UNIVERSITY OF GRONINGEN/ FACULTY OF SPATIAL SCIENCES

DIGITAL URBAN PLANNING TOOLS FOR AN ON-GOING AND INTERACTIVE DECISION-MAKING PROCESS

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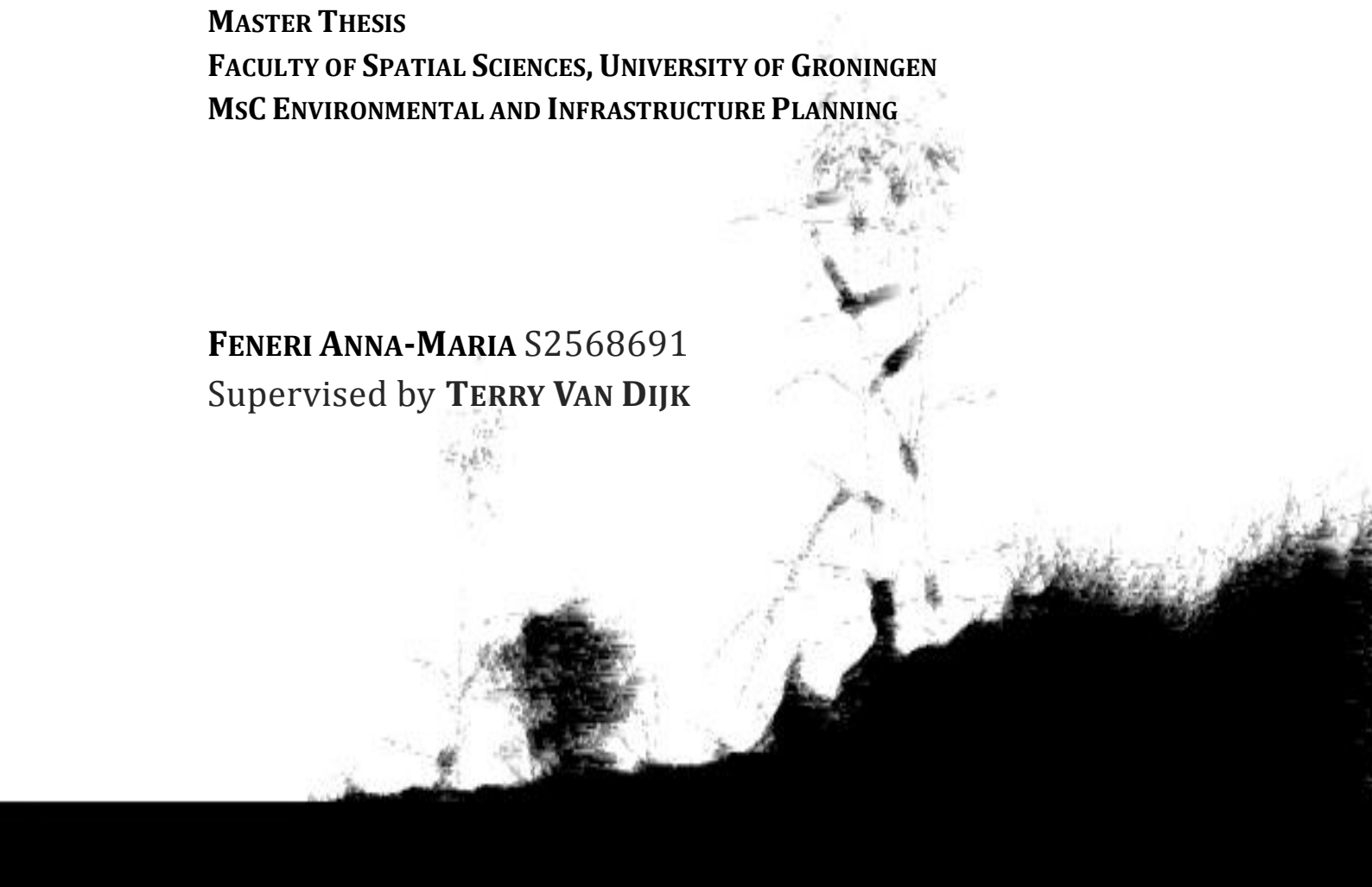

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Master Thesis 2013-2014
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To cope with every difficulty of this thesis, I had always in mind the following simple phrase: 'It is your own game with your own rules'. For that reason, I would like to thank a lot Terry Van Dijk, my supervisor at this challenging and difficult process of developing my own research. The inspirational discussions we had, his ability of dealing with my chaotic thoughts and his targeted questioning and critical point of view worked effectively at this process. I would also like to thank Mrs Catharina Gugerell, as the second reader of my thesis. Both of them gave me considerable feedback and their time is greatly appreciated.

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Let the game begin!
Anna-Maria Feneri

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Abstract

In terms of urban planning and participatory decision making, no element is more important than a voluntary and active citizen involvement and engagement. The last years, there was a shift on IT Technology and digital planning tools that incorporate the necessary software to add a value in this urban planning process. Within the broad scope of public participation, citizen willingness is of crucial importance and the purpose is to identify a way that ensures a more robust place for citizen's involvement in decision-making. This research is presented in an effort to encourage the intersection of digital planning tools, planners and citizens for an active and effective collaboration. As a complementary form of intersection this study proposes the use of social interaction and Web 2.0 technologies to facilitate early engagement and sharing of local knowledge through a digital tool that is based on citizen's preferences for a dynamic cooperation between planners and local citizens.

Keywords: participatory urban planning; digital planning tools; citizen involvement; interactive decision-making process; social interaction

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LIST OF ABBREVIATIONS

EU: EUROPEAN UNION
GIS: GEOGRAPHICAL INFORMATION SYSTEMS
PPGIS: PUBLIC PARTICIPATORY GEOGRAPHICAL INFORMATION SYSTEMS
IT: INFORMATION TECHNOLOGY
PSS: PLANNING SUPPORT SYSTEMS
IUD: INTERACTIVE URBAN DESIGN
OECD: ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT
UN: UNITED NATIONS
ESCN: EUROPEAN SUSTAINABLE DEVELOPMENT NETWORK

CHAPTER 1
INTRODUCTION

This chapter introduces the general topic and the reason that drew my attention to run this research. Some introductory notes are being presented on the issue under examination with a further description of this research's definition, goal and objective. The theoretical insights inspired me to develop a central research question, while dividing it in smaller ones is helpful to design a general framework of the study that will follow. This general framework is a small thesis structure including the main key aspects of the research.

1.1 BACKGROUND

This thesis will look at the notions of public participation, citizen involvement within planning processes and digital tools that are used for urban planning. The starting point of the thesis is the issue of citizen participation, it is one of growing interest for several past decades as this participative vision focuses on the need to include people into decision-making processes and citizens are now able to express themselves towards urban planning (World Bank 1994; UN 2008). The role of participation and collaboration in urban planning has been addressed and many researchers draw on decades of research on the need of having people working together and sharing their opinion and knowledge towards any subject and achieving interaction (SERG 2004; Involve 2005). With the communicative turn there was a shift to a more collaborative planning and coordination as communication and interaction among citizens was seen as a way to strengthen social cohesion and trust (Allmendinger 2009).

Furthermore, apart from the need to include people and how to challenge current planning practices, it should be mentioned that there is a long course on participatory planning and the need for active public engagement in decision-making, as an active citizenry is better than a passive one, and a citizen-driven motive for interaction and early engagement is required (Arnstein 1969; King et al., 1998; Healey 2003). According to Booher and Innes (2004), theory and practice in participative techniques should meet the initial goals of public

engagement which is to be nominated by common interests to reach common goals in order to co-produce collaborative outcomes.

This highlights the need for a thorough analysis and an understanding of the theory in the field of participatory approaches, while investigate the conventional approaches and shifting them into more communicative and collaborative ones. These more dynamic and modern approaches to planning suggest that through engagement citizens can constitute a network of sharing knowledge and ideas and empower them into reaching final decisions. According to Booher and Innes (2004) citizens could then get actively engaged earlier in decision-making, sharing their ideas and inner thoughts and achieving effective interaction on a voluntary basis.

On the other hand, technology and digital tools have been developed and now constitute more modern ways of civil embracement in urban planning. Information technology and digital tools have proved to be a modern way of collaborating with urban planning field and constitute new approaches for urban planning embracing social media, technology and citizens (Kiesler et al., 1992; Al-Kodmany 1999; IDB 2012). Although it is difficult to make citizens think spatially, digital planning with the various forms is offering new ways of embracement as it allows visual representation, innovative graphics and software that enables the engaged participants and stakeholders to understand the surrounding built environment, interpret any relevant issues, identify problems, reflect on those, propose a solution or envision an idea (Hall et al., 2010).

As technology is constantly improving, digital tools are expanding using state-of-the-art software with an emerging trend to include them in urban planning, improving the interaction and communication between planners, strategies and citizens(Kiesler et al. 1992; King et al., 1998; Renn et al 2003). According to the literature that will follow in the next chapter, public engagement through participatory approaches and digital urban planning tools do belong in two large different spectrums which is the main central issue surrounding the intersection of them. Of course there are cases where they overlap, but they embrace a different set of notions and techniques. What is of crucial interest is if digital planning is an efficient solution talking about planning and decision making in practice and how it could add value to the whole process trying to increase the level of citizen participation.

1.2 RESEARCH GOAL AND PROBLEM STATEMENT

Following Arnstein (1969) who introduced issues beyond citizen observation by offering the typology for citizen's degree of participation, Healey's theory (1997) in the way collaborative planning ideals can be achieved and Booher and Innes's (2004; 2010) research on collaborative planning, an idea of enhancing the level of early and active citizenry appears in this thesis with a particular emphasis placed on Information Technology to identify the way in which people can get earlier engaged in decision making (Kiesler et al. 1992; King et al., 1998).

Considering the rise in the presence of digital technologies that gain more and more ground in urban planning field (Hanzl 2007), one of the goals in this research deals with the usage of digital tools in order to examine those that can be applied to embrace citizens into decision-making process and offer them the 'space' to interact and generate ideas. The purpose of this research stems from the insight that voices from people and planners should meet in an interactive collaboration in order to select the most preferable participative technique that according to them will increase the level and quality of citizen participation. Combining the technological advantages of IT with citizens' willingness would then highlight a non-stop engagement with a stimulated interest to take part in decision-making process (Kiesler et al. 1992; King et al., 1998; Renn et al 2003).

The central question follows, that is:

'What type of digital planning tools would ensure active public participation in decision - making for urban planning?'

The main research question of this research focuses on the need to link more effectively the fields of decision-making and technology within the public participatory spectrum. For this reason, the focus is on the types of digital planning tools that are used in urban planning nowadays that could trigger the interest of citizens when combined with a participatory decision-making structure. Due to the research objectives and in order to get insights into the central research question, the following sub questions were developed:

What is the role of citizen participation in planning processes for urban planning?

This first sub-question considers viewing the citizen as a participant that has to come closer in decision-making with a more dynamic and active role. The theoretical chapter will answer this section, based on the dominant planning practices and a proposal to move into a more

communicative and interactive decision-making structure with a strong focus on the need for an early engagement and citizen-initiated input.

What types of digital tools support participatory decision-making in urban planning and in which phases?

Researching the field of digital tools and software that are used in urban planning from planners and designers to support collaboration and coordination between them, it is addressed the importance of those in improving the communication and the representation techniques between the engaged participants. Literature review will be used again to provide an answer on which are those tools that support the process of decision-making in terms of participation. However, a further analysis on the list of digital tools will follow, based on the linkage of those with the proposed interactive decision-making process.

What would prompt citizens to be more actively engaged in urban planning?

The theoretical chapter provides information on the principles for a successful participation, the most frequently used participative techniques as well as the need to trigger the citizen to move towards the core of decision-making in urban planning. For that reason, a citizen-centered survey is conducted in order to underpin their preferences and place them as drivers in this process of empowering zone. The importance of this survey is that it directly captures citizens' perspective in order to examine what could raise their interest to contribute and take earlier part in urban planning for an interactive and effective decision-making.

What is the added value of digital tools based on visualization and interaction for participatory planning?

Among the goals of this study is to thoroughly examine the technological advances of digital tools to planning processes based on the expected outcomes. Each project occurred under particular circumstances and within particular processes. Depending on the technology used, the means, the purpose, the planning steps as well as the final results, these cases differ in a greater or less degree but also provide important benefits in terms of modern digital planning as well as a challenging citizen's involvement in the process.

1.3 Research Outline

The structure of the study is described in the following figure (Figure 1). First of all, theory includes what the literature offers in the field of public participation, digital tools and the prominent intersection. Following the theoretical background, the methodological tools that are used to answer the research question are further explained. After presenting the outcomes of this research at chapter 4 by collecting and analyzing the data, the final chapter includes those findings that lead to the conclusions of this study that finally answer the main research question and give some hints for further research.

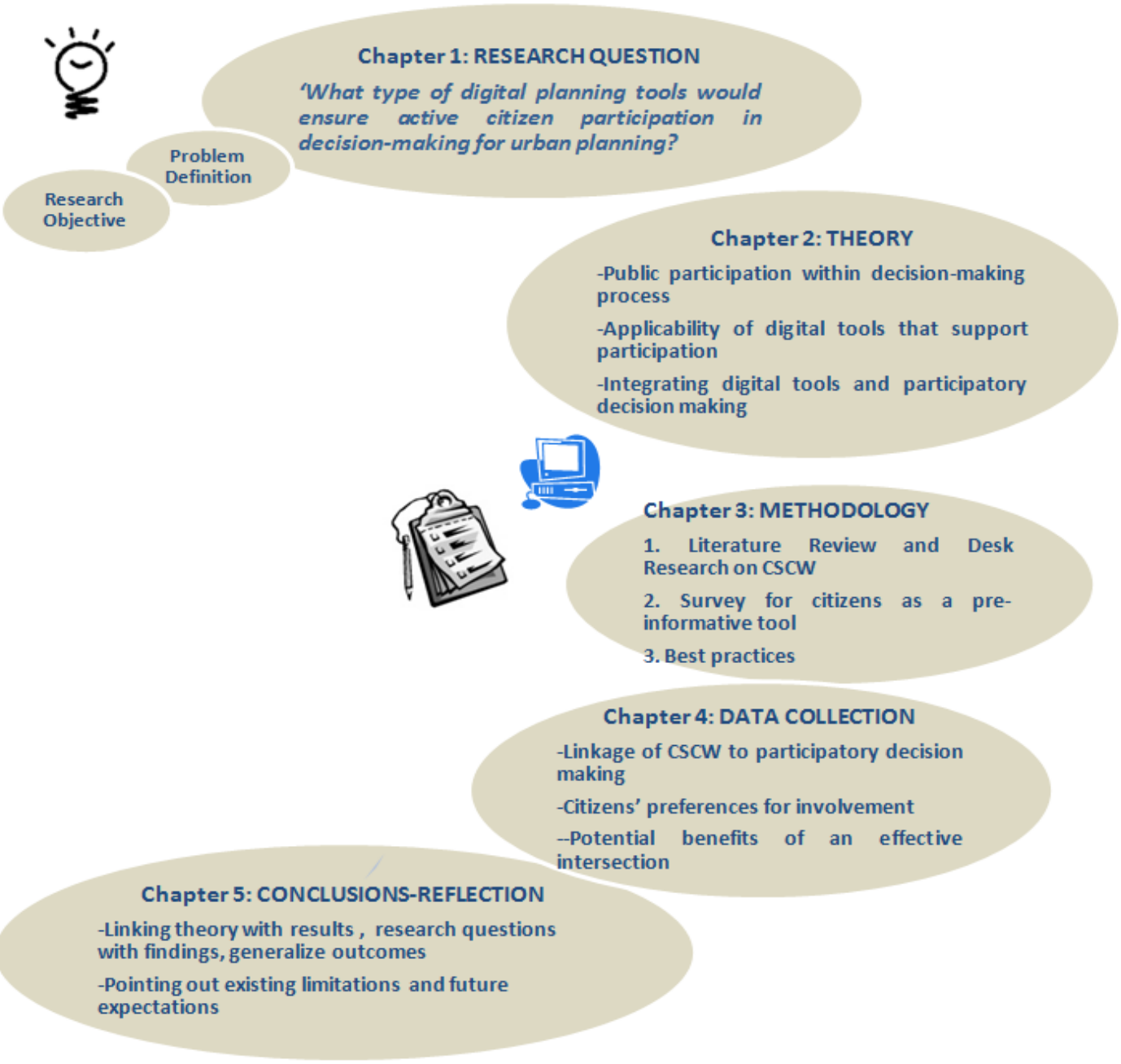


Figure 1: Thesis Outline

CHAPTER 2

THEORETICAL BACKGROUND

This chapter documents part of the theoretical aspect of the research, which is based on the notion of public participation and digital tools. It is a necessity to start with the theory of participatory approaches in urban planning and continue with the challenging section of technology and digital planning tools. It is attempted to see public participation and citizen involvement from a theoretical perspective as well as review the digital tools that are used for urban planning nowadays. Reviewing the necessary literature, this section presents some nuances and outcomes that lead to what is considered as problem. Reviewing this theoretical background it is attempted to address the main variables framing the research problem, presented in a simple conceptual model in order to define the way of an effective inter-linkage of these fields.

