

Social – Economical Evaluation of Sustainable Urban Development Using Regional Planning Models (Case Study: Bam City-Iran)

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ABSTRACT

In the framework of new doctrine of urban development, to overcome the challenges on the threshold of the third millennium, "paradigm of sustainable development" is considered basic approach in urban planning. In this approach framework, urban communities and urban people along with the ground under their feet are be considered simultaneously and in integrated manner, because the sustainability of urban space observing the creating a balance among human and environmental, social and economic aspects. Nodaway, systems of management and urban planning are trying through observing changes in urban development lead development programs to sustainable and strong direction. Monitoring changes of urban systems and changes of sustainable urban development is considered as a fundamental to achieve the valuable goals of sustainable urban development. After an earthquake in Bam on 2002, the city faced wide variations in socioeconomic backgrounds in compare to other cities. Given the importance of the spatial disparities in the region, the researcher is encouraged to assess the current situation and the stability of the regions of Bam city. Research method is descriptive –analytical, based on formal secondary data. TOPSIS rating model and human development composite index model (HDI) were used in current research in order to rank the districts of Bam city based on social and economic index of sustainable development and in order to validate the research findings. Geographical information system (GIS) was used to draw and provide maps. The results showed that district 5 considering the social and economic indicators of sustainable development is in a better condition in compare to other districts and district 4 has the least sustainability and because of that gives the development priority and the importance of more focus to district 4 in future development plans for sustainable development.

KEY WORDS: Sustainable urban development, TOPSIS model, human development composite index, Bam city.

1 INTRODUCTION

According to information of the United Nations Population office world urban population to 2025 will be % 65 of the total population of the world and more important is % 90 of urban population excess is belong to developing countries. So it put pressure on Third World cities and as a result it will create serious challenges for performance and productivity of cities. In other words the evidences from Asian countries show that almost all cities have difficulty in stable supply of urban citizens' needs and even governments cannot keep rate and level of urban needs [1] and is indicators of urban life is always decreasing while the governments' actions in the promotion of indicators are poor and is not consistent with the time changes. In addition to these disparities among cities on sustainability indicators are in high level. Today attention to urban sustainable development approach in planning and urban design is considered more than before. Sustainable concept considers satisfying today needs without compromising the needs of future generations. Sustainable development is a normative concept that mentions maintaining and survival the integrity, and the balance between the goals of economic, social and environmental. At first with accepting approach investment in sustainable development, environment found accumulation as well as other forms of capital and ended to stream of goods and services [2]. As times passes, researchers' efforts to develop the concept of sustainability and its use in making policy leads to two competing views in this domain that in sustainable development essays introduced in weak sustainability and strong sustainability approach. The two approaches have different assumptions, suggest different policies and have different consequences. Undoubtedly accepting each one of these approaches

