22. Roles of geoinformatics in spatial development of Ljubljana

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The intention of this chapter is to briefly present the existing use of geoinformatics related to the spatial development of Ljubljana. Instead of exhaustive description and evaluation we seek for the perspectives, anticipating future possible directions of involvement of geoinformatics in the process of spatial planning and development of Urban Municipality of Ljubljana.

The use of geoinformatics in planning in certain administrative area is always a result of several historical and recent processes and decisions. Among the important factors in general are the availability and quality of relevant spatial data, the existence and effective functioning of a system of regional and urban planning, level of achieved geoinformatic literacy among people working in planning, on all levels of decision making and in certain circumstances (e.g. in participatory planning) also in general population in the area. Even in case of very favourable circumstances related to the mentioned factors, a poor support of e.g. local or regional government or managers in municipalities' administration may result in poor implementation of geoinformatics in the planning. On the other hand even in case of unfavourable conditions some excellent examples of geoinformatic applications in the planning may occur.

Geoinformatics is therefore not discussed as an isolated factor of spatial planning activities or spatial development. We rather see and evaluate it as a component part of e-governance and participatory planning contexts of the spatial development of the municipality. Modern participatory planning paradigm strengthens the traditionally weak part of the planning triangle, political and financial powers – technicians and science – inhabitants, by giving inhabitants increasingly numerous, diverse and influential roles in strategic, implementation and monitoring phases of spatial planning and management. To follow this process we shift the focus of debating geoinformatics from "traditional" counting of computers, GIS experts, databases and software licences for "doing GIS" towards more concrete, actual or potential, impacts of geoinformatics on spatial development.

Some elements of geoinformatics, either conceptual or technological, in form of e.g. data, analytic, visualization or dissemination tools, are nowadays probably used in every phase and on every level of the spatial planning process in Municipality of Ljubljana. This ubiquity of geoinformatics in the spatial planning makes its presentation and evaluation quite a challenge. Our approach is based on the following:

- recognizing geoinformatic elements in the publicly accessible results of the spatial planning in Urban Municipality of Ljubljana;
- identifying major geoinformatics-related players in Urban Municipality of Ljubljana;

- evaluating the existing use of geoinformatics in Urban Municipality of Ljubljana from the points of view of achieved stage of e-government (Ronaghan, 2002), development of selected aspects of e-governance (UNESCO, 2005) and citizen participation (Arnstein, 1969);
- anticipating future perspectives of geoinformatics in the spatial planning based on a cross-evaluation of the so far unattained e-governance goals and available geoinformatic functionalities.

22.1. On ideals of geoinformatic applications in the spatial planning

Developing an "ideal geographic information system" is hardly a meaningful or feasible goal for a municipality. Such expectations based on oversimplified understanding of what the use of geoinformatics or spatial planning should bring usually do not lead to successful projects (Tomlinson, 2003, xix-xx). A persisting belief that the growth of the quantity of available geographic data itself automatically means development of geoinformatics or even planning is also often misleading. Both geoinformatics and spatial planning should be planned and evaluated on the basis of their impact on "real life", e.g. functioning of institutions, quality of life, preserving or changing the places. It is not the system (of information or of planning) that matters, but what it does, and at what costs.

Two different aspects of evaluation of the actual or potential impact of geoinformatics on spatial planning and management have been used. Firstly we try to evaluate how well the geoinformatics is used from the point of view of the technological and informatic perspective. Secondly we try to evaluate how geoinformatics contributes to the development towards participatory or synchronous planning and its implementation, including the perspective of user's (citizen's) "experience" within such processes.

The evaluation of the achievements regarding the first aspect of the geoinformatic effectiveness can be summarized on the basis of general knowledge about the quality of the applied geoinformation, the published planning results, the internal and external (geo) informatic teams or institutions involved, complemented with the information acquired during the interview with a representative of the informatics department of the Urban Municipality of Ljubljana (Stare, 2008) and of one of the major geoinformation providers (Veršič, 2008).

