

Chapter 2

Urban Models of Sustainable Development from the Economic Perspective: Smart Cities

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Abstract In the following years smart cities are to play a fundamental role in the models of economic development. The cities that used to be just a place to live in are becoming areas that have to be adapted to the needs of their residents, and can guarantee them a better life quality, but always from a responsible position. The United Nations (UN) said repeatedly that in 2050 a 70 % of the world population would live in cities and some of them would have more than ten millions of residents. The purpose of this chapter is to make an approximation to the smart cities concept and to deepen into the application and the results of this kind of models of the urban development. The methodology is based on a theoretical–practical analysis of the smart cities. For this purpose an exhaustive analysis of the most recent economic literature on this topic has been done. Moreover, some of the most important results of this new model of the urban development have been indicated, so they can be applied to the problems that some cities have, and a case study has been done as well.

2.1 Introduction

One of the main challenges for urban development is to get cities that could take advantage of all the possibilities that Information and Communications Technologies (ICT) could offer to improve their residents' life quality, but always taking care of the environment.

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Cities influence a lot on economic and social development of countries. Nowadays cities consume about 75 % of the world resources and energy, and at the same time produce about 80 % of the greenhouse effect. A 70 % of the world population is expected to live in cities in 2050; this fact will cause problems of management of services and infrastructures that will mean some difficulties in the social organization and land management, and the environment will be damaged as well.

These cities have to tend to satisfy their residents' needs, providing them services that have more quality and that are more efficient; at the same time they have to take care of the environment, trying to guarantee the sustainable development.

Modern cities are like big enterprises that have to provide multiple services as electricity or water supply, telecommunications, gas supply, transport, education, E.R., etc., and at the same time they have to have a wide net of infrastructures. Taking into account all of this, the smart cities can contribute a lot to this way of development.

To analyze all these points, this chapter has the following structure: after this introduction in the part two a change of the urban model developed by the cities from an approach based on the smart development and at the same time respectful towards the environment is analyzed. The third part marks some of the economic aspects that have to form part of a new design of the smart cities. The fourth part describes a situation of the smart cities phenomenon in Spain, making a general analysis and a study of some of the most important cases. The fifth part establishes a group of recommendations to point out some possibilities for improvement. At the end of this chapter some conclusions drawn from the previous parts can be found.

2.2 Changes in a Model of the Urban Development: Smart Cities

Increase of the number of city residents has been a dominative pattern these years. In 1960, a 32.6 % of the world population lived in cities; in 2010, this percentage grew up to the 50.9 %; in 2030, a 60 % of the world residents will live in cities, becoming a 75 % in 2050.¹ Nowadays cities demand a 75 % of resources, generating up to 80 % of the GBP in some countries. In the following 3 decades the main part of economy, social benefits and improvement of the residents' life quality will be concentrated in cities. Moreover, due to the concentration of residents an unprecedented increase of the pollution levels in big cities that affects their residents' life quality is produced.

It has been more and more required to the cities to be more efficient, to be developed in a sustainable way, and to manage their resources; that needs an evolution of their models of management. This way, public persons, which are in charge, are

¹ See "Hoja de datos sobre las ciudades" published in the Conference of the United Nations on Sustainable Development Rio+20 (2012).

requested to nuance the economic and social effects produced by cities development, and not only to correct the deficiencies that this expansion of services and infrastructures produces, but also to be able to foresee these situations.

It implies that the cities have to progress towards a more efficient model of management with more quality that could let them, amongst other aims: (1) to assure their development, allowing to have organized and appropriate to the needs of their residents evolution; (2) to improve the provision of services with a high level of quality in the most efficient way and with less cost; (3) to get an integrated vision of the provided services to get synergies and savings.

The smart cities are born exactly under these circumstances; these cities are able to take advantage of the technological progress to foresee more and better services,² to reduce the environmental footprint,³ to encourage local innovation and to improve the quality of the services that are provided to the residents.

