

## Open Data for Smart Cities

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*The concept of Big Data is given to data collections that are very large and complex that they are no easy to manage using the usual tools such as conventional databases. To be able to manage such Big Data collections is essential in our age. A future solutions for manage these big data collections is represent by open data. In this context more and different knowledge will be generate and this is a real support for society development. This paper analysis the open data solution and identified the impact of this for future local development.*

**Keywords:** Big Data, Open Data, Knowledge, Local Development, Smart City, Smart Development

### 1 Introduction

Paper aims to analyze the open data solution and the impact of this for local development.

The first part presents information about the largest and complex data collections and the impact of these to our society. The second part is the analysis of open data solution and how this can help us for sustainability cities development. The third part will present the necessity of use open data in our society and will highlight the implication of these in sustainability development. The paper concludes

with the presentation of the impact of open data and how to use all their facilities for the sustainable development of cities.

In our age all digital devices connected through the Internet, are producing a big quantity of data. And all this data can be turned into knowledge using the computational power. With this knowledge we can improve the efficiency, productivity and quality and on the other hand we can reduce costs and cut waste.



Fig. 1. Future society and data necessity

Today evolution is based by produce of knowledge and innovation, because of this is more important to use efficiently the big quantity of data of our society (Figure 1).

Around the world are highlights the potential of efficient using of big quantity of data to facilitate sustainable development, economic growth and societal progress.

European Commission, Europe 2020 pro-

gram - a strategy for smart growth, sustainable and inclusive growth has identified three key factors for the crisis and preparing for the next decade of the European Union economy: smart growth (promoting knowledge, innovation, education and society digital), sustainable (competitive production with efficient use of resources) and inclusive growth (increased market participation, skills and

poverty reduction). The first priority is orienting on knowledge and innovation.

In our age the manager of big data for produce knowledge and innovation are the elements which will determined the growth of productivity.

The research will identified the basic areas where are implemented open data solutions.

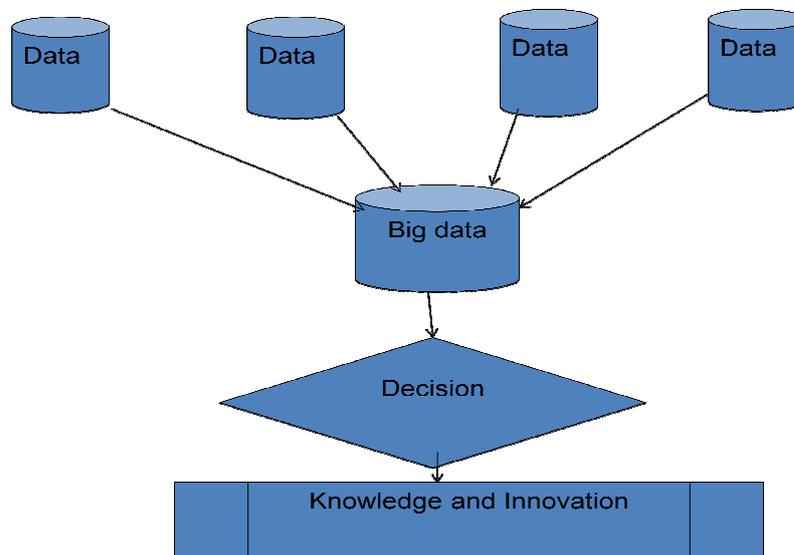
## 2 Big data

In [13] is highlight that every day, our society create 2.5 quintillion bytes of data. This data comes from everywhere: discussion on the web, posts to social media sites, digital

solutions, transaction records, and cell phone GPS signals represents a little part of the sources. This data is name big data.

The knowledge and innovation are determined by the investment in manage of data, research, education, development, creativity, transmission.

The efficient manage of big data is a solution for innovation, competition, and productivity. From big data which offer us a lot of information we can select, using the decision based by our knowledge, the useful solutions and we can produce new knowledge and innovation (Figure 2).



**Fig. 2.** Big data architecture

Evolutions and development of our society in fact wouldn't exist without innovation. We can say: It is all about knowledge and innovation.

All solutions that we have were a result of someone inventing in a better way of doing something, a better tool [14].

