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Budgetary data (in an open format) benefits, advantages, obstacles and inhibitory factors in the view of the intermediaries of this system: a study in Latin American countries

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Abstract. Governments are under pressure to meet new social demands and seek new forms of management. As well as this, the fact that they make considerable use of information technology, has led to the growth of their databases, and made governments and the respective government organizations, fertile ground for open data initiatives. Having access to budgetary data and being able to make use of it (with regard to revenue and expenditure), has traditionally always aroused great interest in society. The purpose of this study is to determine the potential benefits and possible obstacles that can affect the intermediaries who take action on the basis of budgetary data. A number of intermediaries (members of society and government policymakers) from four Latin-American countries were interviewed. The results show that the structural barriers of governments have an adverse effect on their activities because they impair the quality of the information that is made available. Nonetheless, the benefits that allow a greater degree of transparency as well as the ability to reveal more knowledge of the inside operations of governments, encourage the intermediaries to take part in this “ecosystem”.

Keywords: benefits , obstacles, open government data, intermediaries.

1 Introduction

Public organizations (in this study regarded as governments) are being confronted with new demands on the part of society. These demands are linked to the need for greater transparency in the management of public funds, and a greater control over the services provided, as well as a greater degree of accountability on the part of their managers. In this climate, information and communication technology (ICT) is beginning to play a key role.

The Internet can be cited as one of the most important resources for this technology. The set of factors outlined here – a greater demand by society for public organizations, a widespread use of information technology and the growing use and importance of the Internet – have made feasible the rise of a platform called open government. In the view of [6], under the aegis of open government, public organizations are seeking to meet the requirements of society by offering information as a means of finding a solution to some of the problems.

Among an array of opportunities created by open government initiatives, there is the prospect of being able to use open data (OD) which according to [3] means making information available on the Internet in a way that can allow it to be recycled for third parties. According to [12], open government data (OGD) involve the publication and dissemination of information of the public sector (i.e. governments) in the Web, which is shared in a rational and comprehensible format in a way that allows its reuse in digital applications or in other words, makes it legible for machines.

Following the rise of concepts (or technological platforms) of open data and open government, new players are emerging in the scene who may require new ways of using and appropriating the information made available, as well as reshaping traditional requirements. Thus the OGD projects must form a network between the government and society. It is only in this way that the assurances about the prospects of using open data effectively can be fulfilled, which means it is necessary to create and maintain an environment where the different players can interact [11]. Thus, governments and society must create an environment which benefits both and allows these sectors to grow and become more involved. Several authors claim that there are potential benefits that can be derived from open government data: economic growth and an improvement in the provision of public services among other factors.

From what has been outlined so far, undertaking this work is justified in so far as it seeks to achieve the following general objective: to find out the advantages, benefits, obstacles and inhibitory facts in the view of the OG intermediaries, who are involved in the ecosystem of budgetary data in Latin American countries. In attaining this goal, it is hoped that an answer can be found to the following research question: by having a knowledge of the expectations of the OGD intermediaries, can governments be granted better conditions to carry out projects of open government data in the budgetary “ecosystem”?

By undertaking this study it is hoped that a contribution can be made to the background of open government data by obtaining information about how the intermediaries take action, what benefits are sought that can overcome obstacles and other factors that pervade the activities carried out in the budgetary “ecosystem” of open data. Another key issue is the context of the work since it focuses on representative countries from the Latin American continent, namely Argentina., Brazil, Mexico and Uruguay.

The exposed here, we consider important to clarify that intermediaries terms and ecosystem in this work. Intermediate are players (individually or representative of governments and civil society organizations), which operate with public data, released in an open format. Ecosystem as a group of organizations and individuals (government and society), as well as structures (example - public authorities and their agencies, non-profit society organizations), technological tools (eg - software), legal components (example - laws) and values of society that interact in a particular government sector and society by making use of public data released in an open format.

2 Theoretical framework

The theories and models which act as a frame of reference, are employed for this study. This entails defining concepts about open data, its eco-system and the performance of intermediaries. The framework is outlined in the following sections together with its advan-

tages, benefits, obstacles and inhibitory factors in an OGD ecosystem which supports the data collection data and analysis.