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has completely different policy implications in terms of economy, society and environment [3]. The fact is that in the developing world, environmental and economic policies are more designed and implemented in the conceptual framework of poorly sustainable development while most of researchers aimed more valuable goal that is strong sustainability [4]. Despite accepting the principles of sustainable development that is satisfying current needs without depriving future generations in cities of Third World, scale and persistence of inequalities, vulnerability and poverty in low-income add more to the importance of this approach to sustainable development [5]. Therefore the sustainable development of urban is a form of modern development that can guarantee future sustainable development of cities and urban communities [6]. However, the process of achieving sustainable urban development is somewhat unknown. We understand that only we should provide the social and economic health of the projects in this area and it can be done only by approaching to each of these issues at different scales [7]. In fact, the city is a spatial perspective that sustainability takes into consideration in its frame but perhaps it is the best, or at least the most realistic scale to create stability in compare to other spatial scales. The tendency of many urban professionals, first and foremost, is to turn the city into a better place to live. Social workers, health engineers, architects, landscaping, officials and local activists are all trying to implement programs to raise the welfare of the people, especially the improvement of living environment and their business. At first these attempts were used to define the parameters and achieve higher living standards gradually focused on improving the quality of life. For example, the "Strategy of the physical space, healthy city and quality of life" most part of the realization of a healthy city has social and economic aspects. This strategy moves toward architecture and physical space for creating a healthy city, clean environment, safe and high-quality, active neighborhoods, healthy and supportive of each other and creating forms that are compatible with the social and cultural characteristics [8]. Integrated approach to sustainable development simultaneously focuses on environmental, economic, and socio-cultural aspects. Sustainable development is the concept of quality of life with the support of the ecosystem. Social sustainability includes size and stability of the social and cultural sustainability [9]. Among these the cultural dimension of sustainability is the later but important dimension [10]. Concepts related to cultural sustainability are; social capital, social stability and social and cultural development. Social sustainability, in the sense of enabling all categories, to benefit from the essential requirements includes access to reasonable level of comfort in fact considers equitable distribution of opportunities in the fields of health and education. Socially sustainable society should have retention and the ability to produce on its own resources and resistance to future problems. The primary goals of social development implies the possibility of expressing values, self-reliance, providing basic human needs and more participation of the residents in their community. These goals are fulfilled through education, citizen participation, consensus-building and access to information [11]. In economic stability, urban management based on today condition instead of knowing themselves as the owner of city development should consider them responsible for sustaining the development. The requisite for sustainable development is sustainability of life of citizens and consequently the relative stability of economic components. Empowerment issues primarily rely on poverty reduction perspective and human-centered sustainable development with emphasis on citizen and city participation. This dimension is evaluated by indicators such as occupation, income, unemployment rate [12]. Cities must synchronize their socio-economic structure and compatible develop with the physical structure-environment so not to harm the human values and environment and where justice is established inter places and intra-place and it reaches to sustainable urbanization [13]. Hence it is necessary to be analyzed at any period of urban sustainability that with assess the current situation to find strategies and policies to promote sustainability and present moving toward better condition. In fact the evaluation of the stability regions and habitats and analyzing them can help determining strategies to promote sustainability and that is what this study tries to do by focusing on Bam city. In this regard the Bam city in middle urban positions with 80000 populations is the city center of Bam and is located in the south-east of Kerman Province. This city was rebuilt after devastating earthquake on 2002 that destroyed the city but unfortunately has not experienced great growth in recent years and still is not enjoys the view and stability of the proper city. Therefore it is necessary to reach sustainable development and the provision of appropriate policies that we analyze social and economic dimensions of sustainable development of Bam city which is the main point of this study.

In this study we try to measure and analyze areas of Bam city development in various areas of socio-economic and by using 15 indicators and socio-economic variables to identify and describe the current status of development and 6-fold difference between the areas of the Bam city address and prepare the context and background for urban planners and authorities to modify this inequality.

2 Organizing framework of sustainability indicators

"Framework of sustainability indicators" in terms of concept is a structure and organizing the elements or basic components and associated sustainable development (in environmental, social and

economic dimensions) in terms of the big picture and unit. However, due to the many issues related to sustainable development that are complicated and related is required framework that is based on interdisciplinary approach and comprehensive and integrated sustainability matter and satisfies major changes to achieve sustainable development goals [14]. Basically the conceptual framework has interaction, principles and ideas that help the organization and orientation of thinking about the consequences or specific topics in the field of sustainable. It organizes frameworks, specific indicator or set of indicators in a logical manner so that they can be used in several affairs. Frameworks also guided the two data collection and information process and by summarizing key information from different sectors are considered a useful communication tool for decision making [15]. Therefore, the main objectives lie in selecting and organizing framework for sustainability indicators, including:

- a- Providing a logical structure: one of the goals of closed framework of sustainability indicators is helping to identify the important aspects of sustainability, classification of phenomena and to determine the rate and direction of changes. Therefore promoting the achievement of the logical and understandable structure to manage the design process indicators (and collecting and measuring indicators) is vital.
- b- Determining the relationship between the components: sustainability frameworks should represent a symbolic major component of sustainability and how they link between on the one hand and consistent with the sustainability objectives on the other hand. This conceptual image will help to understand the nature of sustainability and build consensus on a set of indicators.

Organizational frameworks for sustainable development indicators in proportion to the objective realities of the international and national - local circumstances are used to achieve the mission and goals of sustainable development plan. Thus, each frame has its own characteristics but it can be attributes or criteria for suitable framework for organizing indicators of sustainability intelligibility, overall effectiveness, scalability, adaptability, stability and internal consistency, dynamism, realism and achievement oriented [14].

