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**Evaluating the Quality of Socio-
Economic Features in Isfahan's Urban
Environment**

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Evaluating the Quality of Socio-Economic Features in Isfahan's Urban Environment

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Abstract

The sustainable human life cannot be achieved without sustainable local communities and cities are the key players of changing lifestyles, production, consumption and spatial patterns toward sustainability. A sustainable city might be defined as a city that provides an acceptable standard of living for its human occupants without depleting the ecosystem and biogeochemical cycles on which it depends. It also includes economic and social aspects of change in addition to environmental features. Local governments from the other hand are close to where environmental problems are perceived and closest to the citizens and shares responsibility for the well-being of human kind and nature. So the heightened role of environmental quality as an urban public policy concern is linked with growing interest in sustainable urban development. Contrasting with these facts, inefficient urban planning and management and lack of coherent environmental policies has led to many of urban environmental problems in a lot of modern cities. The number and scope of these problems are significant and they are considering as serious threats to the health and safety of residents. Recent experiences have shown that the Indicators of environmental quality are extremely a valuable tool for evaluation of the efficiency of urban policies, ideas, projects and initiatives. So the objective of this study is to measure the city of Isfahan's environmental quality from the standpoint of socio-economic needs in the year of 2010. For this aim first we compared a variety of urban sustainability indicators, and then a collection of 22 indicators have been chosen and classified in the form of a simple mathematical model. The ability of data collection and measurability of indicators were the main criteria for choosing the desire Indicators. The results of evaluation of socio-economic needs showed that Isfahan's environmental quality obtained 70% of desirable situation. Within the evaluated measures, the Indicator of urban facilities with 91% of model's desirability and the Indicator of social environment with 43% had the highest and lowest qualities. This result will show the road map of developing urban policies in future toward improvement of the environmental quality of the citizens and nature.

Keywords: Indicator, Socio-Economic Features, Evaluating, Isfahan

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Introduction

Cities are complex ecosystems affected by social, economic, environmental, and cultural factors. Inefficient urban planning and management and lack of coherent environmental policies have led to many of urban environmental problems in a lot of modern cities. The number and scope of these problems are significant and they are considering as serious threats to the health and safety of residents (Taghvaei et al., 2010). Complex socioeconomic characteristics of cities affect the identification and selection of sustainable development strategies from the other hand (Schultink, 2000). The problem of attaining urban sustainable development is thus an important challenge. The development of evaluation indicators and a method for assessing the status of urban sustainable development will be required to support urban ecological planning, construction, and management (Li, et al., 2009). Sustainable development planning might be utilized environmental indices which effectively define comparative development potentials and environmental constraints. So evaluating the quality of Socio-Economic features in order to identify the current state of the urban environment and future planning is essential in Isfahan city as a case study of this research. So the aim of this study is to use the proper indicators for measuring the Socio-Economic environment quality of Isfahan city. Furthermore if the quality is not desirable, the reasons should be investigated. Recent experiences have shown that the Indicators of environmental quality are extremely a valuable tool for evaluation of the efficiency of urban policies, ideas, projects and initiatives (Bahrainy & Tabibian, 1998). Sustainability indicators are effective means of determining whether a city is moving towards sustainable development (Lee & Huang, 2007). Therefore various collections of indicators have designed for evaluation of urban environmental quality. The first study on urban sustainability indicators started in 1994 when some researchers selected a set of indicators based upon the charter of European sustainable cities and towns. The framework was subsequently tested by the cities participating in the research network of medium-sized cities. This publication presents the urban sustainability indicators framework in the context of the foundation's program on socio-economic aspects of sustainable development (Mega & Pedersen, 1998). In another research the Sustainable Society Index (SSI) has been developed for using in 135 different countries. The SSI integrates the most important aspects of sustainability and quality of life of a national society in a simple and transparent way. It is consisting of only 22 indicators about the social aspects of human life, grouped into 5 categories (Kerk & Manuel, 2003). In another research urban sustainability is evaluated by 19 indicators in four cities in china. Although all four cities are moving towards sustainable development, the current situation shows still weak sustainability in three, and even non-sustainability in one city (Dijk & Mingshun, 2005). Researchers in Italy used the Dashboudr of Sustainability to measure the local urban sustainable development. 61 various indicators has presented in their work. The Dashboard of Sustainability (DS) is a mathematical and graphical tool designed

