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# Approach of ICT Application to Governance in Urban Planning

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**Abstract.** This article discusses the use of information and communication technologies (ICT) at the local level of governance in the field of urban planning. It is based on a literature review, in order to define a set of considerations about their use in the urban context and the challenges ahead on this domain. As a starting point, there is the need of rethinking the local governance through the use of ICT related to cities, focused on the modernization of the processes associated with urban planning. Nowadays, in several societies the paradigm about cities is shifting, from an expansionist way of acting towards a regeneration and rehabilitation approach. In the case of Portugal, the local authorities; the municipalities; are the main responsible for the coordination, and integration of policies with territorial impacts. However, these policies are generally onerous and inefficient, triggering communication and information failures in between local administration and citizens. In this sense, governance should support the decision-making process related to cities' policies, engaging citizens and socio-economic agents. As the main result in this scenario, the use of ICT demonstrates the ability to play an important role in urban planning, by contributing as a simplifying tool, regarding the information and knowledge sharing, gathering local authorities, citizens and socio-economic agents. On the one hand, they promote the reduction of inefficiencies associated to the urban planning process. On the other hand, they boost the development of networks, and consequently the social and territorial cohesion. In summary, the use of ICT infrastructures works as a glue allowing the integration of several intelligence elements of the city, and operating as their base platform. Finally, the literature has revealed that the use of ICT in urban planning should be seen as a means to a wider social goal, and not as an end by itself. With the use of ICT, urban planning authorities are more likely to be aware of the city features in their multiple aspects, being able to define and monitoring the public policies, suitable to each situation, reinforcing the democracy and transparency of local governance.

## 1. Introduction

In the last years, the concerns focused on the achieving of the good governance principles, have dominated both the academic literature and the public policy programs, regarding the urban planning domain, in particular related to local authorities. Given that local authorities are the closest urban planning level of the citizens, their actions and strategies have a great impact in terms of perception by cities' inhabitants and socio-economic agents. In fact, there is a number of several literature references



being published all over the world [1, 2, 3, 4] which are focused on the features, motivations, models or funding sources, related with the improvement of governance efficiency at local level. They show that the key fact on this matter is the use of ICT, information and communication technologies, as a way of facilitating the cities' management and the daily-life of their dwellers [5, 6, 7].

In this sense, this article starts rethinking the local governance efficiency in the domain of urban planning, through the use of ICT, regarding the needs for modernization of processes associated with the management of cities. Nowadays, in several societies, such as in Portugal, where the population rate is decreasing and where the number of dwelling is much bigger than the number of families [8], the paradigm related to the cities approach is shifting. It is no longer supported by an expansionist way of planning the urban areas, but is focused on the achieving of regeneration and rehabilitation strategies, in order to promote the qualification of the existent and historical urban areas. Such as in other countries, in Portugal, the authorities that are having the main role in urban planning and in cities' regeneration policies are the local authorities, i.e. the municipalities. They are the crucial agents in terms of coordination, and integration of territorial policies, with a strong impact in peoples' daily-lives. In fact, the majority of planning permission rules is coming from the local level of urban planning, including Decree-Laws, ordinances or special planning instruments such as the Municipal Master Plan. The latter has been since the decade of 1990, the pivotal figure of planning in this country which comprises 308 municipalities, including the Azores and Madeira islands.

In this way, ICT are referred as frequent tools that are used in the automation and communication of business processes, scientific research, teaching or learning. However, there is still a little use of them by municipalities, in urban planning domain, or their use is mainly related to tasks of internal management, being faraway of the citizens and socio-economic agents, in the relationship that they have with local authorities. Frequently the use of ICT is merely understood as a technical means to treat information and to assist communication, including computing hardware or software, the web network or the telecommunications. However, ICT correspond to technologies that can interfere with, and that can mediate information and communication processes, such as those between the municipal administration, citizens and socioeconomic agents. For example, regarding the Portuguese case study, since 2008 [9] that municipalities are expected to provide a computing tool available online for the users i.e. an e-platform system, in order to manage the steps related with the planning permission processes. However only in few cases, such as SIRJUE, the information system of the legal regime of urbanization [10] and SPO, the system of works process [11] these platforms are already operating. They allow the local authorities to have a previous control of building and urban development actions, practicing a real engagement in between this administrative level of public administration, citizens and socio-economic agents.