Organizational frameworks of various indicators have been proposed according to the approach, scientific origins, objectives and the different dimensions have been assumed for sustainable development. Among them we can mention driving forces frame, the reaction, the subject framework, the proposed framework of sustainable development of FAO indicators, the pressure - state - response frame, the driving forces - pressure situation - effect- reaction frame, the proposed framework of International Union of Conservation of Natural Resources, Europe Commission framework for agriculture and rural development, domain frameworks (three categories), frameworks based on target, the stability criteria frameworks, hierarchical frameworks, frameworks based on the World Bank's capital and frameworks proposed by institutions, regional and national experts .

There are three a fundamental aspects based on the current literature to measure the indicators. First indicators should be weight due to the various terms of the nature and unit of measure be normal or standard and secondly, if necessary and third must use the appropriate method for combining indicators and determining united scores for comparing results[16].

Some methods frequently used due to its simplicity in the case of simple methods for data standardization based on taken experiences in different fields of scientific and particularly statistical on many of the measures focused on sustainability. The main assumption is that because of the different data and indicators considering their nature (for example, the average annual household income and density of agricultural lands) and measurement units (hectares or square kilometers) for any combination or comparison they should be free of measurement or so called scale less. Some of the methods used in the measurement of sustainability are including scale-up phase method, the method of the linear scale[17], method of partial or relative scale, using standard scores [18], divided by the average method and the Euclidean method [19].

But the most important and yet controversial development of sustainability indicators is how to combine data as a result of the measurement. The complexity and importance of this issue in a way that is still there is no specific basis or a single and accepted method with the specialists and even associated international institutions. However, the distribution in the used methods do not provide possible appropriate conclusion. In general, what is the most common is consists of two simple methods of calculation and relatively complex methods of inferential statistics.

The simple methods of calculation as the name suggests are considered the most common methods for combining indices because of its simplicity. Different methods are used in this format which some of them are; method of arithmetic mean, geometric mean method, the method based on theory of sets (Ibid: 45) and the method of calculating the sum of the scores. On the other hand, methods based on the measurement of the stability index such as "Ecological footprint"[20], "Barometer of sustainability" [21], "Dashboard of sustainability" [22], Cab web of sustainability [23] and multi criteria analysis methods [24] may not provide an appropriate conclusion. Some of these models that could manifest themselves as the design of sustainable development indicators have been organized in a way that is simply not regarded

as a measuring model but are a package of defined indices that simultaneously taken the design process and stability of parameters and there is no possibility to intervene them. Among others some are a method for combining the indicators that their application is possible at any level. However, the tendency to analysis methods and evaluating multi criteria in management sciences and especially the strategic planning has relatively more background and techniques are various and have been evolving. In recent years, particularly from 1980 onwards some of the techniques of planning and regional development are being considered. Techniques of "decision analysis" (DA), "Multi-attribute utility theory" (MAUT), "multi criteria decision making" (MCDM), "social justice theory" (SJT)," Multi-attribute decision making" (MADM) and multi criteria evaluation method based on hierarchical analysis [25] are some of these techniques. Among the techniques mentioned in review of literature with measuring parameters of sustainable development, in this study we used "TOPSIS multi-criteria model and the Human Development Index for the region comparison and obtaining an index from consolidated results of the indicators." These methods reveal the distinctions between areas and regions.

3 REVIEW OF LITERATURE

Various researches were done in areas inside and outside Iran on evaluation of the development areas. Hoseynzadeh Dalir et al, 2010, in their study with the title of "assessment of qualitative measures urban sustainability in Tabriz" get these results that stability and vitality of the city is not desirable so that the results of the survey that citizen satisfaction with the stability of the urban environment in any of the studied tissues were not desirable and even discontent in the new urban context is more severe than in other tissues. Marco Tolio, 2001, in a study with a title of "sustainability of Asian cities in the age of globalization" believes that until the pressures of globalization forces from abroad enters the boundaries of the cities; sustainable development will be an unattainable goal. Fingly, 2009, analyzed economic indicators for sustainable development in China with a name of "Criteria measurement and procedures evaluation for analyzing development of urban sustainable" and the results showed that the economic indicators of the city from 0.45 in 2007 has reached to 0.62 in 2010 and economic stability had greater consistency.

4 METHODOLOGY

According to the components of the study, this is an applied research and investigating method is analytical – descriptive. Bam geographical scope of the study and population of 6 districts of the city areas are classified according to the master plan of the city of Housing and Urban Development and are collected based on the 2011 population and housing census. Data analysis method is done based on library, documentary and survey method. SPSS and EXCEL software were used for data analysis and urban and regional planning models such as TOPSIS model and the composite index of human development and of geographic information system (GIS) is used for drawing maps.