2.1 Open data, its ecosystem and intermediaries

The advent of the platform (or concept) of open data originates in a historical process, where public organizations were always great users of information technology. This fact allied to new requirements by society for greater efficiency in public bodies and the growing use of the Internet in modern society, have given rise to a new concept called open data. The focal point of this study is open government data (OGD) for the [13], the publication and dissemination of information in the public sector (governments) in the Web, which can be shared in a rational and comprehensible format in a way that can allow it to be recycled in digital applications or in other words, made legible for machines.

Open government and open data are grounded on three pillars: transparency, participation and collaboration. Transparency imposes the responsibility to inform citizens about what exactly the government is doing and what activities it intends to carry out. Participation allows citizen to offer their ideas and skills and thus assists the government to devise more effective and far-reaching policies and also provide more information to society. Collaboration lays stress on the effectiveness of government and encourages closer cooperation between society and the different levels of government.

Until the time when all the initiatives and/or opportunities that the government had for making information available to society (more recently through the use of Internet technology), these questions were traditionally addressed with a view to ensuring transparency, greater control and a better exercise of citizenship. However, with the advent of open data, new opportunities have arisen for society to go beyond these traditional requirements in areas such as the following: developing new goods and services to bring about financial opportunities (through these goods and services), making improvements in social welfare and assisting the government (by providing feedback) through an interaction made possible by these new goods and services.

Authors such as [6], and [11] stress that it cannot be expected that simply by opening up new data, governments will begin to produce goods and services and create economic opportunities. For this to take place an attempt must be made to study, understand and suggest improvements or corrections to the proceedings of governments and society in general, with a view to fostering new activities, facing challenges and reducing (or ideally overcoming) unforeseen problems.

Researchers into the environment of information have used the metaphor of the ecosystem to stand for the wide and intricate web of relationships between the suppliers, users, data, material infrastructure and institutions. In the opinion of [5], an eco-system is "a system of people, activities, values and technologies in a particular environment". [5] think that the owners of an eco-system are located in three entities: a) the policies and practices of governments; b) the web users, companies and citizens of society; c) the innovators. These can interact in several ways and influence the way the eco-system evolves: the policies and practices of government can interact with the web users, civil society and companies.

An ecosystem cannot be established in a satisfactory way without the presence of intermediaries. These might be government policymakers or originate in the society where

there is a capacity and desire to act in the eco-system of open government data by having access to data and being able to handle and disseminate it. In other words, these data can be made useful for third parties for society through its most varied kinds of representation or organization.

Studies such as those of [8, 9], have underlined the importance of the intermediaries in this ecosystem. Setting out from these studies, these authors recognize that it is important for a wide range of players to take part because several technical activities are needed to handle the available information and make it accessible to the public. They state that a good deal is required to handle the available information and that this entails a close collaboration between the participants of this movement.

For the purposes of this study the authors define the term “intermediaries” as referring to “all the players (in an individual way or representatives of governments and social organizations), who are involved with public data that are released in an open format. They may or may not make use of technological, legal or structural artifacts in their activities. In making use of open data, the intermediaries aggregate value to the data to ensure that they can be understood more easily (and hence have a greater value) for third parties after their intervention”. The intermediaries can and must supply goods and/or services with the public database for the government and society/third parties.

2.2 Possible Benefits and Advantages

It can be argued that there are several advantages for society and government in using government data in an open format. As well as having the chance to exercise a greater degree of citizenship, people are given new economic opportunities by having access to public information. The study by [10] estimates that when it is spread to cover areas such as education, transport, health, finance, fuel, and electricity, open data has the potential to add three trillion dollars to the global economy every year.

Governments also benefit from the use of open data. [4], [6], cite the following as possible advantages to governments: greater internal efficiency - by having greater/better access to information, governments can make use of these data to undertake their activities and thus increase their efficiency by using information that is difficult to obtain (even by the governments themselves or other governments); and greater efficiency owing to the feedback provided by society that uses open data can and must “act as an informer” of the government about the possible approach that should be adopted for a better/greater use of public resources. [7] classify these possible benefits and/or advantages in three groups which are as follows: political and social; economic and technical; and operational. These benefits and/or advantages were used for an analysis of the main questions.

