Making a City Smarter through Information Integration: Angel Network and the Role of Political Leadership

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Abstract

Scholars and practitioners around the world are increasingly using terms such as smart cities and smart governments. The essence of becoming smarter seems to be related to connectedness, responsiveness, efficiency, and sustainability. Therefore, by integrating their most important information and services, cities can achieve some of the goals and objectives extensively identified with smartness. This paper aims to show that despite important challenges, information integration initiatives can be implemented with relatively good results if there is enough political support from top government executives. We conducted semi-structured interviews with government managers responsible for the Angel Network (AN) system, which attempts to integrate key information about social programs in Mexico City. This work offers insights on how the support of the mayor can significantly influence the implementation of an information integration strategy in at least three different ways: (1) the creation of an adequate institutional framework, (2) the alignment of diverse political interests within the city administration, and (3) the increase of financial resources.

1. Introduction

Becoming a smart city and a smart government is increasingly important for many jurisdictions around the world. The fact that more than half of the world’s population now resides in urban areas raises a series of complex problems related to economic, social, and environmental issues, among others [1][2]. Public policies for urban areas demand a high level of coordination and cooperation among different government agencies at different levels. An agency working in isolation cannot solve highly complex socio-technical issues. Cooperation and joint policy-making are necessary in order to design and implement effective urban strategies [3].

In order to develop effective citywide policies, it is essential to develop and sustain information strategies that allow better decision processes. Therefore, making a city smart requires inter-organizational collaboration and the integration of data into a single platform that can be used by different government and non-government actors [1]. In fact, some authors argue that the integration of systems, information, and services could be seen as the main characteristic of a smart city [4].

Government information integration strategies are receiving increasing attention from scholars around the world [5][6][7][8][9][10]. One of the most important reasons for this focus on information integration is the range of benefits it could potentially bring to public administrations [5][7], which are related to cheaper services, more accurate data for better policy decisions, the discovery of new social trends, and the development of single points for service delivery [5][11]. In addition, some scholars have pointed out that through information and services integration strategies it is possible to realize most of the benefits of e-government and create more efficient and effective policies that can increase the value of the services offered to citizens [4][7]—what others would call smartness.

This paper conceptualizes an inter-organizational information integration (III) strategy as a policy that allows “managers to work at the same time, with the same information drawn from multiple disparate sources” [5] (pp. 1). These initiatives usually imply changes in technical, organizational, and behavioral elements [1]. Some of the most important challenges that scholars have identified in previous studies are technical incompatibility, poor incentives to collaborate across organizations, legal impediments to share information, politics, and the lack of a transparency culture, among others [1].
In addition, in Latin America these initiatives face the inherent difficulties of e-government policies in developing countries, such as the digital divide, lack of infrastructure, insufficient funds, political instability, and a poor technological environment [6][7]. Therefore, it is expected that this kind of initiative usually takes a long time to be implemented and even longer to be fully adopted. This paper presents and analyzes the case of Angel Network in Mexico City. This initiative was developed and implemented in a relatively short period of time (two years) in a city that suffers from serious technological lags and infrastructure deficits. In this context, the role of political leadership is essential for city-wide efforts.

Angel Network (AN) is a system that integrates information from all social services programs and includes the participation of most city social development agencies. However, AN was created after most of the social programs were already implemented, which implies additional challenges to integrate complex data sets that were created in an isolated manner with single objectives. The key factor that has driven the rapid adoption of AN is the deep involvement of top political leaders, particularly the mayor of Mexico City, who has been closely following the development of the strategy, providing all the necessary political support and direction. Thus, a key research question guides this study: What is the role of the mayor in the development and implementation of citywide information integration initiatives?

This paper shows that, similar to other developing countries, in Latin America, where e-government strategies face so many obstacles, political support from the highest level is critical for these policies to be implemented. However, in contrast to previous research, this study explicitly identifies and explains some of the mechanisms by which the mayor was able to influence the development and implementation of Angel Network. The paper is organized in five sections, including the foregoing introduction. Section two provides a review of recent literature on electronic government and government inter-organizational collaboration and information integration. Section three describes the research design and methods used in this study. The research is based on the analysis of official documents and semi-structured interviews with public managers and government officials. Section four presents preliminary results in terms of the design and implementation of Angel Network and the role of the mayor in this policy process. Finally, section five offers some theoretical and practical implications and suggests areas for future research.