There are a lot of approaches for a concept of a smart city (Mosannenzadeh & Vettorato, 2014). Caraglui et al. (2009) claim that a smart city as that one that gets that investments in social and human capital and infrastructures in transport and ICT could strengthen sustainable economic development and better life quality, using in an efficient way resources and having a participatory and sensible to the residents' need governance. Nam and Pardo (2011) say that a smart city is that one where infrastructure and human and social capital allow sustainable economic development and improve life quality through collaborative governance. López Pol (2012) indicate that the smart cities need an integration of the goods and services supply with suppliers and users, playing supervision a very important role in this process. For Batty et al. (2012) a smart city is a synthesis of physical capital, of a system of communication and interconnection, and of a process of constant improvement of the search for quality.

The EU, one of the institutions that support more than others this kind of initiatives,⁴ indicates that the smart cities would be those ones where nets and traditional services are provided in the most efficient way, due to the use of the ICT for their residents and enterprises' profit; although a concept of a smart city has to go beyond a simple use of the ICT, involving smart networks of urban transport, water supply, collection and recycling of rubbish, lighting, improvements of public spaces, and more interactive and transparent with the residents government Unión Europea (2008, 2013) and European Commission (2013).

²It means to take an advantage of the ICT to interconnect and control all the services provided through centralized management and to reduce their costs due to the synergies between all the municipal departments.

³Environmental footprint measures an impact of any product or services on the environment throughout all its life cycle. It is possible to reduce the impact of human activities measuring the environmental footprint.

⁴This initiative follows the objectives of a document "Europa 2020: Una estrategia para el crecimiento inteligente, sostenible e integrados," better known as 20–20 objectives.

Focusing this study on the articles published in Spain, different approaches for the concept of a smart city can be found. The Institute for Diversification and Energy Savings (IDAE, 2012) indicates that a smart city is that one which is able to use sustainable development without damaging the environment using the ICT as a tool for a smart management of resources with the aim to satisfy the residents' needs. A definition of a smart city by the Telefonica Foundation (2011, 2015) is spread out as well; according to it, smart cities are those that use the ICT to allow their infrastructure and public services to be more interactive, efficient and appropriate to the residents' needs, enabling a higher interaction with the received benefits.

This way, a city will be the smart one if the investments that are made in education and academic training, in social aspects, in infrastructures, energy, ICT, transport, etc. allow a higher life quality, economic and sustainable development and prudent management of natural resources. The smart cities are the cities that are committed to their environment, where infrastructures with the most developed technological solutions are guaranteed to the residents to allow their interaction with urban elements, making their lives easier.

A structure of a smart city is based on at least four elements (Table 2.1). First of all, it is necessary to have an urban area (occasionally it can be also a metropolitan area, if it is close to an important city) where a high number of services is provided to the residents. Therefore, it is mandatory to have a city of a determinate dimension that can provide enough for the collective needs services. It allows to introduce the first criterion of selection, because not all the cities can be smart. This way, those that are small have to join another cities that are close geographically to provide a certain kind of service or if not, they will not be smart.

Secondly, it is mandatory for the cities to have infrastructures that can deal with social requests. This point needs these facilities to be respectful towards the environment. It is not enough just to have a good infrastructure if energy consumption is unreasonable or if its maintenance requires a lot of money.

Table 2.1 Elements the smart cities' structure is based on

Element to be considered	Content
Urban area	An urban or metropolitan area that allows to provide a wide range of services to the residents
System of infrastructures	Infrastructures appropriate for social requests and at the same time respectful towards the environment have to be guaranteed, in a sustainable urban development framework
System of networks and smart platforms	It is necessary to count on information systems that allow data collection, not only to provide a better service to the resident, but also to foresee new needs and to reorganize resources
Residents	The residents are to be the main element of the smart cities, due to the fact that provided services and created infrastructures have to satisfy growing needs of the urban residents, but always in a sustainable urban development framework

Source: Own elaboration from the Libro Blanco smart cities, Ernest et al. (2012)

Thirdly, it is necessary to have an information network based on smart platforms. With the implementation of the ICT in municipal services an important quantity of information can be collected, but the aim of this is to improve a service provided to the residents, not only to detect possible incidents, but also to plan potential requests. Only this way a supply of goods and public municipal services can be optimized.

