Telectronic Government and Process Innovation: The perception of Municipal Public Managers

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Abstract

This study aimed to identify and interpret the municipal public managers in the use of the electronic portal of the State of Rio Grande do Sul. Thus, the applied and quantitative research was carried out with 62 municipal managers from the municipalities of Rio Grande do Sul. As a result, it was observed that the electronic portal is seen as process innovation, which minimizes public administration and user spending, and enables process improvements for the citizen. It was also observed that the variables were grouped into three factors: technology, processes and interaction, with no variance between the groups by mesoregions. Finally, it was observed that there is a moderate positive correlation between Technology and Processes, Technology and Interaction, and Processes and Interaction.

Keywords: e-Government. Innovation. RS State Portal.

1. Introduction

With the advances in information and communication technologies, public organizations need attention to the alternatives arising from computerization, seeking socioeconomic and institutional transformations, specifically in relations with society. This dynamic in the relations with the State contributes to efficiency in the offer of public services to citizens and companies, since they tend to opt for transactional services in virtual environments, according to their convenience (BARBOSA, 2008).

In this sense, with the use of technologies and the Internet, a collaborative, flexible and innovative government modality emerges, which aims to bring the government closer to the citizens (PRADO et al., 2010). Thus, the democratization of access to information and the dynamization in the offer of efficient public services make emerge the mechanism of Electronic Government (EG), as a tool that, electronically, aims to provide services and information to citizens, replacing traditional channels (ALSHEHRI; DRW; ALFARRAJ, 2012).

As a strategy to maintain a culture of innovation in processes and organizational management, the GE is associated with the very essence of democracy, public transparency, proper public conduct and improvement in the quality of services provided (GUIMARÃES; MEDEIROS, 2005). This concept arises from the use of information and communication technologies to bring the public administration closer to the segments of society, in order to democratize access to information (CUNHA, 2010). According to the United Nations (UN, 2014), the EG improves the quality of services and public information provided to society, both in the relationship between the government and citizens as well as companies and other entities of public administration.

Thus, the EG seeks to improve the interaction between government and society, through the availability of services and information online (MANOHARAN; HOLZER, 2012). Thus, both in Brazil and in other countries, the implementation and development of Electronic Government Programs (e-Gov) aims to improve the relationship between public service providers and citizens. And they cover all levels of government, whether federal, state or municipal. Moreover, the use of EG improves performance and maximizes efficiency in public administration, providing the sharing of information between different levels and promoting the development of processes (CETICBR, 2011).

Therefore, in order to offer services with efficiency, ensuring effectiveness, the Government uses the GE as a facilitating mechanism (GUIMARÃES; MEDEIROS, 2005). Thus, in order to evaluate this tool, specifically in the state sphere, the following research problem was defined: What is the perception of municipal public managers in the use of the electronic portal of the State of Rio Grande do Sul regarding process innovation?

This article is justified based on a bibliometric biased search carried out in the Scopus database. As search criteria, the terms "e-government" and "innovation process" were used separately and together ("e-government" and "innovation process"). One can identify that policies aimed at transparency in the public sector have a positive impact on service delivery and on citizens' knowledge about the actions of public entities in several countries. Similarly, it was observed that good external relations with stakeholders improve the innovation process, allowing greater efficiency of processes and transparency of services provided.

However, it was identified that the complexity of the environment, that is, the bureaucratic structure of the public administration presents problems for the existence of an awareness of cooperation and adequate flow of information between the spheres of government. In this sense, the bibliometric study carried out pointed out that the technologies and innovations by means of the Internet platform make it possible to assist in the improvement of processes both internal and external to the public administration.

Thus, the objective of this study was defined as to identify the perception of municipal public managers in the use of the electronic portal of the State of Rio Grande do Sul regarding the process innovation. The article presents, besides this introductory section, the theoretical framework that supported the study, the methodology, presentation and discussion of results and the final considerations.

