Interoperability, Electronic Government and Electronic Governance in Latin America: Expectations and Results

Flávio Soares Corrêa da Silva

Laboratory of Interactivity and Digital Entertainment Technology
University of São Paulo
Matão St, 1010, São Paulo (SP) BRAZIL
fcs@ime.usp.br

Abstract

Electronic Government and Electronic Governance systems are important tools to ensure and to broaden citizenship as well as to increase the effectiveness of government processes and services. Given that these systems are fundamentally vehicles of information and services, utilized essentially to connect government offices, citizens and organizations, and provided that these components and agents are highly heterogeneous and could be dispersed both geographically and in time, interoperability between components and agents becomes a critical requirement for these systems and can be used as metrics to evaluate their quality. Taking as basis recent studies published by the United Nations, we have analyzed in this paper the situation and perspectives of Electronic Government and Electronic Governance systems in Latin America, adopting the effectiveness of the interoperability in these systems as the basic attribute for comparison and analysis.

Introduction

In recent years, the refinement of concepts and requirements of interaction in our society, fostered and/or allowed by emerging information and communication technologies, has stimulated the characterization and development of new categories of digital information systems.

Amongst the categories of systems under development, we highlight the Electronic Government and Electronic Governance systems, which focus on interactions with governmental institutions, systems and structures.

As characterized by the World Bank (Palvia & Sharma, 2007):

> *E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.*

As characterized by UNESCO *(*Palvia & Sharma, 2007):

> *E-Governance is the public sector's use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government lives accountable, transparent and effective. E-governance involves new styles of leadership, new ways of debating and deciding policy and investment, new ways of accessing education, new ways of listening you citizens and new ways of organizing and delivering information and services. E-governance is generally considered to wider concept than e-government, since it can bring about change in the way citizens tells it to you governments and you each to other. E-governance can bring forth new concepts of citizenship, both in terms of citizen needs and responsibilities. Its objective is you engage, enable and to empower the citizen.*

In order to simplify the notation, we shall refer to Electronic Government and Electronic Governance systems as *e-Gov systems* in this paper.

In its technological dimension, e-Gov systems belong to a broader class of systems, whose main goal is the communication of information between users. Recently, the importance of these systems has been greatly evidenced.

Contrasting with "classical" systems, whose focus is on information processing, communication-centered systems consider that data manipulation and processing are supporting activities so that interactions between components – users as well as other systems – can take effect. Relevant technologies to build communication-centered systems are distributed objects and distributed processing.

Many communication-centered applications have been developed recently, focusing on social networks, electronic commerce, entertainment, education and a variety of specialized services and information, especially through the Web. Computer applications for e-Gov are also part of this category of applications.

For systems based on communication and exchange of information and services between components, especially when these components can be heterogeneous, an essential technical aspect is the adequate flow of information and services between components. This attribute is called *interoperability*. Therefore, a basic attribute that allows quality assessment for e-Gov systems is interoperability.

As defined in (EC, 2004):

> *Interoperability means the ability of information and communication technology (ICT) systems and of the business process they support to exchange data and to enable the sharing of information and knowledge.*

Thus characterized the three concepts referred to in the heading of the present paper - interoperability, Electronic Government and Electronic Governance - it becomes clear that interoperability is a key attribute that must be present in e-Gov systems, as it provides to e-Gov systems a partial characterization and measurability of quality.

Interoperability is a broad and essentially socio-technical concept. The interoperability of data, information and services is an essential requirement for computer systems that are built to support e-Gov. Organizational interoperability is also an essential requirement for the management dimensions of e-Gov systems to be successful.

E-Gov systems are communication channels with government institutions. The goals of these channels are the exchange of information and services between government agencies and institutions, citizens and structured organizations (companies, hospitals, associations, etc.). They are asymmetric in the sense that distinct issues are relevant e.g. for the communication *from* citizens to government and from government *to* citizens.

