Participation in a large Arctic city – the possibilities of PPGIS for improving interaction

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Abstract

Like innumerable areas worldwide, northern and Arctic areas are experiencing rapid urbanization. The land is often publicly owned in the main, and there are many interests focusing on the same areas. Different activities lead to specific challenges in land use management in regard to public participation. There are guidelines and legal norms for participation in Finland from the municipality to the ministry level, but the style and rate of participation vary a lot from city to city. In this article the potential of public participatory geographic information systems (PPGIS) is examined in the Arctic city, Rovaniemi. The research questions are: How has participation in land use planning and decision-making been implemented in the context of sparsely populated Arctic city the past and present times? How do the interviewees see the potential of the use of PPGIS? Attitudes towards PPGIS were positive, but the implementation of all types of participation data, such as PPGIS data, was seen as vague and weak. Challenges of the participation were associated with poor communication, insufficient information, and lack of trust. Nature values and local opinions were considered to be at risk of being overshadowed by economic values.

Keywords

Land use planning, urban Arctic, participation, PPGIS, map enquiry, sparse population

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Introduction

Participation in land use planning has been under discussion for a long time, but more intensely in the past three decades (e.g. Beierle & Cayford, 2002; Irvin & Stansbury, 2004; Jones-Walters & Çil, 2011; Randolph, 2011: 56; Reed, 2008; Sipilä & Tyrväinen, 2005). From the planning theory point of view, participation by different groups is ideal, and a lot of

research has been directed at that (e.g. Arnstein, 1969; Beierle & Cayford, 2002; Jankowski, 2009; Pretty, 1995, Tosun, 1999; White, 2000). In practice, though, participation and engagement are constantly problematic for a variety of reasons. Questions such as who should be involved (Harrison & Haklay, 2002; Randolph, 2011: 98), how to build trust between different parties (Irvin & Stansbury, 2004), how to ensure real possibilities of influence (Harrison & Haklay, 2002; Tosun, 2006), and how to solve technical problems (Petersson-Forsberg, 2014) serve here as examples of the challenges of the participation.

Arctic cities surrounded by sparsely populated regions pose an extra challenge for planning. In sparsely populated regions, land ownership by the state or the municipality is more common than in densely populated regions. Contrary to densely populated regions, in sparsely populated regions there are many more interests focusing on land use planning rather than just the issues of house building and the infrastructure. These interests include tourism, nature conservation, mining, forest economy and other primary production, local people's livelihoods and recreation possibilities, and indigenous people's (such as the Sami people) possibility to practice their culture, traditions, and livelihoods. There are many military forces in the Arctic, too. The nature is very sensitive ecologically, and the climate change causes changes in the fauna and the flora, including humans. (Dybbroe, Dahl, & Müller-Wille, 2010; Hovelsrud & Smit, 2010; Nordic Council of Ministers, 2011; Orttung & Reisser, 2014). All that makes land use planning in Arctic cities a complex endeavor.

One way to improve participation is the use of public participatory geographic information systems (PPGIS). With PPGIS enquiries, attempts have been made to include easily ignored groups in particular (Boroushaki & Malczewski, 2010; Brown, 2012; Hanzl, 2007; Kahila & Kyttä, 2010). The potential of PPGIS enquiries lies in localizing and visualizing views and opinions (Brown, 2012; Kahila & Kyttä, 2010; Rantanen & Kahila, 2009). For over 20 years, PPGIS methods have been used all over the world to involve people in different land use planning processes (Brown, 2012; Brown & Kyttä, 2014; Brown & Kyttä, 2018; McCall, 2015a; McCall, 2015b). The PPGIS is one of the newest participation methods and the development of technology has made it possible to use PPGIS relatively easily via different platforms (International Society for Participatory Mapping). There are many ways to use PPGIS at the different stages of the planning process, all the way from the starting plan to the evaluation and as a channel for continuous feedback, too (Kahila-Tani & Kyttä, 2017). How the participation has been implemented and how important it and PPGIS data have been considered, varies a lot by municipality, city, authorities, and policy-makers. The biggest problem is how to get to the stage of practical action after collecting and analyzing PPGIS data.

In many Arctic countries and regions like Faroes, Finland, Greenland, Iceland, Norway and Sweden, public participation processes have been developed and regulated for decades (Hytönen, 2019). For example in Finland, the planning system in use recognizes participatory planning, and it is referred to in the Land Use and Building Act (Finlex 132/1999 English) and the Local Government Act (Finlex 410/2015). The need and the possibility to participate electronically have been recognized even at the ministry level (Ministry of Finance).

There has been some research on participation and interaction in sparsely populated regions of the Arctic (e.g. Armitage, Berkes, Dale, Kocho-Schellenberg, & Patton, 2011; Brunet, Hickey & Humphries, 2014; Duyck, 2011; Sloan, 2004). PPGIS research in the Arctic, however, has been quite sparse (Brown, 2012; Eisner, et al., 2012; Kantola, Uusitalo, Nivala, & Tuulentie, 2018; Uusitalo, Tuulentie, Kantola, Huhta, & Nivala, 2018). This article is

intended to bring out the potential of the PPGIS method as a tool in land use planning in the urban Arctic. The research questions in the study were as follows: How has participation in land use planning and decision-making been implemented in the context of sparsely populated Arctic city the past and present times? How do the interviewees see the potential of the use of PPGIS?

The data comprised 27 expert interviews conducted in Rovaniemi in 2017. Rovaniemi is a Finnish city with a population of 62 000, located on the Arctic Circle (66°33′48″ N). Within the borders of the city of Rovaniemi, 52 % of the land is federally owned (Vaara, I., personal communication, January 25, 2019). In this study, the possibilities of participation in land use planning and decision-making in the Arctic city context were examined in the light of the expert interviews. Besides examining the data, the development of interactivity in land use planning was advanced by means of the PPGIS.