to integrate the complex influences of sustainability and support the decision-making process by creating concise evaluations (Scipioni et al., 2009). In a similar study, 51 sustainability indicators have selected for evaluation the socio-economic characteristic of Taipei city. These indicators are classified into economic, social, environmental and institutional dimensions. Analysis results demonstrate that social and environmental indicators are moving towards sustainability indicators, while economic and institutional dimensions are performing relatively poorly (Lee & Huang, 2007). Some of the foresaid appropriately have been used in order to evaluate the socio-economic features in Isfahan. Iran has recently paid special attention to evaluate urban environmental quality by using various indicators too. In a main study after reviewing traditional methods, a model has been presented for evaluation of urban environmental quality (Bahrainy & Tabibian, 1998). On the other hand, quantitative and qualitative characteristics of Tehran's environmental quality were evaluated as average with a score of 53.3% in a similar study that was conducted in 1996 (Tabibian & Faryadi, 2002). After that, Tehran's urban environmental quality has been evaluated again by reforming and optimization previous indicators (Seifollahi & Faryadi, 2011). In this study, application of urban environmental quality evaluation model had been tested based on various urban quality models and indicators in Iran and the world. The recent Model and Indicators along with some modifications had been adopted for using in evaluating Isfahan's socio-economic features.

Materials & Methods

The case study is 14 urban districts in Isfahan city with a population of 1.7 million people and an expansion of 482 kilometers (TSY, 2006). In the present study the various kinds of patterns and models of sustainability indicators have been studied for evaluating the quality of socio-economic features of Isfahan. Also, urban environmental quality evaluation model (Bahrainy & Tabibian, 1998) and its application which had been tested in evaluating the quality of Tehran's urban environment (Tabibian & Faryadi, 2002) & (Seifollahi & Faryadi, 2011) have been compared. Then, the final collection of indicators for evaluating the quality of Socio-Economic features in Isfahan urban environment had been collected, with comparative analysis of mentioned studies and various indicators of international researches. Table 1 shows comparative analysis. In the first step, the various indicators of different countries have been extracted. In the next step, the similar indicators with Iran's indicators have been removed. So in the following stages the indicators were adjusted based on the current data. Finally a collection of 22 indicators have been chosen and classified in the form of previous studies adjusted model (Bahrainy & Tabibian, 1998), (Tabibian & Faryadi, 2002), (Seifollahi & Faryadi, 2011). The model with a simple mathematical order, determines the quality of Socio-Economic features to the language of numbers based on compared common criteria. The model forms in three layers, first is the final

indicator that shows the total amount of the quality of socio-economic features. The important coefficient of final indicator is 193.5 that were reached from the collection of importance coefficient of measures in the other layers. There are eight main indicators in the second layer such as housing, transport and so on. In the end, there are measures such as divorce rate and so on (Fig.1). Thus, measures are the smaller form of the indicators. For evaluation, information has been prepared from various studies and organizations such as: TSY (2010). As mentioned earlier, socio-economic features final indicator consist eight main indicators. An instance has been explained for clarifying of model function. The transportation is one of the eight main indicators that are divided in to four measures. The measures consist of; percentage of using public transportation for inter-city travelling, average of expectation for buses in stops, number of people per vehicle and share of bicycles in intercity travelling with importance coefficient of 5.5, 3, 4, 3. The total importance coefficient of measures is 15.5 for the transportation main indicator. Other indicators quality had been calculated in the same. The amount of each main indicator quality is evaluated according to the Table 2.

