

INTERNET BASED PLANNING INFORMATION SYSTEMS AS A SUPPORTING TOOL FOR URBAN PLANNING PROCESS

Hany ELGENDY

(M.Sc. Hany ELGENDY, Institut für Städtebau und Landesplanung, Uni Karlsruhe (TH), D-76128 Karlsruhe, Kaiserstraße 12, Email: hany.gendy@isl.uni-karlsruhe.de)

1 ABSTRACT

Information flow during spatial planning is an important and complicated issue. This complication emerged from the huge amounts of information which are circulated among different actors. This information is not only fragmented but also changing in nature. In such circumstances getting an overview to major issues might become a difficult task for planners and decision makers. To overcome this problem a "Planning Information System - PIS" is introduced as an Internet - based, dynamic, distributed and problem oriented platform that links different agencies and actors within a specific region. This paper will discuss theoretical aspects in developing planning information systems, technical aspects and an experiment of developing a planning information system.

2 PROBLEM DESCRIPTION

In drawing the theoretical framework of planning information systems three major issues will be discussed : the regional conflict and information; the nature of planning information in the modern region; and the conventional use of information systems in planning .

2.1 The regional conflict and information:

The regional conflict could be described as a four dimensional conflict. The first dimension covers the relation between the regional level of planning and other levels. This dimension could be called " inter-level" dimension. The second covers the relation between a region specific plans and the effect of these plans on other regions and vice- versa. This dimension could be called "inter-region" dimension. The third covers the relation between different actors inside a specific region who act and participate in planning, implementation and urban management related tasks. This dimension could be called "inter-actor" and "inter-disciplinary" dimension. The fourth dimension is the time where planner should look to the past and the present trends and plan for the future.

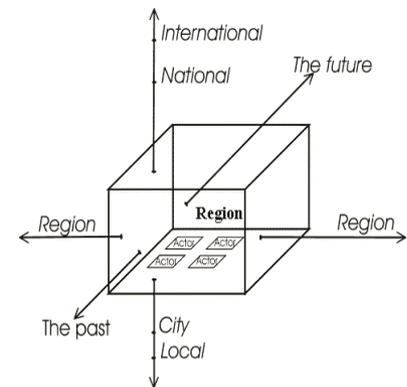


Fig. 1. The dimensions of the regional conflict

While this conflicting situation effects all components and phases of the planning and implementation process, this complication increases in the process of planning information flow among all participating actors.

The importance of information in planning and decision making is an essential and basic pre – requirement. Devas argues that the ability to make appropriate decisions and effectively administrate depends, amongst other things, on the availability of information [Devas & Rakodi 1993]. It is also argued that “ Information has been and always will be the corner stone of Urban and Regional Planning.” [Ian Bracken 1990, P 10].

In a simplified planning situation where in all these dimensions only four actors are assumed to be involved in the planning process: actor (A – regional planning agency), that is running a regional planning process and should co-ordinate with actor (B – higher level planning agency); actor (C – neighbour region) and actor (D – local planning agency). In this simplified process information will be circulated among these actors.

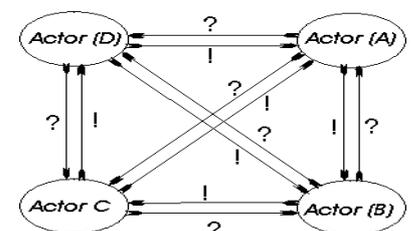


Fig. 2. Information flow in a simplified situation

In the best scenario, where each of these actors knows which information is needed, where this information is available and which process is needed to obtain it, clearly, the volume of information passing among those actors might be extremely large. However, gathering, generation, organising, channelling and dissemination of this information will need huge amount of resources. Part of the management task is to decide how much information is necessary, which information most valuable, how it is to be used and how it can most efficiently be collected. Hence, not to equate "more" information with "effective" and to avoid planners' and decision-maker's plea "... If only there were more information.." [Devas & Rakodi 1993, P. 9].