2 THEORETICAL FRAMEWORK

2.1 Innovation

Innovation is a concept applicable in all sectors of the economy, in different types of organizations, including the media. Therefore, it is necessary to learn to manage and recognize innovation, since these sectors or organizations depend on it to increase productivity and competitiveness (SEBRAE, 2009).

Innovation originates from the Theory of Economic Development, created in 1912 by economist Joseph Schumpeter. His approach defines innovation as a process of "creative destruction" that promotes a rupture with the existing capitalist system and, in this way, moves economic progress. According to Schumpeter (1934), the action of innovation and creation processes promote ruptures in the economic system, thus allowing the appearance of novelties.

Thus, Schumpeter (1912) establishes five assumptions for the existence of innovation, which are: introduction of a new good with new combinations; new production method; new market; introduction of a new source of raw material; and establishment of a new organization of any industry, as well as the creation of monopoly position. In this sense, the innovation processes occur in a cyclical way, that is, new products, processes or services are presented in the market with the objective of supplying needs, generating profit for the companies and, consequently, reflecting in the development in the competitiveness of the countries (SCHUMPETER, 1982).

Thus, innovation is about change. However, changes can be related to the object that the organization offers, i.e., the product, or they can be related to the way the organization creates, produces and delivers these products, i.e., the process. This concept extends to other types of changes such as organizational form, way of working, business, technology and marketing (TAKAHASHI; TAKAHASHI, 2007).

Based on the Schumpeterian assumptions of innovation, for the Oslo Manual (2005), innovation has four dimensions, namely: product, process, marketing and organizational. The first refers to the introduction of a new or significantly improved good/service as to its characteristics or forms of use. The second, in turn, covers the implementation of a new or significantly improved method of production or distribution of goods/services. The marketing innovation consists of a new or significantly modified conception of the product in relation to its packaging and positioning, form of presentation, promotion, or even price definition. Finally, organizational innovation contemplates the adoption of a new management procedure, business practice, work organization or external relations (OSLO, 2005).

Thus, the study was based on innovation from the Schumpeterian perspective and, consequently, adopted the process dimension defined according to the Oslo Manual (2005), considering the modernization of the government through e-Government that can be understood from this perspective (MORA, 2005).

2.1.1 Process innovation

According to the Oslo Manual (2005), process innovation consists of the implementation or adoption of significantly improved or new methods, and may involve changes in equipment, human resources, work methods, or even a combination of these factors. It refers to changes in production and delivery technologies for goods and/or services (Hamel, 2007). In this sense, the implementation of new communication or information technologies, which aim to improve the efficiency of an activity, can also be considered as process innovation (OSLO, 2005).

The process innovation is focused on improving the efficiency and effectiveness of the production process (HIGGINS, 1995), involving changes in the way products and services are created and delivered to customers (TIDD; BESSANT; PAVITT, 2008). Thus, it aims to present advantages in terms of costs or speed in the production process, whose origin consists of the increment of new means of manufacturing, product manufacturing, distribution or service provision (JONASH; SOMMERLATTE, 2001). It plays a strategic role, considering that it provides the organization to accomplish something that the competition cannot, or even do better than others, creating a significant advantage (SCHERER; CARLOMAGNO, 2009).

Thus, process innovation occurs for reasons related to the minimization of personnel, manufacturing costs, product design, material and energy consumption, factory defects, improvement in working conditions, manufacturing flexibility and reduction of environmental pollution. However, it depends on the quality and infrastructure of Information Technology (IT), on the transfer of improved practices by consultants, as well as on proprietary advantages coming from outsourced process suppliers (SIMANTOB; LIPPI, 2003).

This study considered the Electronic Government as one of the process innovations inserted into the public administration as a communication channel, with views to increasing efficiency and transparency. For Fountain (2001), the communication channels are configured as innovation in the public sector, since they change the way services are offered to society, impacting on the convenience, accessibility, and time expenditure of citizens (WEST, 2005).

2.2 Electronic Government

In public organizations, the way of governing is characterized as hierarchical, bureaucratic and segmented, instead of flexible, innovative, collaborative and coherently accompanying the evolution of the knowledge society. Thus, the search for mechanisms that streamline services and information from the public sector to society, in order to generate government efficiency, is configured as a movement of governments around the world (AGUNE; CARLOS, 2005).

