

# ACTORS IN SMART CITIES

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**Abstract.** This paper explores the human side of smart cities. Currently Smart Cities is a term with a very strong technological connotation, and in Smart 360 this is very clear. However we also know that cities are made for the people and by the people that exist in them. In this context in this paper we analyse what are the types of actors that exist in the Smart Cities. We start the analysis by considering what actors exist in the current Knowledge Economy. After we apply the model we consider correct to the Smart Cities. We conclude that the actors that exist in the Knowledge Economy may be divided in four categories: Composers, Owners / Administrators, Performers and Costumers / Citizens. All the four types of actors are essential to the Smart City: Performers make and provide the goods and services, created by Composers, in organizations lead by Owners and Administrators and for the satisfaction of Costumers and Citizens. Smart Cities only exist and survive, all these types of persons work together in successful cooperation. The analysis is important because we need to complement the traditional model which used consumers, producers and employers, with this one that is much more realistic. The paper is limited because we only do a conceptual study and provide few empirical data. Further studies should apply the model in practice. However our model is original, and it has implications for researchers because it offers new grounds of analysis and it also has implications for practitioners and for the society because it provides a useful and updated model of thought.

**Keywords:** Knowledge, Smart Cities, Actors .

## 1 Introduction

Cities are made of people. An empty city is a failure. Cities only have sense for those that live in them. The question is what people? In the 20th century an important model on Economics divided the inhabitants of cities in three main categories: employers, employees and buyers. The second ones should work for the first group in order to satisfy the third group. That was the logic of the second industrial revolution in which order and the pursue of order was a big issue, starting with the Tayloristic analysis. And for decades this model was the essential one.

Then times changed, the society evolved. Nowadays we live in a knowledge based and services led Economy. The 21st century, has the Third Industrial Revolution is defined by innovation and increasing chaos. In this society, other types of actors exist namely Composers, Performers, Owners / Administrators and Costumers / Citizens (1).

This paper is divided in five more sections: in section 2 we present the concepts, in section 3 we expose the theory, in section 4 we apply the model, In section 5 we discuss the implications to smart cities, and in section 6 we define the conclusions and give suggestions for future research. This Word document can be used as a template for papers to be published in EAI Core Proceedings. Follow the text for further instructions on text formating, tables, figures, cit

## 2 Concepts

In this section first (from 2.1 to 2.5) we define smart cities following Rodrigues and Tomé (47). Secondly In subsection 2.6 we describe the actors that in our opinion live in smart cities according to (1).

### 2.1 Knowledge and knowledge cities

An economy based in Knowledge is the one that "encourages organizations and people to acquire, create, disseminate and use more effectively, knowledge (codified or tacit) in order to obtain a greater economic and social development" (2). Knowledge can reach people,

companies, public organizations, the regions and affects the cities too. And of course, in the current economic setting, sciences, technology, innovation, training of human resources are factors of economic growth and regional development.

Cities are a reflection of who inhabits them. Knowledge cities exist when people, companies, public organizations and the surrounding region are based on knowledge. A city with no skilled human resources, and with traditional companies with no prospect of future, will never be a knowledge city. In that context, public investments are needed primarily to the creation of universities, and to the planning of cities. But support for knowledge cities also must come from the private sector. Managers give importance to innovation and to the creativity of the human resources they manage.

In a limited approach, knowledge cities are seen only as cities that have research centers, educational institutions and companies operating internationally that are defined by the knowledge and the potential they possess, and the quality of its human resources; in a more comprehensive approach, knowledge cities are able to use the technological innovations generated elsewhere, boost a variety of Creative Industries, and to renew the operating mode of the city and all its activities (3).

## 2.2 Types of knowledge cities

In a knowledge city, the critical piece is the individual. This happens because for a creative city to be successful, a creative class is needed (4). Clearly, all individuals are different and the results of these sets of people are also different. So all the cities of knowledge are not equal. A possible typology of cities according to their status in the knowledge economy is the following (5, 6, and 7).

