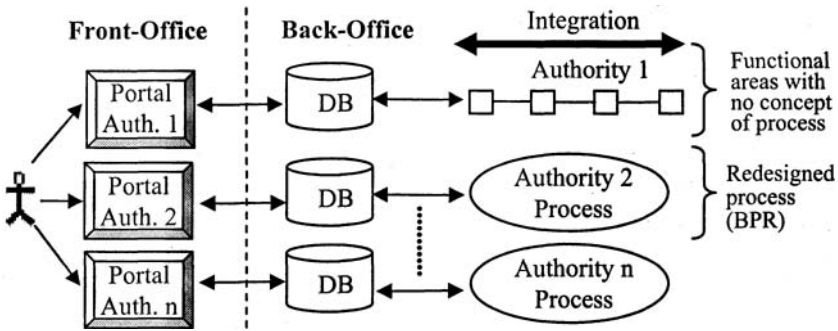


Figure 2. Stage 1 of e-government

Projects start at the first level as a result of individual and isolated initiatives of each agency, basically focused on technical matters (performance, security, tools for the portal development, equipment, etc.) and front-office questions (website content, how it looks, formats, etc.) (Figure 2). Back-office remains without changes. Starting from the need of offering new services and improve the current ones, there is an evolution towards higher levels. Technical matters and business processes must be considered, though difficulties are always greater during the process integration.

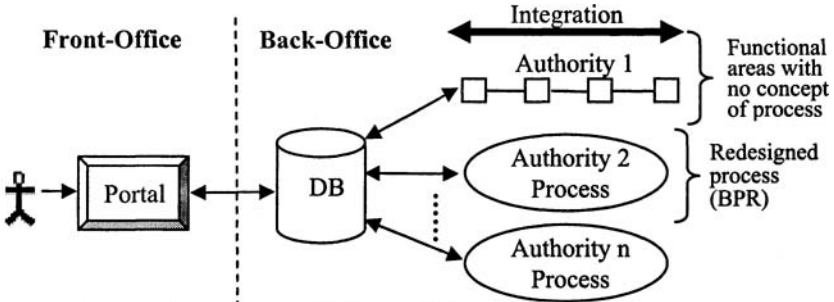


Figure 3. Stage 2 of e-government (OSG with BPR per Authority)

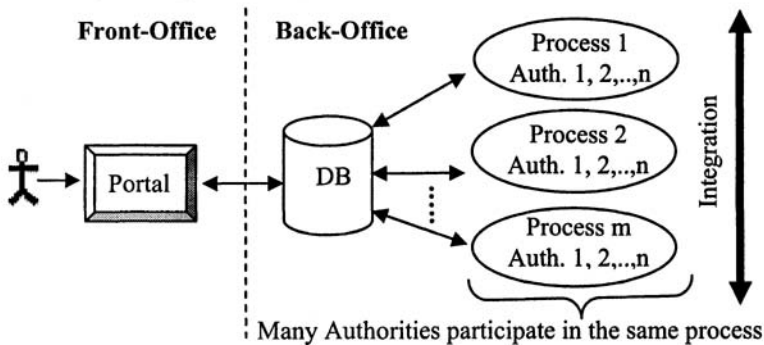


Fig. 4. Stage 3 of e-government (OSG with BPR between Authorities)

Figure 2 shows an unequal evolution of e-government initiatives in its first steps, depending on each agency authorities. There is no connection between different projects. In the first portal, an initiative that is still at the initial stage, back-office shows a group of tasks that has not been integrated with a significant fragmentation. The second portal, an initiative at a higher level, shows that the authority has redesigned the process. The tasks composing the process have been integrated. The difference between projects shown in Figure 2 is marked by the vertical integration of activities of each business process in the back-office. It will remain at an initial stage of e-government, while these tasks are not integrated. Moving to a higher level requires working with a complete process. The application of a radical redesign is closely related to difficulties detailed for BPR in Section 3. Figure 3 shows an initial stage in an OSG solution. Usually, authorities detect many individual initiatives. This creates a series of problems: duplication of efforts, low quality portals, loss of institutional image due to poor design or low performance, incompatibilities of initiatives, etc, leading to an OSG proposal that integrates different initiatives.