In this context, the minimization of public spending and the improvement in the execution of resources become an evident benefit, since services become available and performed electronically, at any time and by the society itself. Aspects such as convenience, agility and flexibility drive the maximization of the number of services provided electronically (DAMIAN, 2012).

The term Electronic Government appears in the English language as Electronic Government, usually abbreviated as e-government or simply e-gov, being also common the use of corresponding denominations, such as digital government, online government and transformational government, depending on the context considered (MISURACA, 2009). However, there is still no consensus on the definitions and applications of EG, since it can be understood as an electronic service provider or even as a way to maintain a database of citizen information (PINA; TORRES; ROYO, 2007).

However, its origin dates back to the mid-1990s, in the context of the emergence of the commercial Internet and models such as New Public Management. At that time, the term simply meant the transfer of e-business experiences from the private sector to the public sector (PINA; TORRES; ROYO, 2007). However, one of the first references to the term GE in the literature was made by Milward and Snyder (1996), who conceptualize it as technology used to connect government services and citizens, eliminating or minimizing the need for them to report to a specific location or to stick to a certain service schedule, facilitating access to certain services.

For Group (2002), the GE can be considered as a transforming agent, both of internal and external relations in the public sector, which, with the use of the Internet and information and communication technologies, enable the optimization of public services, improvement in processes, as well as citizen participation. Accordingly, Ferrer and Santos (2004) define GE as the electronic provision of a set of services and access to information for different actors in society.

In turn, Stahl (2005) elucidates that GE can be understood under three aspects of Public Administration, namely: tasks related to the improvement of internal processes, considered as administrative; supply of public services and information, in which the focus is on the development of public policies; and under the aspect of interaction with society by means of enabling incentive mechanisms for democracy.

As an emerging concept, the GE, through electronic means, aims to provide or make available the information of public agencies at any place, time and for any citizen, so that all stekolders involved with the public sphere can add value (ABRUCIO, 2007). In this sense, the United Nations (UN, 2014) defines such term as the use and application of information technology in public administration, with the purpose of streamlining and improving service delivery, as well as expanding communication channels, thus enabling people's participation.

3 METHODOLOGICAL PROCEDURES

Methodology is conceptualized as an intellectual process of acquiring knowledge through the investigation of a reality (FACHIN, 2006). Therefore, it is necessary to consider that scientific research is based on the logic of empirical methodology (POPPER, 2003), aiming to obtain knowledge through the discovery of facts (ANDER-EGG, 1978; COLLIS; HUSSEY, 2005).

The research developed was configured as applied in relation to its nature, considering that it aimed to create new knowledge possibly put into practice in order to solve concrete problems (LAKATOS; MARCONI, 2011). As for its approach, the research adopted the descriptive quantitative method, seeking to identify characteristics (HAIR JR. et al., 2005), objectively, by analyzing numerical data and applying statistical tests (COLLIS; HUSSEY, 2005), in order to describe or analyze phenomena, evaluate programs

or isolate key variables (DENCKER; VIÁ, 2002).

Data collection was carried out by means of a survey. The data collection instrument adopted was a structured questionnaire on a five-point Likert scale, according to the respondent's degree of agreement, originally proposed by Damian (2012), modified by Alawneh, Al-Refai and Batiha (2013) and subsequently adapted by Moreno (2014).

Regarding the sampling, it was used a simple random probabilistic sample, considering the municipal managers or their representatives of the 497 municipal governments in the State of Rio Grande do Sul, i.e., public managers who use or not the electronic portals as a basis for decision making. To this end, it was obtained from the Court of Accounts of the State of Rio Grande do Sul (TCE/RS) the list of emails of the municipal managers of Rio Grande do Sul and then the questionnaire was sent electronically, between April 15, 2017 and July 20, 2017.