2. Inter-Organizational Collaboration and Information Integration Initiatives

Making a city smart involves many important transformations. Governments need to change institutional and organizational arrangements that influence the way information and technologies are used to manage the city and to deliver services to citizens. It is particularly challenging to have public agencies interacting, sharing, and integrating information [1]. Smart cities need to implement information integration strategies in order to develop effective public policies. To implement these initiatives, city governments need to pay attention to a number of elements and their complex interactions. Previous studies have identified a variety of these elements, which can be categorized into four dimensions: technology, organization, institutions, and context [7][6][13][14][15][16]. Therefore, this paper argues that institutional theory could be a useful lens to understand these initiatives. Following, we explain each of the most important theoretical constructs of the technology enactment framework, which integrates technology into the institutional perspective [18][21].

2.1. Institutional Arrangements

Some of the most important factors in an inter-organizational information integration initiative are undoubtedly institutional [16][17]. Institutions can be understood "as guidelines that have been created by society and the individuals who are part of that society" [16] (pp.29). In e-government, institutions can be seen as legal, cognitive, cultural, and social guidelines that channel the actions of individuals and organizations [16]. As in any other e-government strategy, institutions play a crucial role in determining many key aspects of the way technological programs are designed and oriented [18].

Institutional arrangements can be formal and informal. The formal ones are laws, regulations, and standards that look to affect organization actions to achieve some goal. The informal arrangements vary widely from cultural values to individual habits. In this paper we see two important kinds of informal arrangements: political leadership and trust among participants. Leadership can be seen as executive involvement in IT projects through the use of formal and informal authority [13]. In this context, trust can be seen as an organization’s belief that other
organization will act in such a way that produces positive outcomes for them both [14].

Institutional resources and responsibilities are generally distributed across different agencies [16]. Developed countries tend to depend heavily on legal and statutory responsibilities, which can constitute an important boundary to cooperation [1]. Given that laws and regulations distribute responsibilities with a top-down view of the policy process, there are few spaces for communication and cooperation among offices involved in similar objectives [19]. In contrast, developing countries tend to have informal relationships and the distribution of responsibilities relies heavily on political networks of trust and negotiation, rather than formal legal mandates. If the political context favors these initiatives, they can be successful even without the support of formal rules.

2.2. Organizational Structures and Processes

Institutions affect organizational aspects that play a crucial role in the success of III initiatives. An analysis of organizational aspects looks at the decision-making and work processes which are carried out in each organization involved in the strategy implementation process [20]. It is crucial to understand how different organizations use ICT to construct decisions based on accurate information and deliver different kinds of services to different groups of stakeholders. Some of the most important organizational arrangements that have been identified by previous literature are size, goals, objectives, budget, and accountability methods [16].

Other aspects are related to inter-organizational relationships, which will depend on negotiation among agencies in order to distribute resources, tasks, and responsibilities [5]. This requires a huge level of commitment and trust among the different parties involved, since valuable information is going to be shared with different parties with new rules and potentially novel technological platforms. When political conflicts are present, cooperation across agencies tends to appear in formal terms like directive committees, inter-agency workgroups, formal forums, and so forth.

2.3. Enacted Technology and Results

Once a strategy has been adopted and implemented, its perceived benefits and main impacts can affect the political support that originally made the strategy possible. Organizations decide to launch an IT strategy expecting that the benefits will surpass the costs [10][14]. Some of the most important benefits are an increase in productivity, a better decision-making process, and cost reductions, all of which usually vary across different stakeholders [5]. Some authors have classified benefits in three main categories: technical, organizational, and political [10].

Technical benefits refer to data and information processing. Sometimes these strategies promote the creation of standardization and interoperability standards, which are a key element for launching new strategies for integration [10]. Organizational benefits can be understood as the widening of organization capabilities like better decision making, stronger professional networks, and better control and coordination [10]. All these benefits could bring better services for clients and other stakeholders. Finally, political benefits relate to the enhancement of the organization’s image through the dissemination of the project’s goals, greater public accountability, more complete public information, and better policy results [10].