**Table 1: Types of Knowledge Cities**

<b>Type of city</b>	<b>Meaning</b>
<b>Global Cities</b>	Prominent cities in the world economy, with a universe of values and cultures of different ethnic groups.
<b>Knowledge Stars</b>	Cities with excellent standards of quality of life, and large urban diversity, which confers high-level knowledge and local innovations.
<b>Metropolises in Transition</b>	Traditionally industrial cities that go to processes of renewal of the urban system, seeking knowledge through cultural events, business and sports.
<b>Knowledge Pearls</b>	Cities recognized worldwide as centers of technology and development; the urban planning associated with high population endowed with knowledge, these places stand out as cities of the future.
<b>Star Technotowns/Star Nicheplayers</b>	Smaller cities than the metropolis, characterized by a technological specialization, but low economic diversity.
<b>Technotowns in Transition/Nicheplayers in Transition</b>	Cities that go towards the development of knowledge, making partnerships with other

	locations to leverage the growth of knowledge and technology.
<b>University Towns/Intellectuals</b>	Cities in which major universities, but without the business structure to boost the economy and innovation processes in place.

Source: (8).

### 2.3 Factors explaining knowledge cities

In order for a city to be transformed in a knowledge city, several structural changes are needed; pillars such as education, economy, quality of life, communications have to be built. It is the junction of these pillars that effectively leads to knowledge cities.

Knowledge cities can be understood as urban areas where knowledge is created and applied, based on the attraction of knowledge workers, and leading to the formation of clusters of activities that produce goods and / or innovative and competitive services. The activities of knowledge should give uniqueness to each city's knowledge, in the sense that it conveys a distinctive trademark .

According to (6), the foundations of knowledge cities are the knowledge base, the economic base, the quality of life, the connectivity and accessibility, the urban diversity, the urban scale and the social equity. Namely:

- a) The *knowledge base* consists in the creative and educational levels of the whole population, the prestige of universities and research centers, the knowledge management, the organizational skills and the artistic and cultural creativity;
- b) The *economic base* includes the various economic activities, often organized into clusters, the city has to offer to the outside world and which distinguish it from other cities;
- c) The *quality of life* is essential to attract knowledge and creative workers;
- d) *Connectivity and accessibility* are essential for a high level of physical and digital accessibility, including excellent telecommunications services and access to international airports and excellent mobility solutions in its interior and also pervasive digital connectivity for its residents;
- e) *Urban diversity* results from the diversity of the population in several respects (cultural, ethnic, national, lifestyle, etc.). Studies show that the creative class prefers cities with a thriving cultural life, a cosmopolitan orientation and high levels of human and social development;
- f) The *urban scale* means that the size of the city accounts for its opportunities in the "Knowledge Economy". Not all cities can be knowledge cities, and this impossibility is more likely to exist in the case of small cities. However one can't deduce from this statement that all big cities are cities of knowledge. In fact even medium-sized cities can be knowledge cities especially if they can benefit from externalities. The concept of urban scale will be important is the analysis of smart cities (see 2.5)
- g) *Social equity* results from creating conditions that minimize the risks of social dividing that are a byproduct of the "Knowledge Economy".

According to (9), local knowledge is present in the society and the agents living in each region. The city area is a corridor of the flow of knowledge that permeates the local society, within a decentralized territory that is integrated with the outside environment. Other authors point out that knowledge strengthens the cities, through cultural, historical and human factors (10). Also, cities are formed by diversity, attracting, creating and transforming value (11).

Social embeddedness postulates that the attractiveness of a location depends on a set of systemic elements; those are the local, economic, social, cultural and political factors that generate unique identity of the region (12).

In the view of (13), the capacity for innovation is a key element for the success of local and companies residents. (14) states that the process of innovation is the driving motor for economic development. Innovation is widely discussed in the evolutionary discussion about technology and economic development, and is based in the systemic characteristics of the local sphere resulting in the interaction of public and private flows of foreign knowledge, and having in mind the learning ability (10). In this context, according to (15), cities are seen as informational entities that allow an acceleration of flows of knowledge, through innovation and human capital externalities. Finally, in a different vein, (4) gives a strategic role to cities, stressing the importance of proximity, diversity and creativity to generate dynamics of innovation, providing a sustainable flow of ideas between individuals and companies and promote the pace of innovation.