Regarding the sample size, it was used for the present study the minimum sample defined by Marôco (2011), of three respondents per question applied. Thus, given the questionnaire with 15 questions, the minimum sample size was 45 respondents. However, after sending the questionnaire electronically to all elements of the listed population, a total of 62 respondents were obtained.

4 ANALYSIS AND DISCUSSION OF THE RESULTS

4.1. Characterization of the respondents

The first step in the analysis of the results was to analyze the frequency of answers about the profile of the respondents. Thus, it was identified that, of the 62 respondents, most are: male (64.5%); between 31 and 40 years old (35.5%); experts in their fields (37.1%) and other 35.5% are graduates; have income of 1 to 5 minimum wages (64.5%); and are mostly from the Metropolitan region (30.6%) and Northwest (27.4%) of Rio Grande do Sul.

Moreover, an analysis was also carried out on the use of the electronic portal of Rio Grande do Sul, in order to identify which accesses the respondents use more often, and they can choose more than one electronic portal. It was observed that the most used portal by respondents is the portal of the Treasury Department (42 answers), followed by the portal of the Health Department (18 answers) and the Education Department (16 answers).

Thus, it was found that the Secretariat of Finance, which concentrates the administrative expenses in general, is the portal with greater access by managers, given the need for constant cost minimization. The Health and Education Secretariats, on the other hand, are those that demand the allocation of most public resources by force of constitutional legislation, causing managers to seek information about agreements or resources needed to supply public policies in these areas.

*4.2. P*erception of the respondents

It was found that the advantages of using the electronic portal, according to the perception of the respondents, are: improvements in public services and agility (GE1) with a mean of 3.69; assist in the elaboration of public policies (GE2) with a mean of 3.53; improvements in the interaction of society with the government (GE3) with a mean of 3.52; approximation of the government to society (GE4) with a mean

of 3.74; promoting the awareness of society regarding the use of information and approximation of the population to the services offered by the State (GE5) with a mean of 3.79; transparency of public acts (GE6) with a mean of 3.77 and offering society better conditions for access to information and government services (GE7) with a mean of 3.79.

Regarding the perception of respondents regarding innovations, it was identified that the electronic portal is seen as an innovation of processes (INP3) with an average of 3.16; an opportunity glimpsed by the Government for the increasing use of Information Technology by the population (INP4) with an average of 3.74; a way for the Government to adapt to society's new technological context (INP5) with an average of 3.90; implementation of a new or significantly improved method of production or distribution of goods/services (INP8) with an average of 3.73; minimizes public administration and user expenses (INP1) with an average of 3.16 and promotes economic-financial return for citizens (INP2) with an average of 2.98; enables improvements in processes for the citizen (INP6) with an average of 3.66 and the Government's need to improve its services in order to approach the new reality of the population (INP7) with an average of 3.81.

4.3. Factor Analysis

Factor analysis was performed, which consists of a class of multivariate statistical methods, which aims to define a fundamental structure in a data matrix, examining the interdependence between all variables and reducing diverse variables to a smaller number of common dimensions, called factors (HAIR et al., 1998). Initially, the Kayser-Meyer-Olkin (KMO) and the Bartlett's Test of Sphericity were performed, which are shown in Table 1, with the objective of confirming the validity of the factor analysis for the data collected, that is, to test the adequacy of the sample (HAIR et al., 1998).

Table 1 - Kayser-Meyer-Olkin Test (KMO) and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0,899
Bartlett's Test of Sphericity	Chi-Square Approx.	634,108
	DF	105
	Sig.	0,000

Source: Data obtained using SPSS (2017).

Thus, considering that the value of the Bartlett's test of sphericity with significance level $p < 0.05$ indicates that the matrix is favorable (TABACHNICK; FIDELL, 2007), it was observed that the test of sphericity presented a significance of 0.000, so that it is identified that the data are suitable for factor analysis. As for the Kaiser-Meyer-Olkin (KMO) test, it was considered for this study that values lower than 0.5 are considered unacceptable; values between 0.5 and 0.7 are considered poor; values between 0.7 and 0.8 are considered good; and values higher than 0.8 and 0.9 are considered excellent and great, respectively (HUTCHESON; SOFRONIOU, 1999). Therefore, it is found that the KMO test result for the study is excellent and the data are suitable for factor analysis.