Theoretical starting points for the possibilities of participation in the land use of the urban Arctic

Public participation has been developed and studied for decades, and different models and forms of it have been brought out (e.g. Arnstein, 1969; Beierle & Cayford, 2002; Jankowski, 2009; Pretty, 1995; Rydin, 2007; Tosun, 1999; White, 2000). The stages in participatory planning were discussed by Arnstein (1969), who developed the notion of 'Eight rungs on the Ladder of Citizen Participation.' The ladder was divided into three parts: nonparticipation, degrees of tokenism, and degrees of citizen power. Jankowski (2009) also introduces five levels of public participation, which have been launched by the International Association of Public Participation (IAP2). The IAP2 classification is based on Arnstein's (1969) 'Ladder of Citizen Participation', which Connor (1988) and Wiedemann and Femers (1993) have developed further. The levels are inform, consult, involve, collaborate, and empower, with each next level providing the participant with increasing (hence more meaningful) impact on the overall process. The lower levels of participation (inform, consult) involve the use of information tools such as maps, aerial photographs, virtual globes, and interactive websites for public comments. The higher levels of participation (involve, collaborate, empower) may require analytical tools for "what-if" simulations of the impacts of decisions in addition to utilizing information and communication tools.

Beierle and Cayford (2002, p. 55) point out that the impact of the information obtained through the participation process can be properly evaluated only after 5-7 years have passed the participation. Estimating the impact of the participation is challenging. Decision-making is often politics, where decisions do not need to be based on factual knowledge only. Beierle and Cayford (2002, pp. 56-57) define "Five stages of Implementation". The progress from public participation to implementation goes through five stages, starting with the output of the public participation process and ending with real changes in the environment. The stages 1 to 5 are the following: output of the public participation process (e.g. recommendations or agreements); decision or commitment on the part of the lead agency; changes in laws, regulation, or policy; actions taken on the ground; and changes in the quality of the environment.

The participation is a place- and context-dependent, and the problems and benefits vary with the subject matter (Irvin & Stansbury, 2004). It has many benefits, such as mutual learning between the parties, empowerment, prevention of deadlocks and court conflicts, and managing the environment. Building trust between the different parties such as stakeholders,

authorities, and politicians is an essential benefit, too (Beierle & Cayford, 2002, p. 15; Irvin & Stansbury, 2004).

There are many ways to participate and engage people: advisory groups, cooperation between different parties, enquiries, conflict solution groups, interviews, leaflets, the media, public events, rounds of commentary, and small groups (e.g. Anderson et al, 2009; Beierle & Cayford, 2002, p. 45; Randolph, 2011, p. 102-103). Physical public events have not been regarded as a strong enough way of involving the public any longer, but needs for participating electronically have increased (Boroushaki & Malczewski, 2010; Goodchild, 2007; Hanzl, 2007; Kahila & Kyttä, 2010). The internet makes it possible for people and groups who agree or disagree with each other to have cross-border and even global discussions (e.g. Boulianne, 2015; Hanzl, 2007; Loader, Vromen & Xenos, 2014; Stieglitz & Dang-Xuan, 2013).

How effective and relevant it is to exchange opinions in each case and on each forum and what happens in concrete decision-making to the information and data obtained through participation process are quite different questions (Beierle & Cayford, 2002, p. 55). Though there are many ways to participate, people often feel that they do not have a real possibility to influence the decision-making (Harrison & Haklay, 2002; Kahila & Kyttä, 2010; Tosun, 2006). According to Boroushaki and Malczewski (2010), people are interested in participating in decisions that impact their lives. Social and ecological values in particular have often been felt to take a place second to economic interests (Irvin & Stansbury, 2004; Leskinen, 2004; Saarikoski, Tikkanen & Leskinen, 2010). Reed (2008) posits that both local and scientific information can be used when the aim is to understand complicated entities. He speaks about participation all through the process, not just using some tools of involvement. However, the obligation and the power to make decisions cannot be handed over to the different parties. In a democratic society it is the politicians and authorities that have the responsibility to make decisions (Aarts & Leeuwis, 2010).

The question of who should be involved in land use planning processes continues to be relevant (Brown, 2012; Forester, 1987; Beierle & Cayford, 2002, p. 65-67; Harrison & Haklay, 2002; Randolph, 2011, p. 99-100; Schlossberg & Shuford, 2005; Sieber, 2006). Attention should be paid to those people and groups in particular that do not look like parties at first, for those parties can bring surprising new perspectives to the topic (Randolph, 2011, p. 99-100).

Sometimes public participation is seen as a waste of time and money by the organizers (Irvin & Stansbury, 2004; Randolph, 2011, p. 99-100). The problems and obstacles met in participation include lack of trust towards authorities and politicians, unwillingness of authorities to enable participation by the public, weak representation of the respondents, lack of resources of the authorities, over-representation of economic interests, defective or faulty information, lack of time, uncommitted participants, stakeholders clinging to their opinions, not enough responsibility given to stakeholders by the decision-makers, hierarchy of authorities, and legal action. Furthermore, lack of trust among the parties, the long time span of the decisions and planning processes, and planning too complicated entities at once can bring about poor participation results. (Harrison & Haklay, 2002; Irvin & Stansbury, 2004; Randolph, 2011, p. 98; Tosun, 2006). Randolph (2011, p. 100) points out that not all people are willing to participate, no matter how much work is put into involving them. Also, participation methods that are biased (Anderson et al., 2009) or technically too demanding may lower the motivation to participate (Petersson-Forsberg, 2014).