The OSG integration is different to the previous cases. Its development is independent from individual agencies and a coordinated approach is required. To abstract the citizen from government fragmentation, on the one hand, a strong technologic infrastructure must be provided. On the other hand, views, contents, formats, etc. must be standardized when portals of different agencies are integrated. Data must be combined in a unique consistent database or, at least, must have a common access to the data sources. Information systems from different agencies must be compatible. Figure 3 shows an intermediate stage of this evolution, integrating front-offices from different initiatives. Basic guidelines are generated about contents, formats, etc.; and the requirements each agency initiatives must meet are standardized and included in this global portal. Then, OSG advances on back-office. Basically, it works first on front-office since it is directly related to e-government initial levels.

The evolution to higher levels of OSG requires interaction among agencies, through a horizontal integration among current processes. In many cases, agency existence can be discussed. Many of them have been created in a fragmented government to perform tasks that have now disappeared because information is now available online (Figure 4). This new stage requires a different process redesign. Starting from the analysis of the interactions of the  $n$  existing processes, many of them are not now required, because they are combined, others disappear, etc., with a tendency towards wider processes integrating more agencies. This will be enabled by digital media for performing tasks instead of the traditional papers. Figure 4 shows the shift from previous  $n$  processes to new  $m$  processes, with  $m < n$ . Besides, the process owners must be considered because the interaction between agencies forces them to define the scope of the tasks and who are in charge of performing them.

#### **4.1 One-stop E-government Difficulties**

The need for integrating business processes and systems increases in the OSG. The changes are very complex due to a series of difficulties that may arise:

- *Technical*: the lack of standards and coordination in the equipment incorporation, the existence of independent systems, etc. are the main problems. Government is a large geographically dispersed and barely coordinated organization.
- *Political*: authorities are not involved. They lack knowledge on this issue and consider it is a technical problem. In the OSG, difficulties are bigger because of the need of coordinating different areas and solving conflicts arising from this interaction.
- *Integration processes*: Business processes from different agencies need to be integrated horizontally as much as vertically to implement OSG, and then BPR is required. However, the previously analyzed problems must be considered. Until now, the structure of public agencies has been stable, almost without changes.

The existence of many participants and the previous processes lacking a good coordination increase the complexity. These projects are new and there is not much experience related to their development. The lack of knowledge on methodologies for adequate change management is a severe restriction for the pursued integration.

Coordinating several independent agencies becomes a problem. It may arise when dealing with complementary activities as well as similar activities performed by agencies with different locations or different jurisdictions. For this reason, it is quite difficult to clearly specify BPR objectives. Coordination problems among several agencies are moved to resource management. Getting resources for an adequate change management is very difficult; even more if the organizational frontiers of the project do not adjust to the usual assignment. Agencies integration requires solving many legal barriers and even changes in laws because services integration implies information exchanging that are not consistent with the current legislation. Many of the quoted problems limit the application scope of the OSG approach. Due to the difficulties in solving these issues, the extent of changes is erroneously reduced and e-government remains at initial levels.

#### 4.2 A Framework for Successful BPR Incorporation

Different alternatives are proposed to simplify e-government application [9] [12]. Wimmer [5] presents an interesting approach that shows the insertion of BPR into a global politics of e-government (Figure 5).

At the first stage, e-government is considered as a *vision*, whose scope must be determined (objectives, social development, etc) so as to reach political support. At the *strategies* stage, the decisions for making the suggested vision come true must be made, including an adequate e-government architecture:

- Guidelines and norms for the incorporation of IT, protocols and standards, etc.
  - Security requirements, performance, access speed, etc.
  - Criteria specification to generate an appropriate legal framework.
  - Definition of the service characteristics to be provided.
  - Specifying the mechanisms for agencies to solve conflicts in a coordinated way.
- As regards BPR, some points to be taken into account are:
- Methodology selection for BPR application.
  - Specifying a mechanism for project management involving several agencies, specifying resources assignment, change management, etc.