2.1 PUBLIC PARTICIPATION IN URBAN PLANNING

2.1.1 THEORETICAL FRAME OF PARTICIPATORY PLANNING

Public participation is a concept that can be defined at various levels trying to facilitate governance and institutional practices. Participation do plays an important role in decision-making the past decades with planners and project leaders try to include people early in decision-making process depending on the project and content each time. When different stakeholders and individuals get involved in the complex process of planning with power, responsibilities, interests and needs varying, then it is called participatory planning (CIFOR 2007). It is this process where stakeholders influence and share control over policy making and access to public goods and services while according to Cernia, participation is defined as the notion of empowerment where citizens are more than passive actors (Cernia, 1985).

The arguments for public participation and the positive aspects for participatory planning could extend into large lists, based on details or more general and philosophical terms. Perhaps the list could correlate best with what could be the purpose in promoting and

analyzing this term of participation. Kurian and Ramkumar (2001) wrote about the meaning of participatory planning, which actually focuses on the process for learning rather than plunging directly into a solution. The focus is on the process and is actually an expression of a society's political culture (Renn et al., 2003; SERG 2004). Generally, participatory planning is an urban planning paradigm that emphasizes involving the entire community in the strategic and management processes of urban planning. It is not something new and people are familiar with that concept. According to the International Association for Public Participation (IAP2), the concept of public participation relies upon wide collaboration, seeking the involvement of those potentially affected by or interested in a certain decision, empowering the notion of democratic governance, as public involvement is seen as being a term connected with notions such as democracy and justice. It is among the challenges that countries and their political and institutional systems have to take into consideration.

The history of Public Participation in democratic societies is long and it has taken central place in policy making, as a response to traditional approaches and management processes since 1960's (Beirle et al., 2002; Rowe et al., 2004). The participatory challenge lies in creating shared meanings, embracing people and linking them with the state and it is a good tool for building citizenship focused on the inclusiveness of people (Woltjer 2002; Involve 2005). The communicative turn in 1980's made it a theoretical must for this field as a participatory design approach can bridge urban planning with community development and local governance (Healey 1997). Healey argues that planners have to have a clear set of theoretical tools to develop an effective technique. But it is essential to explore the whole process, the interaction among the citizens at a first level, earlier engaged within the process, exchanging information and discussing the issue and the possibility of enabling a lot of feedback and effect on the decisions that were taken. She also focuses on the need for deliberation, argumentation and interaction to achieve mutual understandings.

After citizens were given the right to take part in decision-making processes, some general principles followed in order to make this process more effective. More specifically, according to Egger and Majeres 1998 (In: Duraiappah et al., 2005), these categories are divided based on the power of the participants that possess during the process of decision-making and the distribution of their requirements and responsibilities:

- **Inclusion**

Inclusion of all the citizens or the representatives of all of the groups that might be affected by the results of the decision-making.

- **Equal Partnership**
Equal right of everybody to take part in the process, no matter of the social and educational status of the person.

- **Transparency**
The participants have the requirement to make an effort in order to create a form of open communication and constructive dialogue.

- **Sharing Power**
Sharing power and authorities between participants are equally distributed in order to reduce dominance of one party over another.

- **Sharing responsibility**
Responsibilities are similar and equal among the participants regarding the decisions that are made within each process.

- **Empowerment**
The participants with a field of expertise are encouraged to take initiatives and more responsibilities based on their skills, while also encourage the other members to act similarly in order to promote learning and knowledge distribution.

- **Cooperation**
This stage is considered as the most significant one, as it is about strengthening everybody's strong skills and reducing the group's weaknesses.

Participatory planning is also associated with more general notions of getting engaged into the process of urban planning. According to Healey (1997), is connected with more powerful procedures than just the qualitative decision-making, focusing on the beneficial aspects of an effective communication platform for urban planning, policy makers and the people involved in the process.

2.1.2 Citizen's Level and Degree of Engagement

According to Aggens (1998), there are six orbits that the participants follow when engaged in participatory planning based on the available time, resources and interest they share. These orbits are the six levels that are defined by the required human energy to sustain them. Aggens implies a hierarchy of influence in decision-making moving from the inner orbit to the outer one. What is required to affect the decision-making process is energy from both the participants and the planning authorities. Moving from the least to the highest level of citizen engagement, the following categories can apply:

-The **unsurprised apathetics**: they are the disinterested participants that want to highlight the lack of information they might have received and that they do not get affected by the existence of that issue under discussion

-The **observe**r, who are those that are distant and might turn into disinterested or more active participants later on this process if there are more chances for participation

-The **reviewers**, for those that have limited time. They usually need their own pace and convenience of time, so the work can be done by distant or web-based communication (telephone, email).

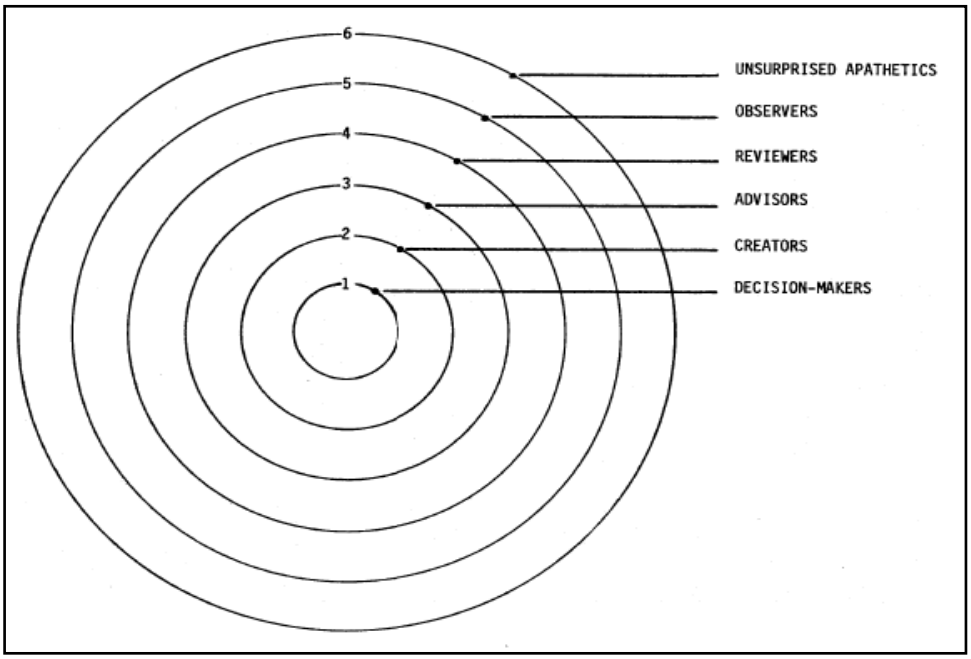


Figure 2: Orbits of Public Involvement Activity (Source: Aggens 1998)

-The **orbit of advisors**, which requires more energy. They are usually the representatives of public and private agencies or those that are more affected by the project. Advisors are more engaged into the process as they are attending the necessary presentations and public meetings, consuming time from their routine, in order to be able to have all of the information they need to question or assess the expected outcomes.

-The **plan-makers** or creators constitute the 2nd orbit, which requires a significant amount of time and energy from the citizens was well as a strong commitment from the planning authorities. Those participants, in order to be part of the plan-making team, they are required to acquaint their opinion and ideas to the designers and the planning authorities.

-Lastly, **the decision-makers**, consisting of the very interested and highly committed to the process participants. They also give a least one vote when it comes to the final decision-

making, if they do not have the full control over that decision. Moreover, in some cases these participants or groups of people or community may have a veto power over the agency's decision and refuse to proceed.

Regarding the degree of involvement, this is something that depends on the desire as well as the knowledge of the citizens to get engaged into the participatory processes and the conditions that frame the under-discussion topic. Following the 'ladder of participation' from Sherry Arnstein (1969), she distinguished eight steps of participation from non-participation (manipulation and therapy), to tokenism (informing, consultation, placation) and finally to citizen control (partnership, delegation, citizen control). According to this division, there is a distinction between symbolic and real participation. Citizens can play some of these roles in planning: review and comment, consultation, advisory, shared and controlled decision making and they can be enacting more than one of these roles in an organization (Sarjakoski 1998). A simpler categorization is the one of IAP2's Public Participatory Spectrum, as this involves the stages of information, consultation, involvement, collaboration and empowerment. The following figure shows the comparison of these levels of participation. This figure criticizes the oversimplification of the ladder of Arnstein, neglecting the higher level of citizen control (Pietro-Martin 2010).

Table 1: Levels of citizen participation according to Arnstein and IAPP (Source: Pietro Martin P., 2010)

S. Arnstein: Ladder of Citizen Participation (1969)	**IAPP: Spectrum of Public Participation (2000)**
Citizen Power	
▪ Citizen Control	▪ Empower
▪ Delegated Power	▪ Collaborate
▪ Partnership	
Tokenism	
▪ Placation	▪ Involve
▪ Consultation	▪ Consult
▪ Information	▪ Inform
Non-Participation	
▪ Therapy	
▪ Manipulation	

2.1.3 TRANSITION IN PLANNING PROCESSES AND DECISION-MAKING STRUCTURES

The 'public participation-believers' consider decision-making and policy making as interrelated issues. However, there has always been a rationale defining public participation, its goals and expected outcomes based on the existing laws of thought. For many decades, the functional rationality was dominant, with a hierarchical and top-down approach in decision-making. During that time, the methods and techniques that were applied had a systemic approach focusing on the goal rather than the process (De Roo 2003). With the communicative turn there was a shift to a more collaborative planning and wider inclusiveness as communication and interaction among citizens was seen as a way to strengthen social cohesion and trust through incorporating a broader spectrum of the public (Allmendinger 2009; Ziersch et al., 2011).

In an attempt to define the steps of a planning process according to the technical rationality, one has to examine the type of planning of the city/country as this depends by its administrative and institutional context. The steps are similar to conventional approaches to planning, including the identification of the problem before moving to the second step of problem analysis where ideas or alternatives are into preparation. The next one is the alternative selection, which is followed by the phase of implementation. A solution evaluation step may follow in order to assess each strategy or decision that occurred (UNCHS 2001; Geoghegan et al., 2004). For that reason, although the exact sequence of steps vary in decision-making, the most common steps are presented at Figure 2 and are trying to cover the majority of these approaches. In this research, it is addressed that the existing framework for planning starts as soon as public demand for a specific issue is raised. That is that planners and community groups have to face and take a decision upon a problem that already exists. Figure 3 illustrates the basic steps in decision making process, and based on the pre-defined issue/problem, a conventional approach dominates, where the most important step is the selection of the alternative, regarding the choice between the alternatives.

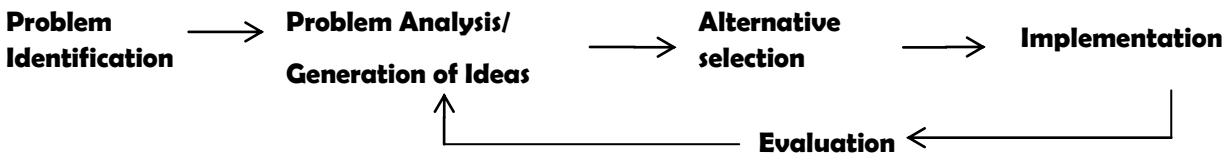


Figure 3: The 'traditional' decision making process

From a personal perspective, this 'participative' approach is not effective, as the actor becomes aware of an existing problem, carefully weighs alternatives, chooses among them according to his/her estimates of their respective merit, with reference to the state of affairs he or she prefers (Etzioni 1967). In addition, within this rational decision making model, the results are expected and more likely to serve the preferences of the same decision-makers. Based on that traditional decision-making process, the citizen is most likely to contribute merely to the analysis of the problem and the alternative selection phase as it offers no challenges for the public to be deeper involved and participation is seen as a goal rather than a means. However, there are ways to challenge the dominant decision-making process by using the guidelines for an effective participation, empowering communities and participants to influence the direction of development initiatives, rather than contribute to a scenario selection and a passive vote over or against an alternative or idea (Duraiappah et al., 2005).

A turn to a more communicative way of planning has more benefits and the main core values and principles are based on the involvement of everyone potentially affected by the prominent decision making seeking for citizens' input and voice in designing and promoting sustainable decisions by communicating the needs of all participants and decision-makers (Zwirner et al., 2008). Participating in group discussions strengthens the public deliberation, through dialogue, communication and exchange of information and emotions, taking into consideration the participants' perspectives, central elements to planning and collaborative approaches (Innes 1998; Doelher 2002; Bessete 2004). The process is inclusive, taking into consideration different world-views and all opposing viewpoints are able to co-exist in the same 'room'.

Based on the sources of my theory for the research on collaborative planning from Innes and Booher (2004;2010), Habermas' theory of communicative rationality (Habermas in: Bohman et al., 2011) and Arnstein's (1969) ladder of participation, the purpose here is on linking citizen participation with decision-making processes focusing on early engagement enhancing the level of active citizenry. The question remains of how to locate this content into practice, as communicative approaches are context dependent and focus in process rather than models that can be implemented. A lot has been said about communication, interaction and the flow of information but a new planning dialect should take part in the planning processes based on a citizen-driven flow of interaction and information flow. That is we need to shift to new type of decision-making where citizens are both providers and

recipients of information. A simple figure to illustrate the proposed decision-making framework is the one presented (Figure 4), showing how people should be earlier engaged in the whole process. Being pro-active is among the basic principles for this approach as the status-quo shapes dialogues.