Table 1. Comparative analysis of indicators presented by various studies in social environment indicator

China (Qi·Ma ‘Ta ‘ Wu) (Mingshon and Dijk, 2005)	Italy (Padua) (Scipiono et al, 2009)	European foundation (Perugia) (Mega and Pederson, 1998)	Iran (Tehran) (Tabibian & Faryadi, 2002)
1- Social welfare 2-Growth rate of income per capita 3- Growth rate of basic needs index	1- Poverty thresholds 2- Population density 3-Birth rate 4-Immigration rate 5-Foreign immigration rate	Social justice equivalent expressed by the percentage of people affected by poverty, unemployment, lack of access to education, Information, training and leisure.	Family size
			Social relationship 1- Number of driving breach 2- Divorce rate
		Citizen participation 1-Percentage of people participating in local elections 2- Percentage of people being active members of environmental, public health and cultural associations.	Participation Percentage of people participating in association

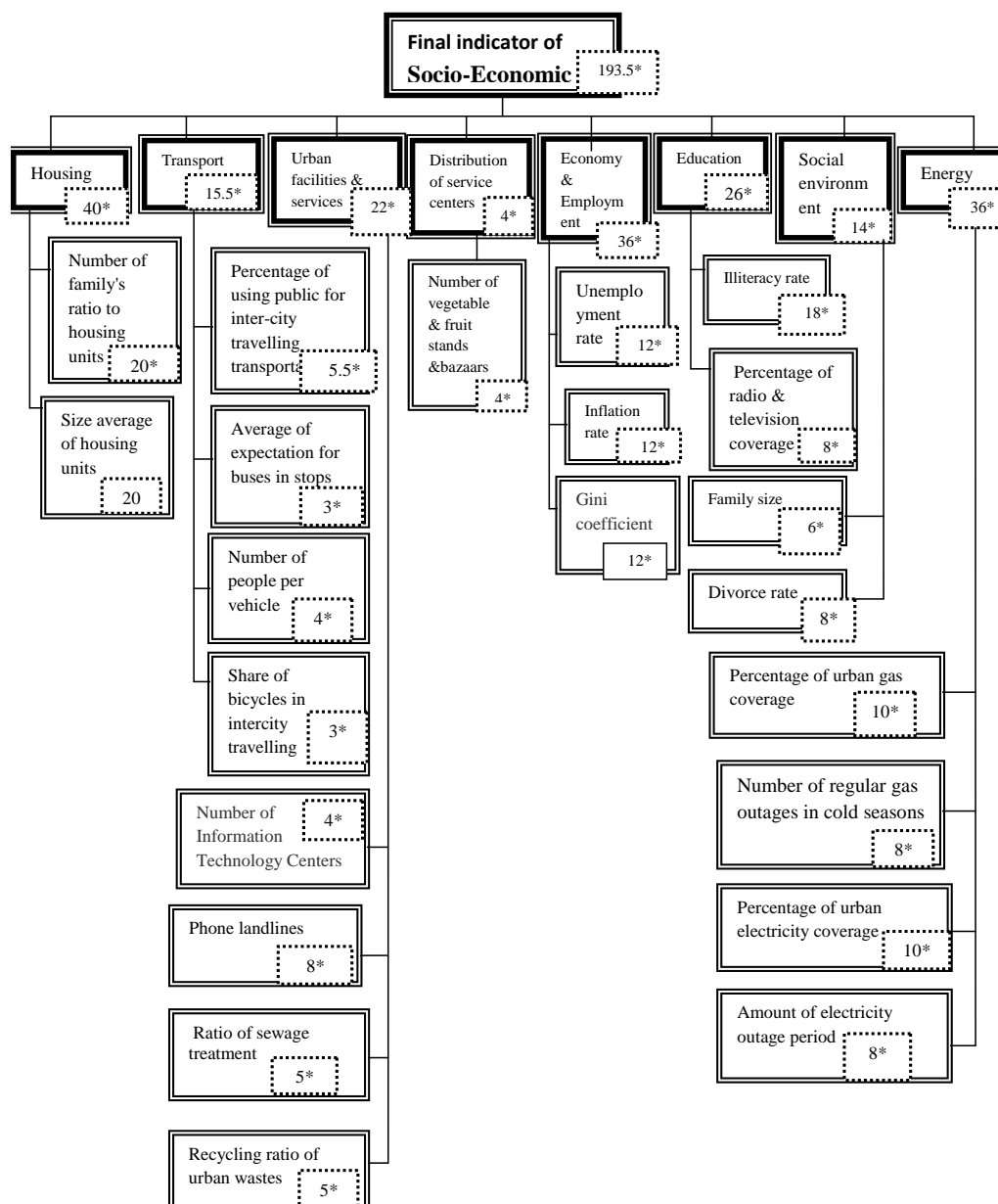


Figure 1. Tree chart of Isfahan's socio-economic indicators

(*)The important coefficient numbers

Table 2. Categorizing of the quality amounts of evaluation indicators (Tabibian & Faryadi, 2002)

Condition	Amount
Best quality (very desirable)	80% & more
Desirable quality	60-80%
Middle ranking quality	40-60%
Low quality	20-40%
No quality (undesirable)	20% & less

Calculating Isfahan's Socio-economic Environmental Quality

Isfahan's socio-economic environmental quality in 2010 has been calculated based on Table 3. Based on the sum of the eight main indicators quality, the score of the final indicator will be calculated in the next step.

