Urban Information Systems in Turkish Local Governments

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INTRODUCTION

Since the end of 1980s, different sectors have implemented geographical information systems (GIS) in Turkey. A study on GIS market in Turkey indicates that municipalities are the primary customers (Gülersoy & Yigiter, 1999). One of the earliest GIS projects in Turkey began with the production of digital maps covering the boundaries of Istanbul Metropolitan Municipality in 1987. Since 1994, a rapid development process has occurred with the widespread diffusion of GIS especially in universities and large public sector organizations respectively. However, the early city-wide municipal GIS projects were initiated only after 1996 (Ucuzal, 1999). In recent years, a major change has occurred in the context of GIS projects from small-scale infrastructure projects to city-wide municipal GIS projects for three reasons:

1. After the devastating earthquake in Marmara region in 1999, people suffered from the lack of vitally important information, because such information never existed or was never kept in a systematic way. The importance of accumulation and distribution of up-to-date and accurate data among city-wide organizations was recognized (Tecim, 2001);
2. Rapid development of Internet in Turkey in recent years encouraged the communication efforts within and among the organizations, and among people and organizations, and this triggered the need for inter-organizational GIS (Karas, 2001);
3. Initiatives supporting e-municipality and e-government, and transition from government to governance raised the importance of transparency, communication, and public accountability (Tüzün & Sezer, 2002). In this sense, the concept of "urban information system" (UIS) began to be popular in the context of local governments. At the time of publication, UIS was used as an umbrella term encapsulating all the efforts for an information system—whether GIS or LIS—or information technologies like the Internet within an integrated system that is supposed to be performed in municipal operations in order to support organizational rationality.

Although so-called urban information systems were being marketed by vendors as the panacea for all problems, the implementation of large-scale information systems generally ended up with failure because information systems (IS) require large changes in the organization's existing structure. In the Turkish case, no municipality has been able to complete establishing a city-wide urban information system so far. Ankara, Istanbul, and Bursa are the cities, where implementation processes are still underway (Celik, 2002). Therefore, there needs to be case studies to address implementation problems of UIS and to evaluate the reasons behind the failures.

In this article, the emphasis will be given upon organizational and political aspects of UIS implementation that is critical for the success and failure of such systems. For this purpose, the approach adopted rests on the assumption that "the success or failure of IS projects is dependent on the degree of mismatch between the conceptions of these systems and the organizational realities into which it is introduced" (Heeks, 1999). In the rest of the article, based on Heeks's argument, the assessment of these gaps is evidenced in the case of Turkish metropolitan municipalities, and further evaluations are made guiding further projects and studies.

ORGANIZATIONAL CONTEXT OF INFORMATION SYSTEMS

Information systems today play a vital role in businesses, governments, and other organizations. Because they are so closely tied to organizations, it is necessary to closely understand the nature of organizational realities. Public sector organizations like municipalities are the single largest collector, user, holder and producer of information. The work of these organizations is thus very information-intensive.

Municipalities are responsible for providing the basic urban services (i.e., infrastructure development, fire department operations, garbage collection, planning services, etc.) to the public that requires collecting accurate information about environment and efficient use of this data to perform municipal tasks. The capability for planning, programming and decision making in the municipali-

ties is largely dependent on the collecting, storing, preserving and managing of the spatial information. Municipalities collect and manage both spatial data (i.e., district plan, base maps and cadastre maps) and non-spatial data (i.e., water-system revenues, environmental taxation and building permissions) in their operations. Almost 80% of total data exploited by municipalities are "spatial data". Thanks to advancing technology municipalities are increasingly using geographic information systems (GIS), management information systems (MIS), and the Internet to carry out municipal tasks and services more efficiently. By combining many of the municipal services into an urban information system, the aim is to obtain service unity, reduce service costs and increase revenues.

Information systems differ from information technologies in that they involve people and their actions. Further, they incorporate a set of rational structures, processes and even culture and strategies for the operation (Campbell & McGrath, 2003). Thus, changes in the organizational context are required for information systems to operate rationally.

Considerable declines in the price of information technologies and the increased capacities of technological innovations in supporting municipal tasks and services have increased the implementation of urban information systems (UIS) in Turkish municipalities. Although considerable resources were allocated for UIS projects, a great many "implementation failures" are experienced due to the lack of required interest during the implementation process. Despite the promise of supporting the organizational rationality, the aim of many UIS projects is to get prestige. Municipalities tend to favor large, complex UIS projects supported by generous funding. But the continually changing political context brings an end to the projects started because of prestige, but not supported by organizational rationality.

In this context, Heeks's ITPOSMO model, based on conception-reality gap assessment, allows a suitable framework to reveal the mismatch between the concept of hard-rational design of information systems and soft political realities of organizations.

ITPOSMO DIMENSIONS OF INFORMATION SYSTEM

Richard Heeks's (1999) model of conception-reality gap assessment is an effective technique, which helps to illuminate the causes of an implementation outcome in organizations (Kouroubali, 2002). According to Heeks, there are conception-reality gaps in implementation process of urban information systems. Successful adoption depends on the size of these gaps: "the larger the gap, the greater the risk of failure" (Heeks, 1999, p. 59). After a review of a number of case studies, he concludes that gaps between conceptions and reality can be classified into seven categories summarized by the I-T-P-O-S-M-O acronym:

- **Information:** Provided by the system versus actual information needs, and the extent to which the organization can access the information.
- **Technology:** Technological capacity required for participation and actual technology capacity of target organizations.
- **Process:** Technology features in relation to existing processes.
- **Objectives and values:** In accordance with the objectives and values incorporated in the system in relation to objectives and values of users.
- **Staffing and skills:** How well the system fits with human capability requirements.
- **Management and structures:** How well the system fits within existing organizational structures.
- **Other resources:** How available resources such as time and money match with required ones (Heeks, 2001).

Heeks's model of conception-reality gap based on ITPOSMO dimensions has a great value for the following case study section for three reasons:

1. Conception-reality gap assessment is derived from world-wide examples of IS implementations particularly from the public sector organizations and those of many developing countries;
2. ITPOSMO model has the value to being able to examine the reasons why the introduction of information system projects in similar organizational settings results in a various degrees of success or failure;
3. A knowledge base consisting of ITPOSMO dimensions creates opportunities to share and communicate the reasons of success and failure of different cases systematically.

Further clarifications on the pros and cons of the technique are discussed by Heeks elsewhere (Heeks, 2003).

BURSA URBAN INFORMATION SYSTEM (BUIS)

As mentioned in the previous section, efforts to implement Urban Information Systems (UIS) in Turkish municipalities are in infant stages so there is value in carefully documenting implementation process. The Bursa Urban