![Figure 1. Enacting City-wide Information Integration Initiatives](image)

These factors interact and have direct and indirect impacts on the success of information integration initiatives. As it is shown in Figure 1, institutional (formal and informal) and organizational (size, goals, budget, accountability methods, and inter-organizational relations) factors have a direct impact on the implementation of these initiatives and are then reflected in the overall results (technical, organizational, and political). However, institutional and organizational factors coexist and affect each other in different ways.

3. Research Design and Methods
In order to analyze how different categories of factors affect the implementation of information integration initiatives, this study analyzes the case of Angel Network. AN encompasses the integration of key information about most social programs in Mexico City.

3.1. Document Analysis and Semi-Structured Interviews

To perform our analysis we did an extensive collection and analysis of official documents and carried out six in-depth interviews from September through November 2011 at the Modernization Office in Mexico City. Each interview lasted around one hour and twenty minutes. The interview was designed by an international research team in order to understand city information and service integration initiatives. The research team includes professors and doctoral students from four universities in three different countries. The overarching project aims to analyze the adoption of smart city initiatives that involve the integration of key information and services in four North American cities. In Mexico, interviews were conducted with the Mexico City chief information officer (CIO) and several government managers involved in the design, implementation, and evaluation of AN. The interviews were divided into six main sections: concepts of smartness; technology, management and organization; governance; policy context, people and communities; and primary initiative outcomes. The interviews were transcribed and coded using Atlas.ti. The codes represent the categories and specific factors explained in the previous section.

3.2. Brief Description of the Case

AN is a system that integrates information from all of Mexico City Government’s social programs referring to health, education, and equity, among others. According to city officials, Mexico City’s social policy is not the result of rational processes or very elaborated policies that are implemented in a systematic manner. Social policy is the result of different social movements within the city during the last 30 years. Therefore, social programs are oriented to solve long rooted problems in the city like homelessness, youth and gender violence, education deficits, unemployment, the dignity of elders, lack of health services coverage, and so forth. Different agencies and programs have created the social policies for the city, with limited or null communication among them. Since the 1998 arrival of democratic governance to the city, different offices have managed social programs in a very independent manner, following their own logic and stakeholder interests. AN comprises the most prominent programs in the city given the amount of resources that are spent on them (around 80% of the city’s government spending on social policy) and the number of people who benefit from them (around 2 million).

AN comprises 15 programs from 8 different agencies. These programs were implemented before the establishment of AN, but in a non-integrated manner. Some of these have been operating for more than 10 years, like the children’s breakfast program and subsidies for people with disabilities. Others were implemented recently, like unemployment and high school student subsidies. Through AN’s creation, the Mexico City Government has taken five main actions: the creation of a call center, home visits from social workers, the creation of a website, the installation of information modules, and the most important action: the creation of a single database with the information of every single person in these social programs. Therefore, AN can be seen as an umbrella system for Mexico City’s various social programs, which attempts to integrate disparate program information into a unique body of information. Given the isolated development of these 15 programs and the specific kind of people they serve, every agency selected their own systems to host and manage their information at their inception. It represented one of the main challenges to be overcome during the initiative: creating a single technological system from very different platforms that were not created in an interoperable manner. Interoperability was only possible if the initiative was able to close the gaps among very different agencies with diverse ICT departments and ICT specific needs.

4. Analysis and Results

This section presents and explains some of the main results of this study. It is organized in terms of the categories described in our literature review: institutional arrangements, organizational structures and processes, and enacted technology and results.

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1 For a complete description of the programs and agencies involved, visit: http://www.redangel.df.gob.mx/index.php?option=com_content&view=article&id=74&Itemid=84
4.1. Institutional Arrangements

Referring to formal institutional arrangements, new regulations and standards had to be implemented in the city government. According to people interviewed, the creation and the implementation of new laws and regulation was generalized, not focused necessarily on the implementation of IT projects, but the general operation of social programs. It involved very complex processes of political negotiation and bureaucratic adaptation, but they were necessary and urgent to move forward in the operation of all social programs. Many of the social programs that were operating in Mexico City Government did not have clear regulations or standards. Some of them had very old rules that did not fit with the existing reality in the city. Just after the Mayor took office (2006) and previous to the implementation of AN, there was an intensive revision process of laws and regulations to formalize and protect many of the programs that were already operating. The Mayor was very supportive of this revision and improvement of rules and regulations. He empowered the Modernization Office to lead this effort, which had to coordinate with the different agencies to construct or modernize their operating rules. Today there are over 268 social programs with operating rules in Mexico City.