Consequently, we split the three usually considered categories of interaction (G2C - Government to Citizens, G2B - Government to organizations (Business) and G2G - Government to Government) into five categories: G2C - from Government to Citizens, C2G - from Citizens to Government, G2B - from Government to organizations (Business), B2G - from organizations (Business) to Government and G2G - interaction between Government agencies according to current understanding.

In the present paper we analyze the Latin America situation regarding e-Gov interoperability. Our analysis is based on the UN document published in 2008 (UN, 2008). Although other similar reports have been developed for the same purpose (e.g. The UNESCO report (UNESCO, 2002) and the studies compiled and referred to by Brown and Burke (Brown and Burke, 2008)), we have considered the UN document for a number of reasons:

1. The document is recent and its scope is quite broad.
2. The proposed methodology by comparative analysis of countries is clear, objective, well founded and lined up with general standards and metrics for systems evaluation.
3. The institution that produced the document is widely known and has high recognition and reputation.
4. The adopted evaluation criteria utilized within this methodology require the integration of diversified and broad attributes. According to these criteria, in order for specific systems to be well qualified, each considered attribute must feature good results and also the various attributes must be well coordinated and integrated.

   The UN evaluation model takes into account well founded and sustained development results, monitors and also induces the evaluated nations to the integrated development of their systems. Specifically, the UN model takes into account the evolution of each country regarding infrastructure, the capabilities of citizens and organizations to make good use of that infrastructure, and the offer of specialized integrated systems that provide and collect adequate e-Gov information and services.

The aim of our study is to identify, in the best ranked Latin American countries according to the UN document, what results have been obtained and what realistic expectations can be created related to e-Gov.

Metrics for e-Gov Interoperability

The interoperability for e-Gov must ensure that services and information flow between individuals, structured organizations (governmental and not governmental), computational and technological components. Technically speaking, three forms of interoperability can be identified:

1. *Technical Interoperability:* refers to the flow of information and services through the technical components used to implement the e-Gov systems. The focus of the technical interoperability is to ensure the communication of data and services across components of distributed software connected by computer networks.
2. *Semantics Interoperability*: refers to the consistent interpretation of information and services that flow across the components of e-Gov systems, in which citizens and organizations are included as relevant components. The focus of semantic interoperability is to ensure the coherent attribution of meaning for the communicated elements.
3. *Organizational Interoperability*: refers to the consistency and continuity of flow of operations across the connected components of e-Gov systems. The focus of the organizational interoperability is to ensure the organizational and systemic integration of the various components of e-Gov systems.

In the UN document (UN, 2008) we have a proposal for the classification of e-Gov systems based on a maturity model, in which the capability for interoperability can be used as the differentiating attribute. The maturity of systems for e-Gov is organized in five stages:

1. *Emerging:* e-Gov system is mainly comprised of static Web information. Available services are few or non-existing and information integration, when present, is limited to links to other Government agencies.

2. *Enhanced*: the available information in the Web pages of Government agencies are dynamic in nature and comprise information of usual public interest, newsletters and updates. Citizens have Web access to information repositories, forms, documents, legislation and regulations.
3. *Interactive*: the websites of Government Agencies supply straightforward services such as the fulfilling of online forms (which are in general, printed out, delivered in paper to the appropriate agencies and processed off-line). Simple forms of structuring and integration of information are used, for example, in the development of thematic Web pages which contain integrated information coming from different Government agencies.
4. *Transactional*: information and services are made available by the Government agencies, typically through the Web, enabling the exchange of information and services *from* Government as well as *to* Government. Examples of implemented transactions for this maturity stage class of systems are tax report and payment online systems, form request and fulfilling and online document issuing systems.
5. *Connected*: this is the most sophisticated maturity stage for e-Gov systems. In a connected system, the Government features a high degree of information integration among its agencies, citizens and external organizations. This integration level allows a flow of activities fully integrated with the behavior of its components. The results are systems that allow the multilateral exchange of information and services through inter-operable components, thus making feasible high indices of participation, transparency, citizenship and the promotion of democratic values.