## **2. Governance at local level**

In the urban planning domain, governance should be seen as a way of support the decision-making process and the implementation of policies towards a better development of cities. It requires the engagement in between the administration authorities in all level, from national, to regional, interregional or local, the citizens and the socio-economic agents. In this scenario, the ICT are playing an important role by contributing as an instrument to facilitate the necessary exchange of information and knowledge sharing, eliminating the associated inefficiencies and promoting the development of networks, while promoting social and territorial cohesion.

The good governance at local level means, to have a program with several actions and strategies that monitor the urban functions (in an urban framework), enabling environment issues. This requires an appropriate legal framework, and a political, and administrative efficiency. Thus, the urban planning authorities should provide strong local institutions capable to respond to the needs and expectations of citizens. In this sense, the concept of governance and its importance at the local level in a contemporary context, must arise from the perception that a participatory democracy is an "expansion of the concept of politics, through citizen participation and deliberation in public spaces" [12]. In this perspective, and according to the same reference, the notion of democracy refers to an articulated system of instances of

citizen intervention in the decisions that concern them and in the surveillance of the exercise of government. However, considering the Portuguese local administrative system, this participation of the population into the municipal decisions, is not always happening in a proper manner. Despite the urban planning system framework considers the public participation as a feature of the planning instruments process (elaboration and implementation), in many cases, local communities are not yet familiar to exercising this practice.

Considering the words of the Secretary-General of the United Nations, in the contemporary societies the struggle for global sustainability will be won or lost in cities. Despite the role of local authorities, the efficiency on the way that the public realm is dealing and managing the cities, including the urban growth or the poverty is a shared responsibility among local, regional, and national governments. Also, the Habitat program from 1996 is claiming that the task of enabling environment is a crucial issue for the sustainable urban development, supported by the decentralization of responsibilities, throughout the participation of civil society, the reinforcing of partnerships in between public authorities and civil society, and the empowering of those involved in decision-making process regarding the urban development policies. The latter aspect refers to “empower local leaders, promote democratic regimes and use public resources in all public institutions at all levels (...) ensure transparent, accountable, fair, effective and efficient governance in cities, municipalities and metropolitan areas” [13]. At the present days in several contexts there is a lack of adequacy of urban planning policies, institutional and financial capacities, with disadvantages for the governance efficiency.

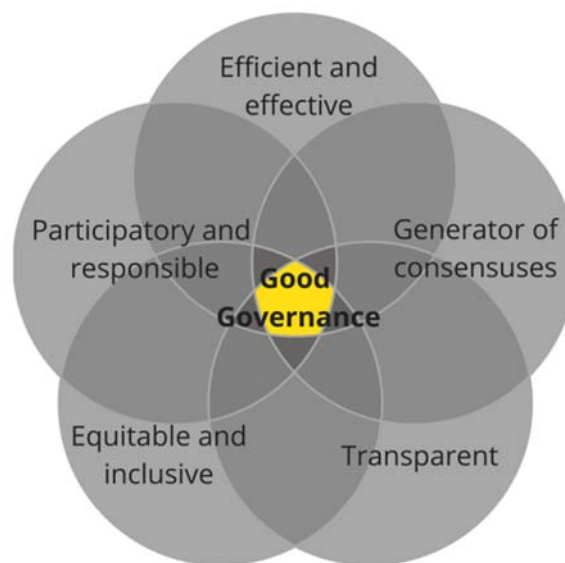
A good governance performance by local authorities in terms of cities’ management requires to provide to the citizens a quick and flexible response, allowing them to know and to understand the urban challenges and to meet their daily needs. In urban planning, good governance means governing with the citizens, their knowledge and their understanding about the rules. Consequently, many local authorities are undertaking innovative experiences such as participatory budgets, neighbourhood committees, youth councils, or e-governance solutions, in order to improve their efficiency. This way of acting requires a sophisticated relationship between the public realm and the private entities, supported by a clear commitment of sharing responsibilities, and a stronger collaboration among the different levels of governments i.e. a multilevel governance. Another aspect of governance is to have a more regular and creative practicing of interaction with civil society, stimulating a cultural cooperation between citizens and local authorities, which would help to reduce the impact of negative externalities, promoting a greater inclusiveness, efficiency and competitiveness.