Regarding the interdisciplinary nature of spatial planning and the differentiation of roles among different public agencies as well as private actors, Scholl argues that in a complex regional planning situation it is possible that 30 to 50 actors are participating in the process, which means that different urban development activities, potentials and problems takes place in the region, simultaneously, while the ownership or responsibility is distributed among different authorities. Among these region oriented activities some of these activities might be disturbing, interfering, connected, complementary, or pre- request for another activity [Scholl 1995].

In this situation many uncertainties exists regarding the creditability of information flow: Would each actor make contacts with all other actors to check their activities and future plans regarding the region? If this happened we should think about how much information will be circulated and how much resources will be devoted to gathering and organising these information by each actor? What will be the situation if an actor ignored co-ordination with some activity that is taking place in the region because he has no information about this activity or because this activity may effect his interests negatively.

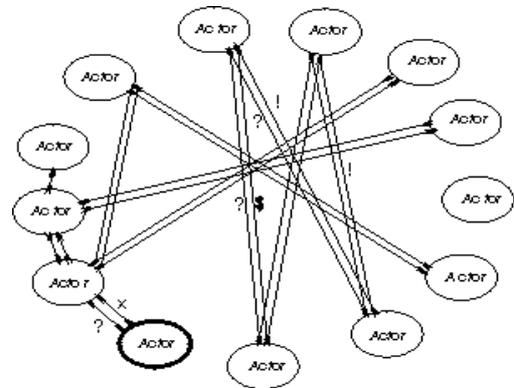


Fig. 3. Information flow in a complex planning situation

2.2 The nature of planning information:

Maurer argues that the precision of information decreases quickly, in other words the so called half – live period of information is short. He argues that it could be from 6 to 12 months [Maurer 1988]. In taking this idea in consideration, planners and decision makers need to update their information systematically and hence they should concentrate in the major issues rather than gathering all available information, which means that conventional spatial information systems will not help.

If we applied the above mentioned two issues to rapidly growing region it is clear that in the absence of a regional overview more conflicting situation is expected where changing characteristics and huge urban activities take place by different actors regarding specific problems as well as the fragmented system of decision-making and administration authorities large urban regions. As an example in a region like Greater Cairo Region (GCR) Three administrative bodies have authority on different parts of the region in addition to the fragmentation between urban administration and planning authorities and other decision making bodies. If we applied the concept of half – life period of information to a rapidly growing region we can argue here that this period will be shorter.

2.3 The conventional use of information systems in planning:

We will not describe here the history of using information systems in planning but shortly we will conclude some points about this use considering the above mentioned issues about information in planning. Under this statement the following major issues will be stated here.

The adoption of information technology in different planning and public agencies is characterised by using different standards and different approaches which created a fragmented and non integrated systems. Hence, the same information is produced again and again by different users to fit their own systems, which consumes a lot of resources. In this context van Helden states that "Information has been and always will be

the corner stone of Urban and Regional Planning. While the use of information in planning may not be new, the technology to supply this information is new and expanding at a rapid rate. This development has resulted in a host of disjointed information systems within the local authorities”[van Heldn 1994].

The Conventional information systems used in planning such as GIS which is wide spread used in planning concentrates on the Geographic details which some time overloads the planner with details that hinder developing an overview of the problems. In this context Batty and Harris stated that “For GIS, geographic details are in the foreground, while for other processes the geography should be in the background, but correctly represented and well-controlled.” [Batty & Harris 1992] Also considering that GIS should be the prime or the sole planning tool is not rational for GIS or planning. GIS useful for specific procedures but not for all procedures. Batty and Harris argue that “.. in our view is that GIS, properly considered, are defined in a way which provides very important types of support and control to many other systems and many activities, but that they are sufficiently limited by their intrinsic nature to fail if they are used as the exclusive tools of analysis and planning. They support the organisation of information in certain ways, but not necessarily in ways which then support every type of production of knowledge or intelligence.” [Batty & Harris 1992] . They then argue that “ The best of these systems maintain an attitude of strict responsibility toward the accurate maintenance and manipulation of geographic information, in digital and computable forms.“ . Additionally these systems also require high investments in finance, time and human resources to develop it.

