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A MODEL OF SUSTAINABLE URBAN DEVELOPMENT FORMATION

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ABSTRACT. Life in any modern city of the world is concentrated mostly in a particular ever-changing environment. Micro, meso and macro environments have a direct impact on sustainable urban development opportunities. This may facilitate sustainable urban development or, on the contrary, it may create constraints. Micro, meso and macro environments must be considered as an aggregate of forces influencing sustainable urban development and combining both the factors that have a direct impact and those whose impact is indirectly. This researches aim was to develop a model of sustainable urban development formation by undertaking a complex analysis of micro, meso and macro environmental factors affecting it and to present recommendations for the increase of its competitive abilities.

KEYWORDS: Sustainable urban development; Model; Decision making; Alternatives

1. INTRODUCTION

Sustainable urban development has various approaches and different priorities in different countries. It is not surprising that there are widely divergent views and interpretations the various countries, with marked differences between countries that have a developed market economies, those with transition economies and in developing countries. Not all countries with one of theses three development levels, understands sustainable urban development in the same way and so have different strategies.

For example, developing countries have other environmental systems than most developed countries. Climatic circumstances and geographic conditions have a distinct impact on the features of ecosystems. Many developing countries possess highly diversified but fragile ecosystems. Moreover, developing countries are still predominantly rural, whereas the developed world is largely urbanized. Socio-economic systems in developing countries also differ from those in developed countries. Successful strategies for sustainable urban development should be more-or-less compatible with political, economic, social, cultural, institutional, technological, environmental, legal/ regulatory and educational situations in the country under consideration. A varied spectrum of strategies can be launched, while keeping in mind that the mix of influencing factors and the relative emphasis is on one or other of the

factors and overall will depend on local conditions.

The best sustainable urban development strategy of another country cannot just be copied. Strategies may only be adapted into a real economic, social, political, legislation/regulation and the provisional situation of the existing state. There is no such thing as a single sustainable urban development strategy to suit all societies that could be applied to all countries.

The model of sustainable urban development formation suggested by this research is based on the presumption that the efficiency of sustainable urban development depends on many micro, meso and macro-level variables. The presence of specific micro, meso and macro-level variable factors immediately imposes objective limitations for efficient sustainable urban development. Sustainable urban development, in the presence of these objective limitations, tries to perform its functions within their bounds with the utmost efficiency. This research aims at producing a model of the sustainable urban development formation by undertaking a complex analysis of micro, meso and macro environment factors affecting it and to present recommendations on the increase of its competitive ability.

2. IMPACT OF MICRO, MESO AND MACRO ENVIRONMENT ON SUSTAINABLE URBAN DEVELOPMENT

Micro, meso and macro environments have a direct impact on sustainable urban development opportunities. This may facilitate sustainable urban development or, on the contrary, it may create constraints. Until recently, researchers were unable to reach a unanimous conclusion as to the structure of factors of micro, meso and macro environments and therefore several variations can be found in articles and books on this subject.

Microeconomics deals with individuals and firms that are profitable in a market of scarcity. Further, it explains how the actions of all buyers and sellers determine prices and how prices influence the decisions and actions of individual buyers and sellers (Perloff, 2001). The microenvironment (households, firms, projects, labor skill's level, sources of finance, types of contracts, equipment, etc.) has a direct impact on sustainable urban development. Microenvironment is an aggregate of external forces. While trying to achieve its goals a city may influence these forces and vice versa and these forces may have an impact on the city. Mesoeconomics is the intermediate level (in Greek, meso means "median") between the microeconomic one and the macroeconomic one (Holland, 1987). The mesoeconomic approach may be considered as a supplement and not a replacement to the traditional analysis of micro- and macroeconomics (Preston, 1984). Mesoeconomics deal with entire sector economies and puts a focus on industrial structures in developed economies as well as the political dimensions of economic development and its policy formation (Preston, 1984). The efficiency of sustainable urban development depends on the following meso variable factors:

- Urban regulations,
- Urban size,
- Urban infrastructure,
- Urban landscape,
- Urban regeneration,
- Quality of the urban environment,
- Affordable and qualified housing,
- Housing needs,
- Inhabitants attitudes,
- Energy use,
- Land use,
- Social inclusion,
- Natural heritage resources,
- Built heritage resources,
- Viable city,
- City institutional structure, etc.