Finally, it is necessary to know the residents' requests for public services and for municipal infrastructures. The smart cities' functioning is to look for a higher level of welfare of the population under sustainable circumstances. Therefore, the last duty of a smart city is to take care of the needs of its residents in a responsible and organized way.

Transformation of a traditional city into a smart one is not an automatic process; neither means it a break with traditional models. Batty et al. (2012) indicate that smart cities are heirs of ancient city models that were able to apply the ICT to the use of traditional infrastructures. However, the smart cities go beyond, because due to the implementation of the ICT a better understanding of all the problems that urban management has, and not only the present ones, but also the future ones, can be achieved. It can be explained with the fact that the ICT development enables organized planning of resources, anticipating the detected needs. Moreover, the smart cities help to improve technological initiatives, because everything is connected, improving management of urban resources and governance of the cities.

The Table 2.2 allows to name some of the actions that have to be carried out to make a city a smart one. First of all, the smart cities have to have appropriate technological infrastructure that enables interconnection between all the municipal services in real time. To do that, it is necessary to make an appropriate investment in communications networks within smart platforms that can guarantee efficiency of a service in a sustainable framework.

Table 2.2 Actions to be carried out in a smart city

Action	Steps to be done
Technological infrastructure	Creation of informational networks as a tool to improve communications, smart platforms, efficient and sustainable infrastructures
Energy strategy	To avoid energy dependence from the sources of traditional energy, especially from fossil fuels, supporting renewable energy, creation of systems of energy storage, energy exploitation, etc.
Management and protection of resources	To promote actions of area and resources development taking into account sustainability and cooperation of administrations
Provision of services	To establish new collaborative models that allow to integrate public and private vision of resources, its common use, metropolitan areas of resources, etc.
Government	Efficient use of information obtained due to an analysis of the demand of services, infrastructure, benefits, that allows to improve the offered to the residents quality

Source: Own elaboration from the Libro Blanco smart cities, Ernest et al. (2012)

Secondly, a strategy that can enable a generalized use of respectful for the environment sources of renewable energy has to be installed. At the same time it is necessary to be giving up on energy dependence on fossil fuels and to create systems of energy storage.

Thirdly, it is mandatory to manage and protect resources, so the municipal actions take place into the organized area and resources development framework taking into account sustainability and providing cooperation between different administrations.

Fourthly, it is very important to support development of collaborative models between public and private sector for provision of municipal services. This way, it is fundamental to detect and to take advantage of synergies, not only in the same city, but also in cities that are geographically close to each other to optimize available resources.

Finally, it is fundamental that municipal governments use in an efficient way information that can be collected applying the ICT for provision of services and infrastructures. This way, due to this information, its use, need to reinforce the service, possible deficiencies, etc. could be determined, so the quality that is offered to the residents can be also improved.

As it is not possible to be done in any other way, cities that want to be smart need an important investment to be done, both human and technological. The technological one needs to have technical support of specialized companies that offer an appropriate for municipal needs product. It is not strange that certain companies that work in the ICT sector foresaw the municipal interest in the smart cities and created departments that consult municipal agents about the best solutions to get subsidies.

Although there are grants to set up the smart cities, they do not cover the whole investment (80% maximum), so economic effort of municipal funds turns out to be important. Taking into account this fact, it is convenient that public managers make a cost-benefit or cost-effectiveness analysis to estimate if an investment in the smart cities is profitable or not. To do this it is necessary to take into account a wide range of profits that can be achieved due to this decision, both in a specific and general way (Table 2.3).

Table 2.3 Benefits of being a smart city

Benefit	Main results
Specific	• Based on a kind of services that is provided or infrastructure that is optimized
Generals	• Consolidation of cities development and at the same time flexible and organized adaptation • To offer a platform for innovation and creation of new entrepreneurial initiatives followed by economic and social improvement • To save public funds in services and infrastructures that are being optimized • To improve the quality of public services provided to the residents • To enable immediate and easier identification of the residents' needs and to detect possible actions to be carried out • To improve transparency of the public administration • To get information in real time, making the residents aware of the needs of a place they live in • To share information with different departments of urban management, taking an advantage of synergies between different areas

Source: Own elaboration

First of all, it is evident that the first profits will be obtained due to improvements related to the provided services or optimized infrastructure. This way, for example, if a city has smart system of lightening that turns on/off the lights taking into account natural light, energy savings will be immediate.