While most computer models used by planners have been developed for structured problems, most decision making in planning, management, and policy addresses semi - structured and unstructured problems [Langendorf 1985] or even not a defined problem at all. Hence, in a complex planning or decision making situation the need will be essential to define the problem or to understand the situation before trying to collect information and analyse in details.

In facing an ever changing world of information technology which introduces new innovation in a fast rate testing and experimenting about using these innovations in the planning process is an essential need for planner to explore potential techniques that serve for their own needs. Bracken argues that “The new information techniques are far more tangible but we stress that not enough to exploit the technology be dressing up traditional concepts of information use with a new technology veneer. To do so denies opportunities for innovation. The new technology encourages experiment with new forms of communication, to develop new conceptual frameworks and hence use information more effectively” [Ian Bracken 1990].

In an attempt to deal with the above mentioned points the study is aimed at discussing the potentials of developing a planning information system that meets the planners and decision makers for developing an overview of the region under study. From the technical point of view the study examines some of the new techniques and their feasibility in developing such systems.

3 THE CONCEPT OF A PLANNING INFORMATION SYSTEM:

It aims at linking the ongoing activities on the region to maximise the benefits and minimise the conflicts and define the gaps. To define major problems in the region and the nature of each. Also to define development potentials as well a how to integrate these three components all together in a comprehensive and integrated overview of the region which should be available for decision makers, planners and investors. On other words it is aimed to be a reference “one stop” for development information in the region. It should also includes a directory component for development related organisations, legislation and procedures.

3.1 Planning information systems as an overview tool

Taking the regional conflict and the nature of planning information in consideration, an overview is needed to the ongoing activities and the existing problems and potentials in the region. This overview will serve all concerned actors in the region to keep an eye about what is going on in the region before taking a regional related decision. In creating this overview only major issues and activities, which are relevant and have importance to the region, should be included in this overview so that decision makers are not lost in huge and irrelevant information. In other words this planning information system is not an information system that includes information about each street and tree in the area. It should also ensure that no specific issue will be

ignored in taking such a regional related decision. To create this overview and to define what are the major issues that should be included in the system primary stakeholders should define these issues and which information should be included according to their needs. That means a pre – designed systems, that serves all cases, will not be suitable, but a system should be developed to fits to the regional circumstances and the needs of the potential users.

3.2 Planning information systems as a distributed platform

The concept of a planning information system is based on creating a platform that links planning information from different agencies and actors within a specific region. Although the use of information systems has several decades in planning and decision making, different agencies adopted different information technology polices which created more problems in the process of information flow in the planning process. Murdick describes this situation as "islands of mechanisation""[van Heldn 1994]. The concept of PIS overcomes this problem by creating an integrated system of planning information which benefits all actors to participate with their own information and allows other actors to browse and use this information. So that each actor will sustain his own information locally while the whole system will be accessible from all users. As in any collaborative task, distributed and locally administrated databases and graphics need to have a set of pre – required basic standards and central administration of the interface is essential to ensure the standards enforcement.

3.3 Planning information systems as a hub

While PIS is aimed to be distributed, it acts as a hub to link all distributed information and to facilitate the use of this information for different actors. To achieve this, PIS includes a user interface where different users can browse and interact with the distributed information and maps from different sources of the participant agencies. The interface allows the user to overlay maps from different sources and produce the map that fits his purpose. The user can also search in these distributed databases simultaneously using different criteria and extract information about the matching elements. A part of the main task needed to create this planning information system is to create and apply common standards to both graphics and databases which presents the components of the distributed planning information system. To achieve such standards, it requires a collaborative work between different agencies to develop and sustain common standards all data and graphics that are provided by a participant agency.

3.4 PIS as a dynamic system

Creating the regional overview is a part of the task. Keeping this overview up to date is another part of the task, which requires each participant agency to update the component that is related to their discipline. Updating the information will take place on the information that is already published on the site of the agency so it will be their own responsibility to ensure applying the standards and guidelines which were adopted by the participant parties in the system. To Keep the system stable while keeping it dynamic, a commission of participant agency may take the responsibility of the co-ordination of the published data and its compliance to the standards.

