Creating Collaborative Infrastructure for Inclusive Urban Innovation

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Abstract. *Cities are becoming actual innovation centres, mainly regarding products and services industries, processes and roles taken by actors involved. Societies' expectations are increasing and, along with the ICT technologies use, they can drive normative and cultural change, thus increasing collective resources and growing social and economic infrastructure performance. This paper aims to present a framework of developmental backgrounds with great impact on collaborative infrastructure that can be used to enhance social inclusive urban innovation. The methodology used for this research is both bibliographic – opting to study the work of specialists in the field, and empirical – the theoretical approach is supported through global case studies. Creating a collaborative infrastructure will become an important element in the context of developing smart and inclusive cities. The results of this paper will show that collaborative practices have an important role regarding this issue, therefore the collaboration between public and private sectors could improve citizens' life quality. Although technology is a main element in all activities, we have identified that the capability and willingness of individuals and institutions to cooperate and innovate is also important, not only by using electronic means, but also through traditional ways of participating in the social developing process.*

Keywords: *collaborative infrastructure, inclusive, innovation, smart cities.*

JEL: P25, R51.

1. Introduction

Cities have been, since many years ago, centers for developing commerce, innovation and culture, being a boost for human creativity (C40 Cities, 2012). Thus, as cities' growth increases quickly, urbanization becomes a fundamental concept for achieving sustainable development (Fukuda).

According to the United Nations, more than half of the world's population (55%) lives in urban areas and this number is predicted to rise to 68% by the year 2050, the overall growth being expected to add 2.5 billion people to urban areas, almost 90% of it taking place in Africa and Asia (UN-DESA, 2018).

As cities' importance increases, they become fundamental for addressing current social challenges, such as inequality, population growth and so on. Moreover, urban areas are responsible for 2/3 of the world's energy consumption, which makes them contribute to climate change. Therefore, it is easy to understand that cities have to be leaders in regard to the innovation concept, their management being vital in meeting goals of new global sustainable development (Zweynert, 2016, a).

Following this thinking, Seoul's Mayor Park Won Soon, winner of the prestigious Gothenburg Award for Sustainable Development in 2016, said that "citizens play an integral role in making policies and implementing them" (Won Soon, 2016).

Park Won Soon also said that cities are "the original platform for sharing" (Won Soon, 2016), thus future cities must meet the needs and requirements of current and future generations, by being more collaborative and inclusive (Zweynert, 2016, b).

In order to improve the decision making process in collaboration with the citizens living in the urban areas, a more efficient data collection regarding the needs of the urban residents considered the most vulnerable from certain points of view is needed (Eskelinen, cited by Zweynert, 2016, b).

Therefore, for building both the urban vertical and horizontal infrastructure and the spaces in between, a data-driven decision making culture must be created and embraced by all actors of the development process, a process that can be achieved by collecting data, sending it to the relevant platforms and also processing and analyzing it in order for the information to be useful to entities that need it. Only after all parties are aware of the current situation, their interventions and investments can contribute at making an actual difference (Beck, 2016).

Establishing cooperative and collaborative relationships between different actors of both the public and the private sector can lead to great collaborative impact, by sharing knowledge and finding the best action plans and strategies.

For a better understanding of the purpose of this paper, we consider it necessary to provide a proper definition of collaboration. Thus, it can be understood as "two or more organizations working together to achieve an agreed goal. This could be two public sector organizations or could be the public sector working with the private or third sector or with the public to achieve a common outcome. In addition to this, collaboration is also a way to build on cross-sectors strengths, share knowledge, pool resources, share accountability and aligned incentives" (Collaborate Foundation, 2018, p. 8).

As for the majority of the world's population will live in urban areas in the near future, we can easily understand that a better future can and must be achieved, either at national or global level, through urban actions and innovation (C40 Cities, 2012).