TOPSIS Model

TOPSIS model is one of the decision making models based on multiple criteria that can open the door to a lot of things that can make decisions for managers and planners. First it was presented by Chen Huang on 1991. TOPSIS algorithm is a decision making very strong multi-criteria compensatory to prioritize options through making the ideal answers the same that has little sensitivity weighting technique and their responses from does not changes significantly [26].

Human Development Composite Index (HDI)

United Nations program entitled "united nation reconstruction program" is used for ranking of 130 countries for the development of human resources. This model has the ability to expand and replace and in every country for comparative study of selected areas, cities and regions are used to measure the degree of development [26].

5 Understudy area

Bam city is one of Kerman province cities; it is located in 185 km from province center. The city is neighboring Kerman city from north, Fahraj and Zahedan from east, Jiroft and Anbarabad from west Reygan, and Iranshahr from south. According to City Population and Housing Census of 2011 Bam population was 80000 people containing 2 urban districts 6 regions and 18 divisions. Bam, with an average annual rainfall of 60 mm and an average temperature of 9/22 ° C is located in a dry climate zone. The city's proximity to the desert has been caused limitations in social, economic and environmental aspects for the city. The city is of particular importance in the world because of farming products like dates, Citrus fruits and of course tourism (Bam old citadel) (Iran statistics center, 2011.p:25).

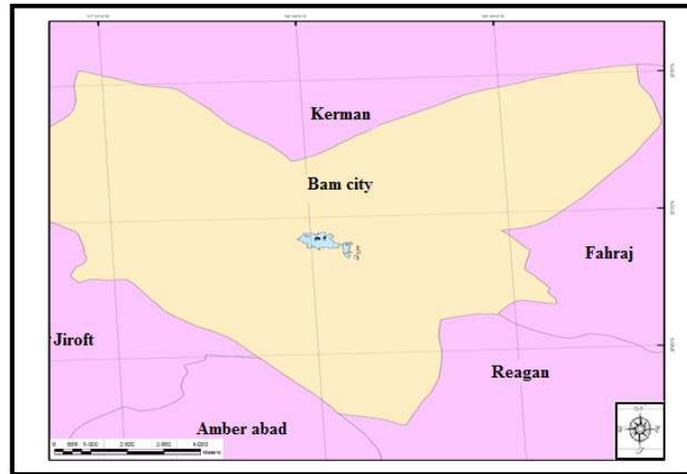


Figure 1. Map of the geographical location of Bam city

6 Research Findings

At first, indicators and variables of research were introduced and characterized in a table. We examined each of the cases was cited in each of 6 districts of comprehensive plan of Bam that is expressed as tables and explanations of each area. In first part, we proceeded to rank and grade these regions based on research variables and also indicators by using TOPSIS model and human development composite index. According to Tables 2 and 3 areas in 6 districts were evaluated in terms of social indicators that district 5 was known for the first and most stable area of development And district 4 as the poor and volatile region. In terms of economic indicators, with reference to Tables 4 and 5, district 5 was known as the stable area and district 2 as volatile regions and based on evaluation were done in Bam most areas of the city at a very low level of development. Therefore, findings indicate a deep gap among 6 districts based on achieving social, economic indicators in constant urban development.

Table 1: Social and economic Sustainability indicator used in this research

Economical indicators in research	social indicators in research
Population of 15-64 years old	Population of 0-5 years old
Number of people working in industry	Number of married women
Land measurement of commercial usage	Number of immigrate to city
Land measurement of service usage	Population of 0-14 years old
The percentage of active to an active population	Population of divorced people
The difference between the number of employed men to employed women	Sex ratio
The number of families hiring a house	Number of illiterate people

Table 2: Ranking social indicators of Bam city using TOPSIS model

Bam urban 6 districts	TOPSIS rate	ranking
1	0.377	3
2	0.178	5
3	0.574	2
4	0	6
5	1	1
6	0.263	4