The UN maturity model has been highly disseminated and accepted, establishing a well defined terminology to characterize and discuss maturity levels for this kind of systems.

The interoperability of e-Gov systems is not a goal in itself, but a pathway to reach the real objectives for these systems (Pardo and Burke, 2008b). Depending on the observed maturity stage of an e-Gov system, different forms of interoperability are allowed and/or required. Therefore, the identification of mechanisms for interoperability and the reasons why they are used can identify the maturity stage of an e-Gov system, as follows:

1. *Emerging*: interoperability requirements for an emerging system are minimal, since communication between system components is reduced and simplified. Essentially, a system in this maturity stage supplies information to concerned individuals. Therefore, the interoperability is only to assure Web access to available information for *G2C* and *G2B* communications.
2. *Enhanced*: information and services available at this maturity stage are more sophisticated when compared to the emergent stage. However, the requirements of interoperability and the considered categories of communication are very similar to those in the emerging stage.
3. *Interactive*: in this stage of maturity, information integration to supply combined information to the users is required, as in e.g. the computation of economic indicators based on indices retrieved from various Government agencies. Even thoughthe goal is *G2C* and *G2B* communication, similar to previous stages, internal operations must be implemented in order to provide the required services. These operations can require the integration of information from different Government agencies – thus characterizing *G2G* communication. The implementation of this sort of communication in an integrated system may require the development of technical interoperability as well as semantics interoperability.
4. *Transactional*: interoperability must be explicit and visible for all e-Gov system components. The three forms of interoperability (technical, semantics and organizational) must be considered, with emphasis on the first two. At this maturity stage, all relevant categories of communication for an e-Gov system (*G2C*, *G2B*, *C2G*, *B2G* and *G2G*) occur in the system.
5. *Connected*: at this stage of maturity, the flow of activities must seamlessly and reliably flow across components. All categories of communication are present and all kinds of interoperability should be taken into account - with emphasis on organizational interoperability.

Monitoring and measurability of interoperability in e-Gov systems must be performed indirectly, based on relevant indicators. The following indicators are proposed in the UN document (UN, 2008), with specific focus on the maturity of interoperability in e-Gov systems:

- *Communication infrastructure:* characterized by the availability of digital and communication resources *per capita* (computers, Internet access, mobile phones, etc.). It is directly related to the technical interoperability capability.
- *Human Capital:* characterized by citizens access to culture, information and formal education. It is directly related to semantics and organizational interoperability capabilities as well as communication categories that explicitly involve citizens - *G2C* and *C2G*.
- *e-Participation*: characterized by the creation of effective possibilities of interaction between Government and external agents. It is directly related to the categories of communication that involve components outside the Government - *C2G*, *G2C*, *B2G* and *G2B*. It requires the three interoperability capabilities: technical, semantics and organizational. The concept of e-Participation is subdivided in:
    - *e-Information*: Government ability to dynamically supply up-to-date , tailor-made information to external agents.
    - *e-Consultation*: Government ability to dynamically get information from external agents based on procedures that are adjusted to the availability, interests and necessities of each agent.
    - *e-Decision*: Government ability to make effective use of the received information obtained through e-Consultation and to feature this use of information clearly and unequivocally to the agents who have supplied them.

Each of these indicators can be quantified as indices, whose values can be established based on queries and surveys. These indices can be used to benchmark the interoperability maturity for e-Gov systems in different countries. This has been regularly performed by the UN since 2002, resulting on regularly published studies featuring high the quality, objectivity and methodological clarity, as well as broad scope, based on data obtained from all UN member states.

Our analysis of the position of Latin America in the last assessment performed by the UN (UN, 2008) is presented in the following sections.