Most innovations have an ICT element in their composition which has a great importance because information and the possibility of sharing it are fundamental for offering public services, putting into motion public policies and developing projects and programs (Matei, Săvulescu, Antonovici, 2015, p. 7). Thus, such goals for development can be met with strong collaboration relationships (Birch, 2018) by using proper tools.

Such multi-stakeholder partnership references are mentioned as being necessary to be started even in the Agenda 2030, which has to be implemented "through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focused in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people" (Sustainable development, 2015).

Moreover, in the New Urban Agenda it is stated that the "global commitment to sustainable urban development [is] a critical step for realizing sustainable development in an integrated and coordinated manner at the global, regional, national, subnational and local levels, with the participation of all relevant actors" (Habitat III, 2017).

Therefore, this process of developing efficient and well-functioning partnerships must start, as for multi-stakeholders groups, formed by different organizations with various purposes, operating modes, organizational cultures, knowledge levels and structures for decision making, are fundamental in finding solutions for actual urban problems and needs (Birch, 2018).

In this regard, we can give as examples various groups that have the purpose of discussing these issues, such as the Global Task Force of Local and Regional Governments (GTF), the General Assembly of Partners (GAP) and other coalitions, they though being in need of member states that can put the ideas collected into practice.

At a local level though, municipalities play a very important role in the development of collaborative urban infrastructure, being the authority for both planning and building, and also a fundamental public developer. Therefore, local entities have a great importance in enhancing the citizens' involvement and establishing the general objectives and plans for developing urban areas, enabling the applicability of ideas by discussing with partners, these being the private developers and other actors (The Danish Government, 2014, p. 25).

Through this paper, we had the aim to present a developmental backgrounds framework that can have great impact on collaborative infrastructure, this being useful for increasing the social innovation issue of inclusive type at an urban level.

In the ending part of this paper, we will see that creating such an infrastructure will become a fundamental issue in the process of creating and developing smart, citizen-inclusive cities.

This paper will show that cooperative and well-functioning relationships between different actors, both from the public and the private sector, can contribute to improving the life quality of citizens living in the urban areas, thus collaborative practices have an important role in this regard.

2. Materials and methods

The main empirical data for this paper was provided by supporting the theoretical approach through global case studies on the topic in discussion.

The smart cities movement has already generated a series of solutions to various social problems that urban areas are dealing with, by creating approaches and applications for a smarter environment. The benefits of putting this movement into practice can be seen by applying intelligent infrastructure and technology and also through data achievement and various analyses. Strategies for smart inclusive cities are being applied in developing and established countries (Beck, 2016).