A very general evaluation of the achievements regarding the second aspect of the geoinformatic effectiveness, the contribution of geoinformatics to the developments towards participatory or synchronous planning and its implementation, can be based on a positioning of current situation in the Urban Municipality of Ljubljana against selected contexts in forms of "qualitative measuring scales". This aspect of our evaluation is actually more related to the transformations of the underlying contexts of the spatial planning and spatial development than to the geoinformatic technology itself. While some authors define the ultimate goal of the development of e-supported spatial planning and managing activities as virtualization of the government, cyber planning or digital Agora (De Montis, 2006), some examples of "measuring scales" in a form of successive stages towards

the final goal can be found. A very general "gradation" of the stages of development of e-governance uses terms e-administration, e-services and e-democracy (UNESCO, 2005). E-governance refers to the performance of governance, including citizens' articulation of their interests and exercise of their legal rights and obligations, via the electronic medium. The involvement of citizens in the process of governance at all levels is a very important aspect of e-governance, which is reflected also in the following "gradation" (ibid.):

- e-administration refers to improving of government processes and of the internal workings of the public sector with new ICT-executed information processes,
- e-services refer to improved delivery of public services to citizens (like requests for public documents, requests for legal documents and certificates, issuing permits and licenses) and
- e-democracy implies greater and more active citizen participation and involvement enabled by information and communication technology in the decision-making process.

It is obvious that spatial planning and management are intrinsically related to the governance, and geoinformatics contributes to implementation of the e-governance. Actually quite a wide field of development of geoinformatics, named participatory GIS (PGIS) or GIS for public participation (PPGIS, 2010; example in Hudson-Smith et al., 2003) focus on enabling the citizens' active involvement in different kinds of activities related to the spatial development.

Alternative definition of the stages in the development of the e-government (and e-governance) uses the following "gradation" (Ronaghan, 2002):

- emerging: an official government online presence is established; information is limited, basic and static;
- enhanced: government sites increase; information becomes more dynamic; content is updated with greater regularity;
- interactive: users can download forms, e-mail officials and interact through the web; they can make appointments and requests;
- transactional: users can actually pay for services and other transactions online;
- seamless: full integration of e-services across administrative boundaries.

Somehow more elaborate, although still rather simplistic abstraction, is "Arnstein's ladder" of citizen participation (Arnstein, 1969). It provides a useful way of "measuring" and expressing the level of public participation in the planning (Smith, 2006) on the basis of relation between the citizen (powerless on lower rungs of the ladder) and the government (and other "powerholders"). The ladder shows two-level gradation of the participation, briefly presented below (coarser level is marked by letters and the eight rungs of the ladder by the numbers).

A. Nonparticipation: real objective is not to enable people to participate in planning or conducting programs, but to enable powerholders to "educate" or "cure" the citizens.

(1) Manipulation.

(2) Therapy.

B. Tokenism: allows the citizens to hear and to have a voice. When they are proffered by powerholders as the total extent of participation, citizens may indeed hear and be heard. But under these conditions they lack the power to insure that their views will be taken into account by the powerful. When participation is restricted to these levels, there is no assurance of changing the status quo.

(3) Informing.

(4) Consultation.

(5) Placation: simply a higher level tokenism because the ground rules allow citizens to advise, but retain for the powerholders the continued right to decide.

C. Citizen power: increasing degrees of decision-making clout.

(6) Partnership: enables citizens to negotiate and engage in trade-offs with traditional power holders.

(7) Delegated Power.

(8) Citizen Control, citizens obtain the majority of decision-making seats, or full managerial power.

Finally, a brief look at the goals and experiences of Denmark's approach to reach a goal of "being among countries that are best at utilizing the global digital transformation to create growth and wealth" (Arleth, 2006) can provide us with a proof that the above mentioned "ideals" can serve the real practice. Here are some of the more detailed goals in the project:

- to utilize the potentials of digital society across the state, regional and local levels of government;
- to organize the public sector in a more flexible and efficient way, with higher quality of service for the citizens;
- to create better and more efficient solutions for administrative tasks through the use of information and communication technology;
- to fully digitize the public sector, which should ensure that work processes oriented toward paper handling and manual control are reduced, while double and unnecessary work is removed;
- to reduce the costs in the public sector while improving citizen and company access to the public service;

- to define different stages in the process of digitalization of all major service areas and contacts, from basic information published on the web, through increased interaction, to high levels of direct public participation.