Table 3. *The main structure of the model of evaluating urban environmental quality (Tabibian & Faryadi, 2002)*

A	B	C	D	E														
				Determine of weight														
				E ₁			E ₂			E ₃			E ₄			E ₅		
				E ₁ 1	E ₁ 2	E ₁ 3	E ₂ 1	E ₂ 2	E ₂ 3	E ₃ 1	E ₃ 2	E ₃ 3	E ₄ 1	E ₄ 2	E ₄ 3	E ₅ 1	E ₅ 2	E ₅ 3
Measure name	Unit of measure	Real amount	important coefficient	Evaluation criteria	Raw weight	Balanced amount	Evaluation criteria	Raw weight	Balanced amount	Evaluation criteria	Raw weight	Balanced amount	Evaluation criteria	Raw weight	Balanced amount	Evaluation criteria	Raw weight	Balanced amount

Following meanings shows the method of calculation.

A: Measure name

B: Unit of measure

C: Real amount of measure

D: Measure's important coefficient, which has been arbitrarily considered for each measure

E₁₁: Criteria of evaluation which have been categorized to 2 till 5 levels based on the best until the worst quality

E₁₂: Raw weight of each measure based on Table 4. According to criteria, raw weights have been categorized to 2 till 5 levels.

E₁₃: The best raw weight of measures

E₁₃: Balanced amount. It's consequence of multiple of raw weight in Measure's important coefficient

E₁₃: the best situation of weight

$$\sum E_{i3} = E_{i2} \times \sum D: \text{Current situation of indicator } i = 1 - 5$$

$$\sum E_{13} = E_{12} \times \sum D = 60 \sum D: \text{Best situation of indicator}$$

N: Total number of measures

N: n₁+n₂+n₃+.....n_n

Q= the amount of quality: $\frac{\text{Current situation}}{\text{Best situation}} \times 100$ (Tabibian & Faryadi, 2002).