Citizens' absence of engagement in an early state of planning is one more reason for ineffective planning (Booher and Innes 2004). There is one important component in the proposed approach: the social interaction among citizens and exchange of ideas among them that will create a plan and lead to an agreed one. In that interactive process, citizens are active actors who generate ideas.. Additionally, the planning authorities can provide them with real-time data for a prominent project and feedback to the generated ideas, broadening citizens' scope rather than narrowing down the alternative options.

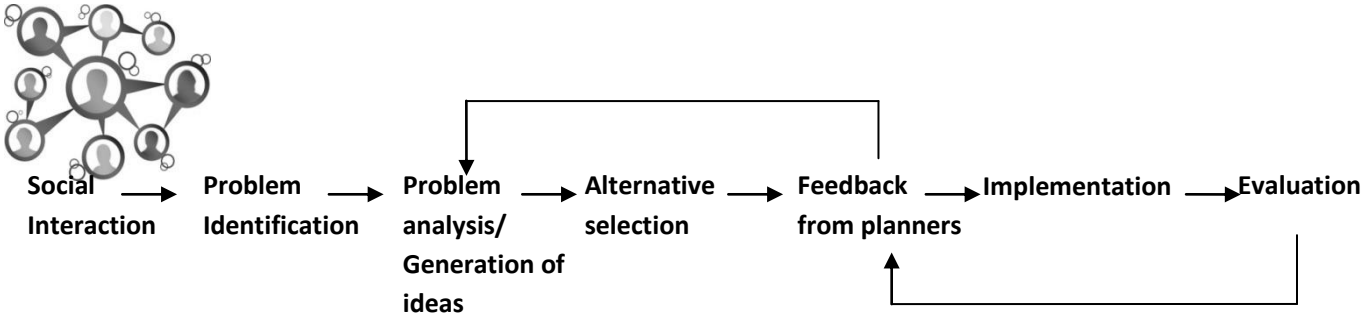


Figure 4: The proposed decision-making model within the zone of empowerment

2.1.4 PARTICIPATORY URBAN GOVERNANCE AND PARTICIPATIVE TECHNIQUES

The selection of the participative technique is context and content dependent. Among others, the goals and expected outcomes of this action are among the most important variables, in accordance with the participants. It is not surprising that the term and idea of 'participation' differs from place to place and from person to person. Moreover, the timeframe and complexity of the issue define the most appropriate technique in terms of available resources and there are plenty of tools and participative techniques that governments and municipalities apply in order to call for citizen involvement in urban planning (Wallin et al., 2010). The traditional techniques that governments and institutions usually use in urban planning include informative community meetings, workshops to discuss relevant issues, public hearings and campaigns, information stands at the municipalities as well as social media and Internet (IAP2; Involve 2005; ICMD 2007). There is

also an increase in local agencies that use technology and modern software and tools to increase the efficiency of the traditional community meetings and workshops through technology or Internet for online public engagement (ILG 2012).

Some governments encourage wider citizen input and active involvement, as participation is connected with the basic principles of 'good governance'. This consists of a set of measures between the public and the governing through interactivity, transparency and accessibility at all stages of decision-making (UNCHS 2001; Mc Call et al., 2005). The Organization for Economic Cooperation and Development (OECD 2001) states that the government-citizen relations should cover an array of interactions at each stage of the policy cycle from policy design to implementation and evaluation. Also, in an attempt to find the best ingredients for good governance, the term 'Open Government' was defined, offering transparency, knowledge, open data and access to information. According to the definition given it includes 'the transparency of government actions, the accessibility of government services and information, and the responsiveness of government to new ideas, demands and needs' (OECD 2001; Gavellin et al., 2009; Macintosh 2004).

The worldwide and easily accessible nature of the Internet however, offers a better service to its citizens providing them with a larger content of information. E-Government as defined by UN (2014), is focused on the use of information and communication technologies in participation and governance, calling for a faster provision of information, consultation and feedback reporting on policy documents and issues (OECD, 2001).

Finally, another dynamic type of government is the combination of Open Government and E-Government is the so-called Web 2.0 Government whose mission is to improve government's transparency and efficiency through social media or cloud computing. In such a way, Web 2.0 takes advantage of the effects of network and people participation and provides citizens higher expectations for participation, exploiting new digital opportunities between citizens and public authorities always in relation to decision-making, processing and results (Goodchild 2007; Holmes 2011; Blanc et al., 2012).

Following this theoretical background on public participation and collaborative planning, we have seen so far that there is a great interest when it comes to encourage and widen citizen participation, but while turning to the role of communication, many tools are being developed to achieve better interaction and communication between planners and citizens (IDB 2012). With the advances that new technology can offer, the need for the use of Web

2.0 technology is proposed, calling for upward dissemination and a dynamic type of governance. There follows an attempt to introduce the digital tools that have been implemented the past decades that support participation and decision-making in urban planning using computerized methods and taking advantage of the benefits when using state-of-the-art technology (Al-Kodmany 2001; Laurini 2001).

2.2 Digital Tools that support participation In Urban Planning

2.2.1 The rise of Digital tools and Cooperative Systems

The development of Information Technology applies in various fields in terms of urban planning while there have been many initiatives promoting the role of tools to support participatory planning that have managed to access, gather and distribute information (IDB 2012). The methods to achieve participatory urban planning are also changing according to technological and societal changes (Booher and Innes 2010). Over the past decades, various tools have been developed and incorporated into the heart of planning practices with a broad use in the modern society, while these tools improved communication between planners, municipalities and governments (Drummond and French, 2008). This chapter should begin with how technology has widely risen and applied in urban planning since we are currently in this age where technology and digital tools progressively consolidate their presence and form new means of communication and interaction among people.

The combination of technology and digital tools is being outlined the recent decades focusing on exploiting information and communications technology in the name of urban planning while they became an important part of daily routine with citizens able to collect, document information, share experience and connect with their urban environment through technology and its various applications (Rotondo et al., 2012). Technology and communication are changing the way people take decisions in groups while Internet sphere, technology, interactive media and public sphere are basic elements being into academic research and have a permanent place on research agendas (Kiesler et al., 1992; Dahlberg 2001; Dalgren 2005).

Digital planning means plurality and imagination while planners need it in terms of participation, in order to promote a general sense of approval and implement their plans or visions. Different technologies are being developed and phasing various transformations and over the last two decades, various techniques have been developed to help in the design

and decision-making process, involving users in the planning process and emphasizing the role of communication (Castells 2009). Computer-supported co-operative works (CSCW) are known as techniques that have been developed to contribute to increase participation, also known as groupware or collaborative software (Laurini 2001). According to Coleman (2005, cited by Laurini, 2001), 'Groupware is an umbrella term for the technologies that support person-to-person collaboration and can be anything from email to electronic systems to workflow'. Through this collaborative system, web, networking and multi-media development enable the public to participate based on Internet and interaction and can be a valuable set of tools for urban planners willing to achieve a participatory design (Ellis et al., 1991; Laurini 2001).

Table 2: Groupware classification (Source: Ellis et al., 1991)

	Same Time	**Different Time**
Same Place	**Face to Face Interactions** ▪ conference tables with embedded computers ▪ decision-rooms	**On-going tasks** ▪ team rooms ▪ group displays ▪ project management
Different Places	**Distributed Real Time Interactions** ▪ shared screens ▪ chat systems ▪ video conferencing	**Communication and coordination** ▪ asynchronous communication ▪ workflow systems ▪ collaborative hypertext

Groupware can be classified based on the variables of time and space based on synchronous and asynchronous interaction as well as proximity (Table 2). The 'Face to face' interactions involves all this computing software that allows for communication the same time and at the same place, used as tools for voting or exploring unstructured problems or brainstorming ideas, such as shared tables and wall displays. Staying at the same axis of time, the distributed real time interactions are these remote ones, including video audio conferencing, shared screens through the web, e-learning platforms and chats. Next, are these tools that are located at the same place but not used synchronically by the participants. It should be addressed that another example in this category is a kiosk, which is a participative technique that provides information to the public about the city attractions. Additionally, this type of tools can be used for widening citizen participation through for other activities as well. Lastly, the asynchronous distributed tools include blogs, emails, web platforms and web questionnaires that are widely accepted by the users as they are less time consuming for them (Baecker et al., 1995).

According to the focus of this research, we claim that groupware is generally referred to computer-supported systems, thus more tools can be linked to that matrix of classification (Table 2) using state-of-the-art technology. Every set of tools can benefit a particular group for a particular purpose but the focus here is on those that widen citizen's involvement in urban planning.

According to Zube (1987), geo-visualization can be divided into perceptual and conceptual type, as well as static and dynamic one. However, in an effort to approach visualization in terms of participatory planning, the term means that it stimulates visual thinking and offers the space to explore data and alternatives, while analyze geo-spatial patterns and trends (Kraak 2003). The computerized methods and models offer geo-visualizing skills trough a dynamic perspective. The following computerized methods are addressing the design of computer technologies that support communication and interaction between groups or organizations as well as geo-visualization, while they are challenging in terms of active involvement (Laurini 2001; Balram et al., 2006; Hanzl 2007; Wallin et al., 2010).

- **3D MODELING**

The numerous advantages in technology and computer sciences developed systems that support collaborative urban planning in a more interactive way and enhance the process of decision-making. 3D models are presented as static pictures, animations and as Virtual Reality models. Visualization techniques are mostly used to raise the interest of the participants and make it easier for them to take active part and understand the possible impacts. Most of them are effective, engaging participation and knowledge exchange. Information Technology is able to offer new potentials for active citizen participation. An example of this is virtual tables, with a rear-projection table for tangible interaction. These developments have been constructed for over 15 years, while they facilitate group interaction with the planning and decision support system (Coors et al., 1999; Hanzl 2007; Wu et al, 2010). 3D modeling can be really challenging for urban planning as the visualization enhances spatial plans to be understood and further examined (Al-Kodmany 2001).

- **VIRTUAL REALITY**

Virtual Reality is an improved version of 3D modeling offering participants high level of interaction and visualization, making these methods attractive. They are in a phase of constant technological changes and improvements as there are a lot of difficulties apart

from the challenges when choosing this method (Al-Kodmany 2001; Johanson et al., 2013). More specifically, people with different social or educational background can take part in the process, and communicate with each other through visualization. However, there are some difficulties to be addressed as an important requirement for this method is to provide each participant a computer as well as the difficulty of managing the vast amount of data (Al-Kodmany 2001).

- **URBAN SIMULATION**

One other method of computerized models that support participation is urban simulation, a method that has expanded the recent years within the technological development era in computer science (Groat et al., 2002). Urban Simulation differs from virtual reality as space is dynamically presented in each case and the changes through time can also be revealed. The variable of time is incorporated as an important parameter while participants can explore the digital environment and visualize many possible scenarios or alternatives with high flexibility and detail (Al-Kodmany, 2001). Active citizenship is achieved and high level of interaction within the participants and the digital environment without difficulties related with the scale of the project or the symbolization. Despite the before mentioned benefits and the dynamic visualization, the cost is higher based on financial and time constraints to build that friendly environment for the public (Al-Kodmany 2001; Groat et al., 2002).

- **GEOGRAPHICAL INFORMATION SYSTEM**

GIS stands for Geographic Information Systems and for the last few decades it has been incorporated into the field of urban planning performing digitally traditional tasks of planning practices with a high level accuracy considering the outputs obtained and it moved from an expert-oriented tool to a tool that can easily be used by many people, non experts (Craig et al., 2002). GIS attempted to take into consideration the challenges of the nature of urban planning and offers applications for group solving, and GIS mapping has been used as a computerized method to offer the participants visualization and support in decision-making (Craig et al., 2002; Balram and Dragicevic 2006). Recent advances in Geographic Information Systems (GIS) and Web 2.0 technologies provide new ways of creating new ways to strengthen social interactions based on online maps (Johanson et al., 2013).

PLANNING SUPPORT SYSTEMS – PSS APPLICATIONS

Planning support system (PSS) is a term describing the software which supports urban planning. According to Balgram et al. (2006) it is about an effective use of GIS by groups that consist of technical experts. The software enables displaying data in forms which are easy to

understand by a layperson and allows for simulation of future state of a site after introducing the relevant parameters of the current state and the planning conditions (Brail and Klosterman, 2001; Hanzl 2007) while digital workshops focus mainly on the usage of state-of-the-art tools in accordance with a collaborative planning process (Salter et al., 2008). 'Community Viz' is an extension tool that can be used with Geographic Information Systems, able to support scenario planning, sketch planning, 3-D visualization, suitability analysis, impact assessment, growth modeling and other planning techniques (URL: www.placeways.com/communityviz/). As they work, the software gives them immediate feedback on the potential impacts of their plans, which they can use to evaluate their ideas, support discussion, and eventually make better informed and collaborative decisions. The model also provides visual feedback for evaluating the scenarios and promoting discussion (D. Walker, personal communication, June 11, 2014).

PUBLIC PARTICIPATORY GIS –PPGIS APPLICATIONS

Through a PPGIS application users can easily explore and comment on the datasets. A database stores the contributions in a format supported by GIS (Hanzl 2007; Bugs et al., 2009). The term PPGIS stands for Public Participation Geographical Information System and was conceived in 1996 as part of the GIS working environment, able to foster public involvement, empower non-governmental organizations and local communities (Sheppard et al., 1999) while it has proved to be effective through increasing community participation in the evaluation process.

Based on the level of functionality a PPGIS could succeed in various levels of citizen involvement and interactivity and can be used with efficiency by the public and community groups (Hansen et al., 2005; Balgram et al., 2006). Participatory Planning Geographic Information Systems serve data with spatial reference to a large group of people via the Internet. The aim of PPGIS is to enlarge the level of citizens' involvement in decision-making and to improve access to data and information.