2.3 Possible obstacles and inhibitory factors

Some problems can arise in OGDs such as obstacles or possible inhibitors. Governments make great use of ICT; currently, they deploy different technological platforms in which the databases are stored. These databases should be the source of the data from open data projects. Governments have to carry out technical tasks that can be distinguished from the implementation of projects and involve the “conversion” of the data from these bases to formats that are suitable for publication in accordance with the rules of open data.

Another area that serves as a possible obstacle or inhibitory factor concerns the “understanding” of data from society (which is addressed in the issue – the quality and usability of available content). How can one ensure that the data are reliable and that the content is up-to-date? Since the open data must be published in different formats from those stored in the database, the task of “conversion” is a necessary investment when forming the teams [5].

The structure of government bodies can also have an adverse effect on these initiatives since even when there are legal guarantees for the publication of the data, the governments need the operational conditions to carry out this task. It is recognized that there is a need for training and to adapt the culture of the public servers to this end as well as a suitable functional and technological framework for a correct understanding of the system and to meet the legal, technological and structural requirements. [13] and [7] classify the obstacles and possible inhibitory factors into six large groups which are as follows □ institutional, complexity of tasks, use and participation, legislation, quality of information and techniques. These obstacles and inhibitory factors were drawn on for the data analysis.

3 Methodology

In the light of its objectives, this can be characterized as an exploratory study, as defined by [2], who believes that exploratory studies are suited to broadening the researcher’s knowledge of a relatively unknown phenomenon and thus providing a greater understanding of it. Another feature of this kind of work is that the researcher does not expect to obtain definitive answers to the problem addressed.

In forming the sample, the authors of the study made use of their findings from a previous work on the “ecosystem” of open government data. Nineteen interviews were conducted, some in person and others via Skype; the interviews were recorded and subsequently transcribed. Four interviews were conducted in Argentina, six in Brazil, five in Mexico and four in Uruguay; all the interviews were carried out between September and December 2014.

The study was based on analysis assumptions with regard to content and a previous categorization of the aims of the research questions according to [1]. This author thinks that conducting an analysis of content is an investigative technique which is employed with a view to obtaining an objective and systematic description of the issue that is being communicated. One of the ways of putting into effect an analysis of content is to categorize the texts that emerge from the data collection. This categorization can be carried out in an a priori way and is grounded on a theoretical basis.

The categories must be valid and there must be a consistent classification of each element. A valid kind of categorization must be significant with regard to the content of the materials which are being analyzed and conform to the goals set out for the study. A qualitative approach was adopted for handling the data analysis which sought to determine what citations or references to previously established categories occurred according to [2]. In Table 1, there is a chart showing the categories that were drawn on for the analysis

Table 1. Categories for analysis.

Category	Characteristics of each category
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Profile of the respondent	Terms referring to the profile of the respondent.
Action taken in the course of the study	Terms used in making citations to the activities that were carried out . What activities were carried out ? However they carried out? Why were they carried out ? What were the reasons for the course of action taken ?
Benefits and/or advantages	Particular issues : political, social, economic and operational or technical.
Obstacles and/or inhibitory factor .	Particular issues: institutional, complexity of tasks, use and participation, legislation, quality of information and techniques .
Results attained	Terms that can define the main results that were attained

In Table 2 there is a description of the instrument that was used, together with the purpose of each question and its relation to the categories defined for the analysis. The first part of the interview consisted of questions to determine the profile of the interviewee. The other questions were aimed at finding out about the activities that were carried out, the benefits and/or advantages, obstacles or inhibitory factors regarding the OGD ecosystem, especially with regard to budgetary data.

Table 2. Questions of instrument.