The factor analysis resulted in 3 factors that explain 71.061% of the total variation of the 15 variables under study, which can be seen in Table 2.

Table 2 - Total explained variance Rotation Sums of Squared Loadings

Factor	Initial Eigenvalues			Extration Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	% Cumulative	Total	% of Variance	% Cumulative	Total	% of Variance	Cumulative%
1	8,331	55,537	55,537	8,331	55,537	55,537	3,852	25,682	25,682
2	1,210	8,069	63,606	1,210	8,069	63,606	3,485	23,231	48,913
3	1,118	7,455	71,061	1,118	7,455	71,061	3,322	22,148	71,061
4	0,736	4,906	75,967						
5	0,578	3,855	79,822						
6	0,555	3,697	83,520						
7	0,455	3,032	86,551						
8	0,382	2,544	89,095						
9	0,358	2,390	91,485						
10	0,339	2,257	93,742						
11	0,295	1,967	95,709						
12	0,194	1,292	97,001						
13	0,183	1,222	98,223						
14	0,154	1,026	99,248						
15	0,113	0,752	100,000						

Source: Data obtained using SPSS (2017).

It is observed that all variables were grouped into three factors that explain 71.06% of the total variance. Moreover, by performing the varimax rotation, aiming to minimize the number of variables that present high loadings in each factor (TABACHINICK; FIDELL, 2007), it can be identified that the distribution and grouping of variables did not follow the proposed in the initial instrument, according to Table 3, which presents the component matrix of the varimax rotation.

Table 3 - Component matrix of the varimax rotation.

	Component		
	1	2	3
INP3	0,807		
INP5	0,786		
INP4	0,770		
GE5	0,716		
INP8	0,635		
GE7	0,630		
INP6		0,833	
GE6		0,702	
INP1		0,691	

INP2		0,636	
GE1		0,623	
GE4			0,821
GE3			0,787
GE2			0,753
INP7			0,631

Source: Data obtained using SPSS (2017).

Thus, it was observed, regarding the perception of municipal public managers in the use of the electronic portal of the State of Rio Grande do Sul regarding the process innovation, that the variables are grouped into three factors, named in this study as by the relationship of the questions with specific keywords, namely: technology, processes and interaction. Table 1 presents the variables grouped into each of the factors.

4.4. Correlation Analysis

Thus, in order to identify whether there is a correlation among the factors Technology, Processes, and Interaction, considering that the data collected does not follow a normal distribution, the Spermann Correlation test was performed. Table 6 presents the correlation between the factors.

Table 4 – Spearman Correlation

			Technology	Processes	Interaction
Rho of Spearman	Technology	Correlation Coefficient	1,000	0,680**	0,740**
		Significance (2-tailed)		0,000	0,000
		N	62	62	62
	Processes	Correlation Coefficient	0,680**	1,000	0,616**
		Significance (2-tailed)	0,000		0,000
		N	62	62	62
	Interaction	Correlation Coefficient	0,740**	0,616**	1,000
		Significance (2-tailed)	0,000	0,000	0,000
		N	62	62	62

** The correlation is significant at the 0.01 level (2-tailed).

Source: Data obtained using SPSS (2017).

Thus, it was observed that there is a moderate positive correlation between Technology and Processes (0.680), indicating that the better the technologies used in public management, the better the processes will be. Likewise, it was observed that there is a moderate positive correlation between Technology and Interaction (0.740), indicating that the better the technologies used, the better the interaction between citizen and government and internally to the government.

In the same sense, it was found that there is also a moderate positive correlation between Processes and Interaction (0.616). This phenomenon indicates that the better the processes adopted in public administration, the better the interaction between citizens and government, as well as the government

internally.