Ranking of Latin America Interoperability Maturity for e-Gov

The Latin American countries among the 50 best ranked, according to the UN report (UN, 2008), are shown in Table 1. The ranking takes into account indices built to reflect the indicators introduced in the previous section. Based on this ranking, our goal is to develop a critical analysis of the status of e-Gov systems in the region.

Rank	Country
37	Mexico
39	Argentina
40	Chile
45	Brazil
46	Barbados
48	Uruguay

Table 1 - Latin American countries amongst the 50 best ranked in e-Gov interoperability maturity.

Broadly speaking, the positions of the countries in the region, regarding e-Gov interoperability maturity, are low. Among the 50 best ranked countries is the nation of Barbados, a parliamentary constitutional monarchy that belongs to the British Commonwealth, with approximately 280 thousand inhabitants, and an economy based on tourism. Due to its peculiar socio-economic characteristics, we are not going to analyze the situation of Barbados in great detail.

Mexico is the best ranked country in Latin America. The Federal Government of Mexico maintains a governmental website with vast amount of information and services. This website is very well organized, well designed, horizontally and vertically integrated, and includes data and services for small regions and towns. Therefore, *e-Participation* indicators are well ranked, justifying its position at the top of the regional classification. Amongst the relevant factors for this Mexican e-Gov system good regional position is its choice of standards for document formatting to ensure information exchange across the governmental web portal. The choice of standards is clearly defined, comprehensive and developed to promote and ensure the freedom of choice for citizens and organizations to encode their documents.

The comprehensive attitude regarding formats for the flow of information and services in e-Gov systems seems a most relevant topic to ensure the quality of these systems through the assurance of interoperability. An incentive policy for the use of open standards is welcome, provided that the proposed standards are acknowledged by widely accepted and accredited organizations and are *effectively open*. In order for these standards to be considered *open* , they must be presented in an open way regarding their availability of documentation and coding, but also be flexible and comprehensive regarding computer systems and applications that can use them. In other words, the standards for the formatting of information and services must regard as a fundamental attribute their potential to ensure interoperability.

A potentially counterproductive behavior is the selection and mandatory use of excluding and restrictive standards for e-Gov systems. Such conduct may be particularly harmful when stated in a surreptitious way, as a baseless technical advice, or based on misleading principles founded on flawed economic concepts and/or issues of sovereignty, instead of explicitly presented technical rules and documents subject to verification and review. This twisted form of behavior in the configuration of e-Gov programs can be observed, for instance, when formatting standards for information and services are imposed, or when, for instance, the use of specific software products developed according to open source software models is required. Although apparently beneficial if superficially analyzed, this practice in e-Gov project development can restrict systems developers, relevant services and software products for e-Gov system still under development stage. This practice can also narrow the possibilities of choice for agents external to government bodies (citizens and organizations interested in interacting with the Government, and/or with whom the Government has interest in interacting) – thus restraining the interoperability possibilities, rather than promoting them.

Obviously, those comments, although made from the characterization of favorable attributes for the Mexican e-Gov system, apply to systems in all analyzed countries.

Argentina is placed second in the region. Although the e-Gov resources available in Argentina are far less sophisticated than those found in Mexico, and focus primarily on the supply of information instead of more sophisticated e-Consultation and e-Decision features, Argentina has advanced significantly in recent years in its communication infrastructure, with emphasis on the expansion and improvement of quality of services for mobile communication.

It should be noticed that, in order for Argentina to sustain its relative good position, a consistent and widespread improvement of human capital qualification and e-Participation will be required. Once again, this observation evidently applies to all countries in the region. In other words, the evolution of e-Gov systems in the studied countries is subject to the balanced development of factors that positively influence the infrastructure capabilities, human capital and e-Participation.

In the past, Chile has shown regional leadership in e-Gov systems and has been supplying, for instance, advanced Web systems for procurement since 1998 (InfoDev, 2002). Its systems, however, have not been updated and modernized, which explains their loss of positions in the general classification.