Calculating of socio-economic environmental final indicator

Total number of measures in the socio-economic final indicator based on 8 main indicator N=22 n₁=4 Total number of measures in energy main indicator

Total number of measures in social environment main indicator n₂=2

Total number of measures in education main indicator n₃=2

Total number of measures in economy & employment main indicator n₄=3

Total number of measures in service centers distribution main indicator n₅=1

Total number of measures in urban facilities distribution main indicator	$n_6=4$
Total number of measures in urban transportation main indicator	$n_7=4$
Total number of measures in housing main indicator	$n_8=2$

Table 4. E_{i2} ; Raw weight of each measure in 4 hierarchical orders, $i=1-5$ (Tabibian & Faryadi, 2002)

0		60		
0	30	60		
0	20	40	60	
0	15	30	45	60

Amount of the socio-economic features final indicator in Isfahan (2010)

Current situation = $\sum E_{i3} = 8127$

Best situation = $\sum E_{i3} = 11610$

$$Q = \frac{8127}{11610} \times 100 = 70\%$$

The Socio-Economic features final indicator in Isfahan in 2010 had desirable quality Based on Table 2.

Results

After calculating of all measures quality in socio-economic environment of Isfahan, the amount of quality of each main indicator are achieved. Table 5 shows the results. Isfahan had the highest and lowest quality in urban facilities indicator and social environment with score of 91% and 43% one by one. Desirable quality of energy indicator was because of the high quality of not electricity outage and the electricity network coverage of the city with a score of 100%, not outages of regular gas in cold seasons with score of 100% and desirable quality of gas coverage to the city with a score of 61%. Middle ranking quality of social environment indicator was because of high divorce rate and desirable quality for family size with 0% and 100% score. Best quality of education indicator was because of illiteracy rate with 89% score and 95% score of radio and television coverage across the city. Desirable quality of employment indicator was because of unemployment rate, inflation rate and gini coefficient with score of 75%, 50% and 75% one by one. Desirable quality of public service centers distribution was because of distribution of vegetable and fruit district's bazaars throughout the city with score of 75%. High quality of urban infrastructures was due to phone landlines with score of 100% and wastewater piping networks with score of 100% (because of Isfahan's urban ago system), desirable quality of information technology centers and recycling house waste with score of 66% on the other hand. High quality of transportation indicator was because of the using public transportation for inter-city travelling with score of 83%, the desirable quality of average of expectation for buses in stops and share of bicycles in intercity travelling with

score of 66% (because of traditionally using of bicycles in Isfahan city), and also desirable quality of public transportation fleet per capita with a score of 75%. Middle ranking quality of housing indicator was because of the number of family's ratio to housing units with a score of 50% and average size of housing units with a score of 66.6%.

Table 5. *Main Indicators of Socio-economic Features*

Main indicator	score	Condition
Energy	79%	Desirable quality
Social environment	43%	Middle ranking quality
Education	90%	very desirable
Economy & employment	66%	Desirable quality
Service centers distribution	75%	Desirable quality
Urban facilities	91%	very desirable
Transportation	81%	very desirable
Housing	58%	Middle ranking quality

Conclusion

In the present study the various kinds of patterns and models of sustainability indicators have been compared for choosing and categorizing suitable evaluating indicators for evaluation of Isfahan's socio-economic features. The ability of data collection and measurability of indicators were the main criteria for choosing the desire indicators. So presented adjusted model in this study may be applied also for evaluating the quality of socio-economic features in Iran's different city and other world's country.

Based on this study the quality of socio-economic features in Isfahan's urban environment achieved 70% of desirability in 2010. Comparing this result with socio-economic features in Tehran's 60.5 % score in 1996 and 67% in 2006 through similar studies, shows the higher socio-economic qualities of Isfahan's socio-economic urban environment.

There are some advices as planning policies for improving the quality of socio-economic features in Isfahan urban environment. Focusing on not desirable evaluated indicators, as the high divorce rate, a good advice is to increase employment opportunities for decreasing economic problems of families. For decreasing the high inflation rate it is useful to remove distribution unnecessary middlemen, granting currency income to private investors. Improving safe sidewalks and special paths for bikers are useful for

decreasing the high traffic congestion and high amount of private vehicles. To increase the suitable housing, good advices are to restore current residences, encouraging renovating old traditional houses, stabilization of housing price thus decreasing municipality services costs such as cost of constructing permit exportation and so on.

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