Questions	Purpose of the questions	Category Analysis
Identification of the respondent.	To find out the name and organization of the respondent .	Profile of respondent
How would you define your use of open data and how much time have you spent on open data ?	To form a profile of the respondents through their performance	Performance
What are the factors that have led you to play your role (i.e. from the action you have taken) in using open data ?	To find out what factors have driven the respondents to take action in this area .	Benefits and/or advantages
What are the main expected benefits (on the basis of your activities) of using open data (for governments and society in general)?	To obtain a better understanding of the driving-force behind the intermediaries in the eco-system.	Benefits and/or advantages
What are the main difficulties encountered when using open data?	To find out what factors serve as obstacles or inhibitory factors in the eco-system and may, in a general way, impair the performance of the intermediaries	Obstacles and/or inhibitory factors.

Is the information available suitable and adequate for carrying out your activities?	To find out the obstacles or inhibitory factors with regard to making information available	Obstacles and/or inhibitory factors .
How would you define access to tools and/or resources for taking action to ensure budgetary transparency ?	To determine the obstacles or inhibitory factors with regard to resources or tools	Obstacles and/or inhibitory factors .
What results stand out from your performance ?	This question seeks to find out what results/ experiences of the intermediary need highlighting .	Results attained a

4 Results and analysis

In this section there is an examination of the results and respective analysis which follows the order of the questions in the instrument. In this way, the profiles of the respondents are shown together with the way they behaved during the project. Following this, the benefits and advantages are outlined together with obstacles and inhibitory factors.

4.1 The profile of the respondents and their way of behaving

The respondents basically had professional backgrounds and came from the following areas: public policymaking, economics, law, journalism and information technology. Attention should be drawn to the presence of journalist in this group. With regard to the question of their performance, there were actors (intermediaries) of governments, who stressed that their main aim was to support the task of publishing data. On the other hand, there were key players who sought to publish the academic subject of the research they were carrying out.

The intermediaries in the area of information technology stated that they acted in this area to develop tools that could make it easier to access and handle the data. Several actors (intermediaries) stated that they were involved in the observation of public policies and in the context of the interviews, the issues they focused on were financial matters or the public budget. Another issue that was often cited to justify the work of the intermediaries, were questions related to transparency.

4.2 Interviews: Benefits and Advantages

Table 3 shows the benefits and/or advantages that were revealed by the interviews. In all the tables there is a number beside the factor that is cited, which corresponds to the number of citations given for it. The number of citations of each category is the sum total of the citations of its respective advantages and/or benefits. The results are arranged to include all four countries and each interviewee is able to cite more than one benefit or advantage.

This way of displaying the results can be explained by the fact that the main purpose of the study is to find out the advantages, benefits, obstacles and inhibitory factors in the view of the OGD interviewees who are involved in the ecosystem of budgetary data.

Table 3. Benefits and/or advantages

Category	Benefits and/or advantages cited – number of citations
Political and social (53)	Greater transparency(11); increased participation and self-accountability of citizens (web users) (11); creation of trust in the government (5); public participation in producing data (6); equality of access to the data (1); new government services for the citizens (1); improvement in the formulation of policies (7); creation of new kinds of knowledge in the public sector (5) and new social services (innovations) (6).
Financial (11)	Assists in improving procedures, goods and/or services (1); development of new products or services (3) and the use of collective knowledge (7).
Operational and technical (14)	Improvement in policymaking (10); improvement in decision-making which allows comparisons to be made (1); makes it easier to access and find data (2) and the creation of new databases by combining data (1).

It is clear from the results that the greatest benefits and/or results are linked to political and/or social factors where there are good prospects of bringing about greater transparency. This is one of the three pillars of open government and its citation was either made in a direct form or by mentioning other factors such as: the prospect of encouraging greater participation among the citizens or providing the public with greater access to the data.

Financial gains were also mentioned in this category and there were clear signs of another pillar of open data being found in this category- collaboration. This was clear when the interviewees stated that they were able to derive advantages or benefits from the use of collective knowledge through the use of an intermediary.

The factor highlighted above converge when obtaining operational and technical benefits or advantages in so far as there is a recognition that policymaking can be improved and that to achieve this a greater participation and collaboration between society and the government is needed through the main players (intermediaries) of these sectors.