The PPGIS as a tool in land use planning and decision-making

PPGIS is one part of the geographic information systems (GIS). PPGIS have been used in attempts to collect information from groups that have usually been ignored or excluded from traditional participation (Boroushaki & Malczewski, 2010; Brown, 2012; Hanzl, 2007; Kahila & Kyttä, 2010). Improving the interactivity of planning processes is not a new thing, and the PPGIS is best seen as a tool for achieving this goal. Kahila-Tani and Kyttä (2017) discern seven stages at which PPGIS can be used in the planning process. The PPGIS methods have proved to be useful and functional in both planning and research, and they have been applied in hundreds of studies and plans for urban and rural areas (Brown, 2012; Brown & Kyttä, 2014; Brown & Kyttä, 2018; McCall, 2015a; McCall, 2015b;). The basic idea of PPGIS is very simple: social values are localized by means of either electronic or paper maps. PPGIS have been used to obtain experiential knowledge about the target place. (Brown, 2012; Kahila & Kyttä, 2010; Rantanen & Kahila, 2009). This social GIS information can be combined with other GIS data to produce context-dependent maps. Internet-based PPGIS methods offer possibilities to produce information that comes from a larger number of people and is in a digitalized form already (Figure 1).

Figure 1. An example of PPGIS survey (Natural Resources Institute Finland)

Besides all the benefits, there are also some problems in the PPGIS method (e.g. Anderson et al., 2009; Ball, 2002; Brown, 2012; Jankowski, 2011; Kahila & Kyttä, 2010; Kangas & Store, 2002; Kingston, 2012; Sieber, 2006; Wood, 2005). These can be compressed into technical and response-based challenges (Kantola et al., 2018). New methods can arouse mistrust, and proper use of the method can be slow (Brown, 2012). One essential question is what happens to the information obtained by means of PPGIS after it has been collected, analyzed, and presented. That is why the problem of the implementation information has been put forward as one of the most central questions in PPGIS research (Aditya, 2010; Anderson et al., 2009; Brown, 2012; Brown & Kyttä, 2014; Harrison & Haklay, 2002; Kahila & Kyttä, 2010). Is the PPGIS merely a method for collecting information, so that the respondents' only involvement is responding to the enquiries and thus producing information (Brown & Kyttä, 2014)? After collecting and analyzing the data, how can one get to the level of using the information in practice, like Beierle and Cayford (2002) speak about?

As to what information can be regarded as scientific information in discussions about the environment, for example, is very much a value judgment (Pellizzoni, 2011; Rantanen & Kahila, 2009). Fact-based knowledge is often perceived as the opposite of emotion-based knowledge (Wood, 2010, p. 164–165). Participation is hard work and a time-consuming process (Irvin & Stansbury, 2004; Randolph, 2011, p. 99-100). Many researchers bring out the authorities' attitudes as the biggest problems in realizing interaction and the implementation of the information obtained by participation methods such as the PPGIS (Brown & Kyttä, 2014; Brown, 2017; Hysing, 2013; Rantanen & Kahila, 2009; Wood, 2010). If there is a desire to develop participation, then developing the PPGIS method will not only solve the problem but will also significantly redirect attitudes and opinions about what information is to be regarded as real and relevant information.

Characteristics of the sparsely populated Arctic city

Arctic cities face the same phenomenon of urbanization as is met all over the world. However, cities in the Arctic have the special characteristic that the population of the regions

has been quite small. Arctic cities grow for reasons such as the following: many inhabitants of the region, especially young educated women, have moved to cities from the sparsely populated regions; military bases have been established there; and the growth of Arctic city centers and the natural resources of the Arctic have made the regions attractive to many countries. Tourism in the Arctic has been, and will be, an important and growing livelihood. Traditionally, the Arctic regions have had self-supporting households and family-owned companies, but nowadays many multinational enterprises have started to become interested in the possibilities offered by tourism and mining, for example. There are big nature conservation interests in the Arctic, with many protected wilderness areas and national parks locate there. The effects of the climate change are strong in the Arctic. Globally, the Arctic is in focus because many countries near and far, even including China, who want to claim a stake in the region's rich natural resources (Dybbroe et al., 2010; Hovelsrud & Smit, 2010; Nordic Council of Ministers, 2011; Orttung & Reisser, 2014).

Brunet, Hickey and Humphries (2014) report that the involvement of local people in Arctic regions has increased only slightly over the last half-century and that it continues to vary systematically according to discipline, organization, and region. Knowledge co-production and social learning are key issues where adaptation to the environmental changes is uncertain in the Arctic situation (Armitage et al., 2011). Duyck (2011) studied how various groups of non-state actors participated in international environmental decision-making in the Arctic. In Arctic fisheries, women's participation in the decision-making processes of resource management has gone a long way towards broadening the concept of the fishery village in the Arctic (Sloan, 2004). In Finland, the possibilities of using the PPGIS in the planning of tourism in an Arctic resort have been tested (Kantola et al., 2018; Uusitalo et al., 2019). PPGIS research in the Arctic, however, has not been done much. This article brings under discussion the potential of the PPGIS method as a tool in land use planning in the Arctic urban context.

The region studied was the city of Rovaniemi in Finnish Lapland, on the Arctic Circle. The study focused on the area within the limits of the city of Rovaniemi (Figure 2). With its 62 000 inhabitants, Rovaniemi is the biggest and growing city in Lapland, and its surface area is 801 675 square meters. The state owns 52 % of the land in the Rovaniemi region (Vaara, I., personal communication, January 25, 2019). The main livelihoods in Rovaniemi are in the service sector, tourism, and forest economy, but reindeer herding, agriculture, other primary production, and mining are well represented also. The Finnish Defense Forces have a base in the city as well. There are 1000 Sami people (the only indigenous people in the European Union) living in Rovaniemi, but the city is not part of the official Sami native locality.