For example, according to Carassus (1999), construction's mesosystem is mediated by a large number of institutional regulations. These regulations may concern the structures (building permits, construction codes, product and service certification), the firms (firms standards, labor management, prices) and the

firm's environment (procurement methods, funding, tax, R&D support, education and training). These are defined and applied by a complex system of public institutions (international, national, regional, local) and private institutions (industrial, unions, consumer organizations).

Macroeconomics operates at a national economy level and deals with relations between average prices, employment, income, production, and the effects of taxes, government spending and budget etc. (Parkin, 2000).

The macro environment has an indirect effect on sustainable urban development. Macro environmental research is conducted in order to prepare an urban strategy and select urban strategy implementation measures. Such research makes it possible to determine the possibilities and shortcomings of sustainable urban development. This also makes it possible to see the positive aspects and the things that need to be changed in order to achieve better results. The success of sustainable urban development is directly linked to the level of the realization of goals of urban residents and enterprises.

The level of efficiency and the scope of activities of the sustainable urban development depend on the following macro-level variable factors:

- Employment,
- Income,
- Taxes,
- Interest rates,
- Inflation,
- The unofficial economy,
- Economic development,
- Economic prosperity,
- Globalization,
- Demographic changes,
- Education,
- Climate changes,
- Politics,
- The social sphere,
- Culture,
- Environmental issues,
- Poverty,
- Legislation,
- Demand and supply,
- The government's intervention,
- Etc.

The following short analysis illustrates how several macro environmental (economic, political and legal, technological, social-cultural and natural environment) factors influence sustainable urban development.

When analyzing the influence of economic environment on sustainable urban development (SUD) several patterns and trends may be singled out. The purchasing power and, consequently, demand is to a large extent determined by economic conditions, first of all by the level of income and savings of natural and legal persons, the level of prices, and the lending conditions. The main indicators illustrating the economic development are the cyclic nature of economic development, inflation and unemployment. They cause changes to other indicators, i.e. the increase or decrease in the level of GDP, buyers' income, level of accumulation, price of goods and the availability of credit facilities, etc. Inflation is a very important economic phenomenon and is characterized by an increase in the price level and a decrease in the purchasing power. Some researchers emphasize the importance of investment environment that is best described by the level of interest rates. Sometimes, unfavorable economic characteristics make it impossible to carry out successful SUD activities or necessitate an introduction of changes related to the sphere of activities.

The political and legal SUD environments consist of a legal basis of a city, the city's administrators and interested groups that influence and restrict the activities of various organizations and persons. Governmental and management institutions may issue legal acts creating more favorable conditions for certain types of enterprises or persons, encouraging investments or prohibiting or restricting certain activities. The government, by way of tax and social security systems, decides how to distribute national revenues and its assets. The government may influence the level of corpo-

rate expenditures by introducing indirect taxes (thereby causing a decrease in demand) and by granting subsidies (thereby causing a decrease in supply). It is up to the state to decide which branch of the industry will be encouraged or restricted by adopting the above-mentioned measures. The city's government may also introduce various measures encouraging or restricting foreign investment. Such measures may be introduced in the form of rights and guarantees that are provided for foreign investors and local tax systems.

The level of technology shows the potential of the city's market, the level of infrastructure development and the degree of urbanization. The level of technological development determines the qualification of personnel and a users' view on science and innovations. Technological environment is probably the most important factor that forms the future of cities. Huge investments are needed in order to carry out scientific research and create new technologies.