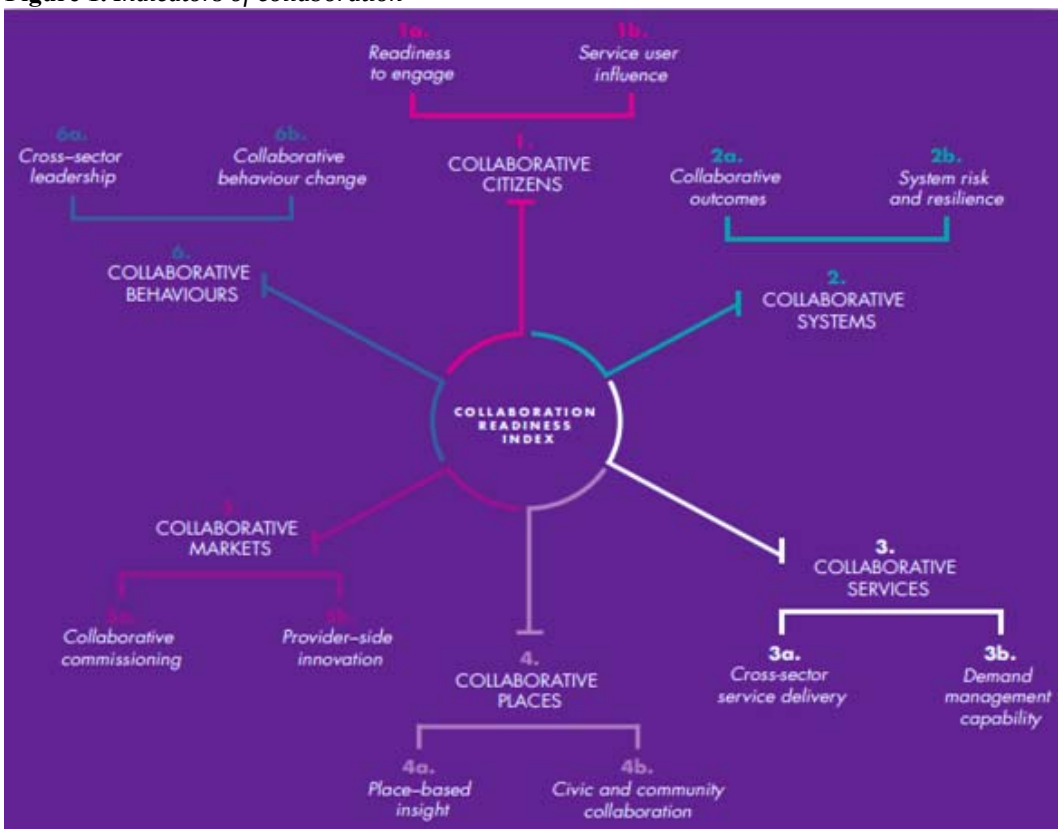
As an example in this context, we can mention Gabon, a West African area that has, as the fundamental basis for the development of Libreville's urban land, a Smart Code model which represents the governing planning system. It is a new and practical approach to meeting the area's municipal objectives within a flexibility framework, thus providing the possibility of integrating new ideas in terrestrial planning and also smart technologies in services of transport and water (Opticos Design, Inc).

But firstly, we want to mention why there is a need for collaborative infrastructure in an urban area approach. The problem regarding this aspect can be divided into two parts, namely (Randle, Anderson, 2017, p. 5):

a) Social problems causes are complex and interconnected, this implying that addressing them involves the contribution of various actors;
b) Problems and their solutions have a geographical dimension, this implying that numerous parts of the solutions and problems can be found at a local level (individual, family, community, neighborhood, town or city).

In this context, citizens and communities, local organizations which are non-statutory and governmental authorities are fundamental actors in achieving better results, being the main local viewpoints of the system that supports these challenges and changes. Thus, even if the contributions are different, citizens and institutions are empowered, through these collaborative places, to work together in order to obtain positive change, needing the creation of new collaborative infrastructure (Randle, Anderson, 2017, p. 5).

Figure 1. *Indicators of collaboration*



Source: Kippin, Billiald, 2015, p. 19.

Actors involved in collaboration processes have been provided with an important tool, namely the Collaboration Readiness Index – CRI. It is a starting point in the direction of adaptation at a local and conceptual level, being focused on organizations that deliver public services. Its interpretation is formed by six categories, from collaborative citizens to collaborative systems, these categories having two indicators that help create a basic analytical assessment, then also offering a framework for readiness creation in time (Kippin, Billiald, 2015, p. 12).

As previously mentioned, each category presented in the figure above has two indicators of collaboration (Kippin, Billiald, 2015, pp. 22-27):

1) **Collaborative citizens:**
   1a) Readiness to engage → to what extend do providers of public local services feel ready to engage with citizens and share power with them;
   1b) Service user influence → to what extent the instruments for delivery and processes for commissioning are both independent to and influenced by the needs and requirements of the users;
2) **Collaborative systems:**
   2a) Collaborative outcomes → to what extent a collaboratively developed system vision puts results for citizens ahead of those for institutions and other actors;
   2b) System risk and resilience → the systems approach to a risk situation and the approach of individuals and institutions parts of the system in such a situation;
3) **Collaborative services:**
   3a) Cross-sector delivery → to what extent practitioners can work across service lines in order to provide incorporated interventions with citizens;
   3b) Demand management capability → to what extend understanding and managing demand is used as a service reconfiguration strategy;
4) **Collaborative places:**
   4a) Place-based insight → it determines if civic leaders feel they have the accurate level of making decisions and priorities regarding issues of cross-economy and cross-sector;
   4b) Civic community collaboration → it assesses if public service partners are able to create the proper conditions in order for communities to collaborate and determine change;
5) **Collaborative markets:**
   5a) Collaborative commissioning → it measures if commissioners and providers have the accurate conditions for joining competitive share and for creating a better social goods' market;