Figure 2. Rovaniemi

The data comprised 27 expert interviews (11 women and 16 men) conducted with the presenters of stakeholder groups, authorities and politics. The questions asked were divided into three parts: background questions, stage-of-involvement questions, and PPGIS questions. Some of the questions were spatial ones, requiring the answer to be given on a paper map. The interviews were conducted as either single or pair interviews in 2017. The interviews were done face to face in Rovaniemi, except for two email interviews and one Skype interview, and their length ranged from half an hour to two hours. The interviews were audio recorded and transcribed. In structure, they were semi-structured theme interviews. The idea in the theme interview is that the researcher has in mind certain themes that she/he wants to

cover, but the sequence of the questions can vary. The interviewee can also ask more specific questions concerning the theme at hand. (Hirsjärvi & Hurme, 2015).

The interviewees comprised nine representatives of authorities, three of policy-makers, and 15 of stakeholders representing different fields such as entrepreneurship, tourism, reindeer herding, local inhabitants, forest economy, the Finnish Defence Forces, regional boards, nature conservation, and a hunting club. In four cases, the stakeholder representative was also a policy-maker. The issues covered hinged on the current situation, the problems and successes in land use planning, and the decision-making in Rovaniemi. In addition, the current use and potential future uses of PPGIS was discussed. In this study, the participation in land use planning was examined in terms of many levels, such as the federal, regional, and city level, according to each interviewee's perceptions and experiences of the participation.

The research questions were analyzed by means of theory-based content analysis, which means that the theory guided the analysis (Tuomi & Sarajärvi, 2018). In this method, the function of the information produced earlier is not to test the theory against new results but to open up new perspectives. In this study, the content analysis took the form of reduction and theming. The data were carefully scrutinized, so that all responses containing essential information relevant to the research questions were noted and recorded. Theming means that the data are first broken down and then classified into different themes. After this, the analysis was taken to a higher three-theme level: Experiences of map-based participation, Experiences of the complexities of reconciling land use modes and Specific features of the large sparsely populated Arctic city. In addition to data in text form, there were also GIS data comprising 111 comments.

Results

Experiences of map-based participation

Displaying things on maps and reading maps was familiar to all interviewees. For 12 interviewees, the PPGIS method was familiar from either work or leisure. Seven informants had carried out a PPGIS survey. Two of them had never seen a PPGIS survey. 22 interviewees saw a lot or some potential in PPGIS surveys. Two interviewees were not interested at all in using the method in future, and they saw the map enquiry as more of a threat to the function of the organization and generally considered the various hearing methods to just slow down the land use planning processes. Two representatives of stakeholders perceived the electronic survey as a scary thing. It was generally considered in the responses that the PPGIS is an important means in participation but that it does not automatically solve all problems associated with public participation and does not remove the importance of face-to-face discussions. In addition to the map questions, open questions were regarded favorably as an important part of PPGIS surveys. In the name of equality, response possibilities to traditional paper maps were also regarded as important. Participation in other ways than only electronic methods was considered important in the future.

The respondents emphasized the importance of short and easy-to-use surveys, technical reliability, and structured surveys. For advantages of the map survey, the visualizing of information, concretizing the issues, spatializing the expressions, and the possibility of reaching a higher number of people were mentioned. On account of using spatialized expressions, map surveys were believed to increase the reliability of the information. As a problem of the map survey, the possible overrepresentation of a single group was mentioned:

that problem could arise if some group started a very strong advertising campaign about the enquiry on their networks. The risks of intentional abuse, such as the same person responding to the survey several times, were brought up. The third problem brought up was that the nature conservation information spread about protected species had been perceived as an attempt to slow down forest timbering, for example. Another problem mentioned was that if GIS information had been made in too small a scale, it could not be localized. Also, technical problems, and in some cases even the need to use a computer to respond, were seen to restrict and slow down the responding to map enquiries.

One of the respondents who had implemented PPGIS surveys said that they had not got any radically new information to add to the information they already had. On the other hand, if they did get a lot of responses on some point, that occasioned a deeper examination of the place. The representatives of authorities felt that people gave more inappropriate responses to map surveys than to other participation methods because they were able to respond anonymously and electronically.

With internet and electronic communication, participation was considered to be easier now, but the public sector was perceived to be slow in accepting new participation ways. There is more and more local knowledge collected all the time, but it is still unclear what is done about the comments and opinions in the decision-making. Opinions and comments have been collected and recorded, but their real significance remains questionable. As an idea to be developed, it was suggested that a compilation of the opinions obtained be drawn up in text form, with an explanation of their significance and their use in the planning. It is difficult to find a responsible person from the city's website, and it often remains unclear to those giving feedback whether their input has caused any action at all. One interviewee demanded a stronger obligation for the city authorities to respond to feedback, for silence and not responding to the feedback may be one reason for the locals' weak motivation to participate.