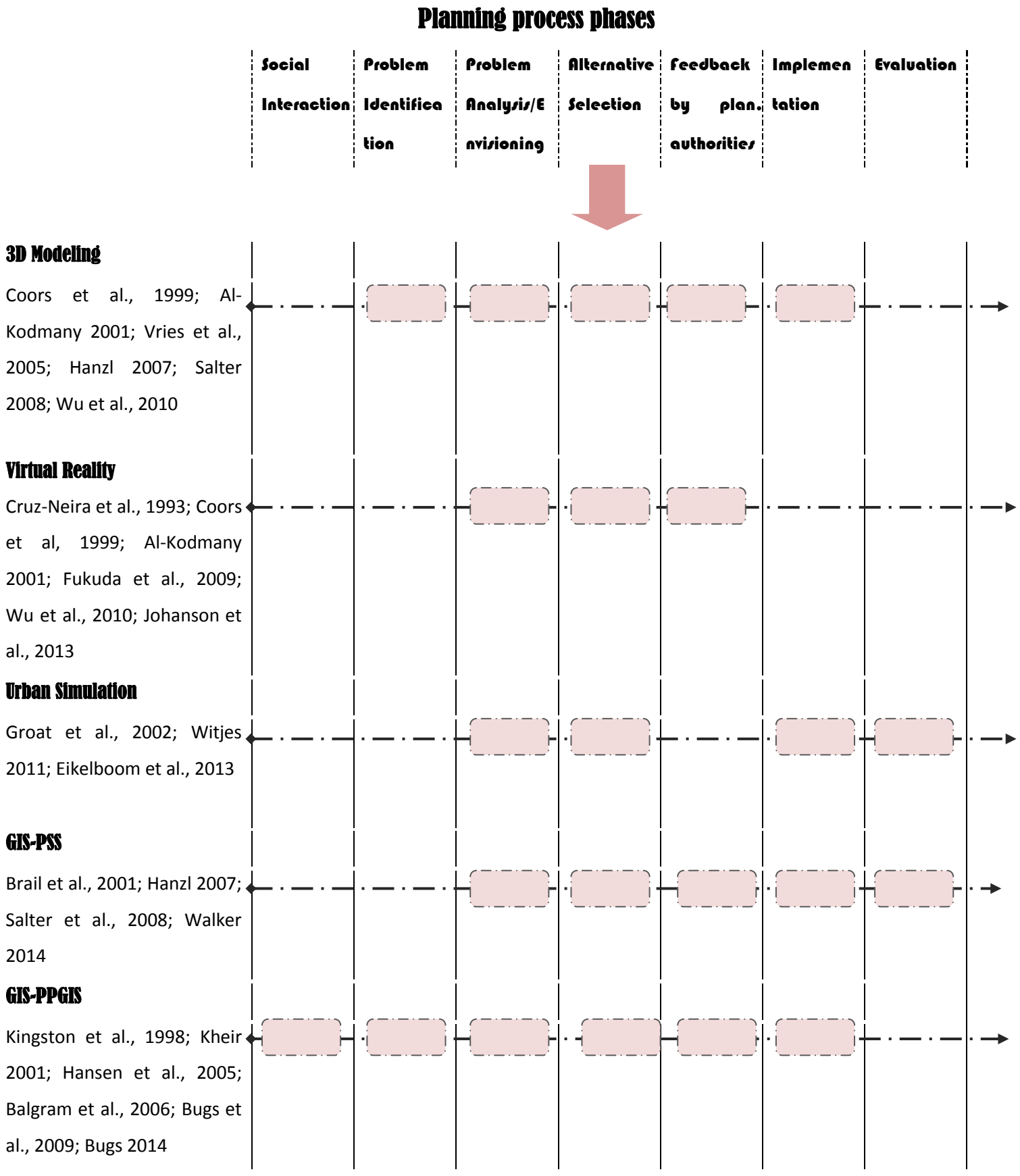
What makes PPGIS differ from GIS is that PPGIS is a bottom up approach empowering the process of participatory planning. Web 2.0 is a term that refers to a next generation Internet applications that can be embedded in the technology mentioned above to make them more interactive, where users are not passive receivers rather than co-creators of content (IDB 2012).What is of crucial importance is the fact that PPGIS enables a communication sharing platform, also referred as Web 2.0 communication platform (Goodchild 2007; Hanzl 2007; Bugs et al., 2009). This possibility increases PPGIS effectiveness in terms of communication within a web-based platform.

2.2.2 Decision-Making in the Design of Digital Tools

The ways in which participation is incorporated in the design of the digital tools is related to the software embedded in those. Although the programming and development of the tool has been done by experts and computer specialists, planners use those technological advantages for their own benefit and particularly, for participatory planning. Using the matrix of decision-making process (Figure 4), a series of examples are mapped in the areas of digital tools and urban planning. These examples were chosen because they achieve some functions of the proposed participatory structure.

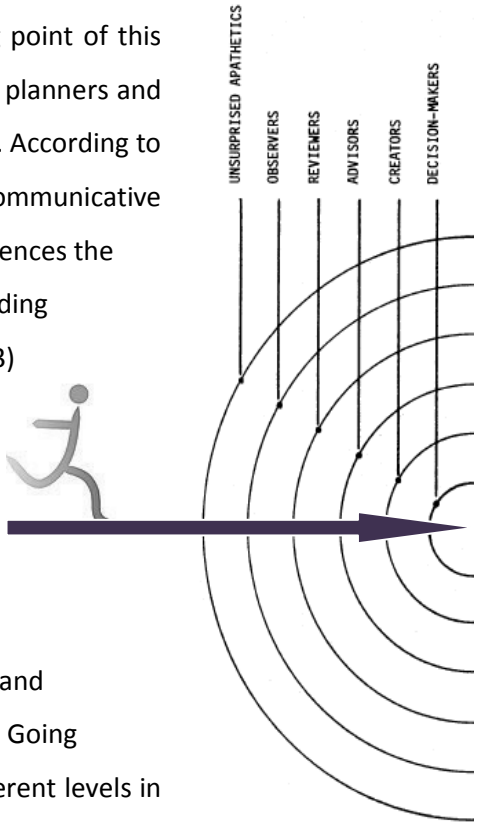
Table 3 shows the literature review that was used and summarized in terms of urban planning and digital technology. The following overview makes it possible to identify and match the functions that can be supported in the design of 3D Modeling, Virtual Reality, Urban Simulation, PSS and PPGIS and explore them through the phases of the proposed planning process.

Table 3: Decision-making process in the design of digital tools



2.3 INTEGRATING DIGITAL TOOLS WITH PARTICIPATORY DECISION-MAKING

The first part of this chapter focused on the need to increase citizen involvement with participatory approaches in urban planning. The idea of placing the citizen closer to the core of the circle of Aggens (Figure 2) requires energy and effort from both the participants and the planners. The starting point of this research though is the role of collaboration between planners and citizens that is proposed, calling for social interaction. According to Allmendinger (2009), it is addressed that the communicative rationality is based on the instrumental one that influences the barriers between citizens and decision-makers. According to the new proposed decision-making model (Figure 3) the purpose is the constant communication between citizens and the relevant authorities, where people are the drivers of the dialogue in a creative environment that triggers them to participate, communicate and collaborate. People will then have the chance and power to shape decisions and visions and planners all the knowledge needed to evaluate these. Going back and forth is of crucial interest between the different levels in planning and decision-making while planning authorities provide people with feedback so people are working with real-time data, acting and re-acting on the information receiving. After all, this procedure entails democracy, helping the planners to shift the decision-making into a participative democratic process as visions and solutions are being created after debate and dialogue and communicative rationality is being embedded into the process (Allmendinger 2009).



Information Technology offers various tools to support urban planning and decision-making and the focus of this research is to identify those that come closer to the nature of participatory techniques and citizen's preferences. Digital tools are nowadays faced with complex issues that need to be solved and for that reason there is a strong focus on their possible linkage with decision making for effective spatial planning and urban governance. Information and Communication Technology can affect the existing typical procedure in planning and digital tools combined with public participation can empower citizen involvement, with citizens and stakeholders able to collaborate throughout argumentative dialogues (Kiesler et al., 1992; Dahlberg 2001; Dalgren 2005). Many reports tried to prove

how a successful public participation project can improve the quality and legitimacy of decisions, increase social trust and understanding among citizens, and build capacity to engage in the policy process (Grima et al., 1983; Stromer-Galley et al., 2004; 2009; Dietz et al., 2008).

As we have seen, the spectrums of public participation as well as the one of digital tools belong in separate fields. According to our research questions, we are trying to find a way to connect these fields within the process of decision-making. The intersection zone is the one of crucial interest and this dynamic one that embraces the notions of dialogue, interactivity and citizen participation. With regards to the conceptual model that follows (Figure 4), the key challenge is to identify the possibility of integrating digital tools and citizens in an effective way.

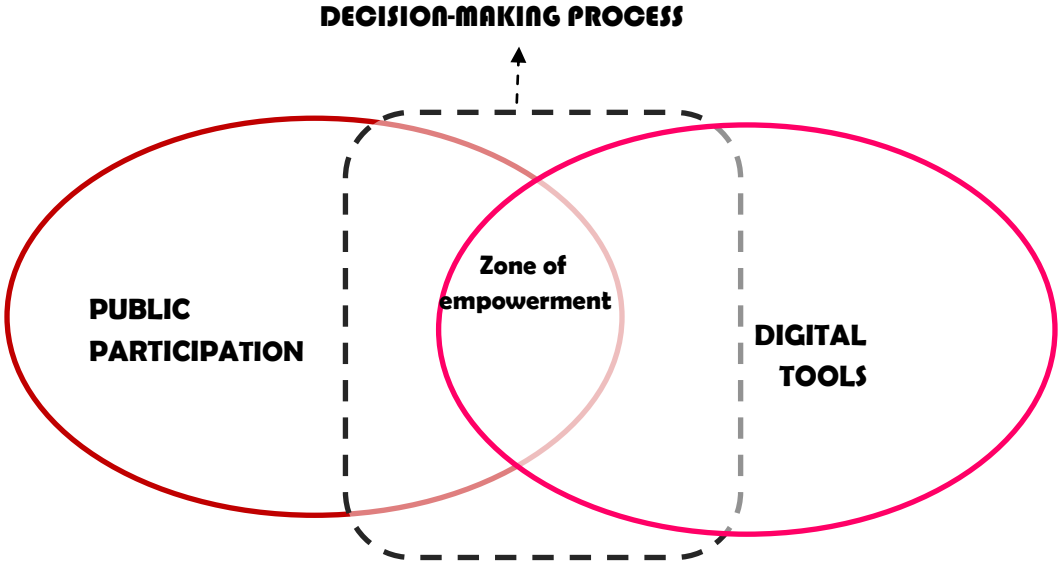


Figure 5: Conceptual Model

The next step links the field of participatory decision-making and digital tools. Regarding participatory decision-making procedures as a whole, we can assume that the different components and ideas generated as well as the different types and methods of digital tools can be summarized in two different spectrums. Are there digital tools that can be found in the intersection zone? That would mean that certain tools can actually be implemented in such a way that they contribute to the planning procedures and more specifically that these tools manage to early embrace people offering them the space to interact before moving the identification of a problem or formation of a new vision. Groupware and CSWC do

support participatory decision-making but we are mainly for those seeking for early citizen's input and involvement focusing on geo-visualization, interaction and participation.

The importance of public participation is recognized for urban planning and a collaborative democratic networking is only a start. In order to connect it with urban planning, digital tools should prompt for actual participation in more steps in decision making (Dawes 2008). The common area is the one where digital tools work effectively and according to the planning process, in the name of public participation and interactive decision-making and is based on the zone of empowerment. Macintosh characterized as empowering level, the one where citizens are actively engaged into decision-making, ensuring that they possess the necessary skills to influence the process as well as engage within using technology (Macintosh 2004). The intersection zone of digital tools and participatory decision-making will be this dynamic zone where digital tools empower citizens, offering the space to interact while citizens are also empowering themselves as they selected themselves the appropriate technology and software to achieve that.

CHAPTER 3

METHODOLOGY

This chapter is describing the methodological phase, which encompasses mainly qualitative techniques. It focuses on the way that the secondary and primary data were collected, the reason for selecting each methodological tool and the type of the data that are supposed to collect. A basic step is to gather all important information through qualitative techniques which were selected to connect the theoretical notions, practices and assumptions to the empirical world (Denzin et al., 2004). This approach of mixing methods based on qualitative thinking starts with a desk research on participatory planning and digital tools. Moving on to the public participatory spectrum, a survey is created to conceptualize some quantitative standards and link them with the empirical world, while a selection of a digital tool that matches the public's preferences will be examined through some best practices.

3.1 PARADIGM AND QUALITATIVE RESEARCH

The focus of this thesis is based on an effective intersection of the two sub-fields of citizen participation and the technology used in such a way as to enhance the decision-making process. The conceptual model that was presented in the theoretical chapter was used systematically as a tool to conduct the research, while this report is based on qualitative and participative research style. Following the interpretative paradigm as a researcher, the focus was on viewing society as a central element for analysis while it is worthwhile to consider the inclusion in the design of the research of citizens and experts in the field of digital tools. That paradigm is associated with more qualitative approaches but it also provides an opportunity for the researcher to interact with the participants and provide an insight of the concerns and practices of the citizens that should be heard. According to Burrel and Morgan (1979), through an interpretative viewpoint the researcher tries to understand the on-going processes and observe the spiritual nature of the world. This research is qualitative in nature with that need to interpret and understand. According to Miles and Huberman (2002), this

type of research can lead to an enriched description and analysis of contexts and various findings can be derived. Starting from a qualitative perspective, helps researchers to move beyond the initial concept by generating or revising conceptual frameworks, as design is an activity that only through a variety of methods will help move beyond the current idea (Mason 2006).

The challenge in this research is that the questions were clarified on a first basis and were gradually answered through the process of engagement. Following the conceptual model as a methodological tool, a desk research was conducted in order to use the existing literature and internet sources to identify the digital tools that support participatory planning and additionally link those to the proposed decision-making model. The second phase concerned the survey which was focused on the empowerment of the citizens themselves to make their voices heard and bring their experiences, their everyday knowledge and ability into the research process (Russo 2012). Apart from the aforementioned survey, a selection of some examples considered as best practices are further examined in the last section of this research providing the researcher the opportunity to examine those thoroughly. The boundaries can be defined based on the particular time, cultural context or space in order to enable multiple interpretations (Merriam 1998). In this research, selected examples are used as a methodological tool collecting data through personal observation and interviews, where each one is unique and important for certain attributes.

It should be addressed that other alternatives would include the introduction of the existing digital tools to the participants of the survey. That is, citizens themselves could choose their preferred tool before moving on its implementation in real-life context. However, the primary aim of this participatory research was to intersect technology and participatory planning through the citizen's perspective. The survey is used as a pre-informative tool for desired citizen involvement and interaction and not on what the first side can 'learn' from the experts and academic worldview. Letting citizens choose among the traditional participative techniques, level of engagement and interaction is identifying more clearly and less biased citizens' needs.

3.2 METHODOLOGY FLOWCHART

The following flowchart is produced for a better understanding of the procedures that were followed in order to answer the research questions. Reviewing the literature was the starting point in order to conduct some research on existing digital tools that are in use nowadays. The result was the list of them and their linkage to the proposed conceptual model (Figure 5) presented at chapter 2. After the thorough desk research, a selection of them was made to those that support more steps, but mainly those that seek for citizens' communication as an initial requirement. Then, the web-survey was conducted which prompts citizens to select and evaluate a list of participative methods and techniques. After the citizens express their opinion and the tools is selected from the majority of respondents, a further research is conducted based on the possible outcomes that may occur after the prominent implementation. Matching the public's preferences with the digital tools, the cases of PPGIS are further examined as best practices and evaluated pointing out some of the attributes and criteria met.