#### **2.4 Knowledge cities and intelligent cities**

The concept of intelligent city and concept the knowledge city differ from one another. An intelligent city It is the intersection of the knowledge city with the digital city (16). Digital City is a "community space that is used to facilitate and enhance the activities and functions that occur in physical space of the city". The intelligent city is defined as "knowledge city committed to technological innovation and the creativity of its inhabitants, with a strong institutional leadership and organizational capacity, in seeking solutions to increase their competitiveness and sustainability, considering that it can cover a range of activities wider than is normally referred to knowledge cities". Furthermore intelligent cities are areas "*with high capacity for learning and innovation, which is constructed by the creativity of its people*, its institutions knowledge creation and its digital infrastructure for communication and knowledge management".

#### **2.5 The smart cities**

For many authors, knowledge requires scale: to be able to speak in cities in the knowledge we need a large urban scale or medium scale with links to major cities. But for other authors (17) medium cities are a fascinating target group. Around 120 million people live in some 600 cities of this size in Europe. Those cities have enormous potential, but nevertheless are often in the shadow of large cities. They have difficulties in positioning themselves at times, struggling with issues of brand and are forgotten by investors. But they have an important advantage: because of their size, they are flexible and can transmit their wits (17). Therefore smart cities are medium size intelligent cities.

#### **2.6 Actors in the Smart City scene**

In the Knowledge Economy there are four fundamental types of actors, namely are the following:

A) Composers - these are the people whose work output is somehow unique. These people produce the knowledge assets which helps to model our society. They are individuals who contribute at the highest level as knowledge workers. Examples of these people are inventors like Thomas Edison or writers like James Joyce and painters like Picasso or Dali. In terms of business and industrial organizations these are the persons that conceptualise goods and services that afterwards will be developed and produced for use by others. Bill Gates and Steve Jobs (for goods), Larry Page, Sergei Brin or Mark Zuckerberg (for services) and Nonaka or Edvinson (for books or reports) are examples of this category of individual. These people seem to be constantly one step ahead of the rest of their peers, and effectively they show the way to the rest of the world through thought leadership. Composers create new goods and services or routines and with important consequences for the societies they live in.

B) Performers – these are the people who use the knowledge assets in a routine way, and as such their work pattern are often in some way predefined. These individuals are very common in our society and they are found in offices, factories and most other locations of work. Workers that use the Six Sigma mind set for example are of this type. Performers are important because they implement the outcomes of the Composers and in so doing they and create profitable companies that use ideas Composers' ideas to satisfy Costumers Without the knowledge assets and routines created by the Composers the Performers' work would mostly be inefficient and effective. If Composers are the soul, Performers are the muscles, even if their work may not be physical. Performers are indeed a more routine class of knowledge workers. Some Performers may be extremely well paid like footballers, CEOs, surgeons, airplane pilots or classical pianists because they are extremely skilled and efficient in their profession; also they are a bit unique even if they don't create anything new. Crucially the way they perform is based on tacit knowledge and therefore some Performers may became Composers, and the more Composer like they become the more they earn. But most of Performers do not create much, and they are not so unique in fact they often depend on a machine or a tool or an organizational routine to add some value to society.

C) Owners/Administrators– these people have direct control over the factor of production. They determine corporate and national objectives and strategies. Owners can also be Composers or even Performers if they arrived at the Ownership position because they earned enough money to acquire the companies or because they achieved or were put in a position in which they control the factor of production. Owners depend on Composers for ideas, on Performers for effort and on Costumers for the demand of the goods and services the organizations they own provide. In the public sector although the owners are officially the State their role is often fulfilled by administrators, and in the following subsections we will put this distinction forward. We may also consider that all knowledge workers (Composers and Performers) own their own labour force. However the biggest representatives of this class of people are the Owners of multinationals or the heads of big national services and governments. Composers and even Performers may achieve either of those positions.

D) Customers/Citizens – these are the people that consume the output made by Performers following ideas of Composers in organizations possessed by Owners. They are indeed powerful because the new economy is a society of consumption and marketing and because information is available in the internet about almost every product we may buy or sell. In consequence, Costumers effectively drive the businesses, and ultimately define their good or bad fortunes. Nowadays Costumers search quality and high value whereas in former times there was a greater

tendency for consumers looked for quantity and low price. Citizens search the fulfilment of rights and more related to Administrators. Of course Composers, Performers and Owners also are Costumers, and vice versa.

The three first categories are linked to the supply side of economies and the fourth to the demand side.