4. TECHNICAL ORGANISATION OF THE PROPOSED SYSTEM:

The proposed system is an Internet-based interactive information system using client's side JavaScript and Dynamic HTML. The proposed system consists of the following components:

- ?? Information components
- ?? Database directory
- ?? The user interface

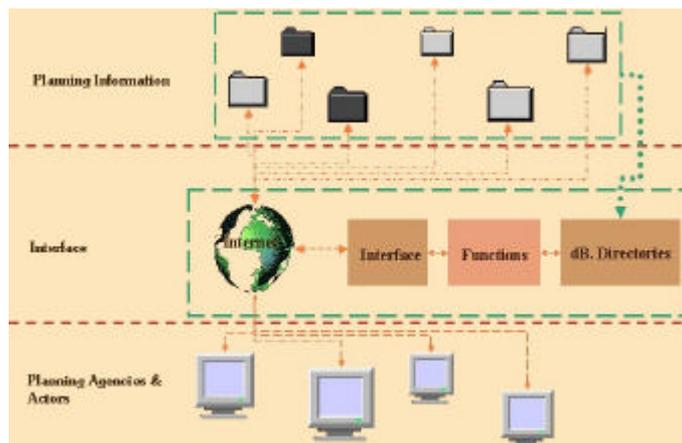


Fig. 4. The organisation of the proposed PIS

Information components: both graphical and tabular information are possible to be distributed in different locations. That means, each agency or actor can publish and maintain his own information and maps in his own server, so that it should be updated systematically according to the standards and in co-ordination with the system administrator. The maps are raster maps (vector maps are still under experiment), and the database are imported from any database into a JavaScript format. Distributed maps and databases are loaded simultaneously to the client, even parts of the same database can be obtained from different sources. After loading this information and maps to the client machine it runs on it which reduces data transfer from the server and operating time for the user.

The database directory: after each user publishes his information, this information should be registered to the directory which is sustained centrally in the time being (possibilities of distributed update of the database directory are still under experiment). This database directory includes information about each information item (e.g. contents and web location). The database directory is also written using JavaScript.

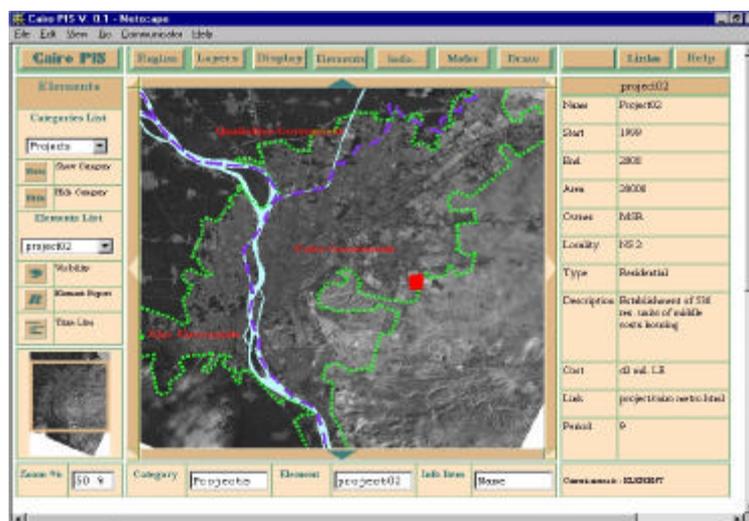


Fig. 5. Screen Shot of the user interface – with different

4.3. The user interface: is a dynamic HTML web page which includes different sets of functions, map display area and information area. It runs inside the user browser. This interface uses client side JavaScript to apply different functions in a dynamic HTML web Page. Cross browser tests are applied on the major popular browsers (Internet Explorer and Netscape Navigator). These functions are prepared in a modular way to add new functions according to the changing needs.

This interface consists of the following components:

The regional overview: different layers about major issues in the region linked to information about major issues and elements. The interface includes function to brows and overlay different maps. Simultaneously the user can extract information about important elements.

The elements component: is a list of different categories. Each category includes different elements. Three categories are included now: projects, problems and potentials. Other categories could be added according to the need. Each element has a graphical representation and a database element. Each element can be obtained from a different source (server). The user can also search the elements' databases for elements according to different criteria. Each of these elements can be linked to further web pages of the project or the corresponding agency.