In an economical crisis the need for knowledge and innovation is higher as ever and the analyses of the new solutions for manage data like open data is very important.

## 3 Open data

Open data is the concept who tries to accentuate the idea that certain data can be use by everyone and republish as they want, without restrictions from copyright or other mechanisms of control.

Open data offers the new possibilities to analyze and visualize data from different sources.

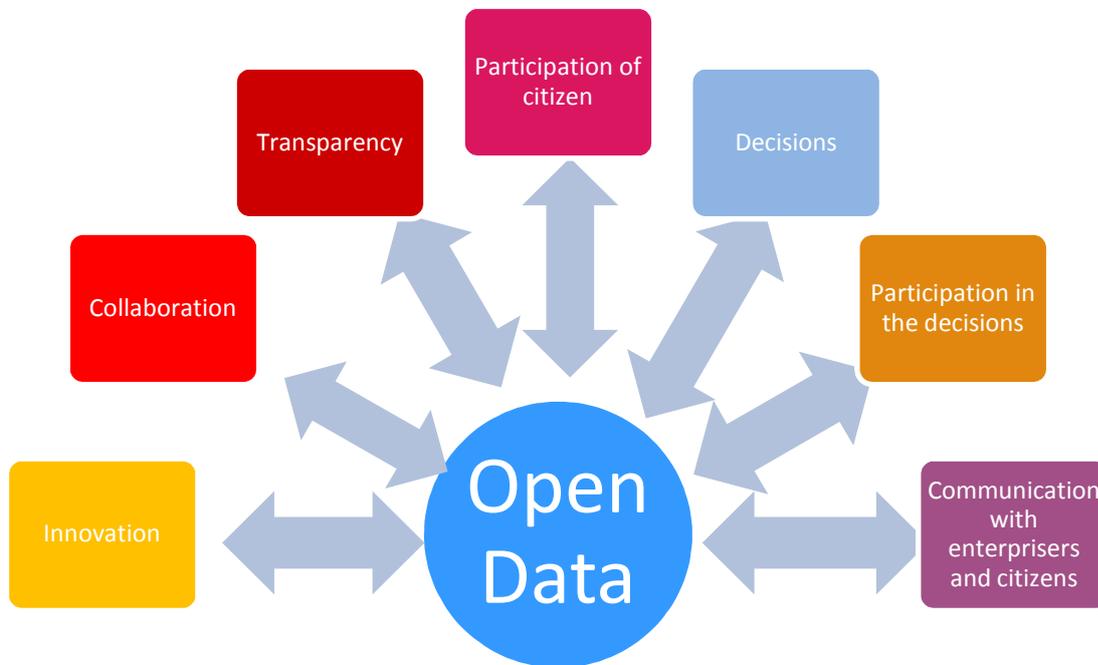
Open data can make the world work better and this is a reality, and the reason is that information is a crucial part in producing innovation. The must quantity of data from our world is generating by public sector.

The European Council stated in the Visby Declaration (Presidency of the European Council, 2009) said that European Union (EU) member states should make data freely accessible to everyone and stimulate the reuse of public sector information using open data.

The European Commission and the EU member states committed announced in the European eGovernment Action Plan 2011-

2015 to “maximizing the value of re-use of public sector information (PSI), by making raw data and documents available for re-use in a wide variety of formats (including machine-readable ones) and languages and by

setting up PSI portals” [7]. This highlights the necessity by using open data in every part of our cities.



**Fig. 3.** Benefits of open data

Open data for public sector focuses on the following areas (Figure 3):

- Transparency and accountability;
- Participation in the decisions;
- Decisions;
- Communication with enterprisers and citizens;
- Participation and citizens engagement;
- Internal and external collaboration;
- Innovation.

Intelligent processing of data is essential for society challenges. Data can for example be used to enhance the sustainability of national health care systems [7].

Over 30% of all data stored on earth is medical data and it is growing rapidly. The medical sector has a problem with this data [9].

Open data for the moment in medicine means not only access for medical professionals and patients. Open data means the access of everyone to data which are protected by laws, rules and regulations.

Open Government Data Initiative (OGDI) [8]

from Microsoft is a cloud-based collection of open government software assets that enables publicly available government data to be easily accessible.