Urban social and cultural environment means institutions and other factors that help to form and perceive the main social values, views and behavioral norms. Human personality matures in a certain society and that determines his or her main values and beliefs. A later outlook on the life of a human being's influence his or her relations with other people. Cultural peculiarities influence the adoption of business decisions. Each society has its own set of values and beliefs. Most of these values and beliefs are strongly rooted in each person and these values influence our behavior and views in everyday life.

The natural environment (climatic conditions, natural resources, environment protection) also has an impact on the SUD. Many cities of the world suffer from a high level of air pollution and in some countries the shortage of water has become a major problem. Forests and other renewable resources are not used in a rational way in some part of the world. The level of air and water pollution in many cities of the world has reached dangerous levels. Also, the world is concerned about the depletion of the ozone layer and by the greenhouse effect, i.e. dangerous climate warming caused by the ozone hole. Many enterprises in transition countries, especially those that generate huge amounts of production waste, complain that it is too expensive for them to meet their obligations with regard to ecological requirements and to introduce new, environmentally friendly production technologies. Other enterprises address a public concern over environmental problems and have started to produce environmentally friendly products, have started using recyclable or biodegradable materials for their packaging and have modernized treatment facilities and introduced energy saving measures. However, at the time when some cities take decisive steps in order to protect their environment, other cities (usually the poorer ones) hardly do anything to solve these problems. The reason for this is usually a shortage of funds or the absence of political will.

3. STAKEHOLDERS AND THE EFFICIENCY OF ALTERNATIVES

It has been found that the more alternative versions that are investigated before making a final decision, then the greater the possibility to achieve a more rational end result. It is further possible to form many various SUD alternatives such as the following:

- Alternatives for social cohesion (ecologically sound, economically efficient and socially cohesive settlements, caring society, no poverty);
- Alternatives for the quality of life (more comfort, time, money; happy people, more pleasure, less work, reconstruction of settlement structure, revitaliza-tion of street spaces, confidence);
- Alternatives for the environment (a peaceful, cultural society; safe, pollution free, green environment; surroundings, public transport);
- Alternatives for the economy (full employment, innovative);

- Alternatives for the knowledge society (user driven integrated tools, equal access, e-democratization);
- Alternatives for decision-making (cooperation between authorities, access to information, participation, assessment tools);
- Alternatives of safety/security, etc.

The diversity of available solutions contrib utes to a more accurate evaluation of political, economic, social, cultural, institutional, tech nological, environmental, legal/regulatory, edu cation and other perspectives, as well as mak ing the sustainable urban development process cheaper. This also leads to a better satisfac tion of the needs of all the involved parties in the sustainable urban development process.

Stakeholders' decisions (urban planners, city administrators, elected representatives, architects, public or corporate owners of flats, etc.) can increase or decrease the efficiency of SUD alternatives. Therefore, the developed sustainable urban development model should integrate multiple points of view and make possible the collaboration of the different stakeholders that are involved in this process.

One of the main tasks of the efficient implementation of sustainable urban development is multiple criteria optimization of its life-cycle process with the aim to maximum the purpose satisfaction of all interested parties involved in the process. The interested parties and their aspired goals make up one entity. However, there are some potential conflicts among the interested parties: e.g. speed versus waste, cost versus quality, present capital cost versus the after operational efficiency, aesthetics and comfort versus cost and environment versus user needs, etc. It has been found that the greater the scope of the realization of the pursued goals (taking into account their significance) the greater (in the opinion of interested parties) the total efficiency of the sustainable urban development. In other words, the total efficiency of sustainable urban development is directly proportional to the entity of its realized goals.

The problem is how to define an efficient sustainable urban development process when many various parties are involved and because the alternative versions are in the thousands and the efficiency changes with alterations to the micro, meso and macro- environment conditions and the constituent parts of the process. Moreover, the realization of some objectives seems more rational from the economic perspective though from other perspectives (i.e. technological, comfort, space, administrative, technical, etc.) they have various different significances. Therefore, it is considered that the efficiency of a sustainable urban development process depends on the rationality of its stages as well as on the ability to satisfy the needs of the interested parties and the rational character of micro, meso and macro-level environments' conditions.

