D o s s i e r E d i t o r i a l

Quantitative models in planning

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I[st] National Symposium on Quantitative Models in Planning aims to bring together students, researchers, public officials, private sector professionals, software developers, and professional organizations that use and develop quantitative methods for planning of settlements and generating development strategies. The symposium stimulates new approaches to planning and design by constructing an interdisciplinary discussion platform. The sessions are titled: The Evolution of Quantitative Models in Planning, Spatial Analysis, GIS and Planning, Quantitative Model Development, Water Reservoir Planning and Modeling and Transportation Modeling.

The uses of computers along with numerical models and city simulations have facilitated various methods to explain development phenomena, development trends and growth prediction since 1950s.

The first attempt of numerical modeling was made in the Land Use Estimation studies for metropolitan area transportation planning. Models such as the Chicago Area Transportation model, Detroit Urban Simulation Model were designed to simulate the main changes in the structure of urban space in 10-50 year periods. These models demonstrate the effects of spatial structures, employment and population growth, income growth, changes in transportation technology and the long-term trends in spatial distribution of employment. Under the title of Econometric Models for planning, a prototype model was developed by Herbert-Stevens in the 1960s based on the linear programming for the estimation of residential areas. As a result of this, a new understanding in theoretical and experimental researches has emerged in connection with the economies of city planning. In the mid-1960s, an empirical model was developed to estimate the spatial distribution of population and employment by the Boston Regional Transportation study. Meanwhile the Gravity models were developed to estimate land-use, after the work of Ira S. Lowry "The Lowry Model", in 1961. The model was developed to predict where the labor force and others serving to industry could settle and how the transportation network would work. In 1971 and 1973, Batty revealed the differences between sub-

regional scale models and city scale models, and proposed a housing market model by combining first demand model with gravity type spatial distribution model. Since the early 1980s, Cellular Automata based Land Use Simulation Models have been developed to explain the urban systems. Tobler, with his work in 1979, was the first person who proposes the cellular approach in geographic modeling. In 1996 Batty and Xie developed the Cellular Automata Model for both land use samples and an integrated transportation network modeling. New numerical models were developed in 1990, 1992 and 1996 by Violave Cecchini, in 1995 and 1997 by Portugal, in 1993 and 1997 by Benenson, Engelen and White, and in 2001 by Yüzer. Their models were based on physical data and cellular neighboring relations, where densities and urban texture were used in determining the cellular urban form. These models were used to simulate the growth of urban areas.

While economists and geographers were found of the economic and socio-economic impact assessment methods since the 1950s, the politicians, local authorities and decision-making bodies were eager to see in which direction and size their projects and investment decisions would have affected the urban system. Subsequently, scientists have developed a variety of methods to understand the potential effects of projects and investment decisions in advance. Despite the frequent use of these methods all over the world, the modeling did not evolve in Turkey the same pace due to difficulties in the provision of numerical data, not having linguistic unity among existing data, lack of researchers working in this field, and lack of legal instruments that encourage the use of socio-economic impact assessment methods in the planning system.

One of the most important activities of planning involve defining urban growth and its change processes, investigating its effects and different sizes, and making predictions in order to control urban expansion. In the recent years, the importance of the relationship between land use and environmental quality are often stressed. Decision making between alternatives and strategy development are other major responsibility of a planner. Issues such as conflict resolution, achieving consensus between the actors and/or strategies are closely related to planning. Because the aforementioned tasks requires an intensive spatial data processing, analysis and reporting, the models frequently referenced in planning studies rely on remote sensing technology, geographic information systems and their related methods.

Use of planning decision support systems developed under information technology is becoming increasingly common. Decision support systems in planning can be divided into different types based on their technique and application areas such as large urban scale models, rule-based, case-based and cellular automata methods. The main areas of application include making predictions of land use change, developing versatile projections, and enabling visualization and evaluation of impact.

City planners should be able to use this software as a subsidiary tool in decision-making problems they meet by obtaining adequate information about developed decision-support system software. Rather than solving each of the problem with a single software, preferring a software will allow more accurate results to the solution of the problem and in many problems open to debate with the planner's expertise, scientific, objective approach, it will assist in taking decisions based on real data,

On the other hand, the model applications related to cities must be in harmony with the national and regional development plans and programs in macro and strategic scale.

Whether with the principle of deductive or inductive, the hierarchical use of numerical models in the development of policies, decisions, spatial relationships, and strategies are one of the most important tools in the efficient and effective assessment and monitoring of the country's resources and improving quality of life.

Concepts such as environmentally sensitive planning and sustainable development for the protection of natural and cultural heritage are the main themes of the planning studies in Europe. The European Union, in the close future, will introduce planning standards that rely on modeling and simulation techniques for generating possible future development schemes of cities, clarifying the natural, physical, and social transformations, and determining the positive and negative effects of the developments of settlements on the natural and cultural landscapes. In this context, development of numerical modeling and simulation techniques combined with social, economic, and physical elements of the settlements in Turkey will facilitate unity of language in education, compatibility with the European standards, and integration of economic and political relations at the global scale.

Since the beginning of the planning education, the uses of both quantitative and qualitative methods are common. However, the use of models in the training programs is still insufficient despite the advances in the relevant technologies. The new arrangements should be made to increase the knowledge and skills required by the modeling process in education programs. In this context, the academic, cultural and technological environments need to be improved.

"Ist National Symposium on Quantitative Models in Planning has assumed the role of information dissemination and raising awareness about the use of numerical methods and latest technology towards creating healthy cities in a multidisciplinary environment. With the participation of different disciplines at universities, professional chambers, the Local Government and the State Planning Organization, this kind of periodic meetings are important to develop new research and applications related to the subject in Turkey and to follow developments in the world.