Moreover, it is important to take into account other general improvements that can improve the residents' life quality more than these specific profits. Thus, the steps that can help a city to become smart strengthen cities' development under the circumstances of flexible and organized adaptation. In addition, a platform to promote new entrepreneurial initiatives is achieved; savings of public funds become possible, so they can be used for other services or the taxes can be reduced; an easier and immediate identification of the residents' needs can be also achieved, as well as to make short- and medium-term actions that allow to improve quality of the provided services. Also it helps municipal administration to have more transparency, to have information in real time and totally adjusted to the current needs that can be shared by all the departments of urban management.

Using the example we mentioned before, this system of smart lightening in public buildings will allow not only to have some savings of energy, but also to have less energy dependence, less light pollution and to reduce CO₂ emissions into the atmosphere.⁵ This measurement can be also complemented by revitalization of night areas and strengthening of touristic activity in the cities, for example, with touristic routes at night. Other advantages could be increase of security levels and cities' habitability.

We should ask if the smart cities phenomenon is something new. This term has been used since more than 2 decades, but its development was more cautious in comparison with the current moment. Introduction of technologies into public services and functioning of infrastructures has been supported for several years, although nowadays, being the ICT implementation at its peak, cities start to act in another way. It is about interconnection and monitoring of all the public activity with the aim to centralize its management and to promote savings.

However, the smart cities go beyond, due to the fact that thanks to this implantation of new technological tools the cities generate a lot of information that not only has to be used by the public managers to improve infrastructures and benefits, but also to arrive to the residents and to the enterprises, so they can make better decisions in real time. For example, there would be a possibility to know if there is free parking space in a public car park, if it is necessary to improve cleaning of public roads or if a certain public area needs a better maintenance.

The Table 2.4 summarizes the main features the smart cities must have. Although there is no any standardized pattern, the main part of studies that evaluate cities' commitment to be smart uses these criteria. These features are based on six pillars: competitiveness, social and human capital, participation, transport and the ICT, natural resources and life quality, having each of them a group of actions to be carried out. It is evident that each smart city assigns a special weight to all these features, supporting specific initiatives that go for certain objectives.

⁵This kind of actions can reduce about 44 % of light consumption in a city as Madrid, see eSmacity.es, Todo sobre ciudades inteligentes.

Table 2.4 Main pillars and actions to be carried out in a smart city

Pillars	Actions
Competitiveness (<i>smart economy</i>)	• Adaptation to the changes • Innovation skills • Encouragement of entrepreneurship • Improvement on competitiveness • International repercussion
Social and human capital (<i>smart people</i>)	• Adaptation to the changes • Creativity • Encouragement of continuous learning • Improvement on the qualification level • Participation of the residents
Participation (<i>smart governance</i>)	• Ability to be adapted to the needs • Municipal management of transparency • Participation in the decision making
Transport and the ICT (<i>smart mobility</i>)	• Infrastructures based on the ICT • Improvement on the local accessibility • System of efficient and sustainable communication
Natural resources (<i>smart environment</i>)	• Appropriate use of resources • Control of pollution • Sustainable management of resources and the environment
Life quality (<i>smart living</i>)	• Housing quality • Social cohesion • Facilities to improve education, culture and knowledge

Source: Giffinger et al. (2007) and own elaboration

Being analyzed studies carried out on this topic, we can say that the main part of all the efforts is focused on natural resources development, transport and the ICT. In addition to it, it is proved that there are patterns of different level of interest according to the number of residents. So big cities tend to support improvements related to the governance more that smaller ones do; the same tendency is noticed in relation to the life conditions. Nevertheless, improvements related to natural resources, mobility and the ICT do not depend on the number of residents (European Parliament, 2014).