4. DECISION MAKING IN SUSTAINABLE URBAN DEVELOPMENT

A thorough sustainable urban development evaluation is quite difficult to undertake, because a city and its environment are complex systems (compatible with political, economic, social, cultural, institutional, technological, environmental, legal/regulatory, education situation, etc.) where all sub-systems influence the total efficiency of performance and where the interdependence between sub-systems play a significant role.

Many decision making models and methods (multicriteria (Nijkamp and Vreeker, 2000), a cost-benefit appraisal (Gallez, 2000), input-output analysis (Ferng, 2002), forecasting, quantitative and qualitative models and methods (Rotmans *et al*, 2000), etc.) have been used globally for solving different sustainability assessment problems. For example, in Peters' (1981) opinion, microeconomics can be analyzed by using demand, cost and production, market and price, competition and distribution of income theories; mesoeconomics - economic structure and change, regional economics, environmental economics, groups and associations, eco-

nomic and political theories; macroeconomics - national economic accounts, economic stability and growth, monetary, international trade and macroeconomic distribution theories.

The efficiency of a sustainable urban development variant is often determined by taking into account many different factors. These factors include an account of the political, economic, social, cultural, institutional, technological, environmental, legal/regulatory, education situation in country and other factors. The models should enable a decision-maker to do a comprehensive analysis of the available variants and to make a proper choice. In order effectively analyze alternatives of sustainable urban development and to prepare recommendations for cities under consideration, it is essential to find the best research methods and analysis tools. In this model, the aim was to direct the research methods and analysis tools (Multiple Criteria Analysis, Life Cycle Analysis, etc.) for assessing and implementing the goals of sustainable urban development.

5. MODEL FOR SUSTAINABLE URBAN DEVELOPMENT FORMATION

The level of efficiency and the scope of the activities in the sustainable urban development (SUD) depend on the many micro, meso and macro-level variable factors and all these variable factors can be optimized. The main objective of this model is to analyze the best experience in the field of SUD, to compare it to the present situation in a particular city and consequently to present particular recommendations.

This research included the following six stages.

Stage I. Identification and description of the sustainable urban development in developed countries and particular city:

- Determining a system of criteria characterizing the efficiency of sustainable urban development;
- Giving (based on a system of criteria) a description of the present state of sustainable urban development of developed countries and particular city in conceptual (textual, graphical, numerical, etc.) and quantitative forms. **Stage II.** Execution an efficient analysis of the gathered information and determination the best decisions of sustainable development in particular city using a multiple criteria decision making methods developed by authors (Zavadskas *et ai*, 1994, 1999; Zavadskas and Kaklauskas, 2000; Kaklauskas, 1996):

Stage III. A comparison of the sustainable urban development in developed countries and particular city:

- Identifying the global development trends (general regularities) of the sustainable urban development (see **Appendix 1);**
- Identifying sustainable urban development differences between developed countries and particular city;
- Determining pluses and minuses of these differences for particular city today and in the future;
- Determining the best practice for sustainable urban development for particular city as based on the actual conditions.

Stage IV. A multiple criteria analysis of the sustainable urban development's components and selection the most efficient versions. Incorporation the received compatible and rational components of a sustainable urban development into the full sustainable urban development process.

Stage V. Development of some general recommendations as how to improve the efficiency level of sustainability for particular city.

6. CONCLUSIONS

Model for sustainable urban development formation developed at Vilnius Gediminas Technical University enables a decision-maker to develop alternatives and to make a comprehensive analysis of the available variants so as to make a proper/best choice.

The more alternative versions that are in-

vestigated before making a final decision, the greater the possibility to achieve a more rational end result.

