Municipal E-Government in the Provincial Capitals of Ecuador

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Abstract

The level of development of the e-services of the cantonal municipalities varies depending on several determinants such as the size of the government, population density, budgets assigned by the central government, among others. This article aims to determine the development of the e-government of the cantons that are the most representative in each province because they are the ones that contain in their jurisdictions their respective provincial capitals and for having achieved a greater social and economic development. For this purpose, the information contained in the web portals of 24 cantonal municipalities were collected and analyzed. The results show that the degree of e-government development in the cantonal municipalities in general has a tendency similar to that the annual budget and population density, so it is necessary to give more attention to the low-e-government development sectors with in order to achieve greater technological and social equity.

Keywords: e-government, canton, determinants of success, municipality.

1 Introduction

Public and private organizations, and more specifically municipalities in different countries, are aware that information and communication technologies (ICTs) are a strategic ally to achieve their objectives and provide better service to citizens. In Ecuador, the constitution and administration of the cantons is governed by a Municipality, as stipulated in the Political Constitution of the State. The Municipality is a sectional government entity that administrates the canton autonomously to the central government [1]. The municipalities offer their services through web portals and present different levels of maturity. Likewise, the web portals of local governments are usually not as developed as the entities of the central government [2] [3]. In order to assess the level of development of electronic government (e-government), maturity models have been designed. It is considered that the "optimal" level of maturity of an organization is one that can help achieve strategic objectives effectively and efficiently [4]. The maturity model of an e-government web portal is structured in stages or levels of development that determine the maturity of the same. The main benefit of these models is to provide a way to classify e-government portals [5]. Benchmarking and ranking tools, such as the e-government index, vary depending on the methodology and components used [6]. Population density, municipality size and type of government are significant institutional factors in the implementation and development of e-government [7].

This article presents the results of the evaluation of the web portals of the 24 cantons of Ecuador that include the provincial capitals in their respective jurisdictions. The cantons evaluated are generally those with the highest population density and budgetary allocation, and have achieved greater social economic development within each province [8]. To evaluate the development of municipal e-government through the evaluation of its e-services offered to citizens, the Aramouni model [9] was used. Aramouni model is an extension of the Esteves model [10].

This article is organized in five sections, which includes the Introduction. Section 2 reviews the literature on the municipal e-government index, evaluation tools and the determinants in its implementation. Section 3 details the research methodology. Section 4 presents the results. Finally, Section 5 presents the conclusions.

2 Literature Review

Change in municipalities has become a necessity and governments have budgeted for e-government projects in order to provide adequate services to citizens, keep them informed and increase confidence in the applications of ICTs
[11] which have contributed to major changes in government institutions such as reduction of bureaucracy [7].

2.1 Models of E-Government used in Municipal Environments

The Municipality is a sectional government entity that administers the canton autonomously to the central government [1]. ICTs have become one of the central supportive elements in the provision of e-services to citizens, and e-government can play a prominent role in the future governance of municipalities [7]. Local e-government can contribute to the transformation of municipalities towards an agile, transparent, effective, efficient, productive and participatory management model capable of providing a better service to citizens and promoting sustainable local development [12].

The definitions for the term e-government are diverse, but generally refers to the use of ICTs to support government operations, engage citizens and provide government services [3] [4]. International research suggests that most government-to-citizen (G2C) transactions take place on a local or municipal scale, however, local government web portals are often not as developed as those of the central government [2] [3]. The implementation of e-government in developing nations faces many challenges and the willingness of individuals to accept, that change is only possible if they are aware of the potential benefits of e-government initiatives [13].

Maturity models provide systematic benchmarks for evaluating e-government performance in particular areas of policy. The "optimal" maturity level is one that can help achieve its strategic objectives in the most effective and efficient way [4]. The maturity model of an e-government web portal is structured in a set of stages of development that determine the maturity of the e-government portal. The main benefit of these maturity models is to provide a way to classify e-government web portals [5].