The starting point of the "project" has been the notion that public participation in the planning process requires well-developed communication between the authorities and the public. In the context of spatial planning and development, the internet and geoinformatics are bringing more and more options for such communication. E-government is one of the results, including a growing field of geoinformatic services. Another factor stimulating such communication is decreasing number of employees in the administration. By questioning themselves about the capability of citizens to adequately use such communication, especially the one based on geographic information, the researchers have come to some interesting findings. Experiences gained from teaching geographers and in other "spatially oriented" disciplines about geoinformatics suggested that the concept of geographic information (as opposed to maps), and the idea of layered information, have not been intuitively understood. But these internet-based services have become rather popular among those who have been their regular users, such as farmers (e.g. applying for subsidies or for permission to increase their livestock), agricultural consultants and property handlers. In comparison to "average citizens" these have some professional knowledge (beside the interest) which enables them to comprehend the substance and context of the information in the interactive map. Studies suggest that map-based services are popular among the majority of users as long as they are not too complex or too technically demanding. Improving the usability of the geoinformation-based web services obviously requires knowledge about the nonprofessional user's understanding and use of geoinformatics. Since modern geoinformatic services are meant as a service for all the citizens in a certain area, and are supposed to replace the personal-based service, the advances in their usability by wider population in the last few years make the goals of this project even closer to realization.

22.2. Geoinformatics in Urban Municipality of Ljubljana: situation and evaluation

A look at several important contexts of the use of geoinformatics in Urban Municipality of Ljubljana can serve as starting point for our presentation of the current situation. Among the relevant contexts the following are briefly discussed: available geographic information, main players (internal and external to the municipality), generally attained level of technological development enabling the implementation of e-governance (on both sides, in the Municipality as institution and among citizens), level of knowledge and skills needed to effectively perform e-governance, including online geoinformatic tasks, and finally, a general sketch and evaluation of the use of geoinformatics in the municipality.

Geoinformatics is widely used in relevant phases of the planning, including the research activities supporting the planning, as well as in the data storage, management and distribution. There is no evident reason to be in doubts about high professional level of the use of geoinformatic technology in the planning or other activities related to the spatial development. However, there are some potentials for improvements in the field of geoinformatics in the municipality.

Extensive Slovenian national geoinformatic databases, including for example numerous territorial divisions, registers and cadastres, infrastructural, environmental, land-use, economic, and partly accessible[90] social and demographic databases, make a substantial backbone of the municipality's geographic information resources. Improved quality of some of the geoinformatic layers, mainly provided on the national level, could contribute considerably to the overall effectiveness of the geoinformatic support to planning and spatial decision making, for example the spatial accuracy and the reliability of the attributes in the land cadastre. In situation of abundance of geographic information there are still some missing that could add important basis for better informed spatial decisions, like a register of illegal dump sites, or a register of degraded or derelict areas as potential for new investments. On the other side, there are some databases of paramount importance for spatial development, like those provided by The Environmental Agency of the Republic of Slovenia (ARSO, 2010), with already mentioned legally unsettled relations to spatial planning and management activities, and consequently unclear responsibilities of the data providers (Veršič, 2008). The INSPIRE initiative (INSPIRE, 2009) is driving an important "background process" related to e.g. quality, interoperability, accessibility and usability of geographic information and services and should contribute to the quality of the national and local geoinformatic basis for spatial planning and development in the close future.