By basing oneself on the collected information it is possible to perform a multiple criteria analysis of the sustainable urban development's components (e.g. by increasing the international competitiveness of city, developing a new economy, creating an advanced society, developing of transportation infrastructure, etc.) and to select the most efficient versions.

Having performed a multiple criteria analysis of the full sustainable urban development process in this way, one can then select the most efficient versions.

A formalized presentation of the research shows how changes in the environment and the extent to which the goals pursued by various interested parties are satisfied, cause corresponding changes in the value and utility degree of the sustainable urban development process. With this in mind, it is possible to solve the problem of optimization concerning the satisfaction of the needs and with reasonable expenditures. This requires an analysis of the sustainable urban development process versions that allow one to find an optimal combination of the pursued goals and the available finances.

REFERENCES

Anderson, L. M., Charles, J. S., Fullilove, M. T., Scrimshaw, S. C, Fielding, J. E. and Normand, J. (2003) Providing affordable family housing and reducing residential segregation by income: A systematic review. *American Journal of Preventive Medicine,* 24(3), p. 47-67.

Benenson, A. (1998) Multi-agent simulations of residential dynamics in the city. *Computers, Environment and Urban Systems,* 22(1), p. 25-42.

Capello, R. and Faggian, A. (2002) An economic-ecological model of urban growth and urban externalities: empirical evidence from Italy. *Ecological Economics,* 40(2), p. 181-198.

Carassus, J. (1999) Construction system: from a flow analysis to a stock approach. In: Ruddock, L. (Ed), *Macroeconomic issues, models and methodologies for the construction sector.* CIB, Rotterdam, p. 17-29.

Carsjens, G. J. and van der Knaap, W. (2002) Strategic land-use allocation: dealing with spatial relationships and fragmentation of agriculture. *Landscape and Urban Planning,* 58(2-4), p. 171-179.

Chung, Y. P. (1996) Gender earnings differentials in Hong Kong: The effect of the state, education, and employment. *Economics of Education Review,* 15(3) p. 231-243.

Couch, C. and Dennemann, A. (2000) Urban regeneration and sustainable development in Britain: The example of the Liverpool Ropewalks Partnership. *Cities,* 17(2) p. 137-147.

Deci, Z. (1996) The Open Door Policy and Urban Development in China *Habitat International,* 20(4), p. 525-529.

Fekade, W. (2000) Deficits of formal urban land management and informal responses under rapid urban growth, an international perspective. *Habitat International,* 24(2), p. 127-150.

Ferguson, C A. and Khan, M. A. (1992) Protecting farm land near cities: Trade-offs with affordable housing in Hawaii. *Land Use Policy,* 9(4), p. 259-271.

Ferng, J. J. (2002) Tbward a scenario analysis framework for energy footprints. *Ecological Economics,* 40(1), p. 53-69.

Firman, T (1998) The restructuring of Jakarta Metropolitan Area: A "global city" in Asia. *Cities,* 15(4), p. 229-243.

Gallez, C. (2000) Indicators for comparing prospective scenarios: Can we broaden the urban travel debate? *Recherce - Transports - Securite.*

Hadjieva-Zaharieva, R., Dimitrova, E. and Buyle-Bodin, F. (2003) Building waste management in Bulgaria: challenges and opportunities. *Waste Management,* 23(8), p. 749-761.

Hall, P. (1987) Urban development and the future of tourism. *Tourism Management,* 8(2), p. 129-130.

Henderson, V. (2002) Urban primacy, external costs, and quality of life. *Resource and Energy Economics,* 24(1-2), p. 95-106.

Holland, S. (1987) *The Market economy, From Micro to Mesoeconomics,* Weidenfeld and Nicolson, London.

Kaklauskas, A. (1996) Total life analysis, modeling and forecasting of construction in Lithuania. *Research output, EC PHARE-ACE Programme,* Vilnius.

Keyes D. L. (1982) Energy for travel: The influence of urban development patterns. *Transportation Research,* 16(1), p. 65-70.