The e-government maturity models focus on the development of e-government using sequential steps, for example, from an immature to mature e-government with better quality. From the academic point of view, the most mentioned maturity models in the literature are the Layne and Lee model [14], and the Andersen and Henriksen model [5]. The first describes the different stages of e-government development and proposes a "growth stage" model for a fully functional e-government. The Andersen and Henriksen model proposes a reorientation of e-government maturity models, focusing ICT applications on improving core activities and bringing end-users as the main stakeholders in future e-government investments [15]. None of the two models mentioned are explicitly focused to evaluate the development of a municipal e-government.

To evaluate the development of maturity levels of municipal e-government, the closest models are those used by Gómez [16] and Aramouni [9], as it focuses more at the level of municipalities. These models are composed of five dimensions that represent the different stages of maturity of the e-government lifecycle. The stages of these models are very similar to those defined in e-government lifecycle models such as Accenture, Gartner Group and European Union [10].

2.2 E-Government Assessment Tools

There is much debate among scholars about what constitutes e-government success, what method is best to measure it, and what attributes or variables describe it best. This lack of consensus naturally leads to disagreement over the best approach to classifying e-government programs in different countries [17]. Benchmarking and ranking tools such as the e-government index vary depending on the proponents in terms of their methodology and components used [6]. At the country classification level, a widely used method for calculating the e-government index is that of the United Nations (UN) [6]. The UN research team to determine the overall e-government development index bases its calculation on three aggregate components: Index of online service, Telecommunications Infrastructure Index and Human Capital Index [17]. The UN has developed a four-stage maturity model of e-government that is used to classify UN member states [12] [18].

At the level of evaluation of e-government web portals, the model most focused on e-government municipal environments is that of Esteves [10], which was expanded by Gómez [16] and Aramouni [9]. The calculation process is based on a maturity model structured in five layers and applied to evaluate the development of specifically municipal e-government. The layers will be evaluated to define an indicator or index of municipal e-government development. For each stage, a series of qualitative variables are defined that account for the existence of the relevant attributes of the online government service, which in turn, will allow to define a global e-government index [9]. These tools are used by decision-makers when designing information and communication policies and allocate resources to implement those policies, and despite their widespread use, current tools for benchmarking and classification have limitations, for example, they do not differentiate between Static websites and highly integrated and interactive portals [6].

For the development of the research in this article, we used the Aramouni model [9], the same one that also has its bases in the Moon models [7] and Layne & Lee [14]. Aramouni
uses 5 levels or layers of maturity and 26 attributes (e-services) categorized by levels that will be assessed by assigning dichotomous variables, which will determine the development index of municipal e-government (see Table 1).

2.3 Determinants of Municipal E-Government Success

There is much debate among scholars about what constitutes e-government success, what method is best to measure it, and what attributes describe it best. The review of the literature on the main factors leading to success in local e-government initiatives presents many differences when referring to a unified conceptual framework of success factors, however, a starting point when referring to this is that the studies identified are based on a categorization of critical factors. Revised literature has identified political, technical and organizational factors and has shown the need for the implementation of local e-government to respond to the needs of citizens and encourage their active participation.

Research on e-government success depends not only on technological factors but is influenced by other factors such as: Leadership, governance, human, social, cultural, economic and even political, geographic and demographic factors. Successful implementation and adoption of e-government will increase transparency and foster open, inclusive and responsive governance [12] [13] [19] [20]. The size of the municipality and the type of government are considered to be significant institutional factors in the implementation and development of e-government. It is likely that larger governments will be more proactive and strategic in advancing e-government [7]. Another study explores the complex relationships between the relative success of state web portals and certain organizational, institutional and contextual factors [21]. Government factors (strategy, leadership, financing and others), technical factors (infrastructure and IT standards, perceived advantages in the web service and others) and organizational factors (political and legal, implementation, technical staff and others) are mentioned in [19]. It is also noted that political, technical and organizational factors, stating the need for the implementation of local e-government to respond to the needs of citizens and encourage their active participation [12].

Other studies to be mentioned conclude in the existence of existing relationships between institutional and organizational contextual or environmental factors and their influence on the success of e-government web portals [22]. There are also aspects such as complexity, human resource capacity as well as economic [23]. Another study identifies possible critical factors in e-government implementation and classifies it into four categories: Institutional, resource, access and legal, but concludes through its results in two categories of critical factors for the successful implementation of local e-government: Institutional and access [20].