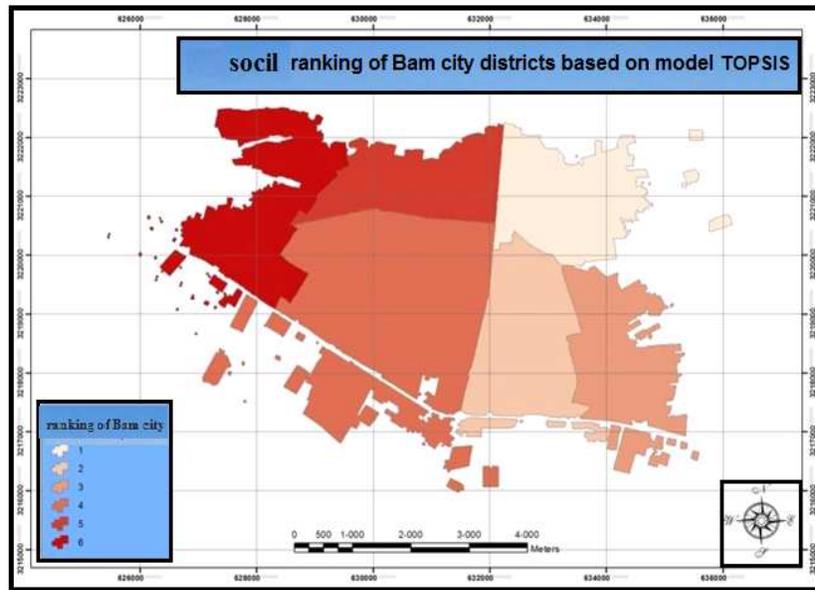


Figure 2. Map of Bam city areas of social rating based on TOPSIS model

Table 3: Ranking social indicators of Bam city areas using human development index

Bam urban 6 districts	average	ranking
1	0.4061	3
2	0.1851	5
3	0.3438	4
4	0	6
5	1	1
6	0.556	2

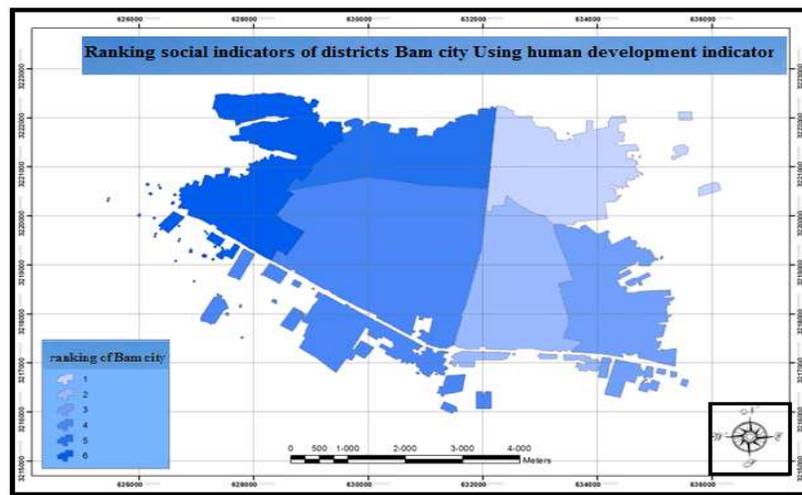


Figure 3. Map of ranking social indicators of districts Bam city Using human development indicator

Table 4: Ranking economic indicators of districts of Bam city Using model TOPSIS

Bam urban 6 districts	average	ranking
1	0/4017	3
2	0/1354	6
3	0/3206	4
4	0/1686	5
5	0/91469	1
6	0/6103	2

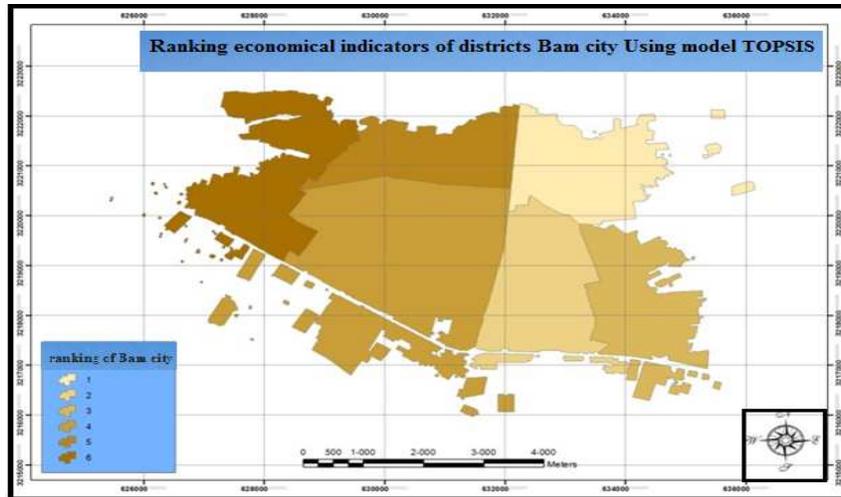


Figure 4. Map of ranking economic indicators of districts Bam city Using model TOPSIS