Generally speaking, the low ranking of Latin American countries can be partially explained by a more thorough analysis of what has occurred with the Chilean systems. Some countries have presented

acceptable projects and proposals in the past. However, these projects have not always been implemented with efficiency and promptness. Globally, e-Gov systems have matured on their expectations and concrete possibilities of contribution for a growing and improved citizenship. Throughout the years, countries whose developments of e-Gov programs have evolved slowly have steadily lost positions in global classifications.

Brazil is placed fourth in Latin America. Some isolated examples of success cases in this country are worth mentioning : communication channels with the House of Representatives, web services for information provisioning and financial transactions' statements for tax purposes, supply of government information and services related to vital sectors such as health, public safety, traffic, education and environmental issues, centralized websites with information about procurement and skilled human resources available in certain sectors, mainly in academic and scientific research sectors. However, these services and access path to this information are still scattered and poorly structured.

Additionally, the vast geographic dimension of this country, as well as its regional heterogeneities of:

- communication,
- access to services and information and
- transportation network resources,

represent significant challenges for the improvement of its e-Gov resources.

Compared to programs from other countries, including Latin America, Brazilian e-Gov program has evolved slowly. If this trend is not reversed, chances are that the Brazilian position in the global ranking will go even further down in the future. In order for this trend to be reverted, solid actions will have to be taken. Amongst these actions, we can identify:

1. The establishment of organizational structures to ensure technical quality of projects presented for the e-Gov Brazilian system – even though, in general, we can find good quality projects, the Brazilian government has not motivated a regular and coordinated participation of experts, , from the international as well as the Brazilian scientific community in the development of these proposals. As a result, some proposals contain specific items that are technically inaccurate or outdated.

   Theoretically, every citizen in Brazil can participate in the refinement of projects for e-Gov, through public consultation procedures that are available in the e-Gov infrastructure. However, this communication channel, in practice, has not really fostered the systematic involvement of a community of experts outside the Government for the design and refinement of e-Gov projects in Brazil. The Brazilian Government should advertize clearly and unequivocally its interest in counting on the participation of experts and research institutions to refine its e-Gov projects and plans.

2. The unequivocal characterization by the Brazilian Government, of the design of e-Gov system as a technical issue, so that political speeches and informal mechanisms to influence project decisions become of lesser relevance. The technical mechanism that facilitates this characterization is the adoption of practices to document proposals, projects and systems that are aligned with internationally accepted standards.

3. The commitment to align evaluation metrics for the quality of e-Gov systems with international practices adopted by highly acknowledged and broad organizations. The credibility, visibility and quality of e-Gov systems can only be ensured if they are measured by international bodies. In the vast majority of cases, the proposition of local methodologies to assess the quality of e-Gov systems can be redundant and/or unbalanced and partial, thus potentially hindering to the perception of existing projects by external bodies.

4. The establishment of a long-term plan for e-Gov, aiming at a natural, clear and efficient evolution of the system maturity. Considering the inherent complexity of e-Gov systems, a long-term plan cannot be rigid and inflexible, and mechanisms of updating goals should be part of the plan itself.

Moreover, the established goals must be clearly and explicitly presented, open to consultations and evaluation, and adjustable according to all e-Gov system related agents.

5. The establishment of clear and solid incentive mechanisms, so that government bodies and their constituents feel encouraged to use the e-Gov system and, therefore, commit to its design, deployment and subsequent utilization.

   Without such incentive mechanisms, it is highly unlikely that government agencies can work cooperatively, thus preventing organization move towards the more advanced interoperability maturity stages, such as transactional and connected.

   The construction of mechanisms to ensure organizational interoperability is an essential requirement to make it happen, especially among government agencies, but *it is not enough* to ensure organizational interoperability, particularly considering the more advanced maturity stages. If these mechanisms are not combined with normative resolutions that require the update of organizational practices towards integration and interoperability and/or operational efficiency metrics that leads to these practices, it is highly unlikely that such practices naturally occur. Interoperability, and the consequent improvement of quality of e-Gov in which it is observed, should be perceived by the organizations that interact through such systems, as something useful to achieve their local goals, instead of an additional burden that might hinder their access to these goals.