Therefore, regarding the Technology in the context of electronic government as process innovation, according to Silva (2013), the civil landmark of technology and the Access to Information Law have influenced the field of Public Governance best practices. Grembergen (2004) deals with the term information technology governance, conceptualizing it as the organizational capability exercised by the executive board and management together with the Information Technology (IT) team, which allows to control the formulation and implementation of the IT strategy, in order to ensure the alignment of IT with the organization. Thus, the purpose of IT governance according to the author is to support the process of identifying the objectives, the phases of decision making and meeting the present and future demands of the organization and its citizens.

In the same sense, the relationship between technology and e-Government as a process innovation is perceived in public management by the form of digital governance, which aims not only to perform the interaction with society, but also to understand the meaning of information as an asset. Thus, e-Government is perceived as a process innovation that is based on technology, also called Electronic Governance. Its goal is to provide civil society with efficient government management in information management, improve service delivery, increase interaction with citizens through access to information and broaden their participation in public policy decision making (UNDESA, 2012).

Similarly, improvements in Processes are also perceived by respondents regarding the use of electronic government as innovation. In a context of managerial revolution of public administration, the use of new technologies enables effective and efficient performance of governments in certain sectors of the economy (BRESSER PEREIRA; SPINK, 2007). Different examples of these improvements caused in the processes in public services by the use of technologies with a view to efficiency and transparency in processes can be seen in the literature.

Under this approach, Kettl (2008) analyzed the changes and reforms in the modernization of the State, identifying that the innovations in processes implemented have increased the power of the local manager in the execution of public policies, which reflected in the achievement of efficiency.

Likewise, in 1997, the use of the Poupatempo service center in the State of São Paulo, through which departments of several related agencies were installed in a single location, revolutionized citizen service, becoming synonymous with efficiency (DIAS, 2008).

However, in addition to the gain in efficiency advantage, the use of technologies in public management processes also allowed the Interaction, with the emergence of deliberative democracy in the mid-1990s. It is, therefore, a discursive democracy around dialogic cooperation for conflict resolution, where political actors position themselves as active agents in processes of public deliberation (SILVA, 2009).

Thus, the technology applied to the processes, and the interaction of governments with citizens or internally to it, made possible the control of public acts by the population through the mechanisms of transparency. Moreover, democratic participation was expanded (KETTL, 2008) and there was the promotion of quality in services provided with fewer resources (ALBUQUERQUE FILHO, 2012),

5. FINAL CONSIDERATIONS

The present study had as its theoretical pillars the literature on the subject of innovation in public administration, with emphasis on process innovation. Thus, innovation is characterized as the implementation of a new or significantly improved product (good or service), process, new marketing method, or a new organizational method in business practices, workplace organization, or external relations (OECD, 2006). However, when it comes to the public sector, it is necessary to consider aspects such as legality, impersonality, structural rigidity, and budgetary limit, as well as, unlike the private sector where the focus is on profit, in public administration the focus is given to social return and gains for society (OLIVEIRA, 2014).

In this context, the present study sought to identify the perception of municipal public managers in the use of the electronic portal of the State of Rio Grande do Sul regarding the process innovation. Thus, the first specific objective, which sought to identify the factors that make up the GE was achieved through factor analysis, where it was observed that all variables were grouped into three factors, which explain 71.06% of the total variance, namely: technology; processes, and; interaction.

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During the research, limitations were presented, highlighting the municipal elections held in October 2016, in which only 48% of the candidates for reelection were elected. Thus, considering the change of the entire staff of the new mayors and their positions of trust, there was the need for a period of adaptation and use of transparency mechanisms to be able to answer the questionnaire.

As a suggestion for future studies, it is important to analyze the perception of citizens and companies in order to identify whether there is any difference with respect to the results of this survey on the various mechanisms used by governments for interaction and improvement of processes. The replication of this questionnaire could also be carried out considering other objects of study, such as municipal and federal portals, in order to identify the perception in the different forms of interaction, whether government-enterprise (G2B), government-government (G2G) or government-citizen (G2C).

In addition, it is also suggested to perform a financial analysis of the costs with internal processes, identifying whether the use of technology in the public sector reverts in gains through cost reduction, either by studying costing based on time and motion (TDABC), or by analyzing personnel costs in municipalities.

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