PPGIS information often stays on the level of presentation of knowledge. One representative of authorities pointed out that it's because analyzing tools are difficult to use. Analyzing the information takes too much time and resources. One key problem for the use of the new methods may be the attitudes of the authorities: *"I know that many authorities react critically to the PPGIS method because they want to do things as they always have."* (Authority) There was a PPGIS enquiry carried out in Rovaniemi in 2017, and in the interview one representative of stakeholders mentioned that she/he had not got any information on what really happened to the responses. Thus she/he had got very skeptical about PPGIS surveys. It would be important to get more transparent information about what happens to the responses. If people who have given responses do not get comprehensible information on how their responses have been handled, they may start thinking that responding is useless. They also need information on how their responses relate to other people's responses, so that they understand that responding to a PPGIS survey does not automatically mean that their opinion will be taken into consideration in the decision-making. The diversity of the opinions and perspectives poses challenges especially to the person who analyzes the data. One representative of stakeholders had a frustrating experience about a PPGIS survey concerning forest economy in state forests, where he saw economic pressures to overpower the well-meaning enquiries: *"That's how things tend to go, for the state needs money,…"* (Stakeholder)

The representatives of stakeholders hoped for continuous dialogue to be practiced and developed between authorities, policy-makers and stakeholders. Besides PPGIS surveys, they

saw a demand for using spatial expression in other situations, too. A real-time interactive map application was proposed as one possibility for improving the distribution of information. Another proposal called for introducing an application similar to MyHelsinki, which in this case would be called MyRovaniemi. The application should be a gathering-type app that could be personalized so that it would show information that is interesting to the person. Many interviewees suggested a real-time application, which could be used to improve interactivity and the sharing of information between authorities and locals for example, or authorities and the tourist industry. It could be used to report things such as broken duckboards, for example. The most important thing would be to indicate whether the issue has been taken notice of by the authority, and that could be indicated by means of the traffic lights scale, for example: red = the report has been received, yellow = the matter is under consideration, and green = the matter has been dealt with. *"Up to now, authorities have been able to hide behind the rigidity and normal slowness of the process."* (Stakeholder) The current website of the city was regarded as too challenging a way to present and find information. Distributing information on the map would give the issues a more comprehensible and illustrative form. In the implementing of map enquiries it was considered important to advertise it and distribute sufficient information about it through different channels.

Experiences of the complexities of reconciling land use modes

In addition to PPGIS, there are other more traditional participation methods, which are seen as necessary. The interviewees agreed almost unanimously that public participation is a good thing and a fundamental democratic right. Participation should be as open as possible and should start at the beginning of the planning process, or even earlier. The representatives of authorities, policy-makers, and stakeholders indicated that there have been endeavors to participate a lot, and to do it equally and through different channels. Good examples are regional boards, open doors for face-to-face feedback, cooperation with the third sector, project cooperation, discussions and letters, plan meetings and plan presentations in the city center and the countryside at different times of the day, putting land use plans on display on a noticeboard, discussions and hearings for different stakeholder groups, requests for comments, serial meetings, enquiries and map enquiries open to the public at large, announcing events in local papers, hiring a chief information officer for the city, and cooperation and stakeholder meetings.

It became clear from the interviews that in land use planning one is always reconciling different and sometimes contradictory interests. What is essential is avoiding situations where just one party wins and all the others suffer. *"No project can proceed so that all parties win. It'd be best if all groups lost a bit, so that there wouldn't be a division into winners and losers."* (Authority) For a solution to reconcile interests and reduce complaints, good background work and better strategic and holistic planning were recommended.

Opinions about the state of interactivity and involvement varied a lot among the interviewees, depending on region and case. On the whole, the degree of the participation and the number of complaints were seen to have increased over the decades. The interviews brought out the dictatorial politics that had prevailed for decades and continued into the 1980s but have now eroded because of the rise in education levels, internet, different elucidation tools, increasing awareness, the development of democracy, and improved opportunities of exerting an

influence. The level of participation seemed to be affected by the Finnish maxim: silence is consent. The most active participants are usually the loudest opponents.

The problems associated with poor communication and weak distribution of information came up in almost every interview with representatives of authorities, policy-makers and stakeholder groups. Better sharing of information throughout the planning processes was hoped for. It would be very important to have trust between different parties and a real desire for sincere and early enough listening. *"--- Oh yes, my experience is that someone always introduces some plans and so on and only after that others are able to react. Comments and opinions have not been collected beforehand but the issue crops up and only after that others start to wake up and take a stand on it. --- Many times people have read or heard somewhere that this or that issue is coming, and then it comes in a big hurry, and there's panic to react, and of course annoyance about the short notice."* (Stakeholder) Public hearings were not seen as an effective way to involve the public, and announcing new plans by small advertisements in the local paper, for example, was criticized severely.

Many new and even free ideas and tools were presented for improving the informing and participation through more effective use of the current means: using e-mail to inform stakeholders, sending informative leaflets about current land use planning issues four times a year inside the local free paper delivered to all households, discussions between political groups and representatives of the residents' association, organizing informal meetings, doing map enquiries and giving information by means of map applications, making better use of the social media , electronic newspapers and local radio, and inspection walks and tours. On the other hand, traditional face-to-face and phone discussions and voicing opinions on traditional paper maps were regarded as important as well, especially amongst older people.

All parties pointed out in the interviews that information obtained through different participation methods cannot be used in the same way as scientific fact-based knowledge. There are risks in democratic involvement, too, and enquiries, hearings and participation efforts do not guarantee the factual base of the information shared. Hence, top information from experts is needed, too. Field knowledge is a useful complement to expert knowledge, but when analyzing opinion-based knowledge, it is important to understand that it differs from fact-based knowledge. Unlike authorities' decisions, political decisions in a democratic society need not be based on fact-based knowledge: political decisions can be guided by values, emotions, opinions, and attitudes, too. *"A politician does not need to make logical decisions that would be right from the research point of view, for example. Politicians need to make value choices, and this is a different thing from researched knowledge. Examined knowledge can be used as a help, but in land use planning any type of decisions can be made as long as they are legal. Politicians' hands cannot be tied, nor should they be tied. Authorities must offer good options, which politicians can weigh up and then choose."* (Authority) Thus authorities have a big responsibility for the ways in which they present the different types of knowledge to policy-makers.