Considering their proximity to local communities, local and regional governments are in a unique position to encourage the public participation in urban planning system, regarding political, social, economic and cultural issues. To do this, local authorities have to reveal capacity to identify in a surgical approach the inequalities of cities, the marginalized groups or the vulnerable layers of their socio-economic fabrics. This approach is fundamental to guarantee the access to information, which is essential for citizens’ commitment, leading to an increasing participation, including of the most grassroots community, at the cities’ administration, being part of the formulation of their policies.

In this sense, the literature reveals that the role of governance considering the public realm management, is “to offer a set of common principles and elements, adapted to the reality of each country, that considers related aspects such as leadership, integrity, commitment, responsibility, integration and transparency (...) maximizing the welfare of society” [14]. This concept is inspired by the democratic political theory, in particular that concerns to the connection between citizens and their governments, based on a humanistic tradition in public administration theory. Thus, governance at local scale should reaffirm the values of democracy, citizenship and public interest as prominent aspects of any public realm administration, and the urban planning issues are not an exception on this matter. The existence of an engaged and enlightened citizenship is crucial for a democratic governance [15]. This idea is referred in the literature as “the engagement of local community” [16], especially important in urban planning decisions. In this context, local governance must find shared values and common interests through a generalized dialogue involving citizens [15].

This approach includes an interactive governance as a participatory management trend, implying the sharing and dissemination of information by public authorities, in order to transform the agents of society let them to search “better results, Administrative or in relation to the increase of democratic legitimacy” [17]. According to the same reference, a good governance performance accepts the creation of “favourable conditions so that the interactions between the various social actors, essential to deal with the diversity and complexity of contemporary societies, can happen, and bridges of understanding can be constructed”. Another aspect to be highlighted about the conception of interactive governance is the result of an interactive process, that suggests the idea of interaction, communication, dialogue, shared work and, above all, exchanging of reciprocal influences. However, there is still the lack of these requirements, in many municipalities in the way that they deal with urban planning affairs.

Therefore, there is a set of several principles for a good governance performance in the field of urban planning, considering cities’ management that should be considered [1]. This set includes five main requirements of good governance, which are an efficient and effective approach, capable to generate consensus, equitable and inclusive participation, and transparency of the procedures, with a participatory and responsible attitude by the citizens (Figure 1). These good governance principals are associated with personal attributes such as leadership, commitment and integrity and organizational attributes like accountability, transparency and integration [18].



**Figure 1.** Diagram of guiding principles for good governance [18].

A strong organizational and leadership capacity is required to promote local development. In this sense, municipalities should promote forms of governance that strategically think of urban development in order to respond quickly and effectively to the challenges of society and the knowledge of economy. The governance of cities must take into account all actors, both formal and informal, who are involved in the design, decision-making and implementation of public policies, orienting their procedures for interaction with citizens.

However, compliance with these requirements involves a change in the behaviour of society and the administration itself, because the good governance is a process that faces several challenges, which are not always easy to achieve, such as the absence of citizens in decision-making and, consequently, the distance between public administration and people, that leads to a lack of transparency of this process.

Therefore, there is the need for innovative actions and solutions to respond to these challenges and to implement the processes leading to a good governance performance.

As a result, the use of ICT would be a solution to aggregate the innovation, reducing the urban environmental impacts, the local levels of disaggregated data, and monitoring the urban development, encouraging the participation and accountability practices.

### **3. New technologies in urban planning**

#### *3.1. The importance of ICT*

The use of ICT in urban planning emerges as an innovative approach to improve the efficiency and competitiveness of cities. According to the definition of the International Telecommunication Union, the Focus Group on Intelligent Sustainable Cities defends that a “smart sustainable city is an innovative city that uses ICT and other means to improve the quality of life of its citizens, the efficiency of its functioning in urban services and competitiveness, while ensuring the needs of present and future generation, cautioning the economic, social and environmental aspects” [19].

The importance of ICT in local governance in urban planning, considering the recent processes of socio-economic transformation, is that they support innovative models of urban management, such as tools, technological resources, procedures and appropriate forms of action, in order to create favourable conditions to assist the decision-making agents.