AN has had political and institutional support since the very beginning of the Mayor’s administration. It was created by a Mayoral Executive Order with the main objective to integrate social programs, to avoid duplication of efforts, and to find synergies among the programs. The Modernization Office, under the Administrative Control Department, was created by the Mayor to design and implement AN as an integrative strategy. One of the first problems they found with integrating information into a single database was that as social programs were created and developed by different social agencies in an isolated manner, every program had its own rules for hosting their data.

People from the IT departments in every agency had very different positions in the organization’s hierarchy and different backgrounds. While some people held just a bachelor degree, there were others with graduate education. The IT staff in each agency made different choices about their operating systems. As AN IT chief told us: “You know, some guys used open software, and some others used Windows. It was difficult to find a unique solution to this diversity.” The first great challenge that had to be overcome was to create a single technological platform to host data and information from every participating agency. The Modernization Office had to dictate norms and standards of interoperability to transform and update the existing databases. This created some tensions with departments and agency IT personnel, but they were finally persuaded by the Modernization Office and the political support of the Mayor. In fact, two of our interviewees confirmed that the Mayor made some visits to the individuals who were directly implementing the new platform. It is well-known inside of government that it is not very common for high political leaders to have direct contact with implementation staff, so these visits were very well received.

The Mayor has made great efforts to achieve a high degree of institutionalization for AN. Once it was implemented and operating for almost two years, Mexico City’s Mayor sent a bill to the City Council in order to enact a Social Policy Law, which ensures the permanence of this integrative policy after his administration ends in December 2012. In this bill, some important aspects have been considered, like the protection of personal data and the legitimate use of information. However, the bill is still in the Council waiting to be discussed.

Referring to informal institutional leadership, the Mayor has played a guiding role in the design and implementation of AN. Its governance model is completely hierarchical and at the top of the initiative is Mexico City’s Mayor. Given the novelty of AN as an integrative policy within the highly-politicized administrative environment of Mexican local governments, it needed strong political support from the executive branch (in this case, the Mayor’s Office). Some of the interviews confirmed that bureaucrats were generally aware that technology can represent a strong threat to their job positions, which can make them resistant to these changes.

Even though the Modernization Office had a major role in coordinating the general technological solution, it did not have the power to command the eight agencies at AN. The Mayor was able to mandate different agencies to take on specific roles, tasks, and responsibilities. Reinforcing this central role of the Mayor, a funcionary of the modernization offices stated, “There are some people who are very cooperative, but there are other who are slower. The Mayor is the only one who can put some pressure on them.” Inside of Mexico City, he is seen as the political leader of his government and one of the most notable leaders of the moderate wing of the Mexican leftist parties. According to the interviews we conducted, it was made clear that the Mayor feels AN is his signature project and serves as proof that local public administrations can create effective social programs.

The Modernization Office took the lead role in analyzing the availability of information and
communication technologies (ICTs) within the city government and implementing a strategy of “change administration” based on training and “evangelization”: convincing public servants that ICTs can make their work easier and more productive. Further, the Mayor made several visits to operating offices to convince his employees that their work was going to be preserved and to motivate them to accept the new technologies. The acceptance level was good, and in the few cases where these changes were not very well accepted, employees were reassigned to different areas.

AN is not seen as a program; it is perceived more as an integrative strategy for highly sensitive social program data. The Mayor has ordered a series of general regulations, such as the Personal Data Protection Act, in order to protect this data from political interference. Despite some of the risks in sharing this data, it is clear that single agencies will not resolve the complex social problems the city is facing. An integrative strategy is therefore needed and demanded.

However, the highly politicized and fragmented environment of the City’s administration makes it difficult to implement these kinds of strategies, which makes political support necessary. Most of our interviewees concur that without the Mayor’s political support, AN would never have become a real integrative program. The Mayor chairs every meeting with the directors of all participating programs, which take place every week. This presence motivates many of the people involved in the project and pushes city employees to get the job done. Without his support, this initiative would probably get lost in the day-by-day administrative challenges that have to be faced in local jurisdictions. To help elevate the AN above these daily challenges, the Mayor has allocated extra budgetary resources to keep the project going.