5b) Provider-side innovation → it determines if public services' providers at a large scale actually contribute in enabling innovation, steadiness and better results for citizens in the market space;

6) **Collaborative behaviors:**

6a) Cross-sector leadership → it assesses if this role is a valued skill set and if there are any rewards and boosting comportments towards collaborative practice;

6b) Behavior change → it measures if the behavior change conditions and motivations are seen as being prepared for both supply-demand sides, namely the service and the citizen.

Figure 2. *The nine building blocks of collaborative infrastructure*

Source: Randle, Anderson, 2017, p. 18.

There have been identified nine elements considered fundamental for creating a collaborative infrastructure, for creating interconnected relationships between citizens and organizations and for contributing in the creation of a gravitational tool towards collaboration for common and shared results (Randle, Anderson, 2017, p. 6):

1) **Place-based strategies and plans** → these are constituted by a vision for place that can be achieved if there is a shared understanding of the local challenges that exist or may arise, being created by the actors involved in the process;

2) **Governance** → this element refers to the need of existing a collaborative structure for leadership governance that has the characteristics of being cross-sector, cross-cutting and has the system accountable;
3) **Outcomes and accountability** → there is a need of shared responsibility among actors for the existing elements in the collaborative space and future possible results;
4) **Funding and commissioning** → this means that there should be platforms for collaborative commissioning and social values and principles based on asset should determine local budgeting;
5) **Culture change and people development** → ability to create collaboration readiness and change within organizations;
6) **Delivery** → the delivery of service is important, but network building and connecting in a social matter are just as important;
7) **Data, evidence and evaluation** → this building block suggests that there should exist a collaborative learning and evaluation that is supported by shared data of statutory and non-statutory co-working actors;
8) **Digital and physical collaborative platforms** → online or physical spaces should be created by public entities in order for actors to meet and find better solutions or improve outcomes;
9) **Communications and engagement** → feedback is fundamental for supporting collaborative relationships in a real-time manner and, thus, adapt the delivery of service to the real needs and requirements of the citizens.

In respect to the nine elements mentioned above that are considered to be essential for building a collaborative infrastructure, we consider it important to mention how can such an infrastructure support local collaboration between different actors of the process of developing smart and inclusive urban areas.

Table 1. *How the infrastructure supports local collaboration*

System perspective and actors	Roles	Example	Collaborative place-based infrastructure
Statutory agencies and public service providers	▪ leaders of the system ▪ lead work to determine the vision and behavior of the system ▪ identify, organize and invest in building a local system ▪ provide collaborative public services	▪ the police can connect citizens with public services, meet their needs and requirements and work with other organizations.	▪ strategies and plans ▪ governance ▪ outcomes and accountability ▪ funding ▪ culture change and workforce ▪ delivery ▪ data, evidence and evaluation ▪ communications and engagement
Local non-statutory organizations	▪ the so-called "juction boxes": organizations, groups, associations, businesses that contribute to a better existence of a place ▪ attract people for shared purpose or interests, provide interaction spaces and opportunities ▪ connect social capital and networks elements	▪ support local businesses in order to be responsible employers in their area	▪ strategies and plans ▪ governance ▪ outcomes and accountability ▪ culture change and workforce ▪ data, evidence and evaluation ▪ platforms ▪ communications and engagement
Citizens and communities	▪ joint help, networks, neighbors who know each other and offer help, casual "self-organizing"	▪ residents have the tools, relationships and platforms that let them impact decisions on the area in which they live ▪ residents can know people in their area via networks of formal and informal nature	▪ culture change and workforce ▪ delivery ▪ platforms ▪ communications and engagement

Source: Randle, Anderson, 2017, p. 38.