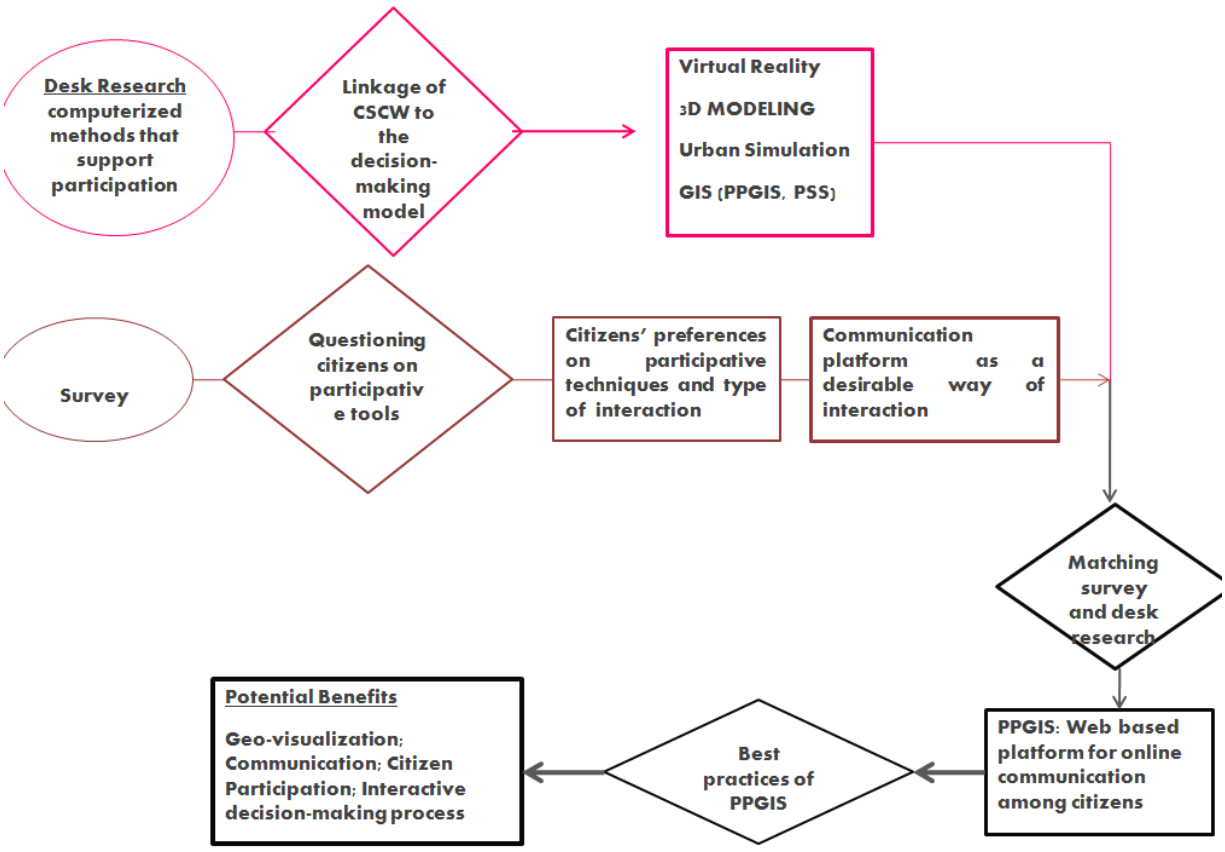


Figure 6: The flowchart of the methodological process

3.2.1 DESK RESEARCH

The first part of research is based on literature review and internet resources to collect the necessary data. Consequently, the starting point of the study is to examine the existing digital tools based on literature review to identify what is already known and what needs to be further examined based on find those that support participatory urban planning. This desk research will try to give an answer to whether digital tools link urban planning and decision-making and more specifically, which are these functions that digital tools can support nowadays. In order to do that, an examination of each tool's design will show the stage of the planning process that it is linked to based on the proposed steps of decision making according to the conceptual model in chapter 2, which include the citizen-driven interaction and information exchange, the phase of envisioning and generation of ideas, the next one where decisions are taken or alternatives are selected. According to the same model, feedback could be provided from the planning authorities before we move to implement the selected solution or idea.

3.2.2 SURVEY

The most important point of this research is to strengthen collaboration between citizens and the governmental agencies. As one of the main purposes of this research is to examine a possibility of building good and voluntary participation (Involve 2005; IDB 2012), the following survey was used as a pre-informative tool to build a stronger collaboration between planners and citizens and examine the last ones' preferences towards participation and desirable degree of involvement. Depending on the way the survey is designed, it can include a large number of different types of data, such as relevant knowledge on a particular issue, opinions based on experience, thoughts and attitudes toward a topic, all linked to the research issue. Collecting these data through surveys has several advantages over other methods for addressing experience or describing behaviors (Diamond 2011).

This citizen-centered survey is to underpin their preferences, locally mapped, and make those people that are already familiar with social media and technology to guide and choose their desirable participative way and technique and what triggers them more when it comes to urban participation about their community. This survey is the answer for the third sub-question, regarding placing citizens as active actors in the process of selecting their preferable technique of interaction and communication. By putting citizens in this process, it is attempted to empower them according to the theoretical frame for a more active citizen engagement.

3.2.2.1 SAMPLING AND MEASUREMENT PROCEDURE

The selection of participants is based on a non-probability sampling or purposive as the survey process was based on the respondents that were able and eager to take part in the process. This self-selection process for the participants is the most important part of the research as the main purpose is to gather information from the citizens that are actually willing to join this procedure (Involve 2005; Dolores et al., 2007). The questionnaire was published online for only 10 days through social networks (Facebook and blogs) requesting from the local people to answer what would prompt them to get deeper engaged within urban planning as one of the guiding criteria of what makes successful a participatory process is to promote learning and development (Involve 2005).

Both open and closed-ended questions with scaled responses explored general attitudes and experience of citizens and to capture their expectations and thoughts on the subject of digital tools when used in the name of public participation. It should be mentioned that despite the fact that questions on a survey must be clear, it is difficult to judge whether you will get the right answers for the precise questions. Many unexpected meanings may occur and trends arise from the various responses (Diamond 2011). A useful strategy was to design a matrix that linked basic keywords of the questions.

3.2.2.2 SURVEY STRUCTURE

The questions were organized in two sections and in such a way as to include a variety of participative techniques that have been implemented from the municipalities the last years. Through this co-relational research and a random sample of respondents, the purpose is to re-introduce public participation within the framework of digital urban planning tools. For the needs of this research, the first section attempted to make resident's opinion part of the goals of participatory planning, by placing them as agents and incorporate a citizen-centric perspective on participation and engagement, an important factor that concern us here. This field research attempts to gather the preferences of people in a close collaboration with planners, private interest groups and local councils to understand what does or does not prompt the locals to get involved in urban planning. The key questions consider the desirable degree of engagement (consultation/informative/co-design/collaborate/decide), the choice between the most popular participative techniques and make them choose their desirable way of engagement. For each question, participants will be asked how strongly they agree or disagree with the statements in a scale from 1 to 5.

The second section considers the field of digital planning tools. Re-introducing this discussion of digital tools, citizen involvement and future willingness for engagement will ensure individual preferences when it comes to community and collaborative planning and what interests us is human behavior towards digital participative planning, their experience and willingness. The participants were also requested to rank some of the guiding criteria that would like those to guide the future design of that tool including the following variables: free and accessible; user-friendly; creative; innovative; effective and functional; dynamic (back and forth participation); on-going procedure.

3.2.2.3 USE OF INDICATORS THAT WILL LEAD TO FURTHER RESEARCH

Very often citizens do not understand their rights and responsibilities and therefore are not able to express their real opinions and concerns. For the purpose of this study and in order to select and collect the citizens' responses with less bias, the survey's structure was designed in such a way so the sample design consists of comprehensive questions to allow recipients answer simple questions rather than complex ones. There should be a logical and conceptual linkage between the responses and the meanings that they connect to for the purpose of this study.

With the following matrix (Table 4), it is attempted to identify the basic keywords of the survey's questions with the hidden concepts, based on the literature review on the variety of tools and participative techniques that most municipalities and governments apply in order to increase citizen involvement (Involve 2005; ICMD 2007; Wallin et al., 2010). A few questions of that survey focus on the type of governance and the related principles that it requires. According to the matrix, it is build based on three types of governance as they are mentioned in the theoretical part of this research, which are further linked with some keywords. More specifically, the answers that citizens give are divided into different types of government, with regard to the information dissemination, the citizen's rights in urban planning, and the preferable level of engagement.

Table 4: Linking survey's question to governance type

	Q3: '*To what degree do the following participatory tools trigger you more to attend in your community*'	**Q4: '*Which following term do you consider more important as a basic citizen right*'**		**Q6: '*Topics you might be more interested*'**
	⬇	⬇	⬇	⬇
	Upward/ Downward dissemination	**Citizen right**	**Level of engagement**	**Issues of interest**
OPEN GOVERNEMENT	Downward	Knowledge	Access to information	Past projects
E-GOVERNEMENT	Upward	Trust	Collaborate Consult	Current projects
WEB 2.0 GOVERNEMENT	Upward and dynamic	Participate	Collaborate Decide	Current projects Future projects

3.2.3 BEST PRACTICES

After the completion of the survey, it was pointed out the communication platform as the most preferred participative technique and PPGIS in this case matches the survey's results. For that reason, PPGIS software is further examined through three examples that are used as illustrations of citizen's preferences.. This is about a selection of specific tools and technology that are in use in order to provide some insight and link theory and practice based on selected projects within their particular contextual background. The focus here is on GIS software, but more precisely on Public Participatory GIS Information Technology and Web 2.0 communication as important elements for research agendas (Kiesler et al., 1992; Dahlberg 2001; Laurini 2001; Dalgren 2005). For that reason, three examples are being mentioned in order to answer the last sub-question about the added value of the interactive web based digital tools.

Various tools have been developed to help in the design and decision-making process, trying to involve people, planners and multiple stakeholders and users with an interest in the planning process. Based on the objectives of this research, a review of these examples follows as these ones have incorporated technology or software to involve citizens through

collaborative decision making in a creative environment that urges for more active engagement. These methods were able to store information, represent it through interactive mapping and produce knowledge (Brown et al., 2013). Moreover, it is evaluated the level of information exchange and interaction between designers, planners, people and policy makers.

The purpose of this evaluation is to investigate the contextual background of them and give an answer of what is the added value of them as they are actually based on interaction and dialogue. A detailed study of them helps us to get a deeper view, trying to identify the most important variables that contributed to their implementation and success. Examining these examples is not a simple task while their effectiveness and efficiency is not something that can easily be measured. Evaluating planning subjects is complicated due to the policies, the local context that was applied, the key players and stakeholders that participated as well as the inter-subjectivity or interrelatedness between the legitimacy of findings and the derived results (Rotondo et al., 2012). Important information can be grasped through them, wondering about the approach they used, their conceptual methods, what did they achieve in reality and what was the desired result. The differences in the hidden logic and the variables that were taken into consideration may reveal numerous advantages and disadvantages when it comes to choose a specific tool for participatory planning for the future.

CHAPTER 4

FINDINGS

Within this chapter of the study the results of the analysis are presented. As described within the previous chapter, it is divided in three sections. The first one includes the review analysis on existing digital tools. Following, a thorough examination of the list made it possible to connect the tools based on their methodological context and goals with the steps in decision making of the proposed conceptual model. The next findings surround the online survey dedicated to capture citizens' point of view. After matching citizens' preferences for communication platform and networking with the existing tools, the PPGIS software based cases were identified as best practices as they come closer to the nature of this research's goal. The findings are presented along the following sections: 1) List of existing digital tools based on different software and linkage to decision-making steps that were achieved, 2) Survey to collect citizens' opinion and preferences for a desirable degree of engagement and interaction in urban planning, 3) Analysis of the best practices to identify the added value of the possible intersection of citizens' preferences and the digital tool.

4.1 DIGITAL TOOLS THAT SUPPORT URBAN PLANNING

Based on the initial literature review that was used in the theoretical chapter of this research, research based on existing digital tools was conducted to identify those that can support participatory approaches. The focus was on collaborative system where web, networking and multi-media applications support citizen participation in decision-making (Ellis 1991; Laurini 2001) and reveals how 3D modeling, virtual reality, urban simulation and GIS mapping offer geo-visualization and interaction to the participants. These computerized methods can support participative techniques by offering space for interaction, either online or offline, as well as geo-visualization. The table below (Table 5) presents an overview of existing digital tools, mentioning the type of interaction and their conclusions. Apart from

that, a linkage was made based on the function in planning process, between them and the proposed framework (Figure 6).

This paper implies that new technologies and digital tools can widen urban participation, but there is a gap of knowledge into the level of participation and engagement that can be achieved. Considering the nuances of the list of digital tools, is a fact that most of them lack of a specific conceptual framework while their linkage to the proposed framework is poor as they use only one or two of the steps in decision making.

A primary question for this research is focused on whether digital tools are linked with some of the functions of the proposed decision-making model. The focus here is to identify each case's methodological perspective by reviewing the relevant reports and evaluations of them and show how the development of the specific tools succeeded in implementing some of the proposed steps in decision-making process, as moving from information to implementation, these applications are flexible and they may vary based on their functional requirements of each project, the complexity embedded and the criteria they fulfill. A few examples follow that successfully implemented some of the proposed functions of the decision-making process is presented at Table 5, trying to show the level of social interaction, visualization and citizen's participation within specific context and strategy that was achieved (Kingston et al., 1998; Kheir 2001; Brail and Klosterman, 2001; Hanzl 2007; Salter et al., 2008; Bugs 2009; Wu et al., 2010).

Table 5: Digital Tools and function in the planning procedure

TYPE	Name/Publisher	Type of Interaction (enabled digitally)	Function in Planning Process	Conclusion
Virtual Reality Fukuda et al., 2009	Citizen participatory patio design project	Design media through VR functions	**Problem Analysis** **Alternative selection**	The design team creates design alternatives, they are further studied in cooperation with the participants and are re-created to find the optimal solution
3D Modeling Vries et al., 2005	Desk Cave Platform	Interactive urban design tool and a 3D view with feedback parameters is projected	**Problem Analysis** **Alternative Selection** **Feedback**	Improves interaction between planning and design strategies, encourages communication between planners and designers and reduces time and cost
Wu et al., 2010	3D Virtual Globe-based Web Service Oriented Architecture	3D urban planning information sharing environment based on City GML	**Problem Analysis** **Alternative Selection**	End users are allowed to label a point in the 3D environment selecting any of the available urban planning designs for visualization
Urban Simulation' Eikelbloom et al., 2012	'Zevenblokken' workshop-A collaborative planning process	Interactive scenario modeling tools with scenario construction and drawing	**Problem analysis** **Alternative selection**	Design a future spatial configuration that includes adaptation options
Witjes 2011	Dutch Wadden Sea Island "Texel"	Drawing tool	**Problem analysis** **Alternative selection**	Several map-based methods are available to support multiple stakeholders in their use of spatial information to design spatial plans
(PSS)Planning Support Systems Brail et al., 2001; Hanzl 2007; Walker 2014	Digital Workshop Community Viz What if applications	Software and analysis models with which citizens assessed decisions and impacts	**Decision** **Alternative Selection**	The final Regional Watershed Plan was completed based on direct decision making from the community
PPGIS-Participatory Planning GIS Kheir 2001	Pilsen Project – Urban Design Visualization of Pilsen	Interactive website	**Social Interaction** **Envisioning** **Alternative selection**	Visualization and contextualization for the many planning and design activities that take place in Pilsen
Kingston et al., 1998; Al-Kodmany 2001	Virtual Slaithwaite Project	Interactive website and Map-base d discussion	**Social Interaction** **Envisioning** **Alternative selection**	Allows local communities to voice their opinions, redesign and make suggestions about redevelopment
Bugs 2009	PPGIS case study in Canela, Brazil	Web 2.0 GIS: Web mapping service	**Social Interaction** **Envisioning** **Alternative selection** **Feedback**	Participants found it easy-to-use, useful for communication, users able to explore and comment

The wide list shows the differences among them on their design and methodological concept. With the help of the research literature in the areas of digital technology and participatory planning, the examples are chosen and mapped in an attempt to explore participation through the decision-making model. Each case occurred under particular circumstances and within particular processes. Depending on the technology used, the means, the purpose, the planning steps as well as the final results, these cases differ in a greater or less degree.