Table 5. Ranking economic indicators of districts Bam city using human development indicator

Bam urban 6 districts	average	ranking
1	0/27318	3
2	0/044505	6
3	0/20478	4
4	0/17443	5
5	0/91094	1
6	0/31029	2

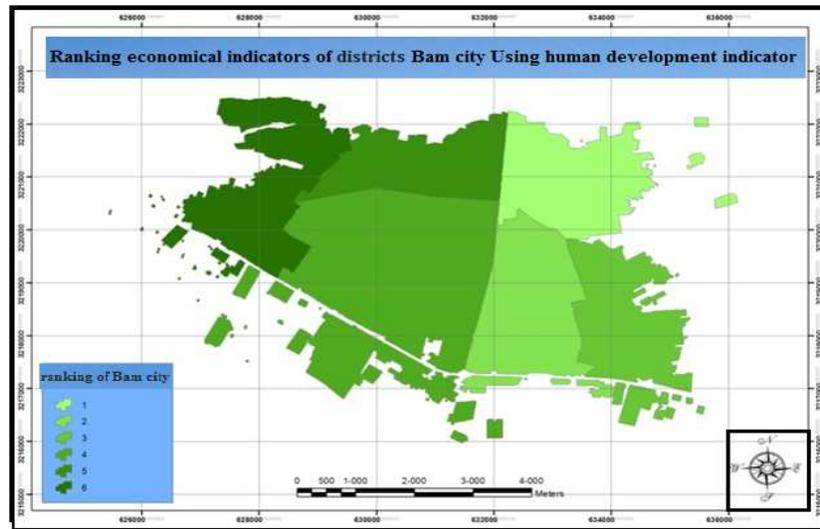


Figure5. Map of ranking economic indicators of districts Bam city Using human development indicator

7 CONCLUSION

Sustainable development is a point of balance to achieve the goals of the dimensions of environmental, social and economic. Is it within the previous paradigms and it has led to conflict between the development dimensions. However, in order to achieve sustainable urban development we can get to a common base. In other words, sustainability is a dynamic concept; there are various features, such as speed or rate, the influence of the changes caused by factors and the amount and extent of the changes that are related to the initial and final state.

Since the measurement of Bam sustainable development requires a compatible set, responsive and appropriate indicators of urban sustainability, in this study we selected 15 indicators, to assess the social and economic dimensions of sustainability. To determine the sustainability of Bam urban areas we used criteria and indicators for sustainable development and social and economic stability was studied in two dimensions. In this study, using TOPSIS model and the composite index of human development and using the Statistical Yearbook 201, selected social indicators and economic were combined and districts of Bam were identified by combining level indicators and stability. The results show that the Bam city in terms of economic and social indicators urban sustainable development is not in a good condition especially in the economic situation is more unstable. The results of the present study showed that district 5 is the most stable in social aspect and district 6 is the least stable in social aspect of sustainable development. In economic aspect of sustainable development using models, district 5 is most stable and district 2 is the least. The devastating earthquake on 2002 is one of the destruction factors of the economic infrastructure of the city and its economic stability reduction. Because of the migrations after the disaster, social context of the city has fluctuated. After studying the indices of development in urban areas, we found that the city is a semi-stable city. It should be noted that the increase in the population growth due to migration, incorporation of villages around the city and suburban is related to unsustainable development in Bam urban areas and it causes not applicable municipal comprehensive plans and developing city in heterogeneous way and deterioration of development indicators. Therefore it is necessary that from now on we pay more attention to economic aspects in development and implementation of development projects. And make more efforts to promote economic indicators that provide the foundation for quality of life. In social aspect it is necessary to provide required social programs. In this case we see the balance of the three dimensions of sustainability and consequently it will integrate urban development at the national level.

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