With regard to political and/or social issues, it should be noted that some benefits or advantages were cited that could be obtained by governments such as: the creation of trust in the government and the discovery of new knowledge in the public sector. In addition, society can profit from open data in the following areas: new government services and social services for the general public. This confirms the underlying assumption of certain authors that everybody can derive benefits or advantages from the use of public data in an open format.

4.3 Possible obstacles and/or inhibitory factors

Table 4 shows the obstacles and/or inhibitory factors that emerged from the interviews. In all the tables, there is a number beside the factor being cited which corresponds to

the number of its citations. The number of citations of each category is the total sum of the mentions of the respective obstacles and/or inhibitory factors. The results have been arranged to include all four countries and each interviewee can cite more than one benefit or advantage.

Table 4. Obstacles and/or inhibitory factors

Category	Obstacles and/or inhibitory factors – number of citations
Institutional (25)	Lack of uniformity in the policy for publishing data (15); priority given to the interests of organizations to the detriment of the interests of private citizens (5); failure to define the procedures adopted for working and/or interacting with the web users (3) the existence of doubtful standards for working with the web user (2)
Complexity of the task (38)	Duplication of data, the data made available in different ways either before or after the processing, resulting in uncertainty about the source (9); even when the data can be found, the users may not be aware of their potential uses (6); the data formats and datasets are much too complex to be handled and used easily (17); a lack of support for the tools or helpdesk (5) and the focus is on making use of individual datasets whereas the real value may come from a combination of several datasets (1).
Use and participation (40)	A lack of incentives for the user (9); public organizations fail to react to the input of the user (2); the costs are unexpectedly high (1); lack of time to use open data (1); a lack of knowledge about how to use or make sense of the data (15); lack of the necessary capacity to make use of the information (9); no statistical knowledge or understanding of the the potential value or limitations of statistics (3).
Legislation (3)	Written permission required to have access to the data or to reproduce them (2) and the question of the renewal of contracts/agreements (1).
Quality of the information (32)	Lack of information (10); lack of precise information (8); information that is incomplete, only a part of the total picture shown or only conveyed at particular intervals (6); the loss of essential information (1) and the fact that similar data stored in different systems produce different results (7).
Techniques(29)	The data should be in a well defined format which is easily accessible: whereas the data formats are arbitrary, the data format must be strictly defined (1); absence of standards (11); absence of a support to make the data available (1); lack of goals and standards (1); no standard software for the processing of open data (5) and fragmentation of software and applications (10).

Several authors stated that they had a lot of difficulties in publishing public data in an open format which originated from the inner structures of the government. This is confirmed by the interviewees when the following factors had several citations: a lack of uniformity in the policy for publishing data and the fact that priority was given to the interests of organizations to the detriment of those of private citizens.

Other obstacles that were often cited by various authors were linked to the quality of the published information in various ways. This is also confirmed by the interviewees where there were a large number of citations: duplication of data; data being made available in different ways; the data formats and the fact that the datasets are much too complex to handle and use easily; lack of precise information, absence of standards; and the fragmentation of the software and applications. At the same time, attention should be drawn to the low number of citations regarding obstacles or inhibitory factors related to legislation.

There are many references to factors regarding the interests of society and the following had a lot of citations: a lack of incentives for the user; a lack of knowledge about how to use or make sense of the data and a lack of the skills needed to use the information. This is supported by the mention made of the factors related to the ability of the government to work together with society and the difficulties experienced by those wishing to obtain support or clarification of the content made available.

With regard to other factors, the driving-force behind the desire of society to participate in the OGD initiatives, as well as its qualifications for using these data, is to some extent related the factor of participation. These difficulties might be aggravated by a lack of understanding of the content made available and by the skills (some of which are technical) that are needed to have access to the information and be able to handle it .

4.4 Results attained

Some questions about the instrument seek to find out what results can be attained. The purpose of these questions was to establish the results that were obtained and allow a parallel to be made between the benefits, advantages, obstacles or inhibitory factors and these results and learning experiences.