LaGro, A. (1994) Population growth beyond the urban fringe: implications for rural land use policy. *Landscape and Urban Planning,* 28(2-3), p. 143-158.

Macintyre, S., Ellaway, A., Hiscock, R., Kearns, A., Der, G. and McKay, L. (2003) What features of the home and the area might help to explain observed relationships between housing tenure and health? Evidence from the west of Scotland. *Health & Place,* 9(3) p. 207-218.

Marquez, O. and Maheepala, S. (1996) An object-oriented approach to the integrated planning of urban development and utility services. *Computers, Environment and Urban Systems,* 20(4-5), p. 303-312.

Moustapha, R, Costa R J. and Noble, A. G. (1985) Urban development in Saudi Arabia: Building and subdivision codes. *Cities,* 2(2), p. 140-148.

Nijkamp, P. and Vreeker, R. (2000) Sustainability assessment of development scenarios: methodology and application to Thailand. *Ecological Economics,* 33(1), 7-27.

Parkin, M. (2000) *Economics,* Addison Wesley Longmann, Harlow.

Perloff, J. M. (2001) *Microeconomics,* Addison Wesley Longmann, Harlow.

Peters, H. R. (1981) Mesoeconomic Theory of Structural Policy in the New Political Economy, *Wirtschaftdienst.*

Preston, L. E. (1984) A Perspective on Meso-economics. *Discussion Papers University of Maryland.*

Recatala, J. R. I., Baird, I. A., Hamilton, N. and Sanchez, J. (2000) Land-use planning in the Valencian Mediterranean Region: Using LUPIS to generate issue relevant plans. *Journal of Environmental Management,* 59(3), p. 169-184.

Rondinelli, D. A. (1991) Asian urban development policies in the 1990s: From growth control to urban diffusion. *World Development, 19(7),* p. 791-803.

Rotmane, J., Asselt, M., Anastasi, C, Greeuw, S., Mellors, J., Peters, S., Rothman, D. and Rijkens, N. (2000) Visions for a sustainable Europe. *Futures,* 32(9-10), p. 809-831.

Savage, V. R. and Kong, L. (1993) Urban constraints, political imperatives: environmental design in Singapore. *Landscape and Urban Planning,* 25(1-2), p. 37-52.

Sentosa, L. S. (2001) Genius loci within Balinėse dwellings environments: the unlikely scenarios of urban development in Bali. *Habitat International,* 25(2), p. 255-272.

Tansel, A. (2002) Determinants of school attainment of boys and girls in Turkey: individual, household and community factors. *Economics of Education Review,* 21(5), p. 455—470.

Tyler, S. R. (1996) Household energy use in Asian cities: responding to development success. *Atmospheric Environment,* 30(5), p. 809-816.

Willoughby, C. (2001) Singapore's motorization policies 1960-2000. *Transport Policy,* 8(2), p. 125-139.

Zavadskas, E. K. and Kaklauskas, A. (2000) Efficiency increase in research and studies while applying up-to-date information technologies. *Statyba (Civil Engineering),* 6(6), p. 397-414.

Zavadskas, E. K., Kaklauskas, A. and Banaitis A. (1999) Analysis, modelling and forecasting of housing credit access. *Real Estate Valuation and Investment,* 3(2), p. 101-118.

Zavadskas, E. K., Peldschus, R and Kaklauskas, A. (1994) *Multiple criteria evaluation of projects in construction,* Technika, Vilnius.

Zavadskas, E. K, Rutkauskas, A. V and Kaklauskas, A. (1999) Development of rational model for Lithuanian construction industry. *Statyba (Civil Engineering),* 5(2), p. 123-134 (in Lithuanian).