2.3 Some Economic Aspects of the Smart Cities

Using efficient management of services and infrastructures of the smart cities it is possible to save a lot, speaking not only about economy but also about other important aspects.

For example, with traffic lights regulation according to the roads' occupation,⁶ it is possible not only to reduce fuel expenses, but also to avoid or reduce trips towards them and to reduce pollution and noise levels as well. It would have as a result better air quality, and as a consequence it will reduce the health service expenses. At the

⁶Premios Contratos y Proyectos Smart Cities 2014: Smart city project for Castellon de la Plana. Castellon de la Plana local government.

same time it could be possible to make some improvements in smart buildings that would enable to reduce fuel costs due to the measures of energy efficiency.

Another advantage of the smart cities would be an improvement on all the system of rubbish collection that would help to introduce some changes in the collection process. This way, smart trash cans that would identify the user of the service and would inform about its level of usage could be used.⁷ These cans would inform when they are full; there would also be an option to reward their users, for example, reducing local taxes (Real estate taxes) if they recycle their garbage in a correct way.

The third possibility is to make some improvements on irrigation in parks and public gardens; irrigation level could be increased or reduced optimizing water consumption according to the water needs of certain areas.⁸

Finally, due to multiple possibilities offered by smartphones, touristic routes or infrastructures used by tourists could be identified to optimize public transport service.⁹ As it can be proved, there are a lot of different options.

Moreover, the smart cities are very attractive for new activities and businesses that could be brought to the cities, because if not, the tendency is to situate them in the suburbs due to the lower price of land.

In addition to this, the smart cities need strong investments in data integration and technology, because they need these tools for efficient management of resources (Pohl and Pohl, 2013). Amongst some of the activities where the main level of smart technological development is estimated we can find security, transport, education, health, automotive industry, energy, buildings and homes. This way, there is an increasing interest shown by several companies in their positioning in the smart cities business, being able to consider different options and possibilities to strengthen competitiveness of entrepreneurial networks.

A very relevant from the economic perspective point is the one derivative from collection and processing of information. In the smart cities concept local administration has an important volume of information that could be interesting not only for the public managers and the residents who receive public services, but also for those companies which are interested in providing some service.

As these data are interesting, they should be open (open data), although it is very important to be careful because of the data protection act. However, it does not mean that this information would be for free. So some ways that allow to make the use of this information profitable should be found, because if not, public money would pay not only a market research, but also the best market research due to the fact that this information would show a thorough use of a certain resource, and we cannot forget that any kind of information has its cost. If a certain price is not established, it would mean crossed subsidization from the public sector towards those companies that can take an advantage from it. This is not efficient neither fair for the residents who are those who pay with their taxes collection of this information.

⁷El Confidencial (2013): A company from Lleida makes cans that inform that they are full.

⁸Econoticias (2015): Smart city project, irrigation of gardens in Oviedo will be managed through smartphones.

⁹Cinco Días (2014): Turn your Smartphone into a touristic guide during these holidays.

2.4 Smart Cities Development in Spain

A boom of the smart cities has been noticed in Spain this decade. There were 22 local governments in 2012 that supported this kind of initiatives; in 2014 60 initiatives were registered in the Spanish Network of the Smart Cities (RECI, 2015).¹⁰

With these numbers Spain had an important on the European level position (on the world one as well) in the smart cities networks. The Ministerio de Industria, Energía y Turismo (2015) seems to be interested as well in the smart cities; in March 2015 it decided to finance up to 80 % of all the financial needs that the smart cities have.¹¹

However, in spite of this generalized wish of any medium or big city to have a smart project, the reality shows us that development is heterogeneous. Therefore, it is necessary to be cautious with the expectations and expected results of this process.

According to the IESE index Cities in Motion (ICM) 2015 that elaborates a ranking of the smart cities on the world level, only seven Spanish cities (Barcelona smart city (2015), Madrid smart city (2015), Valencia smart city (2015), A Coruña smart city (2015), Bilbao smart city (s.f.), Sevilla Smart City Plan Director de Innovación (s.f.), and Málaga smart city 2015) are amongst the 80 best smart cities.¹² There is no doubt that Madrid and Barcelona (with the highest positions in this ranking) are two Spanish cities that more supported integral projects of smart cities development. The case of Barcelona stands especially out because this city leads some of the smart cities rankings on the world level.¹³ Barcelona is also one of the headquarters of the most important international events on this topic, the Smart City EXPO World Congress.¹⁴ The Table 2.5 summarizes some of the most important initiatives of the smart cities in Spain.