The table above shows that each element is important, but the actual power of collaborative infrastructure at an urban level comes from the manner in which these components are combined and how they related to one another. Another essential perspective is to understand that this kind of infrastructure empowers actors involved in the process to contribute to local change, either we refer to citizens or various groups of people (Randle, Anderson, 2017, p. 37).

But in order to better understand the concept discussed in this paper, it is important to see how it was put into practice in different part of the world, through various projects that have the aim of contributing to more inclusive urban innovation and development, through the use of collaborative infrastructure systems and tools.

A first example in this context is the one given by Essex, a county in the East of England. Even though **The Future of Essex** project is made for a larger scale than the urban one, it is important to be mentioned because its content comes from all parts of the area, referring here to local citizens, community groups, institutions of education, public sector, private sector, the voluntary sector – all these actors have participate and share information and knowledge through different means, such as: activities, interviews, meeting sessions, surveys and conversations, everyone working together for better results of social nature in Essex. Thus, the project's purpose is to provide to all the different actors of Essex a way of collaborating regarding the process of planning their future (Future of Essex, a).

Its vision is going towards the following focus points: to unite behind a sense of identity; to enjoy life long into old age; to provide an equal foundation for every child; to strengthen communities through participation; to develop the county sustainably; to connect individuals to each other and to the world; and to share prosperity with everyone (Future of Essex, b).

Another good example is **Birmingham Impact Hub**, a collaborative workspace described as "a place to collaborate and discuss, challenge and be challenged" where different people and organizations can innovate for finding solutions to challenges that arise within the city (Birmingham Impact Hub), thus bringing change and developing the urban area. The platform is now collaborating with the Improvement Team of Birmingham's City Council in order to contribute at creating and supporting culture change work streams within the council (Randle, Anderson, 2017, p. 34).

In Sweden, an institution of higher education, Örebro University, has a great developed relationship of collaboration with the authorities of the public sector in

fields such as healthcare, education and welfare, also establishing collaborative networks with the private sector, mainly regarding engineering, manufacturing, IT and logistics. Örebro is the country's first university to conduct recruiting programs for senior lecturers with external collaboration, the role of each lecturer being to collaborate with the community, to conduct self-initiated research which can also include a collaborating relationship with the industry sector (Örebro University, 2017).

Denmark has put into motion **DK2050**, a striving project that brings together four ministries, ten municipalities, three regions and numerous private companies and foundations with the purpose of supporting innovation and design scenarios for how citizens will live in 2050 in the country's cities, towns and other urban regions (Danish Architecture Center, a). Being created as a national experienced debate on the creation of a sustainable society and urban life by the year 2050, it will gather possible future directions for designing healthy and sustainable environments (Danish Architecture Center, b).

Remaining at a European level, we want to mention some initiatives of the European Union that we consider relevant for this paper. The first one is represented by **The Collective Awareness Platforms for Sustainability and Social Innovation (CAPS)**, which brings new models of creating awareness regarding challenges of sustainability that are currently emerging and also regarding the role that European citizens have in finding solutions for those challenges through collective activities. Its objective is to create design and pilot plans for digital platforms as a collaborative place to foster solutions based on different people, ideas and sensor networks that can support new social innovation forms of online nature (European Commission, 2015).

The European Cluster Collaboration Platform provides modern tools to cluster organizations, one of those tools being the possibility to develop collaboration within and beyond Europe, this collaboration also being a way of sharing knowledge and information regarding many topics, among which the development of inclusive urban innovation can be included. The collaboration cluster's purpose is "to become the leading European hub for international cluster cooperation, building cluster bridges between Europe and the world" (ECCP).