The four types of actors are described in Table 2 below:

**Table 2 – Basic Comparison of the four types of actors**

	<b>Lowest quantity</b>	<b>Middle Quantity</b>	<b>High Quantity</b>	<b>Highest quantity</b>
<b>Highest quality</b>	<b>Composers</b>			
<b>High quality</b>		<b>Owners or Administrators</b>		
<b>Middle quality</b>			<b>Performers</b>	
<b>Lowest quality</b>				<b>Costumers or Citizens</b>

On the horizontal axis we have a proxy of quantity defined by the number of persons that fit in each category. On the vertical axis we have a proxy of quality defined as the quality of the effort, and it may also be related with price or value.

In short, we mean that Composers are few in number and with highly focused specialist abilities, Owners are also not many but more general abilities, Costumers and Performers are larger groups and Performers usually have higher ability than Costumers and are fewer in number.

Characteristics of the four actors

In Table 3 below, we expose the main features of each one of the four types of actors. We have in mind four basic questions, namely objectives, values, measures of success and facilitators or ways of action.

We assume a functional perspective of each actor according to which each one has an objective which is pursued using facilitators and values, and that can be evaluated; the model is depicted in figure 1, below:

**Figure 1 – Functional perspective of each actor**

Values → Facilitators → Objectives → Measures of success

**Table 3 – Basic characteristics of the four types of actors**

	Composers	Performers	Owners / Administrators	Consumers
Objectives	Explore ideas for the fun of it Leave a mark on the world	Deliver a service or making a good	Make money and social good. Have power.	Enjoy a standard of living and quality of life.
Values	Labor is its own reward Creating knowledge is universally good	Being recognized as a caring individual in the community	Get and stay rich Bigger portfolio of investments.	Enhance life style Have more choice Eat better, live longer

		Make a living Climbing the corporate ladder or the social ladder	Be elected or nominated	
Measures of success	Corpus of work Acknowledgement of peers Others wanting to learn from them	Efficiency and effectiveness Wealth accumulated from earnings	Wealth accumulated from Returns on Equity	Conspicuous consumption Good and services consumed
Facilitators	Academic education, trial and error.	Professional education and sometimes talent	Free market and globalization political connections.	Web and the internet

### 3. Theories

This section follows (18).

#### 3.1 Intangibles as economic drivers.

Nowadays intangibles is the fundamental driving force of economic development. Development is made by having the best technology, people and processes (19).

Intangible can be analysed by at least six different and complementary perspectives:

Knowledge Management, Human Resource Development, Intellectual Capital, Social Policy and Traditional Management. The concept of Intangibles according to each perspective is summarized in Table 4. Each perspective is important to analyse the Smart cities

**Table 4 – Concept of Intangibles according to perspectives of analysis**

Perspective	Basic Concept	Authors
HRD	Work related skills, competences, near Organizational Development (OD) and Coaching.	(20)
KM	Knowledge as a cycle, something created, or audited, with emotional as rational side, that has been evolving and can be unlearned	21, 22, 23, 19
IC	Determinants of difference between market value and book value of companies. Human capital, Internal relational capital, external relational capital, renewal capital, trust capital, entrepreneurial capital	24, 25, 26.
Economics	Supply Demand Equilibrium Price Quantity Investment Stocks Market forces	27, 28, 29
Social Policy	Welfare States, Welfare Societies, Laws, political regimes, actors, public programs, private programs	30, 18, 31
Management	Value for money, return on investment, return on equity	32,33

Source – Own work based on authors indicated in the third column

#### 3.2 Economic growth

In economic theory economic growth is defined as the growth of the gross domestic product (GDP). Its opposite is recession, in the short run or depression in the long run. The sum of economic growth originates economic development which is measured by the GDP per head,

economies being rated by the World Bank as low income, middle income or high income (34). Other alternative measures of development relate to Human Development, analyzed by the PNUD which includes also educational and health data in the scale (35). More recently the World Bank issued a Knowledge Economy Indicator (36) and finally much concern has been given to sustainable development following the Bruntland Report (37). The Economy of Economic Growth is one of the oldest branches in Economic theory, its analysis beginning at least with Adam Smith, whose masterpiece was “Wealth of Nations” (38). Relations exist between IaC and the GDP mediated by individuals, organizations and regions. This mediation should achieve sustained (long run) and sustainable (economic, social and environmental) development.