The interface includes some display functions such as zoom and pan to allow the use of large maps of large regions.

Additionally, the user can make a time line of the on going activities on the region to see time organisation.

It also includes a tool for prepare simple statistical charts about the included elements.

The user can overlay different layers and elements. Simultaneously, he can extract information about different elements or topics.

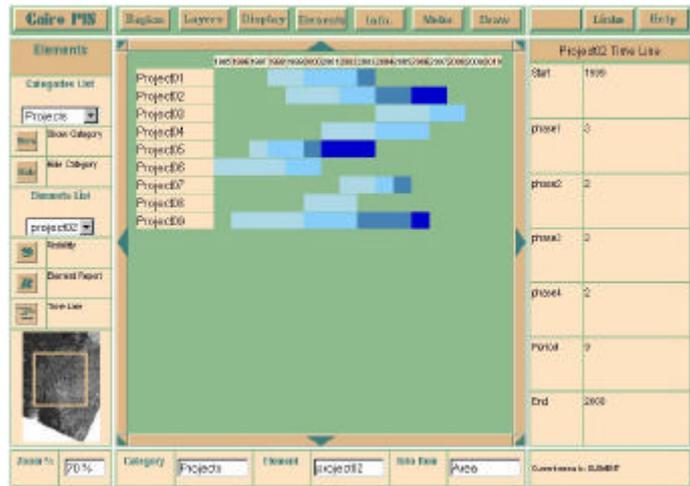


Fig. 6. Screen Shot of the user interface – Time line mode

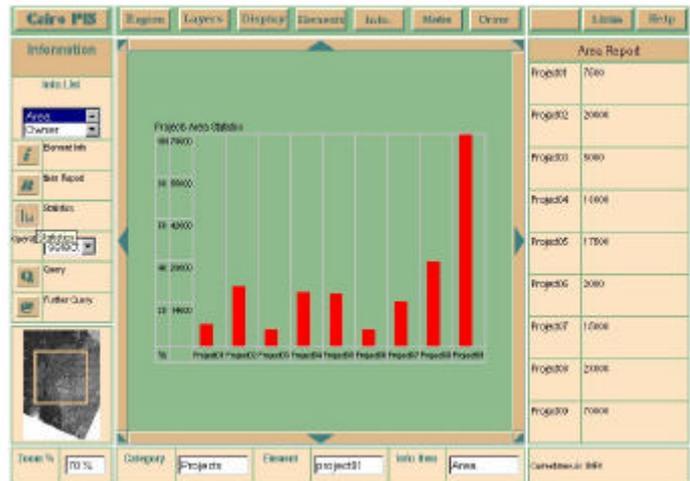


Fig. 7. Screen shot of the user Interface – Statistics

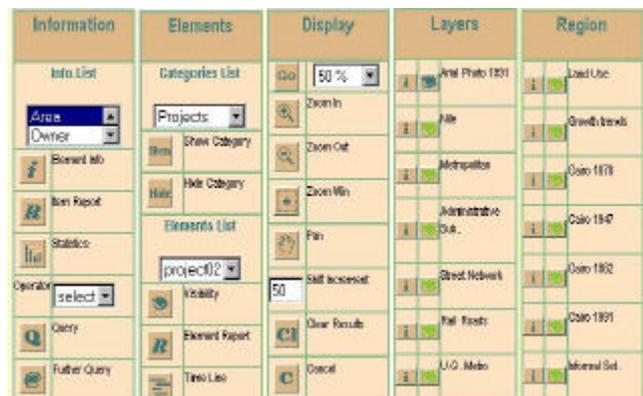


Fig. 8. Different menus of the interface

4 LIMITATIONS OF THE EXPERIMENT

This experiment is prepared as a part of a Ph.D. research. The proposed system was applied in different applications. Most of these applications are still under development and preliminary phases of use. The purpose of this paper is to discuss the concepts and techniques proposed and as an evaluation phase of the first drafts of the system. Different components of the proposed system are still under further research and discussion. Also different possible techniques are still due to research.

5 LITERATURE

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