APPENDIX 1

Identification of the global development trends (general regularities) of the sustainable urban development

Factors and their trends	
Globalization processes	Globalisation process is so influential that almost no major cities remain unaffected, and has in turn given birth to "global cities", the term recently used to describe the development of large cities in the world in light of global economic restructuring - a process of shifts in the international division of labor and concomitant changes in the production system and social regulation institutions. The recent economic and monetary crises which badly hit Indonesia, however, basically show that the globalization does not only have positive impacts but also can have negative impacts on urban development (Firman, 1998). Since the implementation of the Open Door Policy in China, the Chinese economy has been actively involved in the world economy, and has played a more important and influential role in the global economic structure than previously. This tendency has a great effect on Chinese domestic economic development and urban development (Deci, 1996).
Efficient urban size	Among other factors, it is suggested that urban sustainability is also correlated to efficient urban size (Capello and Faggian, 2002).Tolley identified and started to measure private and social costs and benefits of increases in city sizes, with a suggestion that in larger cities in the US, it appeared that the social marginal costs exceeded the social marginal benefits, implying that these cities tended to be oversized. For any city, its optimal size is elusive - highly sensitive to its composition of production, its geographic and regional setting, the quality of governance and administration available to it, and its population composition and demographics (Henderson, 2002).
Demographic changes	Transition-country cities need urgently to find new ways of raising financial resources to meet the huge needs arising from population resettlement (Willoughby, 2001).
Provision of affordable and qualified housing by low- and moderate-income households	Public housing programs, sites and services and upgrading have all been attempted as ways of meeting the housing needs of the population with limited success. Yet over time, informal settlements do improve in quality, providing satisfactory living conditions for a large proportion of the urban population (Fekade, 2000). The Department of Housing and Urban Development established quantitative Affordable Housing Goals requiring the Government Sponsored Enterprises (GSEs) to increase their purchases of mortgages originated by low- and moderate-income households and for homes located in low-income neighborhoods. The goals increased the supply of mortgage credit available to low- and moderate-income households, after controlling for other mortgage market factors (Anderson et al., 2003).
Diffusion of urban growth	Most governments now recognize that diffusion of urban growth, rather than its control and suppression, is essential for economic development. Policies aimed at creating a "balanced" pattern of urban development in Asian countries over the past three decades have largely failed. Programs to slow rural-urban migration and to control the expansion of metropolitan areas fell far short of their goals. Most governments now recognize that diffusion of urban growth, rather than its control and suppression, is essential for economic development (Rondinelli, 1991).

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Factors and their trends

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Tourism

Tourism can play an important part in economic development strategies for many older cities by providing jobs, but cities will also have to provide improved quality of life in the form of, eg restaurants, shops, activities and entertainment (Hall, 1987).

Changing of inhabitants attitudes

Inhabitants can change their residential behavior depending on the properties of their neighborhood, neighbors and the whole city (Benenson, 1998).

The global village patterns of Tihingan, an village characterized by high kinship differentiation, reveals that the weakening village boundaries and the changing spatial connectivity between houseyards are directly related to the weakening social differentiation between rival kin-groups and between different castes (Sentosa, 2001).

Optimization of electricity use

For electricity use, where there is evidence of dramatic increases in household consumption, the longer term implications for atmospheric emissions are troubling. Improving technologies of electricity use in the household sector appears to be easily achievable and could be stimulated through market and policy mechanisms which have been used elsewhere. These measures offer the prospect of real environmental and economic gains without sacrificing lifestyle advantages of electrical appliance use in households (Tyler, 1996).

Rationalization of land use

The rapid growth in population and urban land use has been greater than the nation's capacity to plan and absorb population in a systematic manner (Moustapha et al., 1985).

In protecting farm land near cities, policy makers must balance the interests of farmers against affordable housing demands of the urban population (Ferguson and Khan, 1992).

Population growth and redistribution generate urban development in both metropolitan and non-metropolitan counties throughout the USA. Land use policies designed to protect environmental quality in urbanizing landscapes should focus, therefore, on accomplishing at least three objectives: (1) minimize further fragmentation of the ecological infrastructure; (2) restore, where practical, severed linkages in the ecological infrastructure; and (3) guide new development to locations near existing urban centers (LaGro, 1994).