Another factor that might impede adequate development of the use of geoinformatics related to spatial development in the municipality might be a weak (geo)informatic department within the Municipality itself (as reported by Stare, 2008). Within the municipality Department for spatial management is responsible for the spatial planning, while several other departments (e.g. for real estate, environmental protection, commercial activities and traffic), offices (e.g. Office for development projects and investments) and the mayor himself considerably contribute to these activities. Geoinformatics seems to be quite a minor and dispersed field of work within the municipality, with only one person employed as "geoinformatic staff" (ibid.)[91]. Already this fact alone shows that geoinformatics has not been seen as one of the major informatic activities and instruments within the Urban Municipality of Ljubljana. The municipality extensively uses geoinformatic outsourcing to accomplish tasks like maintenance of the geographic information (e.g. by IGEA, 2003), designing and maintaining the public geographic information system URBINFO (by LUZ, 2004; 2006-2010) or preparing planning documents or providing the municipality with research results serving as a basis for planning activities (e.g. by Urban Planning Institute of Republic of Slovenia, 2010). This outsourcing might be supported by economic reasons, but can also limit the initiative within the municipality to mere coordination of routine operations advised "from outside" instead of leading it towards increasingly innovative use.

With recent advancements of web-based geoinformatic services the circumstances for effective implementing of e-governance have changed considerably in regions with highly

[90] Among the data sources with severe access limitations due to personal data protection, the social and demographic data from Statistical Office of Republic of Slovenia are probably the most problematic. Accessibility of data only for settlements, even for some more detailed spatial level units like statistical areas, usually do not present the demographic or social characteristics of the areas in an adequate spatial scale to allow well informed local spatial analyses, planning and decision making.

[91] However, majority of approximately 50 employees, dealing with the planning activities in Urban Municipality of Ljubljana, are supposedly users of geographic information and geoinformatic services (Stare, 2008).

developed information-technological infrastructure, like Urban Municipality of Ljubljana (and Slovenia in general: Mašič, Vehovar, 2010). The citizens (the clients) do not need any sophisticated equipment with expensive and complex software, and months of geoinformatic training, to be able to access, visualize, sometimes even edit, analyse or respond to certain geoinformation accessible over the internet. On the other side, the municipalities as providers of the (geo)informatics services to the citizens need to deal with at least the following new aspects of their role in the advances in e-governance:

- their (geographic) information system is not in use only internally within their organisation, but now has to serve much wider and highly diversified public;
- web-communication demands new ways of delivering information in both directions, including authentication of the clients, and more content-related visualizations, queries or formalized discussions (e.g. remarks to a proposed spatial plan, response from the municipality, eventual concrete effects of this discussion to the discussed plan);
- new ways of communication and other (geo)information manipulation over the internet make new advancements in the democratization of the spatial planning and development at least informatically attainable; concerning the (geo)informatic conditions, participatory and synchronous planning are no longer only distant and non-realistic ideals.

Looking at the above mentioned changes it is quite clear that nearly all actual power of bringing advancements in e-governance is now in the hands of the municipality, and the state providing legislative and a part of the financial framework for enabling such developments. The citizens will only need to participate, if and when offered the chance. As in other cases of democratization, the participation will probably tend to be relatively low after the initial boom. But providing the belief that they can actually influence the spatial development, the citizens will presumably be willing to participate, especially regarding the developments in their local environment. The example from Denmark (Arleth, 2006) supports the mentioned assumptions: internet-based (geoinformatic) services are rather popular among those who have become regular users, where their level of education, age or professional field of work are not important factors any more.

The previous spatial plan of Urban Municipality of Ljubljana, from 1986, has been prepared and used in a traditional "analogous way". Although it has been digitised later on (by Urban Planning Institute of Republic of Slovenia, using Autocad and dBase), that modernisation of the data storage and presentation did not bring immediate or extensive effects on the planning activities or on the citizens' access to municipality's geographic information. In 2001 a preparation of a new digital spatial plan of the Urban Municipality of Ljubljana has started (in the framework of a project ONYX, supported also by the World Bank). In 2006 a non-official digital version (using ArcGIS, Oracle, SDE) of the plan has been made publicly accessible, named URBINFO (2006), while the analogous version of the document has still predominantly been used in the official practice (Stare, 2008). The new spatial plan (Odlok..., 2010), divided into strategic and implementation part, has became valid in October 2010, and its simplified contents is accessible in digital form on the internet (URBINFO, 2010).