Using open standards and application programming interfaces (API), developers and government agencies can receive data faster and can use in new and innovative online applications.

The Microsoft solutions can [8]:

- Encourage citizens and communities to participate with governments;
- Enhance collaboration between government agencies and private organizations;
- Increase government transparency;
- Provide unique insight into data trends and analysis.

OGDI promotes the use of this data by capturing and publishing re-usable software assets, patterns, and practices. OGDI data is hosted in Windows Azure. It is accessible through open, standards-based web services from a variety of development environments,

including Microsoft .NET, JavaScript, Adobe Flash, PHP, Ruby, Python, and others.

IBM initiative in this direction is based on Real Web 2.0 Linking Open Data (LOD) [2], a community initiative for moving the Web from the idea of separated documents to a wide information space of data.

The key principles of LOD, said the IBM team, are that it is simple, readily adaptable by Web developers, and complement many other popular Web trends.

Learn how to make your data more widely used by making its components easier to discover, more valuable, and easier for people to reuse—in ways you might not anticipate [2].

#### 4 Smart cities

The majority of us live in cities now, and this percentage is growing fast. In fact, it is estimated that one million people move into the world's cities each week.

With this enormous influx of population, we'll need to find new ways to manage complexity, to increase efficiency, to reduce expenses and to improve quality of life.

As our planet gets more urban, our cities need to get smarter [1].

The smart city can integrate and optimize all the systems to achieve a new level of productivity, quality and efficiency. A smart city is based on the use of new technologies in all activities for improving the quality of work and of life, to reduce costs and to improve the efficiency.

The smart city has been acknowledged as a new stage of urban development [15], [16]. Its construction has become an international concern. Solutions for all the cities to become smarter can be found, but cannot be the same solution for all cities. To implement a smart city must have in view the new solutions for manage the big quantity of data.

The big quantity of data is accessed today as never before. It reveals everything from large and systemic patterns (of global markets, workflows, national infrastructures, and natural systems) to the location, temperature, security, and condition of every item in a global supply chain. Through on-line solutions, billions of customers, citizens, students, and

patients tell us what they want, what they like and what they think in real time.

Free access to certain data generates knowledge and innovation. The most important aspect of our society is to know how to use the data efficiently and to take what it is relevant. This will produce knowledge which is the most important thing of a smart society. We can define knowledge like the full utilization of information and data, coupled with the potential of people's skills, competencies, ideas, intuitions, commitments, motivations and with the facilities of the new technologies. So, the knowledge reflects in fact, a deep using and understanding of information interconnected with smart utilization of technologies.

In this age our citizen need more access to data and information. For this we must use open data.

Open data can be defined as certain data which is available to everyone to use and republish as they want [8].

#### 5 Open data and urban development

"Cities generate a lot of useful data" [4] says Tuomo Haukkovaara, General Manager of IBM Finland, and all the city must work actively to make such kind of data open.

Open data can make the world a better place and this is a real think in our society, and the reason is that information is a crucial force in knowledge society.

Information is a must important kind of resource. It is a so-called "public good": consumption of information by one individual does not reduce the availability of the information for others.

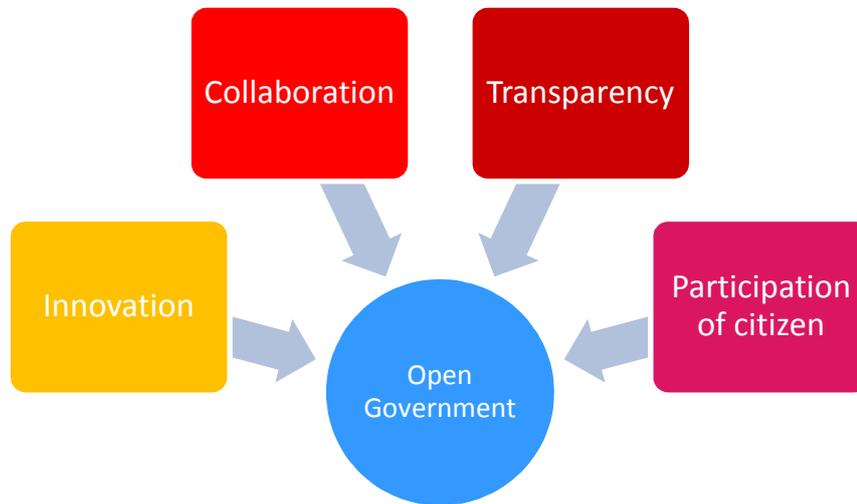
Governments, as a major producer of information, are therefore in a strong position to invest in innovation by promoting open government data [5].