- Identifying tools and standards to be used in the different projects.

Once the adequate infrastructure is reached, specific initiatives must be generated and selected [15]. The correct evaluation of advantages, benefits, and involved risks is a critical point. The use of BPR is one of the reasons why e-government levels are limited. Therefore, when assessing alternatives, its feasibility must be taken into account, regardless of the adjustment to the vision and suggested strategies. Therefore, initiatives must include the need of carrying out BPR, mechanisms to overcome difficulties and the necessary resources so as to assure feasible initiatives of high levels with an adequate evaluation of the involved risks.

At the *projects* stage, approved initiatives are implemented. The challenge is the effective execution of the project as regards goals attainment budget fulfillment, schedule, etc. This is closely related to the effective application of BPR. Many of the BPR problems arise during the implementation. A successful completion is more likely if an appropriate framework has been generated for the development of the projects at the strategy stage, taking into account technical, political and process integration difficulties.

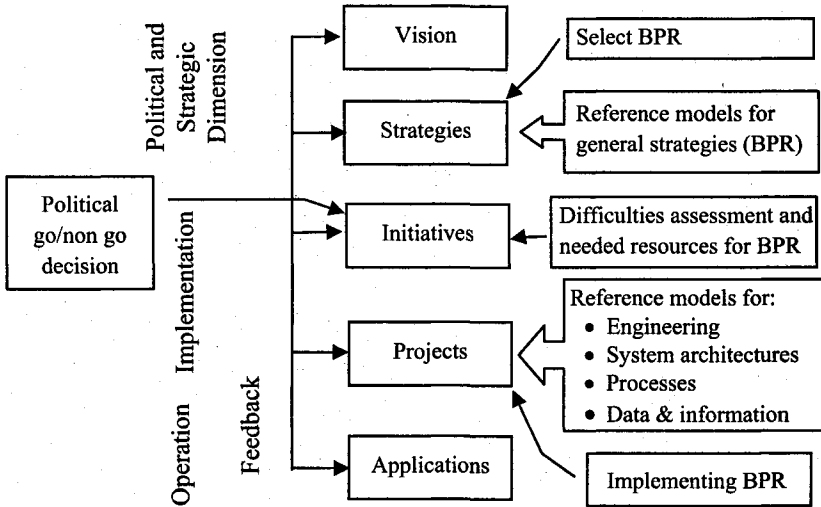


Fig. 5. Application layers of E-government [5]

Finally, in the level of *applications*, services are provided through the Web. continuous monitoring of their progress is needed to correct errors, improve the services and adjust them to the new needs of citizens and public authorities.

## 5 Example

The steps taken in e-government are analyzed in an Argentine provincial state.

## 5.1 Background

Between 1995 and 1999, out of individual initiatives, the first websites in agencies were developed. They were made according to the needs of the agency authority. From a technical point of view, each agency had its own IT expert group that depended on an IT Provincial Direction (ITPD). Therefore, all areas had a sense of autonomy to carry out their projects. The aim of these websites was to present the area on the Internet. This spontaneous development led a series of problems: there was no institutional image of the province, there were no quality standards, etc. Each agency had a website of different quality and performance.

As no services were offered, websites were barely visited. However, visits significantly grew when more than 150,000 inhabitants were affected by a flood in one important city of the province. There were missing people, huge damages in houses and firms. This forced government to provide immediate answers to new requests. The possibility of obtaining updated information through the Internet made the access to websites jump from 800 to 20,000.

These results brought about some interesting conclusions. First, when services are valuable, citizens access to e-government. It would have been impossible to satisfy all requests by means of traditional resources. All the issues concerning the catastrophe were managed by agencies especially created for that matter. This provided higher speed and better resolution skills to face this kind of problems. Also, as the resulting situations were unexpected and extremely serious, new processes were generated. There was no need to redesign existent processes.