The main results that were mentioned, corroborate the fact that this issue is still in its early stages. This is because several of the interviewees stated that the principal result was the publication of documents with a view to publishing material about the question which included documents such as books, lists of statistics, and catalogues. Other results are as follows: it has had a small impact but is gradually being formed; there is more discussion of the issue and the community which is being formed around the subject is growing although only gradually; the fact that open data is an important question but still does not have great popular appeal; the fact that the issue is still in its early stages in the countries that are the focal point of this study .

In the previous subject, various advantages and benefits were cited by the interviewees as being susceptible to inclusion in this ecosystem and the results confirm some of these advantages such as: improving policymaking; a rise in the number of accusations of misdemeanors, which might lead to a better use of public resources; a heightened awareness in society of public expenditure and a greater trust in the government

Some results confirmed that there were obstacles and difficulties, especially with regard to the limited interest and capacity of society to have access to the data or be able to use it. The interviewees cited the following results in support of this fact: a greater concern and awareness of the importance of allowing society to have access to data and the respective

use of this data; in some areas there was a greater interest in the use of the data/information made available in this format as, for example, public transport; finally the formation of alliances between organizations of society increases the interest in the subject.

The results that were cited strengthen the need for the formation of networks between governments and society and allows the intermediaries to play a stronger role in this ecosystem. This is because mention was made of the effort and work necessary to obtain some results which must be carried out by the government and key players in society. As a result, certain activities were carried out such as public events and courses aimed at bringing about a greater degree of integration.

5 Final Considerations

Before giving our final thoughts about this work, an attempt will be made to outline some of its limitations and make suggestions for further studies. One drawback of the work which should be mentioned, is the fact that the sample was formed in an intentional or rather, non-probabilistic way which might have caused a degree of bias in the answers. In an attempt to overcome this problem of bias, the authors decided to interview key players (or intermediaries) from different social origins and professional backgrounds , although all of them were linked to the ecosystem of budgeting.

The authors are aware that in future studies it would be valuable to carry out research into other ecosystems of open government data such as in education, and health among other areas, as a means of determining what results are different and/or similar. Forming a sample with intermediaries from other ecosystems will allow greater assistance to be given to public managers in future planning of schemes for the publication of data in an open format.

Undertaking this study has made it possible to confirm some of the advantages and/or benefits that are proclaimed by several authors, especially with regard to the open data which has the potential to exercise transparency and allow society to have more control over the acts of government and thus establish a historic trend. At the same time, it also confirms that few opportunities have been found in the economic field because not many interviewees referred to benefits and/or advantages in this area.

The results make clear that society still has little interest in the issue and the interviewees made several references to this fact. Several corroborative reasons were mentioned such as the difficulties of understanding the context of the data and the need for a higher level of education and culture to include the social players in this ecosystem. It should be underlined that there was also mention of the need for the intermediaries to have knowledge and technical skills (related to the information technology software sector), and a list was made of the technical difficulties of having access to the data or being able to handle it .

It is also evident from the results that the presence and involvement of governments is important since they can derive benefits and advantages from publishing the data in an open format. Governments should also give priority to mitigating factors that might harm the publication of data in a way and thus circumvent obstacles and technical or structural difficulties with regard to the publication of information. Government actions can also help to overcome the limited interest of society in available information, as well as to encourage activities that can lead to an understanding of the material that is published.

It is believed that this study has attained its intended objective of identifying the advantages, benefits, obstacles and inhibitory factors, from the standpoint of the OGDs who are

involved in the ecosystem of budgetary data in Latin America. At the same time, the results have made it possible to find answers to the research question since identifying the factors listed above (as well as the results and lessons learned by the key players in the ecosystem of open government data) allow the policymakers to profit from the improved conditions for carrying out projects of open government data .

One of the contributions that can be made by the managers is as follows: it is extremely important to create the conditions that can enable organizations like those studied in this work, to be able to carry out their activities and in particular, to have an environment (or an ecosystem) that allows organizations to be combined so that partnerships can be formed in a way that is complementary to their individual capacities. These partnerships can also be formed to obtain benefits or advantages and as a way of overcoming possible obstacles and inhibitory factors through activities that encourage innovation and collaboration, which are the two basic principles of open data.

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