Specific features of the large sparsely populated Arctic city

According to the interviewees, the voices of landowners, tourism, mining, forest economy, entrepreneurs, and the military were heard particularly well in local decision-making. The reason behind that was seen to be the power of commercial and economic interests, and those interests were perceived to get through in the decision-making easier than the perspectives of local inhabitants and nature protection, for example. Possible disagreements in land use

planning were often located in the city center, and the stage of the city plan in the planning process was seen to invoke the most comments. General supervision by state-level authorities has decreased all the time over the recent years in Finland. When supervision by the authorities decreases, the points of view of local inhabitants, users of the region, and nature and nature conservation lose weight, the interviewees believed. *"From the perspective of the weaker party in particular, a support network and opportunities to be heard are needed. Nature is a good example: it does not shout."* (Authority)

In decision-making, all matters tend to be weighed on a scale of economic measures. Therefore one representative of authorities suggested that in order to attain an equal and comparative discussion of issues and values, non-economic values, such as scenic values for example, should also be provided with a price tag. Making better use of spatial information (like PPGIS) besides numerical information could be one way of improving comparative discussions between different pools of knowledge.

The power in land use planning has been mainly given to politicians. Representatives of authorities reported that they only make proposals while politicians make decisions. On the other hand, local politicians have a lot of trust in authorities and regard them as experts: *"I think that the role of the local politician is mainly to consider and accept the plan that authorities have made."* (Policy-maker) Until 2006, Rovaniemi was divided into the city of Rovaniemi and the rural district of Rovaniemi. There is continuous disagreement amongst the authorities and politicians about whether the growth of the city should be directed to the city center by condensing it or whether people should be encouraged to live in the countryside, too. Naturally, the challenges and possibilities of land use planning within the city are different from those outside the city.

Personal relationships were considered to open up more possibilities of influence. Influencing local politicians and Lapland members of the Finnish Parliament directly was seen as an effective way for background groups and single citizens to exercise an influence. However, a couple of interviewees saw risks in such influencing, such as entrepreneurs trying to induce politicians to promote their interests. The possibilities of stakeholder groups to participate and exercise an influence are stronger if the group is well organized, united, and capable of good interaction and communication within the group. *"I think we have been able to exercise an influence. Even though it is sometimes agonizingly slow, we have been able to make a difference. We just need to be active and a little impudent, too."* (Stakeholder) Local people have been encouraged to activity by a strong sense of place and region and the conviction that the issue is important.

The question of who should be seen as legitimate parties and complainants remains problematic. *"A good question is whether we should plan the environment from the perspectives of locals or tourists from outside the area. --- I think these are clear value choices and I think in these kinds of situations the citizens' perspective in the planning get little attention."* (Authority) Critical voices and opposing opinions towards land use planning were accepted better from people who are easily seen to be stakeholders, e.g. because they live close by, own land, or get their livelihood in the region in question. Information that comes from totally "outside" was seen in a very negative light. *"It is so that those people do not have anything to do with these issues. General practice is that there is a right to complain about everything. We cannot build anything if we go to ask them beforehand."* (Policy-maker)

The stigmatization of some people as opposing and obstructing persons came up in many interviews. When a person is stigmatized in a negative light, such as "always moaning and groaning", their opinions stop to be taken seriously and they start to be regarded as an economic burden to the city. When a person is stigmatized as an environmentalist, he/she easily falls into the position of a social outcast especially in the sparse populated small city like Rovaniemi. "*Those people have been stigmatized so badly that I believe they have been emotionally at an extreme limit. Opposing something is hard work, and a whole lot of people are not up to it. At the worst, it can affect the working capacity of the person."* (Authority) One representative of stakeholders, who frequently brought up critical perspectives, pointed out that being an opponent is an important part of a democratic society and that people must use freedom of speech so that people have it in the future, too.

Many interviewees pointed out that there had been no big problems in the land use planning in Rovaniemi. On the other hand, when the map of Rovaniemi was on view, it invoked 84 critical comments while commendations numbered only 20. The majority of all comments focused on the city center. Positive feedback focused on the plans of developing tourism on the Arctic Circle *Napapiiri*, the preserving of the nature reserve *Mortinmännikkö* from construction, and the development of the city center. The most critical voices (84) in regard to participation concerned the city center, focusing especially on the construction of the shopping center *Revontuli*, the building and possible extra building planned for the *Ounasvaara* fell flanking the city center, and the zoning of the beach area *Valionranta*. The public pedestrian access to the rivers Ounasjoki and Kemijoki was seen as an important project well worth keeping and developing. In the future, the participation should be practiced especially in the development of the *Ounasvaara* fell, which is a very popular nature spot for locals, and in the planning of a bridge from *Paavalniemi* to *Viirinkangas* over the river Kemijoki.

Discussion

The views of the current situation and future needs in regard to participation varied considerably among the authorities and the local policy-makers, which has been notified within municipalities in Arctic region, too (Hytönen, 2019). Some thought that participation had been implemented enough already, while in contrast, some saw a lot lacking in the level of current involvement (cf. Harrison & Haklay, 2002; Kahila & Kyttä, 2010; Tosun, 2006;). There was thus a lot of variation vis-à-vis Beierle and Cayford's (2002) and Jankowski's (2009) five-point scales of public participation. The values of the economy and business life were considered to have fared better in the decision-making than nature conservation values, for example (cf. Irvin & Stansbury, 2004; Leskinen, 2004; Saarikoski et al., 2010).