Open data is now seen as a fundamental component of open government – a broader strategy that looks at the evolving roles of governments and citizens in delivering public services to society [6].

Open government focuses (Figure 4) on the following areas [3]:

- Transparency and accountability;

- Participation and citizen engagement;
- Internal and external collaboration;
- Innovation.



**Fig. 4.** Open Government

The expectations are that by adopting open government principles, governments – in collaboration with business, non-profit organizations and engaged citizens – can deliver more services with higher quality and improved democracy.

Some of the most important benefits of open data solutions are [4]:

- Delivering trusted information through integration: Putting all the data together is more easy to find the trust solutions;
- Information security and information governance: It is important to specify the ways in which information is created, stored, used, archived and deleted. This can include defining processes, roles, standards and metrics.
- Data Quality: It is important to ensure clean, standardized, and non-duplicated information. It could be useful to indicate the degree to which data has been cleaned, validated, etc., to help bolster user confidence.
- Real time connectivity: Providing access to diverse and distributed information in real time may involve unified views, and bidirectional data access services.

- Identity and relationships resolution: As an example, managing global names for identity a person.

We can say that the open data is a young movement. The first step in this direction was made by the U.S. Government by the [www.data.gov](http://www.data.gov) site launched in mid-2009 and U.K. Government by [data.gov.uk](http://data.gov.uk), in 2010.

These two sites are well known, and are the most advanced open data sites which exist today.

The open data movement is spreading rapidly and today many countries, states, regions and cities are taking their first steps with open data sites.

In May 2010, the Australian government has published a Declaration of Open Government (AGIMO, 2010) [6], in which it supported informing and engaging citizens through increased government transparency.

In other countries open data has increasingly been placed on the agenda by politicians and policy makers.

The Danish government launched an Open Data Innovation Strategy in July 2010 (Danish Ministry of Science, Technology and Innovation, 2010) and several regions in Spain have actively developed open data policies (the Basque Country, Catalonia and Aragon) [6].

The Spain – Minister of Industry, Tourism

and Market in 2010 launched an Open Data Innovation Strategy ('Avanza2'). In this project is highlight that data are crucial for the knowledge economy. By publishing Public Sector Data, more (economic) value can be generated [6].

The data are the most important source for the development of new products and services. In addition, data are important to exercise one's democratic rights. Citizens are better informed about and engaged in government. Implementing an open data strategy is not a simple task.

In addition is essential when we want to invest in the technology and operations of open data sites to have in view the barriers of these. We can identify the usual barriers [3] to successful implementation, such as:

- cultures opposed to openness;
- data quality problems;
- and difficulties in developing appropriate models for charging for open data.

The instruments applied by countries to implement open data policy can divide in four types:

- education and training (Knowledge exchange platforms, conference, sessions, workshops),
- voluntary approaches (Overall strategies and programmers, General recommendations, Public voluntary schemes),
- economic instruments (Competitions, app contests and camps, Financing of open data portals);
- legislation and control (Public sector information law, Technical standards, Monitoring).

The IBM team was asked to help the Helsinki city to develop strategies for [3]:

- creating visualizations that can enable citizens make use of and benefit from open data,
- and define the components necessary to grow a sustainable, repeatable platform, process and ecosystem to leverage the principles of open data, turning data into information, information into action, and action into change [3].

The expectations are that by adopting open data principles, governments – in collabora-

tion with business, non-profit organizations and engaged citizens – can deliver more services with higher quality and improved society [3], [4].

## 5 Conclusions

The use efficient the big quantity of data using the smart solutions is the main goal for future cities. Our society today is more interconnected, intelligent and the data is positioned in the middle of it, because everybody tries to use efficiently this. In our age the development depends on the access and processing of data.

We can say that today evolution is based by produce of knowledge and innovation, because of this is more important to use efficiently the big quantity of data of our society.

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