The web-based geoinformatic service URBINFO functions as spatial and attribute query tool, enabling access to several geoinformation layers on e.g. cultural and archeological heritage, natural values, forests, agricultural land, water sources, land-use (Figure 82), morphologic and functional areas, areas of dispersed construction, areas of legalized construction, valid spatial implementation documents (and the documents in preparatory phase; Figure 83), special spatial measures like the right of preemption and measures of protection. URBINFO is quite up-to-date, with a delay of about 14 days after formal acceptance of a certain implementation spatial document (Stare, 2008). It may therefore serve as quite detailed and reliable source of information in the search or general appraisal of the locations for certain activities or land-use changes. It is expected that the planed use of this system should shorten the procedure for e.g. a building permit (ibid.).

Figure 82: URBINFO – Public spatial data information system of Urban Municipality of Ljubljana: an example of spatial query on land-use map.

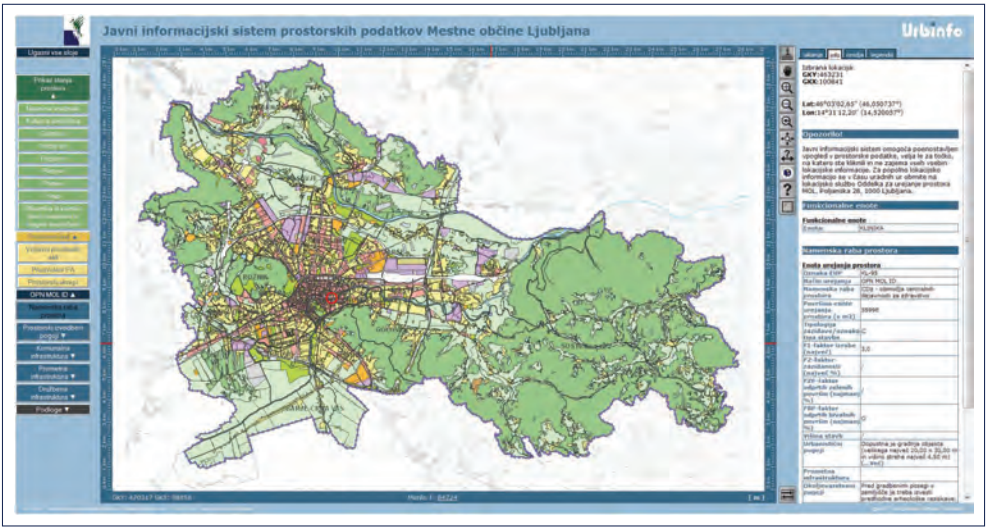
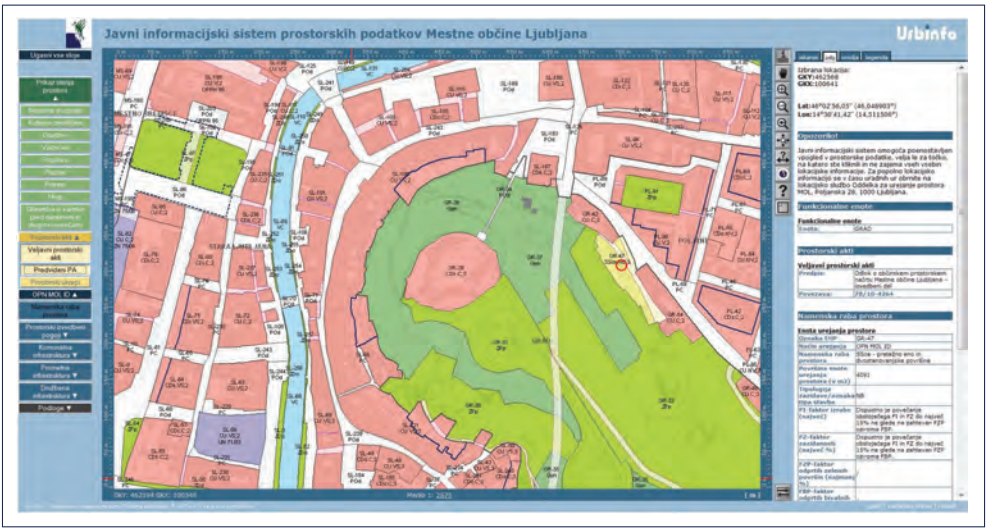


Figure 83: URBINFO – an example of spatial query on the map of planned spatial legal acts.