There was also a lot of variation in the views on whether public participation should be mostly initiated by participants or by authorities or politicians. Some respondents believed that interested parties would be capable and vigilant enough to act by themselves (see Randolph, 2011, p. 100). That is an untenable notion, for not all people have the reserve energy, knowledge and time for continuous alertness on what is going on in land use planning. Thus the essential thing is to build trust that land use planning issues will be brought to public awareness early enough and that the public is informed on participation possibilities widely and through different channels. In the end, the responsibility for the participation was seen to lie with local politicians, as Aarts and Leeuwis (2010) also suggest. Local politicians have the power to return issues to the authorities for a new preparation if they see that public participation in the preparation has been insufficient.

As benefits and challenges of the electronic survey, the same issues are mentioned as are also discussed in the PPGIS literature (see, e.g. Anderson et al., 2009; Ball, 2002; Blomé, 2013; Brown, 2012; Jankowski, 2011; Kahila & Kyttä, 2010; Kangas & Store, 2002; Kantola et al., 2018; Kingston, 2012; Sieber, 2006; Wood, 2005). Generally speaking, almost every interviewee's view on the map enquiry was positive and open, and it was considered to have potential for improving the participation. On the other hand, previous bad experiences, such as the feeling that responding had not made any difference, can easily weaken the faith in the PPGIS method (cf. Aditya, 2010; Anderson et al., 2009; Beierle & Cayford, 2002; Brown, 2012; Brown & Kyttä, 2014; Harrison & Haklay, 2002; Kahila & Kyttä, 2010).

The lack of trust (Randolph, 2011, p. 98; Tosun, 2006;) and the importance of building trust (Beierle & Cayford, 2002, p. 15; Irvin & Stansbury, 2004) between different parties was one of the main issues in this study. One good way to build trust could be to introduce a real-time interactive and technically well-working GIS-based discussion application. The best one can do to improve participation and build trust is telling the stories of positive examples of effective participation such as the regional boards in Rovaniemi (cf. Aluelautakunnat; Brown & Kyttä, 2014; Fung, 2015; Harrison & Haklay, 2002). In the building of the trust, the significance of open, continuous and sufficient distribution of information was highlighted as a central issue. It is important to be able to trust that the authorities will give information about upcoming issues openly and early enough, so that people do not get feelings such as *"---- all the time you need to be awake about what is going on."* (Stakeholder)

According the interviews, the risk issues in democratic decision-making are largely value questions, and the outcome depends on whose perspectives get to guide the decisions. Hence it is unthinkable that all decisions could be made on the basis of comprehensive enquiries; authority information is needed, especially in endeavors to piece together the big picture (Reed, 2008). Also the values which do not have advocates, are exemplified by nature values and the perspectives of people in a weak position in the society (see Aarts & Leeuwis, 2010; Beierle & Cayford, 2002, p. 68; Brown, 2017). The interviewees felt that the parties who represent business livelihoods, such as entrepreneurship, forest economy, tourism, and mining, have been able to participate more intensively than the parties who represent nature values or local people. Nature values and the perspectives of the local people have been perceived as a threat to economic livelihoods. If non-economic values were also provided with a price tag, that would be an effective way to perceive the importance of ecosystem services, for example.

An interesting viewpoint emerging from the data, also noticed by Anderson et al. (2009), is the importance of functional interactivity and information exchange. The better the group is organized, the better its possibilities to exert an influence. In a relatively small city such as Rovaniemi, the importance of personal relationships is even more important. Good personal relations with the decision-makers may help to promote the aims of some groups. On the other hand, with PPGIS (cf. Boroushaki & Malczewski, 2010; Brown, 2012; Hanzl, 2007; Kahila & Kyttä, 2010) people should be able, at least in theory, to have an impact on the planning process without the support of the group or being a member of the group.

The question of who should be counted as a concerned party has been discussed in the literature on participation for a long time (e.g. Beierle & Cayford, 2002, p. 65-67; Forester, 1987; Randolph, 2011, p. 99-100), and the same problematic issue came up in these data. Electronic enquiry methods (Boroushaki & Malczewski, 2010; Goodchild, 2007; Hanzl, 2007; Kahila & Kyttä, 2010), such as the PPGIS, open possibilities of involving larger numbers of people (Brown, 2012). Especially the Arctic, where the land is mainly publicly

owned, seems somehow to be owned by all citizens of the country and particularly by the indigenous people of the area. Therefore the need to participate varies from case to case (cf. Irvin & Stansbury, 2004). All interested parties should be guaranteed an opportunity of participation on a realistic timetable, and Randolph (2011, p. 99-100) recommends paying attention to parties and people who have first been regarded as non-participants, for those parties may have surprising new perspectives to the topic.

The fear of becoming stigmatized because of expressing one's opinion surfaced many times in different interviews. At the individual level, and especially in a relatively small city such as Rovaniemi, using one's freedom of speech can sometimes turn into loss of face. Hence, personal relationships and direct exertion of influence can be both an advantage and a disadvantage. Because of this, general supervision by the authorities is of the essence, and it is important that the state and city authorities be sufficiently funded. On the other hand, with the current electronic methods (Boulianne, 2015; Hanzl, 2007; Loader et al., 2014; Stieglitz & Dang-Xuan, 2013), such as the PPGIS, people can now express their opinions, at least in the optimal situation, be heard, and be able to exert an influence without fear of their comment being regarded as an unconnected statement from a stigmatized person (cf. Boroushaki & Malczewski, 2010; Brown, 2012; Hanzl, 2007; Kahila & Kyttä, 2010).