The Valencian Mediterranean Region is one of the most dynamic regions of Spain in terms of industrial - urban development, population growth and agrarian activity. Consequently, land-use conflicts (agrarian uses vs. industrial-urban uses vs. conservation uses) and environmental issues (surface and underground water pollution, soil and air pollution, soil erosion and salinisation, landscape degradation and deterioration of areas of high conservation value) are emerging increasingly in this region. Comprehensive land-use planning can play a vital role in solving land-use conflicts in the region (Recatala et al., 2000).

In the Netherlands, a debate continues to take place on how to allocate the available space among several types of land use. The rural area is under constant pressure from urban developments. Multi-purpose land use is becoming more and more important. Typically, however, the analysis of topological relationships, initiated by biophysical and socio-economic processes, and the spatial configuration of different land uses, is often neglected, especially for agricultural planning. Neglecting the spatial configuration and these relationships can result in spatial fragmentation of land use, thus endangering sustainable land use (Carsjens and van der Knaap, 2002).

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Factors and their trends

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Optimization urban infrastructure

Rising energy prices and supply shortfalls have underscored the need to improve the energy efficiency of urban travel. To test the degree to which altering development patterns may effect transport energy savings, relationships between gasoline consumption and urban development characteristics were investigated in 49 U.S. metropolitan areas. The results suggest that cities of medium size with clusters of high residential densities are associated with lower levels of per capita gasoline consumption (Keyes, 1982).

An object-oriented model for the integrated planning and management of land resources and utilities-related services facilitates thorough evaluation of scenarios involving land use, and delivery of utilities such as water, gas, telephone and electricity. It therefore provides a mechanism for generating alternative urban development patterns in search of lower utility costs (Marquez and Maheepala, 1996).

Pollution minimization

Building waste recycling as aggregates is a modern approach for preventing environmental pollution through both reducing the stocks of waste and decreasing the use of natural aggregates. The main preliminary conditions for developing the recycling activity are: streams of building waste, experience in recycling, technical and environmental standardization, appropriate technologies, etc. (Hadjieva-Zaharieva *et. al.,* 2003).

Cities are complex ecosystems and, all over the world, they are increasingly confronted with environmental problems such as air pollution, acid rain, smog, water shortages and garbage disposal. Singapore illustrate how urban development and successful environmental management can occur concurrently, precisely because of the presence of enlightened elites and decision makers and firm government. The nature of environmental changes in the post-Independence years, including the cleaning up and greening of landscapes, the urban planning and resultant transformation to a built-up landscape, and the increasing concern with conservation of the landscape, both natural and historical. All this has been practically feasible because of the continuing social education and engineering of social behaviour and attitudes regarding environmental issues through mass media, campaigns and legal binds (Savage and Kong, 1993).

Urban regeneration

It was explored the role of dwelling conditions and neighbourhood characteristics in explaining the frequently observed association between housing tenure and health. The health measures were limiting long-standing illness, self-assessed health, recent symptoms, and anxiety and depression, features of the dwelling and its surroundings help to explain observed associations between tenure and health in the UK, and that housing and area problems may be particularly important. Housing improvements and urban regeneration may help to reduce the health gap between housing tenures, and more generally to reduce inequalities in health (Macintyre et al., 2003).A11 urban regeneration contributes to sustainable development through the recycling of derelict land and buildings, reducing demand for peripheral development and facilitating the development of more compact cities (Couch and Dennemann, 2000).

Increasing of education level

Recent literature documents the important role of education in economic development emphasizing its contribution to economic growth, individual and social development (Tansel, 2002).The Human Capital theory predicts a "trickling down" effect of education expansion on earnings equalization. Through education expansion and employment legislation, the state can reduce earnings differentials. By decomposing the determinants of earnings differentials into their "attribute-quantity" and "attribute-price" effects, education expansion for females has reduced gender earnings differentials (Chung, 1996).