## 5.2 First Steps

The first steps to achieve a global approach to the e-government issue occurred between the year 2000 and 2002 with great efforts of the ITPD staff, analyzing problems, available tools, etc. These tasks were not a response to any political authority request but an initiative to seize all the benefits of e-government. On the contrary, all actions taken afterwards needed to "convince" the authorities. The first stages tended to overcome the problems through mechanisms designed to integrate initiatives and existing portals, guide the projects according to real needs and develop an institutional image. From a technical point of view, the emphasis was placed on standards and platforms definition, selection of tools to deal with contents, training, etc. From a political point of view, the aim was to make the responsible ones be aware of the need of an integral e-government approach. In general, political authorities showed no interest in the issue.

Based on this evaluation, a series of initiatives started. From the technical point of view, the intention was to eliminate the gap between ITPD and the IT groups of each agency who were responsible for the current proposals, to create a general strategy on the subject. This showed the difficulties of shifting from the scenario of Figure 2 to that of the Figure 3.

In the year 2000, the first set of rules is issued, establishing basic definitions to standardize the information and develop websites. The results were not the ones expected; agencies were reluctant because they continued operating with their

websites according to their own needs. In this situation, the objective was to cut down anarchy. A positive element was the participation of the authorities: the Coordinating Ministry considered this subject for discussion.

### **5.3 Towards a Consolidated E-government Approach**

In 2003, new authorities were in charge and this allowed dealing with the subject with new enthusiasm. Even though there is no real advance on a formal proposal like that of Figure 5, works go in a similar direction. A specific agency was created, whose first task was to generate norms. A basic plan was developed, including subjects such as resource availability, contents and services development, technical infrastructure, etc. The aim was to move forward in the development of solid proposals that allow evaluating all benefits so that all areas are convinced of adding their services to a new general portal on the OSG approach.

As the lack of conviction was considered a weakness, a provincial e-government Committee was created so as to develop an e-government strategic plan. It is interesting to consider that the aforementioned agency did not succeed in solving the political inconveniences, which compels for the finding of another solution.

### **5.4 E-government Levels and BPR**

An analysis of the different initiatives shows that most proposals are in Level 1 [12]. Proposals of higher levels started to present problems with the current processes. When working on back-office, there were difficulties in the proceedings: differences in forms, dissimilar interpretations, lack of standardization, etc. Taking into account these problems, tasks remained at the front-office, at Level 2 (Interaction): development of unified forms. Also, there are Level 3 examples (Interactive); however, proceedings standardization among different jurisdictions is emphasized. This has delayed the advancement on back-office, mainly on proposals implying proceedings redesign, taking advantage of IT capabilities. The current situation may be associated to the scenario of Figure 3.

Nowadays, proposals on back-office are still originated individually. It may have happened with other subjects; when repeated problems are addressed, tools and rules will be generated so as to standardize all developments.

In order to uniform developments on front-office, standardized rules were originated through glossaries, a style guide book, norms and rules to be followed (for example Contact Us option), etc. Better results were obtained when coordinating efforts. For example, areas did not provided services of the same quality to satisfy all requests from citizens and companies. A database was generated so as to keep record of the contacts of all jurisdictional websites, making it possible to verify the level of attention provided, for example, response time. Additional services were developed and the present websites were improved after detecting the FAQ.

So far, BPR has not been considered for the two types of integration analyzed in this work. The difficulties of previous levels avoid suggestions about it. On the other hand, advanced level projects have not been presented. Commissions and those responsible for e-government policy do not worry about these issues, since there are

more urgent issues to solve in this matter. A deep analysis will be carried out in the future when moving to interaction and transaction stages; and then proceedings, good practices, tools, etc. will be required.

## 6. Conclusions

E-government success will mainly depend on the improvement obtained as a result of BPR implementation. Reaching higher e-government levels is related to business processes redesign to take advantage of IT capabilities. One portal working on front-office to receive requests is not enough; government must now be prepared to provide quick and high quality services.

The development of OSG brings about much more benefits. However, this means a new level of integration that agencies must face, requiring the use of BPR. However, many current e-government applications appear on the basic levels, regardless of the future benefits that may appear at superior levels. This delay is the result of the difficulties in implementing BPR in the public sector. Consequently, in order to accomplish real e-government benefits, authorities should generate appropriate tools and mechanisms for the use of BPR in the process integration.

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