The importance of ICT in local governance in urban planning considering the recent processes of economic and social transformation such as concerns about the environmental balance and the quality of life that require policies of occupation of the space that leads to a rebalancing taking into account the New realities under construction, as well as the problems created by the aging of the population and the weak growth or stagnation structurally affecting the Portuguese economy, require innovative models of urban management that do not contribute to the emergence of new inequalities or to the deepening of the old As well as appropriate instruments, technological resources, procedures and forms of action to create favourable conditions to assist public managers in dealing with the challenges of today's society.

This approach is still a challenge in contemporary societies. However, the increasing complexities of local decision-making process and the expanded program of local authorities regarding their tasks in urban planning domain (from cities' rehabilitation, to housing providing or to infrastructures networks) have revealed the inability of many of these entities to act and manage many issues of urban planning [20]. As an example of the previous difficulty, there is the understanding that urban developers have about the urban planning permission rules, which goes, frequently, throughout an unnecessary delays, extra costs and bureaucracies, triggered by failures in communication and information between the local administration and citizens in general, or urban developers in particular.

According to the Organization for Economic Co-operation and Development (OECD) [21] the most recent reforms, using new technologies carried out by public administration in Portugal, known as Simplex, are considered as “ambitious and deep”, aiming to respond “to the challenges and growing demands of the economy”. Simplex is referred to as a relevant initiative, being “the only one in the OECD countries as a whole”, which has strong public support and addresses the needs for simplification of the public sector and the provision of services. This initiative focuses on how e-government can be used as a switch to carry out a broader range of administrative simplification, improving the quality of services delivery.

#### *3.2. ICT Tool for Intelligent Urban Planning*

The use of ICT represents a basis that allows the creation and expansion of intelligent approaches in networks, influencing the contemporary societies in their decision-making processes. The e-platforms

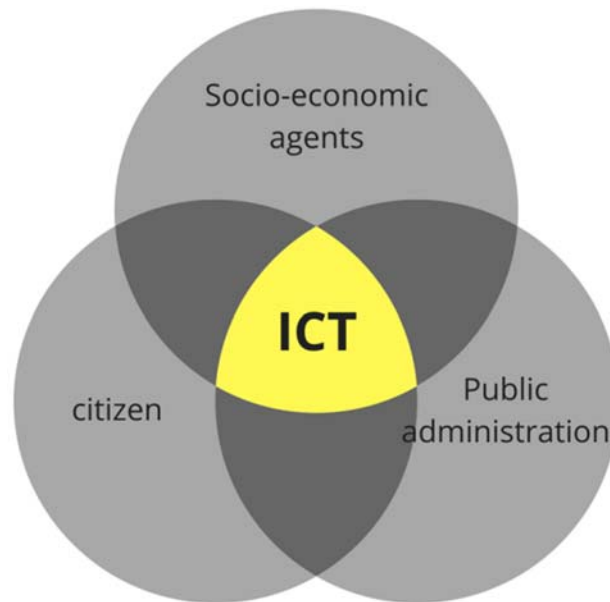
or e-smart approaches are used to refer to innovative and technology-led efforts, supporting the tasks related to the improving of efficiency of urban systems, the quality and effectiveness of the strategies defined for cities. Among these tools there are the use of smart grids, smart transport, smart energy, e-participation, e-services, or e-governance [22]. However, the standardized urban planning and urban design approaches, using ICT need to be in harmony with the local cultural dimension as a way of ensuring the adaptation to local identity and the protection of vulnerable populations.

One aspect of an intelligent city is the way how it is considered in urban planning. In many cases, such as in Portugal, the prevailing models of urban development have rendered cities and neighbourhoods in fragmented areas, promoting the spread of urban developments with not continuity in between them, or a high density of housing areas based on tower buildings as the main architectural typology instead of low density models terms of urban design solutions. Consequently, these options have been encouraging the urban sprawl, in the detriment and with scarcity of attention to the consolidated and historical areas. Therefore, public transports and other services have become inefficient, causing great social impact in terms of living adaptability of the urban standards and housing options. At the present moment, there is a paradigm which is shifting regarding the Portuguese reality. Given the previously referred problems, the urban planning is no longer focused on an expansionist policy in terms of urban development, but is driving towards the regeneration and rehabilitation actions of the urban fabric. It is therefore essential to define public policies, planning instruments, norms and rules to be developed with a participatory approach based on the principles of equity and social cohesion. This new trend of cities approach throughout their regeneration and rehabilitation is generating the need for strategic and innovative strategies in terms of urban design, planning proposals, management models and governance principles, engaging the private sector and the population.