4.2. Organizational Structures and Processes

When the Mayor took office in 2006, an aggressive modernization strategy was initiated within Mexico City. It was clear for the Mayor that ICTs should play a decisive role in local public administration. This strategy consisted of at least of three main lines of action: an infrastructure update, the creation of operating rules for every single social program, and a strategic vision for the city. One of the first challenges that had to be addressed was an important ICT deficit from previous administrations. According to our interviews, the Mayor’s administration argued from the beginning that ICTs must be a vehicle to create better services for citizens. Information was perceived as a key element to more efficiently employ the limited resources available for social programs. The other benefit to be obtained through technology use was to identify, track, and geographically map problematic social phenomena in the city. In this way, it became possible to attack problems before they could escalate into a serious crisis. A lack of critical data was a ballast for previous administrations, so if the government wanted to have more effective and less costly policies, it needed to build this kind of information.

However some challenges had to be addressed before starting, such as updating old infrastructure and equipment. The agencies involved in social policy were not all created at the same time; some had been established recently, while others had been in operation for decades. Usually the new ones were better equipped and had ICT experts with higher levels of knowledge. Therefore, the Mayor created the Modernization Office in order to investigate these differences and to try to generate a common base of ICT equipment among different organizations. It implied a deep reinvention of processes inside social service agencies, which were not familiar with technology as an enabler of better results. The fact that many agencies had obsolete equipment and software was not seen as a difficulty, but as an extraordinary opportunity. Given the technological lag of many social service agencies, the opportunity cost of discarding their equipment was low and they could start with modern equipment and fewer technical barriers.

Given that every agency chose its own technology prior to the AN implementation, AN can be defined as multiplatform, since each agency was not required to change the technology they work with. However, the Modernization Office dictated some standards and rules in order for these technological platforms to interact in efficient ways. Meanwhile, through the use of these simple standards, they have been able to create a single database for the 15 AN programs. These databases are hosted in the cloud and use Google technology for geographical reference.

Inter-organizational aspects were mainly managed by the Modernization Office, which settled general guidelines for the adoption of ICTs as an enabler of government progress. This agency traced a general plan to integrate information, assigning responsibilities to every agency, analyzing their problems, and proposing specific solutions to them. In order to track advances and delays, the Mayor arranged weekly meetings of the AN Steering Committee, which is formed by directors and
ministers of the eight agencies involved, the Modernization Office, and the Mayor. The Mayor chairs the Steering Committee, and he is present for every weekly meeting. The Modernization Office has a major role in linking all government agencies and is charged with monitoring the achievement of objectives and the implementation of decisions from the Steering Committee meetings. Every agency continues to operate its own programs according to specific rules and legislation, but the Modernization Office reports on their progress in meeting key social policy indicators. In this way, the Mayor supervises each agency’s tasks and addresses many of the political difficulties they could be facing.

4.3. Enacted Technology and Preliminary Results

AN was created to achieve at least two important goals. The first goal was the creation of a single database that consolidates information from social programs operated by the city government. The creators of AN looked to have more efficient data management, since the information was previously fragmented among different parties, and there was little control over its use. Further, some of this information was managed through different platforms, which sometimes had no capability to interact or were even obsolete.

The second goal to be covered by the creation of AN was to make more efficient decisions, particularly related to the location of resources. The interviews reflect that the idea of limited economic resources permeates city government, so it is a high priority to obtain the biggest benefits from their investment. In the words of the AN CIO, this policy is seen “as the professionalization of social policy in the city” because it will allow the government to make the best decisions about who should be receiving benefits from the government when and why. It is clear that these programs were born from social and political movements, but they now have to prove themselves to be socially profitable based on technical indicators.