Bringing the discussion to the USA, San Diego has an example of such an initiative, **The Urban Collaborative Project**, which is "an inclusive effort through community outreach, by neighborhoods, town councils and other neighborhood stakeholders to make safety, civic engagement, health and beautification, a

neighborhood practice, making […] communities more vibrant, informed and connected" (The Urban Collaborative Project). The starting premise of the project is that "vibrant neighborhoods are critical to the overall success of [the] city", its organizers establishing connections with owners of commercial properties (The Urban Collaborative Project), this emphasizing even more the importance of developing a collaborative infrastructure for community development.

These are only a few projects and actors that have started focusing their attention on the importance of creating and being a part of a collective infrastructure for the development of communities and cities.

3. Results

This paper presents some important insights regarding the elements that are fundamental to an efficient and successful collaborative infrastructure that can help create and develop inclusive smart cities and urban innovation.

Joseph Stiglitz, awarded in 2001 with the Nobel Prize in economics, believes that markets, the government and individuals are the three pillars of an effective development strategy. The community would represent the fourth pillar (Stiglitz, 2008, p. 57) in this context, therefore the importance of the human resource can easily be understood not only here, but in every life activity. Stiglitz considers that development means both the transformation of economies and of people's lives, education being the key element in facilitating the awareness that it is possible to achieve change (Stiglitz, 2008, p. 55).

In order for a society to be able to successfully develop itself, it must go beyond a simple vision and plan, its members' ideas must be transformed into projects and strategies (Stiglitz, 2008, p. 59). In the educational context, all this helps us understand the importance that institutions of higher education have in stimulating the creative and innovative character of the individuals.

Education can thus be considered a catalyst for efficient development. Therefore, in order for the objective of education to be properly accomplished, there must be acknowledged the importance regarding the level of understanding and making use of the link created between collaborative work and urban innovation. Particularly in this case, physical and digital platforms can be used as instruments for helping the actors involved in the collaborative process get the benefits that this link provides.

Thus, education institutions, the public and private sector and other non-governmental organizations have to build common spaces adjusted to assist the community learning and connecting. These actors can accomplish this purpose by using user-friendly platforms or any other spaces to which individuals interested in the issue discussed are provided with free access. By using these tools, they can organize common interest meetings and thus be able to create new innovations that will help develop the urban areas that these individuals live and work in.

4. Discussion

This paper has the aim to present a framework of developmental circumstances which can play a very important role and have great impact regarding the collaborative infrastructure. Such a frame is useful for developing the inclusive urban innovation that is so important in the context of smart cities.

As we have seen in this paper, building an infrastructure of this type will become an important element in the creation and development of smart inclusive cities.

Collaborative and efficient networks between different public or private participants of the development process can be of help regarding the upgrading of citizens' life quality, this meaning that collaborative practices have a fundamental role in this regard.

In the urban development process, either if it is a physical or a digital platform of communication, using a collaborative infrastructure has a great importance in generating the awareness and willingness among individuals interested in these civic actions and supporting them to access information in a cheaper, easier and quicker manner. Through such a platform, they can connect with public institutions, private companies and other interested parties and, moreover, with the community they live in.

These kind of social actions boost the creation of virtual or physical spaces used by individuals for sharing information, collaborating, exploring already existing ideas and generating or contributing to creating new ones. By using the tools of such actions, people are supported in developing a creative and innovative thinking.

Practices that benefit from collaborative interaction are highlighting the type of education and training focused on cooperation, information and knowledge sharing, problem-solving abilities, communication and risk-taking methods, this eventually

resulting into a greater commitment and participation of individuals, these being fundamental elements of development.

Even though technology is an element of great importance and usability in individuals' life activities, their willingness and skills to collaborate with public institutions, private companies and other community groups, thus generating social innovations, should not be forgotten. There is no key procedure in handling these kinds of activities and comportments, but there should be a balance between using both electronic and traditional means of participating in the development of a society.

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