

Methodologies for local development in smart society

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Abstract: *All of digital devices which are connected through the Internet, are producing a big quantity of data. All this information can be turned into knowledge because we now have the computational power and solutions for advanced analytics to make sense of it. With this knowledge, cities could reduce costs, cut waste, and improve efficiency, productivity and quality of life for their citizens. The efficient/smart cities are characterized by more importance given to environment, resources, globalization and sustainable development. This paper represents a study on the methodologies for urban development that become the central element to our society.*

Keywords: *intelligent locality, new technologies, intelligent solutions, sustainability, city development.*

Introduction

By 2050 in IBM Report, cities will be home to more than two-thirds of the world's population. They already wield more economic power and have access to more advanced technological capabilities than ever before (Alvar, 2011). Simultaneously, cities are struggling with a wide range of

challenges and threats to sustainability in their core support and governance systems, including transport, water, energy, communications, healthcare and social services.

The city of our age uses technology to transform its core systems and optimize finite resources.

At the same time, the city is a complex system that is under constant development. Quantitative and qualitative changes take place all the time there. Cities concentrate manufacture, trade and service industries. Most people spend the larger part of their life in urban areas. Consequently, cities have become an integral part of modern civilization. These integrate the social, economic and cultural lifestyle.

A successful city, according to David Satterthwaite (1997), has to meet some goals: provide a healthy living and working environment for inhabitants; furnish safe water, sanitary conditions, rubbish collection and disposal, drains, paved roads and other essential infrastructure for health and economic development; and remain in an ecologically-balanced relationship with local and global ecosystems.

The continuous growth process of cities in (Amado et. all. 2009), with its uninterrupted demands of natural resources consumption, is related to serious environmental and social problems. All the activities for urban development must be correlated with the environment protection and natural resources consumption.

Anticipating the consequences of urban growth is a difficult task. The economic models of local development are essential to determine the direction to follow to make a sustainable city.

Urban development

Urban development has in view the economic prosperity and social welfare by creating an environment for business, along with community integration of vulnerable groups, use of endogenous resources, private sector development.

Today urban development is a major global issue that requires urgent attention because of the intensification of human activities that wantonly use natural resources and degrade the environment. The urban development is related to the quality of life and in a smart city the economic, social and environmental systems are providing a healthy, productive, good life for all the citizens.

We can say that urban development is a complex system that concerns the entire economic, social, and cultural sectors from the city. In this case, the answer is to focus attention on high-impact areas of the city. In (Dirks, 2010) we identified the eighth primordial areas for urban development:

- Education and training;
- Health;
- Science and research;
- Environmental protection;
- Social development;
- Economy and market;
- Governance;
- Spatial planning.

All these areas are interdependent and for urban development we must develop a strategy based on sustainable urban development models.

One of the major problems of the current economy is to use resources efficiently. This principle requires the conservation and rational use of renewable resources, as well as balancing the pace of exploitation of other resources and their regeneration rate. An effective solution requires that everything is taken from nature to be used and useful substances from waste and used goods to be recycled. Here we can see that it is necessary to use new information technologies to ensure efficient use of the resources.

Sustainable urban development is defined (Hald, 2009) as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The future city has been recognized as a new stage of urban development in which we use the resources and the environment efficiently. Because of different development of these eight primordial areas we can't have the same strategy for the entire city but we can define a model.

Urban development models

The first approach on regionalization and urban issue was devoted to economic activities and geographic location of cities and is known in economics sciences - the theory of localization.

We identified the following models of regional and local/urban theory based on location:

- a) Von Thunen model is known by the name of Heinrich Von Thunen theory which is considered the founder of location. In 1826 he developed a model of rational spatial organization for

farmers. He analyzed the allocation of agricultural land among several competing locations, knowing that the agricultural product has to be transported from place of production to the consumption.

- b) Weber model is known by its author Alfred Weber theory underlying the location published in 1909 his "Theory of branch location." The Thune's model was based on creating a new model for industry location choice. Main interest was to choose the location of industrial centres. Weber's model is an important milestone in the theory of localization, because it attempts to optimize the location of businesses regardless the mathematical basis of their activity profile.
- c) Christaller's model is known by its author W. Christaller. The purpose of this theory was to explain the size and number of cities and the distance to which they are located in a particular territory. W. Cristallerie by his "central places of southern Germany" (Hurjui, 2006) founded the complete analysis of the territory organization, identifying how the centralization of urban structures and relations.
- d) Losh's model is known by its author August Losh. Cristallerie's theory was extended by A. Losch that the book "Spatial organization of the economic system", trying first to introduce elements of nature space in general equilibrium theory of markets (Hurjui, 2006). Unlike Weber, Losh assumes a homogeneous surface on which consumers are uniformly distributed. Manufacturers are concentrated, while consumers are assumed to be spread regularly in space. The fundamental point emphasized by the model is that, because of the overlap of hexagonal networks, prosperous areas rise and others poor. In other words, the hierarchy of industrial concentration, which he called "central places", emerged (Levent, 2006).