The criticisms and comments based on the Brazilian e-Gov plan apply, as a general rule, to all other Latin American countries.

Uruguay presents, in its e-Gov web portals, resources to primarily provide information to agents outside the Government. It is worth noticing that amongst the available resources, there is the possibility to register to receive notifications by e-mail, enabling better engagement and visibility by the citizens of the Uruguayan e-Gov system.

Even though, from a conceptual and theoretical perspective, e-Gov systems focus on the promotion of citizenship and government integration with its citizens and organizations, in practice distortions may occur, and certain systems may be in fact directed to advertise and promote government actions.

The United Nations have also been attentive to these distortions. UN reports present the evaluation of effective integration of e-Gov systems in the lives of citizens. The assessment is based on questionnaires that estimate the extent to which e-Gov systems have complied with citizens needs. In the 2008 Report we find the *Web effectiveness evaluation*, showing the results of the 50 best ranked Latin American countries in Table 2.

Rank	Country
14	Mexico
30	Brazil
32	El Salvador
34	Peru
35	Chile
36	Argentina
38	Colombia
43	Bolivia
47	Dominican Republic
48	Uruguay

Table 2 - Latin American countries among the 50 best ranked in Web effectiveness evaluation for e-Gov systems.

Contrasting with the data shown in Table 1, we observe a better classification for the region regarding this attribute. This is a positive result for Latin America, which indicates the extent to which the perception of citizens about the relevance of e-Gov systems is positive. Specifically regarding e-Participation rates, also developed based on questionnaires, this result is confirmed by the evaluation of countries in the region. Evaluation of Latin American countries ranked among the 50 best in e-Participation is shown in Table 3.

Rank	Country
7	Mexico
23	Argentina
24	Brazil
25	Colombia
29	Bolivia
32	El Salvador
34	Costa Rica
37	Venezuela
38	Dominican Republic
46	Honduras

Table 3 - Latin American countries among the 50 best classified in e-Participation for e-Gov systems.

Tables 2 and 3 present an obvious gap between Mexico and other countries in the region.

Our interpretation is that this shows that we still have low e-Gov systems' effectiveness in Latin America, Mexico being an exception.

The various observed initiatives are praiseworthy; however, as evidenced by UN data, the practical achievements of these initiatives are still limited and incomplete.

In order for this condition to be changed, it is required that Governments in the region commit themselves to long-term actions and plans for e-Gov systems, with clear, explicitly defined and publicly presented goals, whose effects will have greater duration and scope than the corresponding Government team leaders mandate that proposed them.

Conclusions

The e-Gov systems in Latin America belong to Governments' agendas for the countries in this region. As evidenced by the UN report, the impact of these systems in the activities of the citizens and organizations is significant, resulting in positive changes in government systems themselves.

However, the same report shows that the e-Gov systems in Latin America can still be significantly improved in order to influence more effectively the assurance and expansion of citizens and organizations activities on issues that can guide government actions to paths of greater participation and representativeness, and consequently, to more effective activities.

Interoperability, in all its nuances and aspects, is essential to ensure the effectiveness of e-Gov systems, considering that such systems are built to encourage the communication and exchange of information and services between components and agents that can be physically and temporally distributed, and can present high degree of heterogeneity.