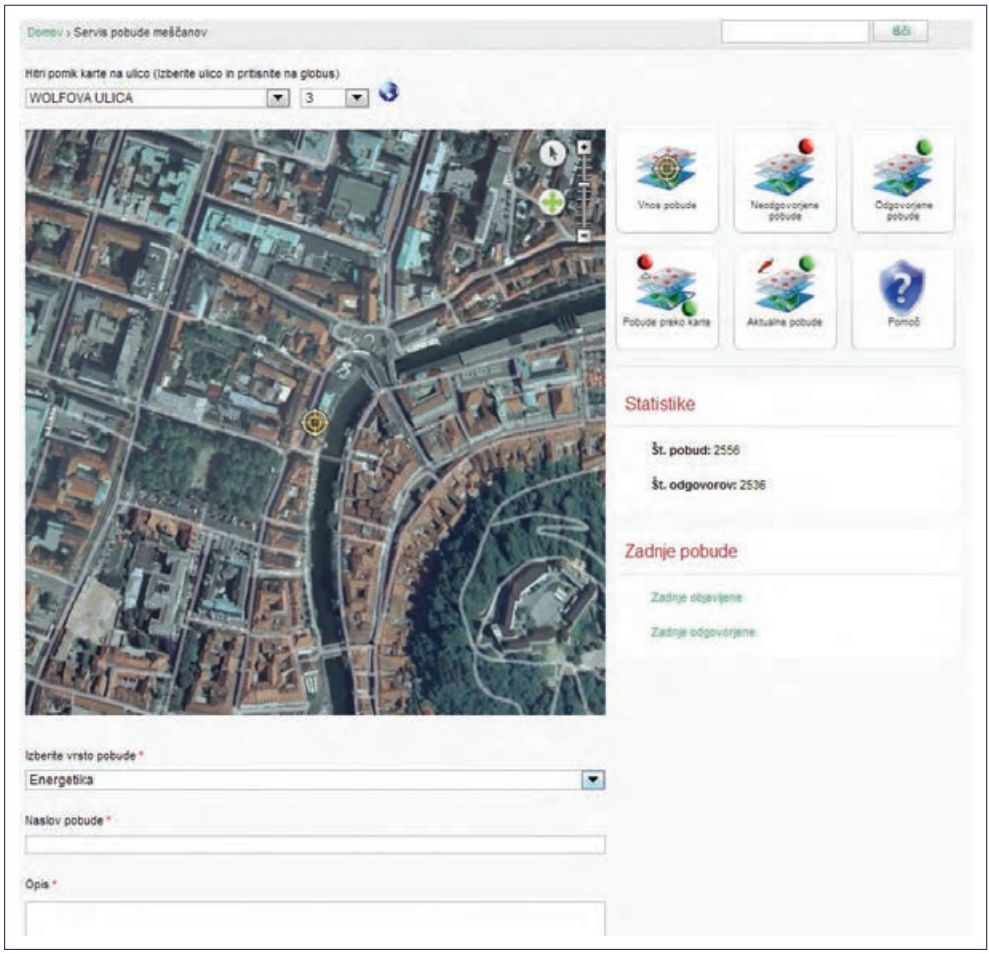


Source: URBINFO (2010).

The citizens of the Urban Municipality of Ljubljana have been invited to give their eventual remarks related to the proposal of the spatial plan (Novi..., 2009). The possibility to give their "e-remarks" has been enabled by a simple web-based application (Figure 84a). Majority of the collected remarks have been processed (Figure 84b), and the answers have been presented publically (Stališča..., 2010). However, only a detailed analysis of these answers would reveal the actual degree of success of citizens with the given remarks.