3 Methodology

The present study is descriptive of mixed type (qualitative and quantitative). The sample is non-probabilistic. The population is constituted by the web portals of the cantons of the local governments of Ecuador. The sample is made up of the web portals of the 24 cantonal municipalities that include provincial capitals in their respective jurisdictions, and which in turn are the most representative for their population size, budget allocation and for having achieved greater development Social economy. The unit of analysis is the web portal of each cantonal municipality [8].

In order to assess the level of development of municipal e-government, it was necessary to define a methodological basis for measuring the progress of e-government initiatives in a defined area. We used the methodology developed by Aramouni [9] that also has its roots in the model of Baum and Di Maio [24] that defines an analytical scheme oriented to the measurement of e-government development, this methodology was adapted and used for this study and focuses on the measurement of the attributes or e-services available in the municipal web portals.

Each one of the web portals of the cantonal municipalities was examined, being analyzed the content, specifically in relation to the services offered by the e-government. For the data collection, an instrument was designed in spreadsheets in order to facilitate the tabulation and processing of the data by each web portal. The format consists of the following fields: levels, attributes and dichotomous variables assigned to each of the e-services offered by the web portals of cantonal municipalities.

The weighting weights assigned to each of the stages of the e-government maturity model give priority to higher levels because of their technological complexity in their implementation. In Table 1, the column with the number (3) in the header corresponds to the maximum dichotomous values that can be assigned to the presence of an e-service, column (4) contains level-weighted values, and column (5) contains the partial values of e-government index by level of maturity. The e-services in bold and shaded in the table are the additional attributes with respect to the original model of Esteves [9].

Obtaining and analyzing data, and determining the results was performed following the procedure set out in Table 2 [8]. In order to compare the level of development of e-government in the municipalities, the e-value that became the municipal e-government index for each canton was determined (stage 5, Table 2).
Table 1: Aramouni e-Government Model [9]

<table>
<thead>
<tr>
<th>Stage / Level (1)</th>
<th>Attributes / E-services (2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence</td>
<td>Printed matter</td>
<td>1</td>
<td>0.25</td>
<td>1.75</td>
</tr>
<tr>
<td></td>
<td>Plenary / Legislative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Seeker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Site map (Web map)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>News</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Links</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dates updated</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban information</td>
<td>City map / Map</td>
<td>1</td>
<td>0.5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>transportation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Productive activities</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Photographic record</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>Email</td>
<td>1</td>
<td>0.75</td>
<td>3.75</td>
</tr>
<tr>
<td></td>
<td>Phone number</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Claims</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hours of operation</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reply to email</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transaction</td>
<td>citizen folder</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Online payments</td>
<td>1</td>
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<tr>
<td></td>
<td>Digital certificate</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Mobile</td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>Personalization</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Online procedures</td>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Help for procedures</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tracing</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>e-Democracy</td>
<td>Survey</td>
<td>1</td>
<td>1.25</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Forum</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sumatoria</strong></td>
<td></td>
<td>26</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

The procedure for calculating the municipal e-government index based on the data obtained in each of the web portals examined is as follows: the dichotomous values (column 3, Table 1) assigned to the e-services offered by each level are Suman. This sum is multiplied by the corresponding weight of each level (column 4, Table 1). These partial results correspond to the e-government index by level (column 5, Table 1). The partial results are added up and the value of the e-government development index of the corresponding municipal canton is obtained.

An ideal web portal would achieve a maximum e-value (1 or 100%) through the Equation (1):

\[
e\text{-value} = \left(7*0.25+4*0.50+5*0.75+8*1+12*1,25\right) \quad (1)\]

\[
e\text{-value} = \frac{12,75}{18} = 0.71 \quad \text{(E-government index)}
\]

4 Results

Using the formula presented in the previous section, the e-government development indices of the 24 cantonal municipalities were calculated, establishing a ranking with data from the 24 provinces of Ecuador (see Figure 1).

4.1 E-government Development in Cantonal Municipalities

The results obtained reflect the considerable progress made by several municipalities in the evolution of e-government (see Figure 1), and that in some cases are due to factors that have had a direct impact on their development as the political decision of their authorities, and not directly to factors with high budget values (see Figure 3) and population density (see Figure 4). A case of these is the Municipality of Cuenca, which, with lower values of budget and population in relation to other cantons, reached the first place in the ranking of municipal e-government (0.71).