The analysis of the best ranked countries in the 2008 UN classification features Scandinavian countries in the first three places (respectively, Sweden, Denmark and Norway). The e-Gov systems provided by these three countries, present characteristics and peculiarities that distinguish them regarding the way information and services are organized and presented. However, some similarities can be identified, which can provide hints to efforts and activities that can be imitated in other countries, including the countries of Latin America:

- These three countries feature very high availability of organizational conditions and technological infrastructure, thus assuring their potential for connectivity for all its citizens and organizations. We can also observe in these three countries high indices related to culture and education, ensuring high evaluations for human capital. Therewith, governmental actions can focus on extending e-Participation quality and target of services.
- The architecture of e-Gov systems, in its technological dimension, is designed and built with great technical accuracy and thoroughness. These three countries have decentralized although extremely well coordinated systems. As a consequence, the speed and quality of the systems is guaranteed, because the maintenance of its parts is transferred to different government bodies. At the same time, system components are kept synchronized and coordinated with each other, developing coherent systems regarding the introduced services and information and related to user experiences published through consistent and carefully designed interfaces.
- State-of-the-art technologies are used to design and build such systems in a highly competent and careful way. The participation of experts in knowledge management and engineering is quite evident, which allows us to infer the participation of researchers and experts from the academic community in the construction of such systems. This perception is confirmed by the existence of post-graduate programs specialized in e-Gov offered by highly recognized universities (for instance, Orebro University - Sweden).
- In those three cases, a multidimensional and comprehensive attitude for the e-Gov proposed architecture can be observed:
    - The systems are carefully developed to provide information and services to almost all of their potential users (i.e. citizens and structured organizations, both governmental and nongovernmental). An example of this concern is the subsystem dedicated to children belonging to the e-Gov environment introduced by Denmark government.
    - The development of these systems is deliberately comprehensive, based on a strategy to encourage participation and competition that lead to increased quality in the development of each system component. The Swedish government, for instance, keeps its e-Gov systems open and interoperable with different technologies and software platforms, thus allowing that diverse IT solution suppliers can be potential collaborators to build the system. Thus, since the effective collaboration in building the e-Gov system is properly monitored, the quality of the solutions presented should naturally grow. This comprehensive attitude is certainly an important component to facilitate quality assurance in systems built. Long term, this attitude must be more effective than *a priori* attitudes that exclude potential solution providers based on beyond-technology principles.
- In these three countries, there is a tradition of citizens' rather intense democratic participation in government decisions, and consequently the existence of traditional mechanisms for government transparency, based on which all government bodies openly expose and present all their actions. The e-Gov systems reflect these traditions and widely and clearly expose the activities of various government agents, including the commitment of each agent to the e-Gov systems. Thus, citizens and nongovernmental organizations can evaluate the performance of their government representatives and show how active they are keeping the quality assurance of provided information and services.

These strategic features and attitudes are also found in the United States and other European Union countries. These countries attain very favorable positions in the maturity rankings of e-Gov systems, notably in the UN document. However, we see that these features are quite limited in the Latin American

countries evaluated in this study. An interesting study that could be developed is the monitoring of the evolution, in Latin American countries, of attributes that we can observe in Scandinavian countries, aiming at the development of a more thorough comparative analysis between Latin America and Scandinavia.

One possibility still not fully explored in Latin America is the transnational interoperability between e-Gov systems, as occurs in the European Community (EC, 2004). Among the few papers devoted to this issue, we highlight the one sponsored by the European Community and the UN (ECLAC, 2007). The paper contains general guidelines for the development of interoperability strategies and standards between national e-Gov systems in Latin America and the Caribbean. It also mentions some isolated systems integration experiences.

Some initiatives to explore this possibility are under development as academic research projects. It is worth mentioning the projects funded by the Latin American and Caribbean Collaborative ICT Research (http://www.laccir.org), which is an organization that supports research with the specific goal to foster the integration of Latin American research centers.

As general conclusions, we observe that e-Gov systems are already acknowledged as significant instruments for citizenship. Nationwide and regional efforts in Latin America can already be identified, aiming at the development and improvement of e-Gov systems. But there is still the likelihood of significant systems improvements, internally to each country borders in the region as well as regarding the transnational interoperability of the existing national systems.

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