The interviewees stated that there had not been big problematic land use planning issues in Rovaniemi, the city received critical feedback on 84 points on the map the city had published for inspection. Hence, presenting a map can be seen to concretize the discussion and the comments as soon as it is on view (cf. Brown, 2012; Kahila & Kyttä, 2010; Rantanen & Kahila, 2009). Most of the comments concerned the city center, which indicates that people's notions tend largely to focus on what they see when they move about. If an electronic PPGIS enquiry is planned to be launched in an Arctic city and a large number of responses is desired, it will be wise to conduct it where most of the population live, i.e., in the city center. The most critical comments were directed to the public construction or demolishing of new buildings and protecting nature spots near the city center.

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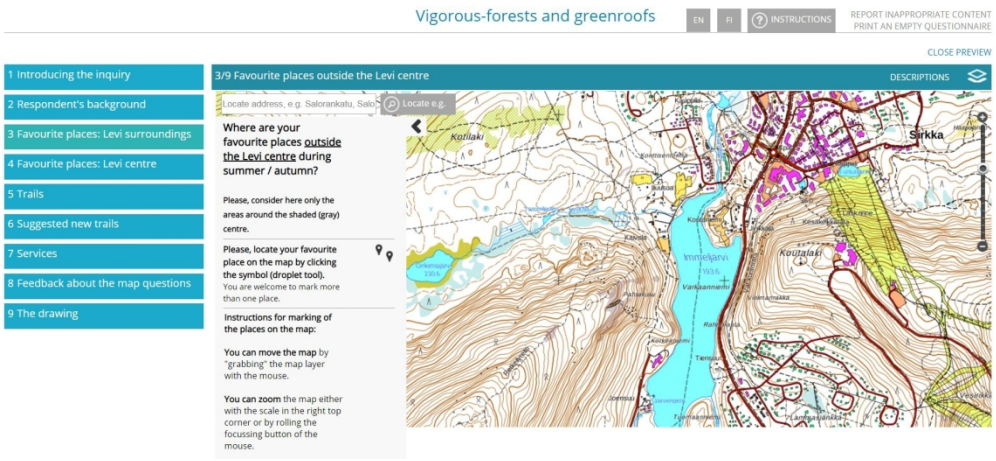

Figure 1. An example of PPGIS survey (Natural Resources Institute Finland)

398x183mm (120 x 120 DPI)

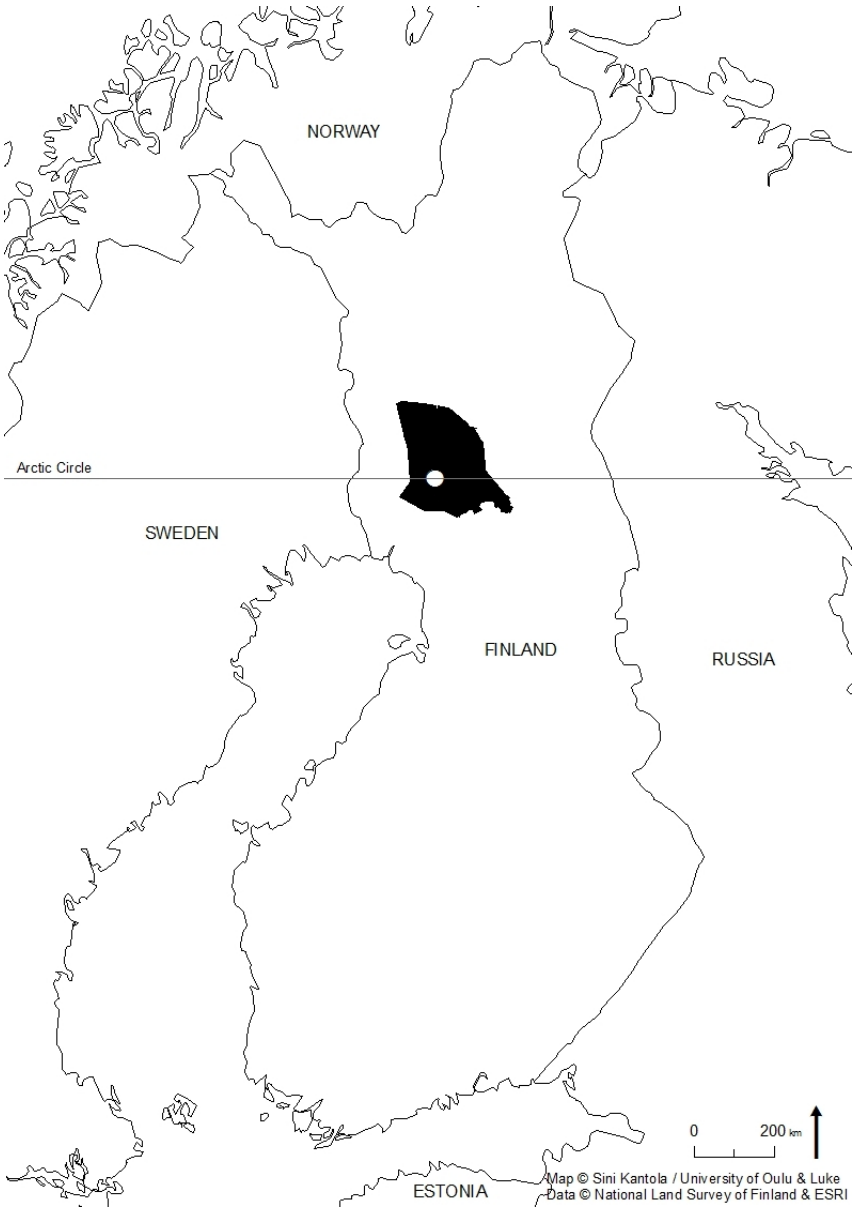

Figure 2. Rovaniemi

210x296mm (96 x 96 DPI)