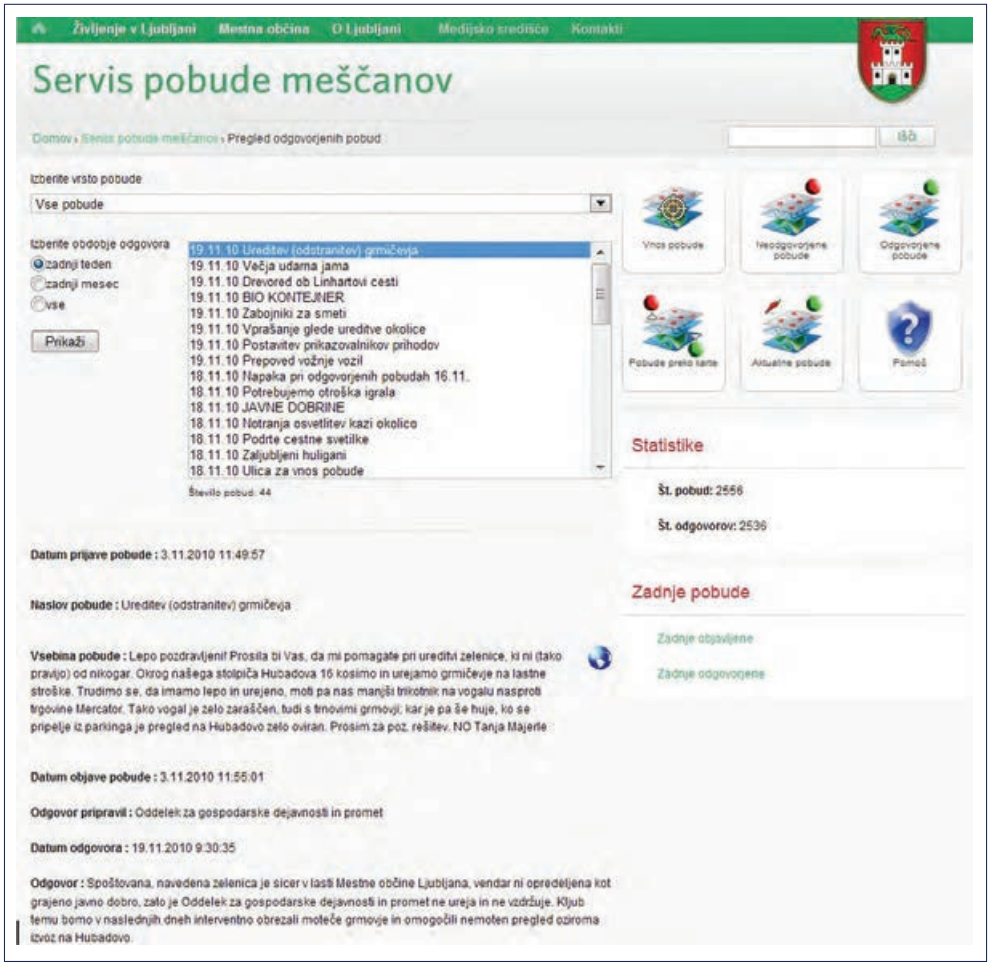
Figure 84: "Service for citizens' initiatives" in Urban Municipality of Ljubljana is an example of a good practice of participatory e-governance: entering a new initiative is simple (a), response rate is very high, easily accessible and up-to-date (b).

a)



Source: Urban Municipality of Ljubljana (https://urbanizem.ljubljana.si/PobudeMescanov2/VnosPobude_Template.aspx#).

b)



Source: Urban Municipality of Ljubljana (https://urbanizem.ljubljana.si/PobudeMescanov2/PregledOdgovorjenihPobud_Template.aspx?ppp=odg).