The interviews indicate that many actual benefits have been realized since the implementation of AN, at least in two of the three areas we mentioned in our last schema (technical, political, and organizational). First of all, technical benefits have come from the more intensive use of technology in the city’s government. The city bought new equipment and updated its systems in order to allow for modernization of its administration, which has facilitated the work and operations of all programs, including AN. One person in charge of technological solutions stated, “When you change old equipment to a person who used to have constant trouble with it for something a little newer, you make them pretty much happier and more productive.” The city has installed a new physical fiber optic backbone for governmental purposes, which has increased its productivity and efficiency, particularly in emergency situations. The Modernization Office has created a set of technical standards for interoperability among social agencies, which can be used for other kinds of public organizations.

In terms of organizational benefits, this integrative process has enabled the creation of a single database, which made possible, for the first time in the city’s history, to know exactly how many people benefit from social programs, how much support they receive, and from which agency. In the past, some beneficiaries could be receiving subsidies from different programs in different agencies and the government did not have a very clear view of the people who start and finish a social program. There was also not a very precise overview of what benefits could be duplicated or even if the benefits can be used for political purposes. According to the AN CIO, this program allows for the professionalization of social policy in Mexico City, since accurate and organized information leads to informed decisions based on technical criteria. Now they can decide where to build new social infrastructure like schools and hospitals based on where the beneficiaries are located in the city, their ages, and other socio-demographic conditions. Now, every social program that is part of AN is in a position to be evaluated through the use of technical and objective indicators.

Political benefits are also present, but limited. The most important of them has been that the Mayor and the Modernization Office have a more precise control on what is happening with social programs and their beneficiaries, given that in the past agencies used to control and manage their own information about social policy. Social service data is now more isolated and secured from political and electoral interferences, given that there is a single AN card for each beneficiary. There are clear rules for entering and leaving a specific program, and for defining the type and amount of subsidies. The endorsement of the Social Policy Law in the Mexico City Council will be a step toward institutionalizing AN beyond political influence.

5. Final Comments: Leadership, Information Integration, and City Smartness
As mentioned before, making a city smart implies, among other things, integrating information and services across multiple city agencies. Integrating information that is fragmented across diverse agencies, following their own technological standards, demands significant political support from the highest level. Adapting systems, following new standards, and transferring valuable information all impose a series of costs for agencies with few incentives to cooperate. This section provides some conclusions from our analysis, which have implications for research and practice, particularly in the context of Latin American local governments.

As mentioned before, in order to implement information integration strategies, several institutional changes need to take place. In this case, the Mayor created operating rules for diverse programs in order to harmonize their processes and performance. Moreover, he created a new organizational structure (the Modernization Office) and empowered it to review, update, and sometimes even create new rules and procedures in order to integrate and manage social programs data within a single database. In this way, the involvement of the Mayor in the project allowed for the creation and improvement of formal institutions and new organizational structures. He is now trying to go a step further and create a law on social policy, which could protect the main aspects of AN for the long term. As one of the interviewees said, “The law is the only way to institutionalize AN, that it does not depend on anybody’s will, but it can continue working as a network.”

In addition, the mayor had the necessary power to align multiple, and sometimes conflicting, political interests in favor of AN. For example, he has the power to remove or maintain department heads in their positions and to push them to cooperate with the implementation of the strategy. He is present in weekly meetings and he observes and evaluates advances and delays in the strategy, which constitutes a powerful motivation for all officials and agencies to keep collaborating and show progress.

In terms of organizational structures and processes, the Mayor took decisive actions to achieve the full implementation of AN. For instance, he created the Modernization Office, which plays the role of a technological enabler and as the overall coordinator of AN. AN has changed the way city authorities make policy decisions, since it has provided them with a stream of information that was disperse and incomplete before. Now they know how much support an individual receives through different social programs. They can make better decisions about how to focus certain services based on age, activities, interests, and location of the beneficiaries. They rely on trustworthy information to make new decisions about social policy, particularly how multiple programs and agencies should participate in AN. However, as the Modernization Office is not an entity with enough political clout, the participation of the Mayor has been essential.

Figure 2. Leadership as a key influence on institutional and organizational arrangements

This situation is particularly important for Latin American local governments, where there is a low degree of institutionalization to create and operate technological projects. Information is usually fragmented and scattered among numerous organizations and actors, who sometimes use it for electoral purposes or to enhance their personal image. Even more troubling, the beneficiaries of social programs are usually selected based on political concerns, rather than socio-demographic and technical requirements. Given that there is a lack of a strong civil service in Latin American local governments, the support of a political leader for a technological project is crucial in order to have positive impacts on institutional and organizational factors, which at the end will determine the successful implementation of these initiatives. Based on these ideas, Figure 2 highlights the role of political leadership for citywide information integration initiatives.