Likewise, the results reflect that cantons with higher values in budget and population than others with similar characteristics, have not achieved a significant advance in the development of e-government, as the case of Azogues Municipality (see Figure 1).

The demographic and specifically population factor has increased in the capitals of province, but especially they have been polarized in two cantons Quito and Guayaquil. Of the total population distributed in the 24 cantons under study, 56% are concentrated in these cantons. This is also one of the reasons for having a higher budget allocation by the State, since, to a larger population, greater social needs (see Figure 4).
4.2 Factors affecting Municipal E-Government Development

Analyzed the annual budget allocated by the State to each of the 24 Cantons in 2016 (see Figure 3), two fully polarized blocks are determined. The first formed by Quito and Guayaquil and the second by the remaining 22 cantons. The first block corresponds to 59% of the total budget allocated to the 24 cantons and the other cantons share 41%. As for the total population corresponding to the 24 cantons, 56% are concentrated in Quito and Guayaquil and 44% are distributed in the remaining 22 cantons (see Figure 4). One of the factors mentioned in the literature review is related to political factors (political decision, leadership) and organizational factors. In the case of Cuenca, Ambato and Loja, the political decision has been a predisposing factor for an important development of e-government in relation to the other cantons, in spite of budgetary constraints. In general, in the development of e-government, not necessarily, cantons with larger population and larger state budget, have achieved greater development of municipal e-government (see Figure 1).

4.3 Availability of e-services

According to the results obtained, most of the cantonal municipalities evaluated, largely comply with the indicators of the first stage of the e-government development model proposed by [6] [9]. Achieving on average 70% of compliance in the first level, and practically with a zero participation (0%) in the last stage of the model. The cantons that are a benchmark in each province have not achieved important goals regarding direct interaction in decision making through citizen participation using electronic means.

As for e-services less offered by the municipalities, approximately 2% of their web portals offer services such as "Update Date", "Transport", "Citizen Folder" and "Personalization". Within the most offered e-services, nearly 100% of the web portals offer services such as "Printed", "Plenums / Legislative Information", "News", "Links", "Productive Activities", "Photographic Record", and "Mobile", of this group the first four correspond to the first layer of the model.
The "Complaints" e-service also stands out, since 83.3% of the municipalities make this service available to citizens through an electronic means to present complaints and observations. But this e-service of "Complaints" turns out to be efficient in only 33.3%, since the e-service "Response to electronic mail" only reaches that percentage. In this case, the answers are not specific to the concerns raised and only remain in offers indicating that they will soon attend.

5 Conclusions

Larger municipal governments are more proactive and strategic in advancing e-government, and are generally the cantons with the largest population and allocation of economic resources. The influence of certain factors such as financial and population in the development of e-government in cantonal municipalities does not necessarily reflect in a direct relation, since they have reached the first places in the ranking of municipalities, cantons that have lower values Population and budget than others. There should be technical responsibility in the management of e-government applications in relation to government-citizen interaction, since certain services, despite being implemented, are underutilized, such as the complaints service that many municipalities have implemented in their web portals; but, they are not efficient since there is no answer to the raised concerns. Certain municipalities with a good e-government development index have excelled in offering services such as free internet access points in different parts of the city, health services to the community and online payments through the web portal Municipal, but the large digital divide in most cantonal municipalities with low e-government index remains evident.

In terms of limitations, this study has as main limitation the fact that it is an exploratory study based on the information available in the literature and in the web services of a series of cases. Conducting interviews with those responsible for these initiatives will enrich the analysis of the study. Future research should deepen, analyze and specify the success factors through a measurement tool to be raised to the political, technical and organizational leaders of local e-government experiences to further advance in the knowledge of them. In addition, considering that e-government models are tools that are used by decision makers, but these current benchmarking and classification tools have limitations, for example, they do not differentiate between static websites and highly integrated web portals and interactive, therefore, a study in this environment would allow a better decision making by the entities responsible for public policy. Also, it is important identify the critical success factors in order to implement e-government in the municipalities.

Referencias