As we can prove, all these cities decided to support actions of urban development taking into account their residents' needs and being respectful towards the environment. Governance of these cities is the second of applied actions, followed by international repercussion, mobility and transport, and social cohesion. Therefore it seems to be true that there is a common pattern of behavior of the smart cities applied to the initiatives on a national level.

¹⁰ Smart City Red Española de Ciudades Inteligentes (2015).

¹¹ Red.es (2015): The first call for smart cities.

¹² This study is based on an analysis of infrastructures, innovation and energy consumption of 148 cities from 57 countries. It is a study of 66 indicators distributed in ten areas: governance, urban planning, public management, technology, environment, international repercussion, social cohesion, mobility and transport, human capital, and economic development. The difference from other analysis consists on the fact that this study does not consider any special or isolated actions, that despite the fact that they can improve provision of a certain public service, actually they cannot provide any integral improvement to the residents' life.

¹³ Junniper (2015).

¹⁴ The next World congress on the smart cities will be hold in Barcelona from the 17 until the 19 November of 2015, see <http://www.smartcityexpo.com/>.

Table 2.5 Main initiatives of the smart cities in Spain according to the CIM 2015 report

City	Actions that were carried out	The most important indicators	World position IESE CIM 2015
<i>Barcelona</i>	New network of urban buses Service of telephone support Open data Promotion of electric cars Smart traffic lights Safe routes to school Barcelona wifi Bicing Sustainable Barcelona Telemanagement of risk Smart city campus Website for formalities	Governance Environment Improvement on human capital Urban planning International repercussion Use of technologies	34
<i>Madrid</i>	Improvement on management of rubbish, cleaning, parks and gardens, irrigation, pavements, public lightening Payments to the suppliers according to the levels of their services and not to the quantity of used resources Continuous actualization of municipal inventory Higher level of transparency of the provided services Improvement on the ways of communication with the residents Integration of information	Governance Environment Mobility Transport International repercussion	35
<i>Valencia</i>	Centralization of all the municipal information Monitoring in real time of traffic, public lightening, gardening, local police, pollution, rubbish collection and tow truck service On-line search and download of taxes and fees improving administrative formalities	Social cohesion Environment Mobility and transport	73
<i>A Coruña</i>	Increase of the number of wifi areas Control of water supply, energy, environment Actions to improve urban mobility services Promotion of electronic administration Higher level of participation of the residents	Social cohesion Governance Environment	75
<i>Bilbao</i>	Free wifi in underground Mobile chargers in buses	Governance Environment Mobility and transport	76
<i>Sevilla</i>	Investment in energy solutions Creation of municipal technological institutes Promotion of the ICT Consultancy about grants for new technological initiatives	Governance Environment Urban planning International repercussion	79
<i>Málaga</i>	Installation of energy storage system with batteries Promotion of electric cars use Integration of renewable sources of energy into electrical grid	Social cohesion Technological development Environment	80

Source: Own elaboration using the IESE CIM report (2015)

2.5 Recommendations

As it was proved, cities are to play a fundamental role in social and economic development in the following years. There is no doubt that projects that form part of the smart cities development will allow to achieve this goal.

However, we have got still long row to hoe. Many Spanish cities form part of this project, but a smart city is more that just make changes or isolated improvements in certain services and infrastructures. It does not mean to make applications that could make the residents' life easier in some aspects, but to make actions that have to go beyond it.

It is not enough just to have a good idea, it is necessary to be able to implement it and to guarantee improvements on integral management of all the activities that are developed by the cities. The cities are not recommended to be up for it all of them just because they do not want to be out of the list of smart cities.