### 3.3 Evaluation perspectives

The six perspectives listed in Table 4 may be evaluated as described in Table 5.

Perspective	User	Problem	Variables	Assessment Methods	Main authors
Social Policy	Public administrator	Public good	Expenses, number of supported persons	Progress reports	39.
HR Economics	Human Resource Economist (Micro or Macro)	Market or Asset. Impacts on individuals, organizations or in the society	Supply demand price quantity. Wages, employment, productivity. exports. Income	Micro: Control Group Macro: Supply and demand methods. Input Output	27, 40
Management / Accountability	Private Manager Traditional Accountant	Impact on the organization	Profits	Return on investment (ROI) or ROE	32
HRD science	HRD expert	Impact for the agents involved	Reaction Competences/learning behaviour, company outcomes.	Interviews, Questionnaire, Participant – Observer	33
Intellectual Capital	New Accountants	Impacts on the organization	Asset  Return of the asset: Market value minus book value Strategic value	Balanced Scorecard; Skandia Navigator; Tobin Q; Pulic VAIC.	34. 24. 35. 36
Knowledge Management	Knowledge Manager	Impacts on the organization	Knowledge, and the Knowledge Cycle	Knowledge sharing, transfer, creation, renewal dynamics, learning and unlearning	25. 21. 19, 44

**Source:** Author’s work, and 45, based on the references listed in the last column



As a consequence the actions of the four types of actors described in section 2.2 and in the cities described in 2.1 should be analyzed in order to achieve the goals listed in 3.2, using the perspectives of 3.1 and the evaluation methods of 3.3.

#### **4. Situation**

In this section we summarize basic statistics about the four types of actors available in the internet, and we follows (1):

##### Owners

The sixty two richest persons have more wealth than half of the world population according to Oxfam quoted by the British newspaper, The Guardian. And the top 1 per cent has as much as the others 99 per cent.

##### Composers

In the UK the so called creative industries account only for 3 million of people and one tenth of the labour force. In the US the value is 4.7 million and less 3 percent in a total of 160 million. To these people should be add the figures of people that are in the intellectual field. Indeed according to the Wall Street Journal “people who had non-routine cognitive jobs, what is often called “knowledge work,” consisting of varied intellectual tasks such as professional, managerial or technical occupations” raised from 30 million in the mid-eighties to double nowadays. In this context composers are around 20 percent of the population in developed countries but much less in developing ones.

##### Costumers

The world population in 2016 is of 7,5 billion. Not all those persons have income, or other funding source, in fact only two thirds have. Also according to the Pew Institute, 15 percent are poor, 56 low income, 13, middle income, 9 upper middle income and 7 high income. Also in the 21st global and technological world, connections are essential for costumers. More than 1 billion people use Facebook. The number of mobile phone users in the world is about 60 percent in 2016 and the expectation is to rise to 5 billion in 2019. Of the current 2.1 billion are smartphone users. The number of persons with internet connections is of about 40 percent of the world population.

##### Performers

According to the International Labour Organization (ILO) the World labour force raised from 2.3 billion in 1990 to 3.3 billion in 2014. Of those only a small fraction of around 20 per cent are skilled and have high qualifications. These people live in rich countries or are the ruling elite of developing countries. Even in rich countries a big divide exist between low and high paid performers, the first being increasingly more in recent years.

#### **5. Discussion**

Given what we just said, the main questions that remain open are the following;

- Can we plan a smart city ?
- Can this new typology help planning a smart city ?
- Are smart cities the way to reduce social exclusion to a minimum ?
- Should this be done with European Money ?

An interesting comparison should be done between the EU and South Korea, a country that relied basically in own funds do achieve prosperity, whereas in the EU countries tend to feel Brussels money as a gift from abroad (46).

## 6. Conclusion

Smart cities are the answer of the developed world to achieve regional economic development. They need technology, people and processes. They are populated by composers, performers, owners / administrators and costumers / citizens. All the categories have to be in equilibria. In the end, composers generate the goods and services, produced by performers, in organizations managed by Owners and Administrators, which have to be used by Costumers and Citizens.

This keynote was about a new model for a new society.

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