ICT show great potential to achieve the desired urban development outcomes, such the following: high quality of public spaces, well-connected networks of infrastructures, well-designed density in terms of buildings and in particular of housing neighbourhoods, resources efficiency, good quality of life, reduced carbon emissions or creation and management of knowledge, able to deal with needs and risks of cities. ICT enable digital platforms that support the creation of information and knowledge networks, which will allow to gathering and storage data, useful not only for cities' analysis but also to intensify the understanding of how cities are working and to help in the definition of public policies, supporting the decision-making processes. The ICT infrastructures act as a glue, integrating other intelligence elements of the city, and functioning as a central nervous system, capable of orchestrating the intentions among various central elements, such as the socio-economic agents, public administration entities and citizens in general (Figure 2).

In summary, the use of ICT is a way to transform the society and to have the potential to support better, with more efficiency the urban planning and the management of cities, by gathering all agents including the participation of local communities at the decision-making process. However, the premise that ICT application in urban planning, urban design and management of urban developments will automatically result in improvements, needs to be rethink. In fact, the success of the use of ICT in urban planning context, depends on to be considered as a resilient path ahead, requiring, in many cases, a long-term approach which cannot be achieved immediately. Thus, the importance of ICT in urban planning at the local level is based on the "capacity for innovation and is part of the collective decision-making system" [23].

In many cities, the praxis of urban planning takes place in ways quite different from what they were some time ago, thanks to the growth of the use of ICT. It may be noted that ICT is a feature that is present in local-scale of urban planning, and its use varies widely from city to city. However, there are still many challenges ahead in terms of urban planning in the area of governance through the use of ICT [24]. This is the case of Portuguese municipalities.



**Figure 2.** Diagram of the interaction between the central elements of the city.

#### **4. The pathway ahead regarding ICT in urban planning governance**

The application of ICT in municipal urban management appears as an opportunity of transparency, able to generate consensus among the stakeholders, and to create a more equitable and inclusive process, more participatory, throughout a responsible governance of integration, focused on the valorization of urban development and cities' qualification. The literature has revealed that ICT play an important role by contributing as an instrument to facilitate the required exchange of information and knowledge in between public realm authorities and private sector, reducing inefficiencies and promoting the development of networks, the social and territorial cohesion. Thus, is crucial for a better efficiency of the urban planning process, to extend their use to new areas of public governance, especially regarding the urban planning issues.

The adoption of ICT allows networking between local governance entities and citizens through the participation at the decision-making process, contributing to an improvement in terms of coordination, integration of policies with a territorial impact, by strengthening the technical bases and the capacity to deal with the planning instruments implementation, monitoring and evaluation systems.

#### **5. Conclusions**

In an increasingly competitive and uneven Portuguese context in between regions and municipalities, in the promotion of urban developments, the engagement of local community actors is a permanent challenge. Territorial governance assumes structural changes with the growing use of ICT. These new required approaches are essentially related to the capacity of municipalities to encourage their inhabitants to participate fully in local, political, social, economic and cultural life, including in decision-making process on the behalf of urban planning. Local authorities should have the ability to engage different public and private actors. In this way, the use of technology should be seen as a way to address a social goal, and not as an end by itself. It should contribute to the promotion of proper policies for cities, to evaluate and monitoring the efficiency of these policies. In this context, the level of municipal government has a prominent role in order to improve the quality of cities' dwellers and to encourage the urban qualification. A knowledge about qualitative and quantitative data about cities, is required to support the results of government actions, or to provide references for discussion among citizens and socio-economic stakeholders. It will give to municipal entities an overview of their performance in terms of urban management.



This research has shown that with the use of ICT in urban planning, the multiple facets of cities will become more likely to understand, and therefore, to define the proper strategies that should be taken in consideration by local authorities, customized and adapted to each situation. The role of cities' managers is essential to the success of the use, dissemination and application of these technologies, in the search for a more democratic and transparent form of governance. The collaborative governance, involves not only an institutional cooperation among all levels of public administration, but also in between the different economic, social or cultural actors, capable of promoting the territorial cohesion.

Finally, the use of ICT makes the perception of the city more plausible for the inhabitants, in its several facets, infrastructures, housing neighbourhoods, historical centres or new urban developments. They make more understandable the solutions proposed by public authorities related to cities.

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