Some kind of regulation of the smart cities needs to be carried out, because up to the current moment there is nothing that could allow to set any objective that must be achieved. Currently each city has its own objectives that they set themselves just not to be out of the smart cities list.

Obviously, this kind of behavior is not recommended if a city wants to learn from other experiences and to take an advantage from possible synergies between the cities. It is convenient to remember that one of the goals that the smart cities want to achieve is to have interconnection of the public services and municipal infrastructures, but there is nothing that could promote interconnection and information transmission between different cities, especially when it is proved that there are challenges and similar problems that could be dealt with the other cities' experience.

This lack of regulation does not allow to know with certainty when a city is implementing a smart program, because as there is no standard of what it must do, any initiative could be seen as an innovative one.

In addition, this lack of information in the beginning does not allow to know the results of evolution of each city. So it is urgent to define what the smart city is and what it is not, collaborating with private organizations that have experience with certification programs. Only this way it will be possible to establish behavior protocols and those that can design initiatives that will really improve the residents' life quality into the sustainable development framework. It could help to avoid this urgency that there were when some Spanish cities decided to become the smart ones. These protocols should include some indicators that have to be satisfied by the smart cities, their deadline, persons in charge of each action and expected results.

Another very important point would be evaluation of profitability of these investments. It is very normal for Spain to stand up for applying of policies and actions that have to improve the offered services' quality, but the final results are analyzed only few times. This way, as the EU and Central Government economically support this kind of initiatives, there is a tendency to ask for "whatever" just not to lose these grants. Acting this way means an inefficient management of public resources, because these funds have to be used to achieve a goal and not to be a goal of the cities.

It is also necessary to provide more information about the smart cities. There is a lot of information about these initiatives provided by public managers, but a huge quantity of residents does not have any background, including those who live in the cities where these initiatives were implanted many years ago. They do not know how a city becomes a smart one, and an important role that the residents have to play in all this process is completely unknown. It is evident that it is rather important to organize awareness campaigns of the importance of the residents' collaboration and participation. Moreover, if the residents are aware, they will be more responsible with their acts, improving the quantity and quality of information provided by their own behavior. All of it will have more effect on the level of intelligence of the actions made by the public managers.

Another point, related to the previous one, consists in going in depth of new technologies development. Young residents form part of the so-called "digital generation," but the cities are inhabited by elderly people who do not know almost at all how to use the new technologies. Many of them do not know to use the Internet, they do not have an e-mail and they are totally lost with social networks. It shows that immersion to the new technologies is an urgent need, but very few times public administrations take it into account.

Digitalization of the processes will be viable if the residents are able to use in an appropriate way new tools. That is why it is necessary that smart cities programs support actions that could improve computer knowledge of the residents.

Finally, we cannot forget what a smart city means. According to Batty et al. (2012), smart cities, despite all their potential, present a challenge for public managers that few times is taken into account. This way, it is necessary to link these smart cities' infrastructure to achieve a better present and future functioning. We cannot forget that the smart cities turn into real laboratories for new ideas and applications development (Veeckman & Van der Graaf, 2015). So the smart cities are more than just an isolated improvement of a certain service.

2.6 Conclusions

In this chapter an important role that the smart cities have to play in the new framework of knowledge-based economy is described. This kind of cities, that are founded to allow sustainable development of big urban areas and that have a sense of social responsibility with the environment, follow a model that was born 2 decades ago and that was to make cities more human.

An appropriate approach of the smart cities goes beyond it, because besides guarantees of a better life quality using the ICT it is also about being responsible towards the environment minimizing damage that they could cause to it. As the population is more and more concentrated in cities and as they are becoming bigger, it is necessary to improve the resources use through an intensive use of new technologies.

In spite of all the positive points of this approach, it is necessary to be aware of the fact that the smart cities require a comprehensive project that could benefit all the residents, that would be viable and long-lasting. In addition, the success of the smart cities depends not only on public efforts but also on their level of usefulness for the residents.

Public managers have to put resources aside not only for these new projects but also to promote spreading of its positive points. Information that could be gotten from a study of the residents' behavior would allow to improve goods and public services providing and available infrastructures. Only this way the smart cities will be viable and useful.

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