

# Online Urban Information Systems

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## INTRODUCTION

Countless factors affect the inner workings of a city, so in an attempt to gain an understanding of place and making sound decisions, planners need to utilize decision support systems (DSS) or planning support systems (PSS). PSS were originally developed as DSS in academia for experimental purposes, but like many other technologies, they became one of the most innovative technologies in parallel to rapid developments in software engineering as well as developments and advances in networks and hardware. Particularly, in the last decade, the awareness of PSS have been dramatically heightened with the increasing demand for a better, more reliable and furthermore a transparent decision-making process (Klosterman, Siebert, Hoque, Kim, & Parveen, 2003). Urban planning as an act has quite different perspective from the PSS point of view. The unique nature of planning requires that spatial dimension must be considered within the context of PSS. Additionally, the rapid changes in socio-economic structure cannot be easily monitored or controlled without an effective PSS.

Various cities in the world have been developing geographic information systems (GIS) as PSS tools, which have the ability to map a city and include a substantial amount of geographic and spatial data in the system.

Local governments which have invested a great amount of money and countless hours of labor in setting up their GIS files, for the most part, used to not want to give the information out free with minimal costs. But nowadays many local governments have started to understand the importance of public participation in environmental and urban planning issues. In the course of time, public opinions and feedback have started to gain more importance in local governance. Regarding to this increasing importance, some of the local governments began to share their urban information systems (UIS) with the public.

One of the elements that many UIS have in common is that they utilize GIS. One of the obvious reasons that GIS provide benefits for urban and environmental planners is their ability to integrate diverse data sets under a common spatial theme. This is not surprising since the organization and management of urban and environmental data often has a strong spatial element to it. Furthermore, GIS are the only technologies that offer computerized spatial query and spatial analysis in an effective manner. Since an UIS may commonly be required to integrate diverse data sets and since urban and environmental problems have an inherently spatial nature, it is no surprise that GIS play such a key role in UIS (Craig, 1998; Kingston, Carver, Evans, & Turton, 2000; Nedovic-Budic, 2000; Ziliaskopoulos & Waller, 2000; Tripathy, 2002).

This article introduces a new approach to online information sharing between local administrations/institutions and the public. This approach, referred as a 'community based WebGIS' (CIGA), is a Web-based public participatory GIS model that aims to integrate a public oriented interactive PSS for urban and environmental planning processes. A pilot application of this online UIS has been developed for the Shibuya City, Japan. The details of this approach and pilot project are presented in the subsequent sections following the background information on PSS and WebGIS.

## BACKGROUND

Geertman (2001) defines PSS as "systems that have been developed and are being used to support current practice in any public or private sector planning context at any spatial scale. In fact, PSS is a term that refers to the diversity of geo-technology tools, which are primarily developed to support planning processes both in terms of derivation and evaluation of alternative futures."

PSS are one of the most significant developments in urban planning technology in the last decade. PSS

have become a major research area in the field of planning starting early 1990s with the advancement in GIS. There have been ongoing efforts to integrate PSS models into GIS and several GIS software already have tools to facilitate PSS functionalities such as what-if, index, and CommunityViz for ArcGIS.

However, developments in PSS are still in early phases and need to be developed to incorporate other related technologies for example WebGIS services (Yigitcanlar, Baum, & Stimson, 2003). Rapid developments on WebGIS are constantly changing the way people obtain, share and use spatial information to be a part of decision-making process (Peng & Tsou, 2003). All these efforts bring up a quite challenging subject which requires radical changes in which the ways planning procedure is carried out. On the one hand, the organizational structure of plan making process should be re-defined to make people enable as *stake-holders* and *parts* and on the other hand PSS should be flexible to include feedbacks from *stake-holders* (Geertman, 2002).

Furthermore, well-known time-space continuity is another challenging topic in GIS-based PSS. Information stored in the geographic information database often represents the reflection of present. In other words, information in GIS gives us the snap-shot of *real-world*. However, urban phenomena are rapidly

changing and any GIS and GIS-based PSS should be able to process spatio-temporality issue. The new generation GIS processes temporal information and tracks dynamic changes in a complex urban environment.

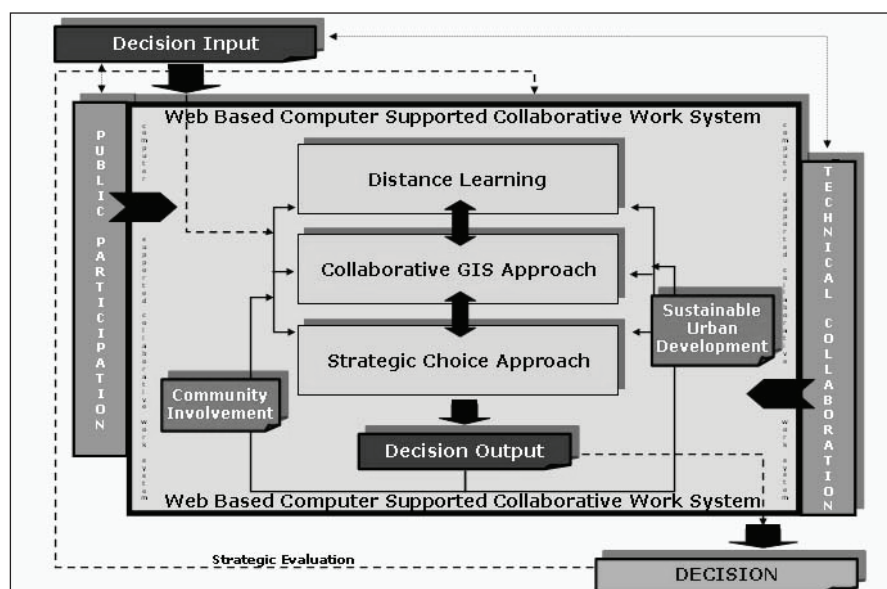
## Community Based WebGIS Approach

CIGA is a Web based support system for collaborative decision-making and discussion. It enables various users, such as the public, technicians, and decision makers to obtain and share information interactively on their environs at different levels, scales, aspects, and details. It also facilitates these users to participate in problem solving and decision-making stages of the community based planning process (Figure 1).

The system architecture of CIGA, therefore, comprises of a computer supported collaborative work system with clients and servers distributed across the internet as an open forum for all collaborators. System architecture of CIGA can easily accommodate all of the relational infrastructures between planning committees, community centers, and individual collaborators. These infrastructures also enclose transparent, secure, fast, and cooperative network configurations.

Collaborative system architecture includes both infrastructures and specific applications for supporting collaboration. CIGA decomposed the functionality of

Figure 1. Community based WebGIS approach



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