In the case of Angel Network, the initiative was implemented in a relatively short period of time, given its limitations, and the fact that they now have a single database is a positive result in itself. Moreover, agencies and departments are now using this information to have better programs and to decide where to locate them. Example of this is the mobile units for women’s health, which are taken to the most vulnerable women with low access to social services. However, more general policy impacts
remain to be seen; for example, evaluating beneficiaries’ satisfaction. Probably the most important political benefits are the greater control over social programs with the information derived from AN and the possibility of making better decisions with an enterprise-wide vision.

Political leadership was a key variable that had a great effect on institutional and organizational arrangements. This case shows a high degree of involvement of the Mayor, who fostered multiple institutional arrangements and organizational structures and processes in order to achieve a better implementation process and clearer results. Moreover, the Mayor got involved with specific organizational aspects of the AN implementation through his presence in all weekly meetings. In these meetings, many decisions about organizational characteristics of the program were decided, like coordination methods, roles and responsibilities, and new lines of action. According to the interviews, it seems clear that without the intervention of the mayor in the whole process, it would have not been possible to develop and implement the initiative, given the great number of influential political and bureaucratic actors that had to be involved. Other variables related to institutional and organizational aspects were important too, but many of them were, in some way or another, influenced by the political support of the Mayor. Table 1 summarizes the most important results of this study.

Table 1. Main results of the study

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<thead>
<tr>
<th>Actions of the political leader</th>
<th>Area of influence</th>
<th>Effect on results</th>
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<tbody>
<tr>
<td>New operating rules</td>
<td>Formal Institutions</td>
<td>Clear operation and harmonization</td>
</tr>
<tr>
<td>Creation of rules and standards for data bases</td>
<td>Formal Institutions</td>
<td>Full Interoperability</td>
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<tr>
<td>New bill on social policy</td>
<td>Formal Institutions</td>
<td>Continuity</td>
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<tr>
<td>Press government executives for cooperation</td>
<td>Informal Institutions</td>
<td>Cooperation</td>
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<tr>
<td>Motivate public employees</td>
<td>Informal Institutions</td>
<td>Cooperation</td>
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<tr>
<td>Technology update</td>
<td>Organizational arrangements</td>
<td>Better operation of social programs</td>
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There are also policy implications derived from this study. First, political support is a key variable to achieve success in III projects, since political leaders such as mayors or governors are able to introduce several changes in formal institutions to favor the policy. One strategy that can be extremely successful is that these leaders can incentivize and elicit the necessary support from other key actors, like bureaucrats and clients. Finally, they are able to create new organizations and empower them to carry a determinant role in III. The steps followed in the AN case could be used by other local governments in developing countries, which face similar political and institutional restrictions.

In the case of Angel Network, the strong support of the Mayor and his high involvement could be partially explained by his political ideology. He is part of the left-wing party in Mexico and one of his main agenda items is social policy. Angel Network became a way to improve the services to poor people and other disadvantaged social groups; the Mayor took on this initiative as probably the most important project in his administration. It is not clear whether his direct support and influence on other important enablers and challenges would be similar if the project were not as close to his political agenda as it was. Future studies could analyze multiple information integration initiatives with different political and ideological content and assess how similar or different the influence of the top political leader is on many of the other important variables.

Finally, this paper helps to understand the relationships between inter-organizational collaboration, information integration, and city smartness. City governments around the world are looking for creative solutions for the increasingly complex socio-technical problems that urban areas face. Some of these potential solutions seem to be related to creating a nervous system for the cities and using information and technology to improve their capabilities in terms of connectedness, efficiency, effectiveness, and sustainability, among other important elements. Integrating some of the most important information and services could clearly be a very important step towards smarter cities and smarter governments. However, the challenges to government information integration initiatives remain difficult to overcome and the resources and capabilities of local governments are particularly
limited. Therefore, there is an opportunity and a need for political leadership to play a key role in achieving information integration and developing smarter cities.

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6. References