Table 6: Relevance of the digital tools with the interactive decision-making model

Planning Process \ Digital Tools	3D Modeling	Virtual Reality	Urban Simulation	GIS: PSS	GIS: PPGIS
Social Interaction					√
Problem Identification	√				√
Problem Analysis/ Generation of Ideas	√	√	√	√	√
Alternative Selection	√	√	√	√	√
Feedback from planning authorities	√	√		√	√
Implementation	√		√	√	√
Evaluation			√	√	

While linking them with their function in planning process, it becomes obvious that these tools based on Public Participatory GIS not only achieved more functions according to the proposed interactive conceptual model by linking urban planning and decision-making process, but this type is also seeking for citizens' input in early stages enabling social

interaction. The aim of this matching is to identify which type best fits the user's needs in terms of participatory planning and can be used to inform the current or potential use.

4.2 CITIZEN'S PREFERENCES

The next methodological step that supports the main purpose is the omit of an online survey, used as a pre-informative tool that planning authorities could use as a way to strengthen their collaboration with the public and capture their view, experience and desire on digital tools for public participatory techniques and it is focused to achieve a citizen-driven process for the most appropriate selection of a participative tool. The survey gathered in a total period of 10 days 280 responses but in order to make this survey apply as a pre-informative tool and use the results locally, I homogenized the sample based on the country of origin. For that reason, 216 was the number of participants coming from Greece and mainly the city of Thessaloniki, and their answers were the only that were further processed, as one of the goals of this research is that using survey could be an effective way of building a strong collaboration between the elected governmental agencies and the civil society based on the society's political culture and context.

The survey was posted in relative groups of people, professionals, planners, students and willing residents through social media (Blogs, Facebook groups) which means that it excluded a big proportion of people that had no access, implying for some bias. However, this was the desirable purpose; to send it to people that are familiar with technology and interested in engaging within digital processes. For this research's goal, what would be effective is to find the solution that motivates people more by choosing and evaluating a list of participative tools and techniques and highlight something for those citizens that are already active and want to find a more effective and interesting way of participating in urban planning.

The first section of the survey focused on citizens' knowledge and experience. The survey included as well the initial details such as the place of origin and permanent stay, personal marital and educational status as well as the age group (Appendix A) but a selection of the most appropriate questions to answer the research questions are here presented and correspond to the matrix of the basic keywords that link the type of governance with the level of interaction, participation and engagement (time, sources required to participate), according to Table 4.

Q3: To what degree do the following participatory tools trigger you more to attend in your community?

- Information centers
- Information stands at the local city hall
- Public hearings
- Advisory groups
- Public budget meetings
- Public awareness campaigns
- Internet and social media

Based on the previous question, participants have to rate how much they would be interested in some general common activities that could be organized in their local municipality or city. More specifically, these activities are chosen so as to connect them with the desirable type of government that citizens would be more interested in, as mentioned at chapter 2. Downward dissemination occurs when the government informs its citizens about policy development and planning through information centers, information stands at the city hall, meetings with public officials or though the local media) while upward dissemination gives citizens voice to express their concerns through public hearings, advisory groups, public awareness campaigns or public budget meetings.

Table 7 demonstrates that people prefer activities that correspond to upward dissemination rather than downward. Among the most preferable activities that trigger people is through Internet and social media and this category gathered extremely higher positive reviews when participants were questioned about the participative tools that trigger them more to engage with (Figure 7).

Table7: Responses on question Q3

Question 3	**Very much**	**A lot**	**Neutral**	**A little bit**	**Not at all**
Information centers	4.6 %	19.9%	28.3 %	17.6 %	29.6 %
Information stands at the Local City Hall	3.7 %	18.1 %	20.8 %	21.3 %	36.1 %
Public hearings	4.6 %	23.6 %	27.3 %	18.5 %	25.9 %
Advisory groups	4.6 %	17.6 %	30.1 %	21.7 %	25.9 %
Public budget meetings	3.7 %	17.1 %	27.3 %	18.9 %	32.9 %

Public awareness campaigns	8.8 %	34.7 %	20.8 %	17.6 %	18.1 %
Internet, Socia Media	47.7 %	27.8 %	16.2 %	6.02 %	2.3 %

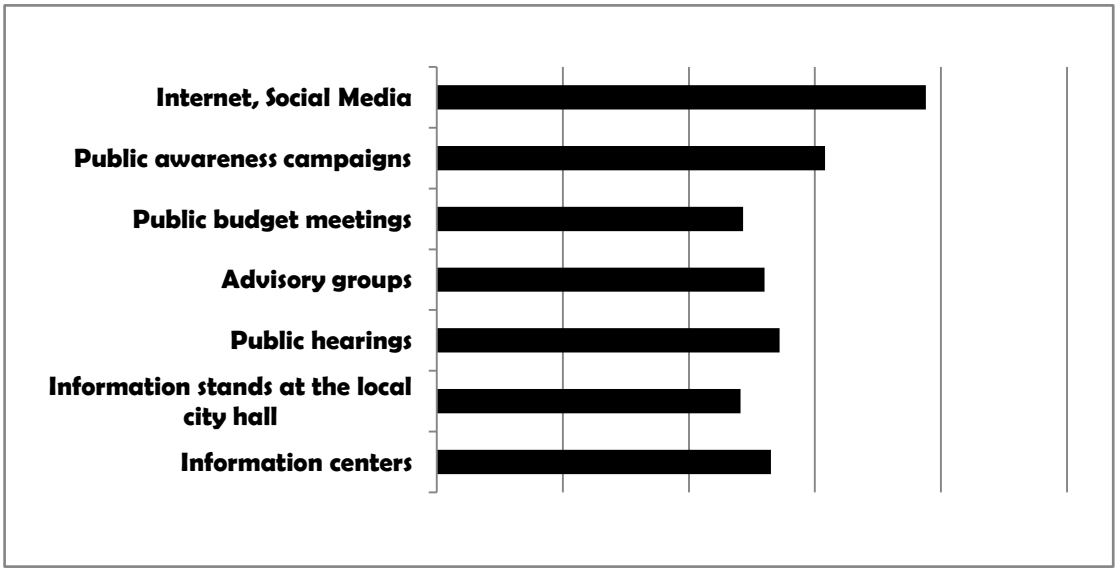


Figure 7: Data analysis and responses on question Q3

The following question is linked with the level of citizen engagement. More specifically, the respondent is questioned about the power of the decision making and whether it should remain in the hands of politicians and planning authorities. The levels of engagement mentioned are varying from consultation when the citizen only wishes to share his opinion, to his right to have access to information. Following these, a deeper engagement is another option, where the locals want to be deeply engaged and collaborate with the planning authorities. Lastly, there are some that would wish to be able to decide and have a strong final say and vote in decision-making. Here, the participant is requested to share his opinion based on what sounds more important to him as a citizen and his 'right to the city', which according to Lefebvre (1996) is comprised of number of associated rights.

Q4: Which following term do you consider more important as a basic citizen right?

- Access to information: knowledge distribution
- Transparency: Collaboration and trust between citizens, planning authorities and government
- Participation: Citizens engaged in decision-making
- All of the above equally important

The participants here were asked to evaluate what they consider more important based on their civic rights. According to the responses, 39.4% consider more important as a citizen right to take part in decision-making and participate, while 37.5 % evaluated information access, transparency and participation as equally important.

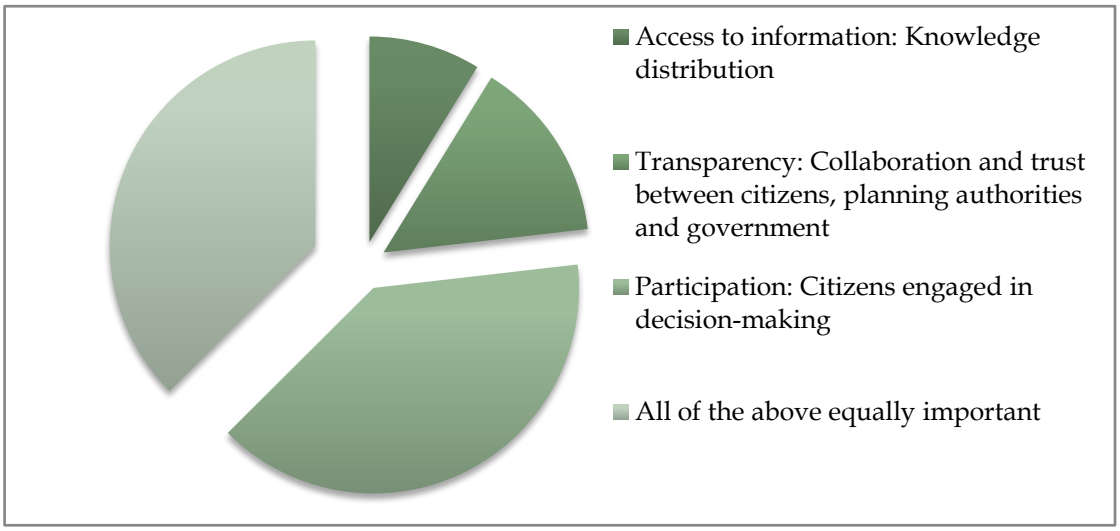


Figure 8: Data analysis and responses on question Q4

The following question requests from the participant to answer the available time that is willing to share on some activities that embrace the notion of public participation having in mind the planning fallacy. How much free time does the citizen have today? How much free time do you expect he will have a month from today? Most of us over-estimate how much we'll be getting done, and therefore how much free time we will have (Zauberman and Lynch, 2005).

Q5: How much time would you be willing to spend on the following participatory activities monthly regarding urban issues about your local community?

- Participative workshops to discuss urban issues
- Informative community meetings
- Online dialogue through technology (communication platform)
- Surveys via email or phone
- Social media (Twitter, Facebook)

Table 8: Responses on question Q5

Question 5	**Maybe More than 3 hours/month**	**Between 2-3 hours/month**	**Between 1-2 hours/month**	**Less than 1 hour/month**	**Not interested at all**
Participative workshops to discuss urban issues	11.1 %	21.3 %	23.2 %	17.6 %	26.8 %
Informative community meetings	6.4 %	14.3 %	26.8 %	16.7 %	35.8 %
Online dialogue through technology (communication platform)	46.8 %	13.9 %	20.3 %	13.0 %	6.0 %
Surveys via email or phone	6.0 %	10.2 %	18.1 %	27.8 %	37.9 %
Social media (twitter, facebook pages)	18.1 %	23.6 %	23.6 %	25.0 %	9.7 %

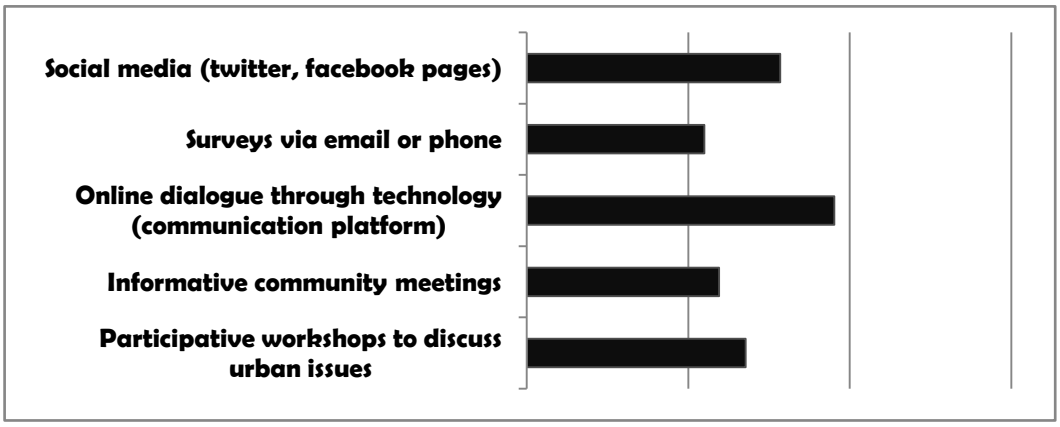


Figure 9: Data analysis and responses on question Q5

Table 8 reveals how interestingly higher reviews communicating online through a platform has, compared to normal social media tools. Almost 47% of the participants claim that they would spend more than 3 hours per month getting engaged into that type of dialogue through technology about urban community issues. Only 6% showed no interest at all at this type of participation. Apart from the usage of Web 2.0 tools to broaden participation and social media applications, more than 32% of citizens ranked participative workshops as the third preferred choice for participating.

Q6: Topics you might be more interested

- Past projects
- Current projects
- Future projects

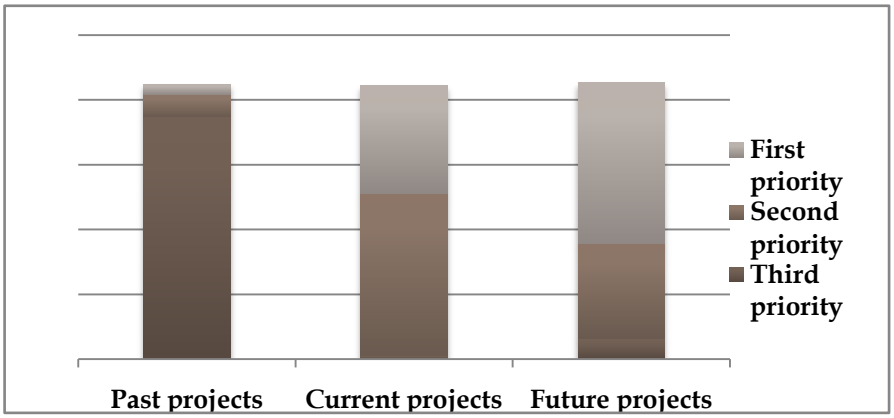


Figure 10: Data analysis and responses on question Q6

After examining the results from the previous results (Figure 9; 10), it is understood that the communication platform grasp citizens' interest as they claim that they would rather spend time on that tool rather than any other solution or community activity. Another important result is that 126 out of 216 respondents placed future projects as their first priority, while current projects were chosen as a first priority from 83 participants. This rate reveals the how citizens value their voice when it comes to urban planning. They simply proved that they need to be early engaged in any future project, something that explains the reason that communication platform grasped their interest. There is a need for early embracement and people want to be part of the process from the very beginning with a dynamic role to participate.

In order to have interaction we have to ensure wider citizen participation. So a future tool that is based on what people want is surely something that motivates them more to use. In order to take the challenges seriously, the second section is focused on the desirable digital tool and the preferences of the people regarding their means of interaction and anonymity (Figure 11; 12), working as a pre-designing framework to guide the principles and requirements for the digital tool based on communication platform and social interaction.

Q7: Which of the following activities do you consider best for bringing out your ideas for public spaces?

- Online group-discussion / brainstorming
- Online submission of ideas (photos, comments)
- Online sketching on a map

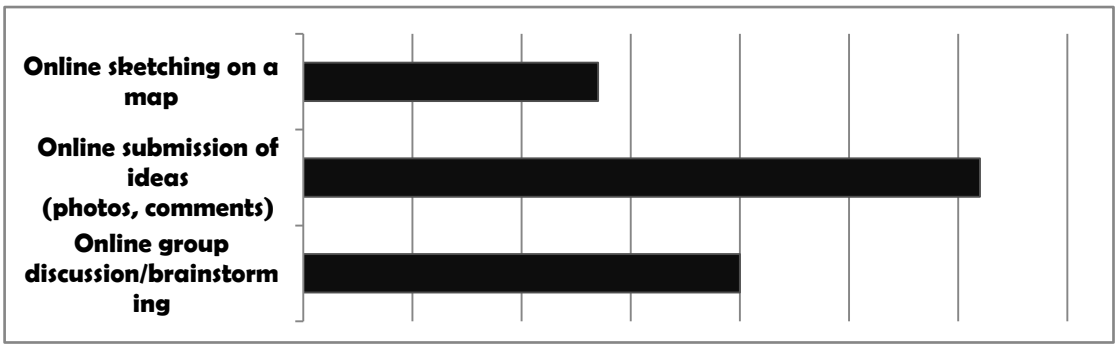


Figure 11: Data analysis and responses on question Q7

Figure 11 shows the desirable way of interaction according to the responses which is the online submission of ideas, either by comments or photos. Additionally, 67% of the participants chose to be part in that web platform with a visible profile, as it can be seen from the figure below.