- e) Zipf's model, known as the law "Position - Size". This model correlates the size of a city (geographical size) with its rank (the position they occupy in the hierarchy of urban system). Currently it has a special place in the study of the location of industrial activity, which showed their tendency to group in space in cluster like industrial parks, small or big cities, etc.

François Perroux unbalanced growth theory and developed regional or local theory called the theory of polarized development of growth poles. The theory stems from the fact that development is unbalanced and hierarchical process and that while only certain economic units act as engines of development. These units are designed poles of economic growth. Become growth poles and certain areas of land or infrastructure.

John Friedmann, Stuart Holland and Gunar Myrdal showed uneven development theories such as centre-periphery relationship. It is considered that regional imbalances are based on time differences in the processes of integration, resulting in the mobility gaps imperfect work - concentrated in the centre.

J. Fridmann and W.Stohr founded the theory of endogenous development in response to classical theories.

According to Friedmann's theory, endogenous development has three basic features:

- Territorial - space is an important value that facilitates specific operations, synergy on an enterprise can use;
- Community - development cannot be created outside the local community;
- Cultural - Promotion of local resources, endogenous development is based primarily on local resources or local industrial traditions.

P.Nijkamp and J. Paelinck emphasized the long cycles of regional development theory in the '80s. They proposed a model of interregional fluctuations (Hurjui, 2006), in which space is allocated to growth poles, poles of attraction and intermediate regions. Attractiveness of a region depends on its capital, infrastructure, and the stock of information.

According to the analysis done on local and regional development models can be classified into two categories: on one hand the theory aimed at localization (Von Thunen, Weber, Christaller, Losh, Zipf), and on the other hand there are models that how try to identifying the determinants factors of local development (Perroux, Myrdal, Holland, Nijkamp).

Location theory models aimed to characterize a region from where it is located, while other models are focused on the theory of growth poles and local resources consumption.

These urban models, which were developed in the twentieth century, progressed from structural models to static models and to dynamic models. Traditional urban models usually simulate the urban system at a macro level, so they cannot accurately reflect the dynamic, self-organizing, or emerging characteristics of urban systems.

The new urban models are based on the use of the new technologies in all activities in order to improve the quality of work and life, to reduce cost and to improve the efficiencies without disturbing the environment.

Analyzing the new urban development models that exist among the world we identified two theories:

- One theory is based on analysing the actual stage of the city and use cellular automata models which demonstrate how simple local transition rules can be used to emulate a complex urban growth. This will help us identify the priority areas starting from one cell to the development of a city;

- The second theory is the Korean model of an urban development. They consider that is more efficient to find a good place and build a new city there.

The development of GIS (Geographic Information System) and other complex adaptive models led to urban models based on artificial life or discrete dynamics. In recent years (Long, 2009), urban growth models have used the cellular automata (CA) approach which is based on self-organizing theory. The CA models are composed of a series of basic rules instead of strictly defined physics equations or functions. The discrete character is a key characteristic of the time and space and status in CA.

Couclelis in 1985 was the first how presented the CA model in an urban context. In this case CA has been adapted to simulate the emergence, self-organizing, and chaos phenomena in urban systems.

In this theory each sector of urban development has some properties that may change over the time and the state of one area at time $t + 1$ depends on its status and condition of other areas at time t . In this case it is essential to identify the priority area of the city and, after developing this using smart solution, we can extend it to other areas. Like Barredo (2003) said in CA is surprising their potential for modelling complex spatio-temporal processes, despite their very simple structure. In his paper Barredo accentuate the theory that cities, as dynamic systems, show some complexity characteristics that can be modelled using CA.

Strategy for urban development

Based on analyze of urban development models can reveal that local development methodology must consider the following steps:

- local analysis will be based on existing data and will be conducted with the involvement of local actors. Analysis will serve as working material group or working groups composed of representatives of all local stakeholders;
- SWOT analysis will highlight the strengths and weaknesses rather, opportunities and risks arising from the analysis area;
- highlighting the general and specific development objectives. They must be measurable in terms of time, relevance and practical results;
- make a plan to prioritize concrete actions taken to achieve the development goals set;
- establish a cost for each priority action and management plan;
- select the model the appropriate local development goals;
- the local development work will start from priority actors.

The local development methodologies currently highlighted choice first need a model of effective management infrastructure and existing resources to meet the needs of present and future

Conclusions

For a sustainable growth of a city is important to promote a more resource efficient, a competitive economy and an economy based on knowledge and innovation. Analysing urban developing models helps us to find the best solutions for a sustainable growth of the cities where most of the citizens of the world live in and to select the perfect model which is essential in our age.

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