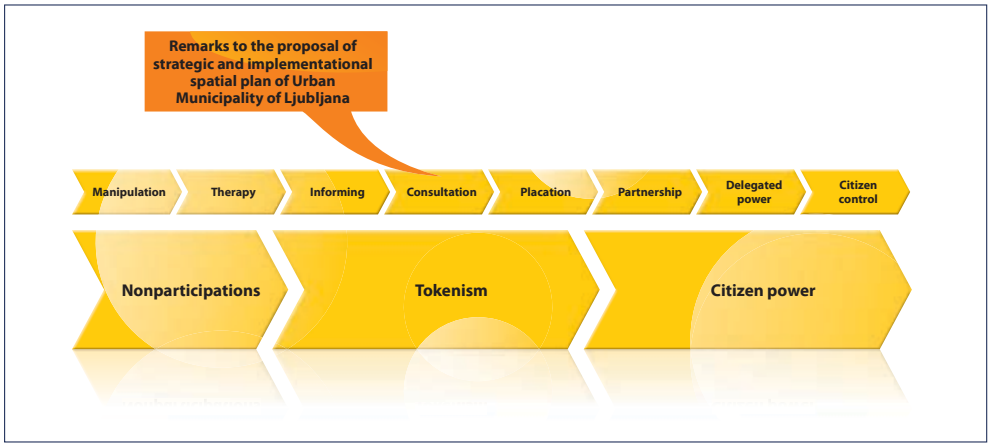
22.3. Perspectives and challenges of contribution of geoinformatics to e-governance and improved spatial development of Ljubljana

As a conclusion to the above presentation and debate we try to position the situation in the use of geoinformatics, and wider attained level of the e-governance in the Urban Municipality of Ljubljana, against the aforementioned steps of development of the e-governance and the citizens' participation level. From the point of view of the first of the "measuring scales", the development of the e-governance (as defined in UNESCO, 2005), including its geoinformatic contents and support, in the municipality is relatively successful in the field of e-administration, and partly in the field of e-services. There are some examples of practices towards more active involvement of the citizens enabled by (geo) information and communication technology related to spatial planning and develop-

ment, but the ideals of e-democracy seem still quite far from the current situation. From the point of view of the second "measuring scale" (based on Ronaghan, 2002), the e-government related to spatial planning and development in the municipality achieved completely the "enhanced level", and gained some characteristics of the "interactive level" of the citizen's participation.

It is hard to assert significant contributions of (geo)informatics to municipality's climbing the"Arnstein's ladder" of citizen participation (Arnstein, 1969; Smith, 2006) so far. As already mentioned, this climb is more related to the advances in the overall democracy, and the consequent level of citizens' participation in the spatial planning and development, than to direct impacts of the technology and (geo)informatics. There are examples of good practices, like the aforementioned possibility for the citizens to give remarks in electronic form to the e-published proposal of the spatial plan of the Urban Municipality of Ljubljana. This example is still positioned quite on a low rung of the ladder ("consultation rung"; Figure 85), because the procedure offered no assurance that citizen concerns and ideas will actually be taken into account. But it presents the already existing possibility of the efficient use of (geo)informatic services in the spatial planning, leading to concrete, although mostly minor consequences in the actual spatial development. We can say it is a matter of understanding and belief of the municipality's leadership that deeper involvement of the citizens into the spatial planning, and into supervising and influencing spatial development, could actually lead for example towards smoother and more transparent planning approval procedures, and above all towards better living environment for the citizens. In times of a deep crisis in spatial planning in Slovenia in general (Simoneti, 2010) such ideas may seem far from feasible in the close future. On the other hand, current situation, activities and appeals of professional associations and individuals related to the spatial planning (e.g. ibid.) might bring considerable changes, hopefully as resolute as in the above mentioned Danish case, into the ways spatial planning and spatial development are performed in the Urban Municipality of Ljubljana. The geoinformatic technology dedicated to servicing participatory planning (Hudson-Smith et al., 2003; PPGIS, 2010), including rich sets of geographic information, to enable such changes and the involvement of the citizens is already here.

Figure 85: Positioning citizens' e-remarks to the spatial plan of Urban Municipality of Ljubljana on the "Arnstein's ladder".



Source: based on Arnstein (1969) and Smith (2006).