Q8: What information would you be willing to share at your profile in that future digital tool?

- Visible account (name, occupation)
- Non visible account (anonymous user)

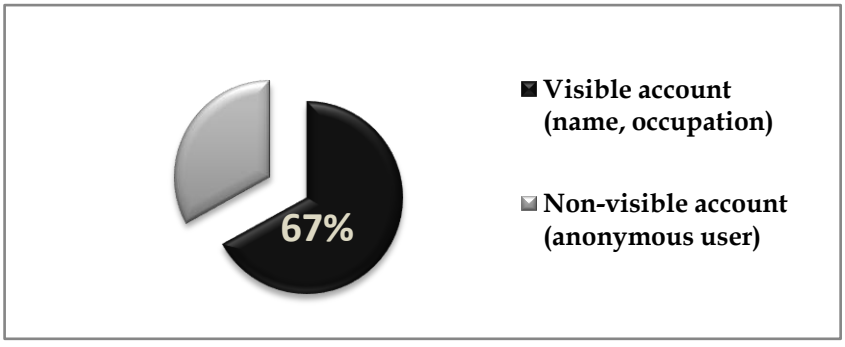


Figure 12: Data analysis and responses on question Q8

Table 9 presents the results from the question Q9 'Please rank (8=more important to 1=less important) the following criteria in order to design a future urban planning tool.

Q9: Design your desirable urban planning tool based on criteria from more to less important (8: more important, 1: less important)

- free and accessible
- user-friendly
- creative
- interesting and innovative
- effective and functional
- constant dynamic participation
- non-stop procedure
- transparent

Table 9: Responses on question Q9

Answer Options	Free and accessible	User-friendly	Creative	Innovative	Effective and functional	Constant dynamic participation	Non-stop procedure	Transparent
8: More important	43	27	23	25	40	30	12	16
7	44	30	32	34	35	10	9	22
6	20	30	26	28	36	34	12	30
5	20	27	31	33	32	28	25	20
4	19	16	25	41	26	31	38	20
3	12	20	32	17	21	31	25	58
2	32	16	29	23	16	43	34	23
1: Less important	13	51	19	7	10	25	26	65

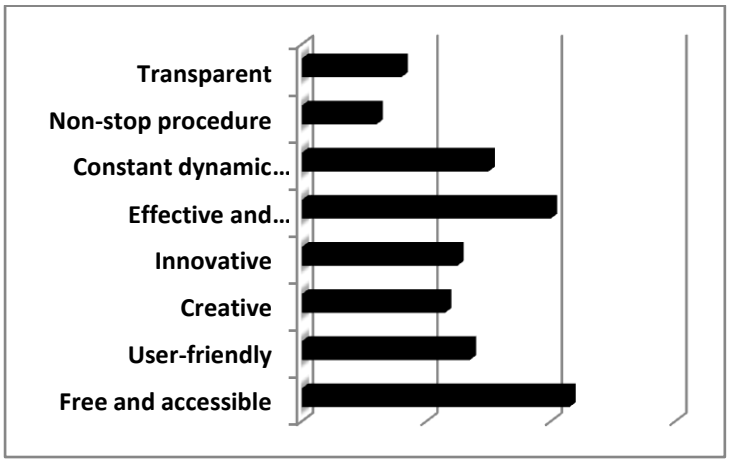


Figure 13: Ranking of most important criteria according to citizens

Figure 13 presents the results about which parameters should be guaranteed on a first place as necessary requirements when it comes to design or implement that tool. It shows that the majority of the participants selected as the criterion of highest importance the right to have free access to that tool. While the next most preferred attribute was effectiveness and functionality. That means that citizens are willing to actively participate in urban planning via a possible tool. Lastly, the third preferred criterion was constant participation. This relates to the fact that citizens are now aware of the need to participate in urban issues and development but they also a tool that ensures a constant and robust participation and collaboration with the planning authorities.

4.3 PPGIS: BEST MATCHING AND BEST PRACTICES

After examining the figures from the previous results (Figure 9; 11), it is understood that the survey indicated communication platform as a preferable technique. That is, PPGIS software is considered more challenging and interesting for the participants. The survey pointed out PPGIS as a best practice and that is why is further examined through three examples used as illustrations of citizens' preferences.

a.'Pilsen Community'

One example is the one that took place in Pilsen, named as 'The Pilsen Community'. This community project took place in 1998 in Illinois, in a low-income neighborhood with various urban problems to be faced like rapid urbanization and industrialization (Kheir 2001). For the prominent implementation the resources of a Geographical Information System were combined with the talents of a graphic artist and through an interactive website, the participants could interact and exchange opinions and ideas in accordance with the planning authorities (Kheir 2001). The research team tried to investigate how on-line interaction could improve public participation while it was seeking to capture citizens' feelings and engage them into the project based on web map based surveys. The tool required for the survey conduction was only a regular computer with access to Internet. The participants could select areas based on aerial photos while according to the instructions they had to like or dislike specific locations and type down the specific argument for these selections(URL_1:http://www.evl.uic.edu/sopark/new/RA/#sub1;URL_2:http://www.uic.edu/cuppa/udv/research/pilsen.htm).

These interactive maps of likability and dis-likability are interactive as they allow for further research based on the comments that were gathered (Figure 14a; b). According to the

University team, the effective visualization was a key to building trust throughout the collaborative process (Kheir 2001).

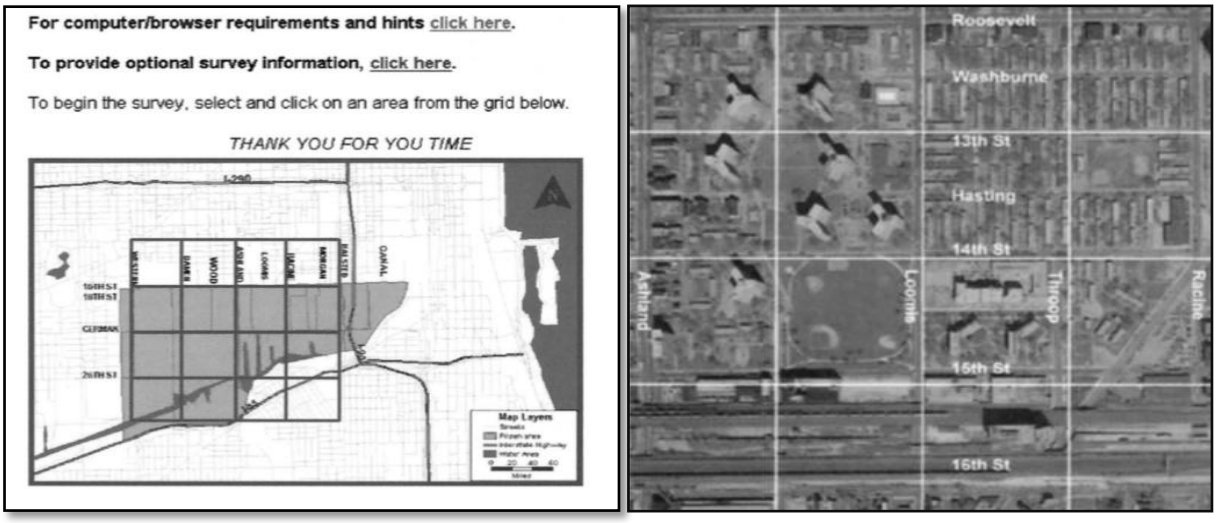


Figure14a. The map-survey interface **b**. Second level of analysis, zoom-pan operations and blocks of areas (Source: Kheir 2011)

b. 'Virtual Slaithewaite'

This project was developed by the School of Geography, University of Leeds, willing to promote public participation in urban planning. The system is based on the open source Java mapping toolkit Geo-Tools, it allows the citizens to view the map with zoom and pan operations and it provides the public with an online feedback form on a spatial scale (URL: http://www.ccg.leeds.ac.uk/slaithwaite/). It represents a two-way flow of information between the website and the participant. Within this system it allows the public to view a map of the area and obtain information on the selected objects. Moreover, the user can perform some operations like zoom and pan and ask questions regarding some parcels or specific buildings and other chosen entities via an on-line feedback form with emphasis on public access to data and involvement in the decision making process (Figure 15). In addition the project required some demographic information and individuals' feelings (Kingston et al., 1998). One restriction throughout this process is that each user is not able to see other people's opinions, in order to promote creativity.

The web based platform was positively evaluated as it helped into information transmission by decision-makers to the citizens, while they are able to distribute information back through the comments. Indeed, this two-way information and 2D modeling of objects is breaking the barrier of physical presence for a collaborative process, achieving public

involvement and participation. In addition, it was observed that the ages participated in this process between 20-30 was not high, rising the chances of wider involvement in the future as younger people are more familiar with technology and modern software applications (Kingston et al., 1998).

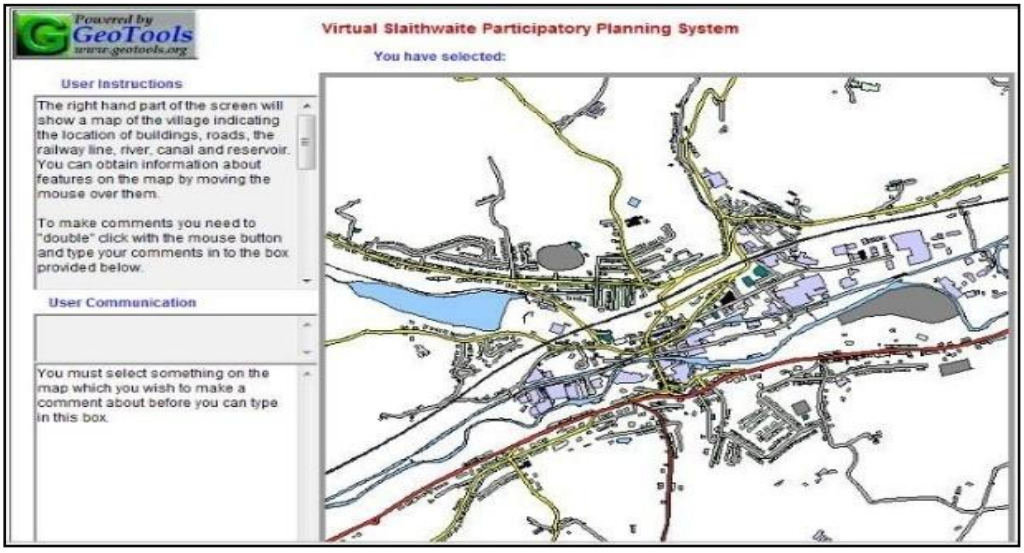


Figure 15: The 'Virtual Slaithewaite' Project (http://www.ccg.leeds.ac.uk/projects/slaithwaite/ppgis.html)

c. 'Canela Project'

The third one took place in Brazil, named 'The Canela Project', another example of an interactive web based public participatory method that was developed for a community forest management pilot project in the Wombat State Forest, Victoria in Australia (Bugs 2009). It is a web based platform that focused on spatial data visualization with geo-referenced comments and possible creation of maps showing spatial patterns and trends. On the presented Web 2.0 PPGIS, users can see layers, edit comments, and send them to the system. The results showed that it is a valuable approach for engaging the public (Bugs 2009).

'Canela PPGIS' addressed the advances in Geographic Information Systems (GIS) and Web 2.0 technologies that provide new ways of creating sophisticated Web applications that strengthen social interactions based on comments on online maps, in order to improve Public Participation GIS (PPGIS) applications in urban planning actions (G. Bugs, personal communication, June 3, 2014).

Table 10 provides information about the attributes that were mainly used in each project with reference to the design techniques, and the presence or absence of dialogue and a personal evaluation of the main criteria met in each case after a personal contact with the project managers, where they were asked to assess the case and rank the following criteria (Appendix B).

Each project occurred under particular circumstances and within particular processes. Depending on the technology used, the means, the purpose, the planning steps as well as the final results, these cases differ in a greater or less degree but also have similar results. The point here is that all of them have quite important pluses, such as local-based decision-making and information, a continuous flow in information, creativity and a possibility for dynamic participation with stepping back and forth steps throughout the process. A very positive point about Public Participatory GIS applications is the incorporation of local knowledge as local experience was necessary in order to take part in decision-making. According to Friedrich Hayek (1945), planners cannot access the knowledge or process it of particular circumstances of time and place (Anderson et al., 2011). This is the reason why central planning authorities should attempt to engage the public into decision-making, because both sides can benefit from this public engagement. The working environment includes a communication platform where the public is given the room for information exchange and social interaction.

Table 10: Evaluation of attributes met

PPGIS practices	**'Pilsen Community'**	**'Virtual Slaithewaite'**	**'Canela Project'**
Web-based discussion	✓	✓	✓
Map-based discussion	✓	-	✓
Brainstorming	-	✓	✓
Argumentative dialogues	-	-	✓
Design tools: zoom, pan, select	✓	✓	✓
Design tools: comment, online texts	✓	✓	✓
Design tools: sketch	-	-	-
Free and accessible	✓	✓	✓

Effectiveness	✓	✓	✓
User-friendly	✓	✓	✓
Dynamic (forth and back interaction)	-	-	✓
Continuous information flow	✓	-	✓
Usage of local knowledge	✓	✓	✓

Apart from the advantages that the working environment of a communication platform embedded in a PPGIS software offers, such as a better visualization of the current and future scenarios throughout an interactive environment and a quicker provision of information, it is also a tool that is user-friendly and flexible to be adjusted to the needs of the any prominent implementation from the local governmental agencies or planning authorities (Balram et al., 2006).

The Web 2.0 platform embedded into a PPGIS working environment allows for a constant communication between the citizens and the relevant authorities (Goodchild 2007; IDB 2012). Among the most preferred requirements was the possibility of a constant participation and this type of tool as we have seen from the selected practices, allows for feedback from the planning authorities so people have a non-stop participation going back and forth. In that way, visions and solutions are the product of argumentative dialogues through a reflective process of non-stop collaboration (Allmendinger 2009).

4.4 Merging the findings

The analysis in this chapter showed that there are various tools that support some basic functions in linking their framework with public involvement. Reviewing the table with the list of digital tools in urban planning nowadays, a linkage to the proposed decision-making model was made. Concerning the citizen's view through the survey that was conducted it is possible to address the points that trigger them more in order to be deeper engaged in urban planning at a more frequent scale. The answers that citizens give were divided into different types of governance, the information dissemination, their right in urban planning, the preferable level of engagement and finally the projects that interest them more in gaining more information. After the analysis of the results of the survey, citizens chose their preferred participatory activity regarding urban issues about their local community and showed an interest to express themselves through social media and online dialogue, rather than the traditional techniques including participative workshops, community meetings or

surveys. After the results that the survey pointed out and the review of the existing digital tools, PPGIS software is seemed to be the matching technique, providing a web-based platform, suitable for interaction between the engaged participants.

Chapter 5
Conclusions-Discussion-Reflection

The final chapter is meant to link the results of this study with the literature, so as to give answers to the sub-questions of the research. By answering the sub-questions it is possible to link urban planning, urban design and decision-making process. This section draws out some overall conclusions, outlines the expectations, results and the outcomes of the investigation and links the conceptual model with the research. Answering the main research question, it is attempted to set the principles and offer some pointers on how technology might be used in the future to embrace people.

5.1 CONCLUSIONS

The growing interest for public participation and citizen engagement in urban planning is focusing on the challenges for a government to have a participative vision, raising awareness to its citizens for the need of an active citizenship (World Bank 1994; SERG 2004; UN 2008). Since the evolution that took place in decision-making shifting the procedures into more communicative ones for more collaborative outcomes, governments and local authorities and agencies seek to establish partnerships between with the civic society to achieve a citizen engagement in current and future decisions (Healey 1997; 2003; De Roo, 2000) to encourage wider citizen input as the government-citizen relations should interact at each stage of the policy cycle from policy design to implementation and evaluation (OECD 2001; UNCHS 2001; Mc Call et al., 2005).

∞ *What type of digital planning tools would ensure active public participation in decision-making for urban planning*? ∞

The central question in this research focuses on the need to link effectively the fields of digital tools and technology with the public participatory spectrum. Based on existing theory, a conceptual model was developed and used systematically as a methodological tool, while several questions were used as guidance. In this section it is attempted to answer those based on the findings of the current research.

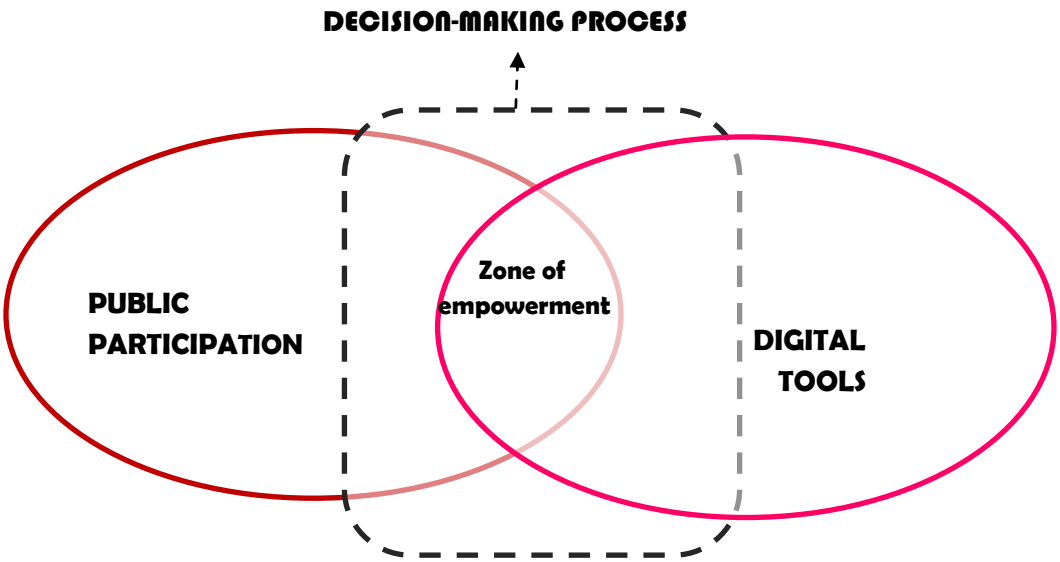


Figure 5: Conceptual Model

What is the role of citizen participation in planning processes for urban planning?

The first sub-question was about the role of citizen participation in urban planning, and a literature review was employed in order to view the existing perspectives in the public participatory spectrum. To continue, the citizen can take a more active role in the urban field and move closer to the core of decision-making process through a change in the decision-making structure. That is, the planning authorities should incorporate a new model in participatory processes which is based on social interaction (Figure 4).

What types of digital tools support participatory decision-making in urban planning and in which phases?

Researching the field of digital tools and software that are used in urban planning from planners and designers, there is an interest the last decades on improving the communication and the representation techniques between the engaged participants. Through literature review on the categories of groupware we answer the second question. Additionally, through the desk-research about the categories of existing tools, their contextual background and linkage to the proposed steps for an interactive planning process were made to present their relevance to the new participative decision-making model (Table 3).

The successful factor of these studies was that they engaged stakeholders into decision-making processes, at an early or later stage in the planning procedure depending on the project. For example the collaborative software applications, the community projects through 3d models and various other extensions available through geographic information systems. The concept is that visual representation and technology is helpful to promote designs and plans, drawing, evaluation and plenty other digital tools that can be used to link design alternatives and spatial consequences, scenarios and results (De vries et al., 2005).

What would prompt citizens to be more actively engaged in urban planning?

After the citizen-centered survey was conducted, it underpinned citizens' preferences and placed them as drivers in this process of empowering zone. . The results showed an interest in communication platform and social media as a starting point for engagement. The planning authorities can benefit from this way of interaction as citizens are supposed to be more creative with more innovative ideas towards current projects or future developments. The essential tasks to achieve with the use of new media are to provide a communication platform allowing for distant contacts and enable participatory process management as social media empower participation and cooperation allowing people to select the degree they want to engage (Arnstein 1969).

What is the added value of digital tools based on visualization and interaction for participatory planning?

Linking digital tools and human behavior is the fact that people through this scenario have the opportunity to interact with the online maps, checking the built-up area and the free urban space, with the ability to upload an idea, opinion or photo and take part in group dialogues. . According to the empowerment zone that is presented in the conceptual model (Figure 5), it is one of interaction and dialogue among people, with them able to visualize and use applicable tools. While examining the selected examples, they are considered as the best practices for guiding the research as there is an added value of citizen's interaction in digital planning, both for planners and citizens. These practices focus on PPGIS and communication in an online interactive environment, seeking for citizens' involvement as one of the required tasks, where citizens became both recipients and providers of information. The importance of these examples is that they added creative and critical ideas and visions, promoting the notion of civic engagement. People shared their local experience but also developed communicative skills through this reflective process of on-going

discussion, providing space for argumentative dialogues and generation of ideas. Additionally, they required citizens' input, which is a basic criteria needed to achieve the proposed conceptual decision-making process.

A basic concept linking digital planning, Web2.0 government and people could be to examine the scenario of the creation of a platform through GIS for every municipality, able to present the current layers of land uses and how planning could be improved based on this tool. This software is supposed to be designed in such a way that will merge with municipalities and support neighborhood planning, while both citizens and planners become providers and recipients of information. The assumption is that intersecting these disciplines will encourage citizen participation, enhance the sense of commitment, build trust, improve communication between planners and locals and make interactivity happen through on-going and transparent processes. Philosopher Alain de Benoist has said that "The highest measure of democracy is neither the 'extent of freedom' nor the 'extent of equality,' but rather the highest measure of participation" (Benoist 1985). PPGIS software with a focus on communication platform and social interaction provides upward and dynamic dissemination and Web 2.0 Government using interactive digital tools focusing on social interaction an experiment with many chances to succeed in raising citizen's involvement.

5.2 REFLECTION AND LIMITATIONS

Looking back and forth is of crucial interest when doing a research. This section is dedicated to the critical reflection on the research. Evaluation is difficult but challenging as well. When the research is faced with the prospect of conducting a survey that is accessible through social media to a variety of cultures, the first issue to be addressed is the difference in the contextual and cultural background. What is important is the existence of the differences across the number of various ethnic groups. Because culture and tradition constitute different behaviors and attitudes, the sample of respondents was homogenized based on the country of origin and for that reasons the responses that were further processed were fewer than expected.

Another limitation with the sample of the survey is the fact that the survey was available only through social media means that it automatically excluded some. However, the survey was an open one and the participants were self-selected (Involve 2005) as the main purpose was to send it to people that are active within these digital processes and what would be effective is to find for those interested, a more effective and interesting way of participating

in urban planning. The age group is another limitation concerning the survey that was conducted, as younger group age was the dominant one, implying for more bias in the results. However, this is also a challenge based on the author's personal research goals as engaging younger population in decision-making for urban planning will lead to more creative ideas and facilitate bottom-up ideas.

What is also worth to be addressed is the researcher's support of social media and Web 2.0 umbrella researching the most participative and effective intersection of social interaction, technology and creation of creative content. The shift from face-to-face communication to asynchronous interaction introduces specific requirements for the design of a digital tool for participatory urban planning to overcome the constraints of lack of deliberation and face-to-face dialogue. However, technology is not a panacea for urban planning and local governments and authorities should complement other approaches as well in order to establish the most effective solution. This is another important limitation to my research, as the nature of the study did not make it possible to further explore citizen interaction through the proposed digital tools and collaboration between them and the planners in a new case study, which would take into consideration all of the theoretical and methodological insights.

5.3 FURTHER RESEARCH AND EPILOGUE

Planning for the future towards public participation requires a change in the traditional forms of citizen engagement. People need to be triggered and challenged when it comes to increase their interest. In recent decades, the shift on IT technologies and communications formed a general trend that touches beyond the traditional means of interaction and social co-existence. Combining the current results with a further research on the actual design of that local-based platform would actually give a chance to analyze the efficiency of it and whether the attitude of people changed towards urban space. The possibility of constructing an interactive tool based on strengthening the public sphere and technology incorporating the proposed framework for decision making links participatory urban planning and decision making. Taking into consideration the proposed conceptual model, the focus now turned on how a digital tool based on communication platform it gives space for discussion, exchange of ideas and argumentative debates, achieving not only citizen-initiated input but also an on-going process.

Additionally, as the physical and virtual spectrums are now interlinked with the various tools and applications that came into the field of urban planning, a further goal is to prove how a digital tool based on citizens' preferences can help the planners broaden their scope, but most important: raise civic responsibility with unbiased communication among citizens, to avoid production blocking from peer pressure and think outside the box. Further focus could be placed on the requirements that have to be fulfilled regarding the reliability and privacy of the content.

5.4 Significance of the research

Various reports on the positive aspects of public participation and the need for broader citizen involvement have been pointed out the past decades (World Bank 1994; UN 2008). Philosophical debates about the notions of communication, dialogue and deliberation. It is understood that there has to be more investigation on the role of all these modern forms of communication and planning (Kiesler et al., 1992; Al-Kodmany 1999; King et al., 1998; Renn et al 2003). Personal experience is something that needs to be addressed and shared through decision-making and social media and technology is able to make people feel more focused and inspired and eager to participate. In that way we can overcome the limits to participatory planning regarding who participates.

The current report used a simple conceptual model in an attempt to intersect current technology and digital tools, the public participatory spectrum and the participatory decision-making structure. Using this model as a guiding tool, the research was conducted and the findings answered the research questions indicating a participative process where I was a neutral researcher collaborating with citizens. At a practical level, the experts and developers of urban planning tools should include the citizen's perspective as the targeted user. This whole process could also be taken as an example by local planners who are investigating techniques to increase citizen participation in terms of good governance and empowerment. This could benefit both local residents as well as the planning authorities.According to Healey (2003), there is no recipe in the governance processes but unique constructions in each case. The roots of citizen participation and public participation have been traced but the solutions should be redrawn based on social demand. This is why a survey should be used as a pre-informative tool between citizens and the planning authorities, to better link the need for public participation and social demand through a two-way interaction among people and the local agencies.

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Personal Contact

G. Bugs (June 3, 2014). Personal Interview by Email

D. Walker (June 11, 2014). Personal Interview by Email

APPENDIX A: Survey

Q1: Place of residence

Country and city of origin: ……..

Country and city of permanent residence: ……

Q2: Personal profile

Marital Status: …… **Male / Female & (Not married, Married, Single)**

Age Group: …… **(15-20, 20-25, 25-35, 35-50, 50-65, >65)**

Employment Status: …… (**Employed for wages, Self-employed, Out of work and looking for job, Out of work but not currently looking for job, Student, Military, Retired, Unable to work)**

Education: …… **(None, Primary, Secondary, College credit but no degree, Msc-Phd-Researcher)**

Q3: To what degree do the following participatory tools trigger you more to attend in your community?

- Information centers
- Information stands at the local city hall
- Public hearings
- Advisory groups
- Public budget meetings
- Public awareness campaigns
- Internet and social media

Q4: Which following term do you consider more important as a basic citizen right?

- Access to information: knowledge distribution
- Transparency: Collaboration and trust between citizens, planning authorities and government
- Participation: Citizens engaged in decision-making
- All of the above equally important

Q5: How important do you think the following actions are in order to achieve interaction among people?

- Listen
- Ask
- Help
- Talk
- Share

Q6: How much time would you be willing to spend on the following activities monthly regarding your local community?

- Participative workshops to discuss urban issues
- Informative community meetings
- Online dialogue through technology (communication platform)
- Surveys via email or phone
- Social media (twitter, facebook pages)

Q7: Topics you might be more interested

- Past projects
- Current projects
- Future projects

Q8: What would be your desirable degree of engagement in decision-making process for urban planning in your local community

- I want to be able to share my opinion
- I want to have full access to information
- I want to be deeply engaged and co-design with the planning authorities
- I want to have the right to vote for the final decision
- Combination of choices

Q9: What would be your desirable way of interaction? (Which of the following activities do you consider best for bringing out your ideas for public spaces?)

- Online groupdiscussion/brainstorming
- Online submission of ideas (photos, comments)
- Online sketching on a map

Q10: What information would you be willing to share at your profile in that future digital tool?

- Visible account (name, occupation)
- Non visible account (anonymous user)

Q11: Design your desirable urban planning tool based on criteria from more to less important (8: more important, 1: less important)

- Free and accessible
- user-friendly
- creative
- interesting and innovative
- effective and functional
- constant dynamic participation
- non-stop procedure
- transparent

Appendix B: Interview

Interview
Name:
Profession, duty: Project coordinator
Date:

Q2: Could you describe the conceptual model of the project in a few lines using some of the following keywords (problem, solution, implementation, alternatives, evaluation, decision, citizens, solution, interactivity, idea, feedback, vision, discussion)?

Q3: Evaluate whether the project's design met the following attributesfrom 5 to 1 (5=very much)

- Online discussion
- Map-based discussion
- Brainstorming
- Argumentative dialogues
- Design tools: zoom, pan, select
- Design tools: comment, online texts
- Design tools: sketch

Q4: In what degree did your project succeed based on the following criteria

- Free and accessible
- Effectiveness
- Easy for participants to use
- Interesting/Creative
- Public engagement

- Inclusiveness
- Dynamic (interaction forth and back)
- Continuous information flow
- Usage of local knowledge

Q6: Prioritize these criteria from 1 to 10

	Criteria
1: Most important	Easy for participants to use
2	Usage of local knowledge
3	Publice ngagement
4	Dynamic (interaction forth and back)
5	Continuous information flow
6	Interesting/Creative
7	Diversity of methods used
8	Free and accessible
9	Effectiveness
10: Less important	Inclusiveness

Q7: Based on your experience, do you think that Web 2.0 technologies and PPGIS can be an indispensable tool for a planner and a community in the name of e-participation and e-planning? Is there any element that your project could incorporate in a better way based on the design, the methodological tools and the implementation?