EGOV-CeDEM-ePart

The Impact of Smart City Initiatives on Human Rights

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Abstract: A smart city is a phenomenon where municipalities engage with stakeholders to use ICT for increasing efficiency, sustainability, and quality of life for its citizens and city operations. However, smart city initiatives can at times challenge human rights. While particular human rights such as privacy have been subject to analysis in the digital government field, a complete view on human rights in smart cities has so far been missing in our discipline. It is mainly studies from other disciplines that voice comprehensive concerns about potentially negative impacts of smart cities on human rights. However, they often lack the technological background. This paper reports on a pilot study as an initial exploration of the phenomenon in the digital government field. In our research, we studied both the positive and negative effects of smart cities on human rights by conducting qualitative interviews with citizens and municipal employees with central roles in smart city initiatives. Our results suggest that in addition to privacy and security, the human rights of freedom of expression, adequate standard of living, and equal access to public services are likely to be affected by smart city initiatives.

Keywords: smart city, human rights, qualitative research, interviews, Norway

Acknowledgement: We would like to thank June Lithell Hansen and Andreas Skaiaa for the data collection.

1. Introduction

Smart city is a concept that relates to addressing urgent urban problems by using new technologies. Around 5 billion people are estimated to live in urban areas by the year 2030 (Nam & Pardo, 2011). This is expected to introduce challenges concerning the inhabitants' wellbeing and quality of life, especially regarding demographic shifts, gentrification, mobility, environmental impact, health care support, security, safety and sustainability in housing, food and water supplies (Oliveira & Campolargo, 2015). A smart city generally uses information and communication technologies (ICT) to make a city more livable. This is done by optimizing public services and the citizens' quality of life, better utilizing common resources, increasing cities' productivity and reducing climate and environmental issues (Kommunal- og moderniseringsdepartementet, 2019). The underlying technology of a smart city heavily relies on the active use of Internet of Things (IoT) and Big data.

Integrating and connecting the Internet to physical "things" makes it possible to gather data from sensors, software and other electronics (Plachkinova, Vo, & Alluhaidan, 2016).

However, the quest for the mentioned benefits can also lead to potential negative effects of smart cities and threaten human rights. Human rights represent rights that are "inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion, or any other status" (United Nations, n.d.) such as the right to life and liberty, freedom of opinion and expression, the right to work and education, and the right to privacy. For example, some of the data gathered in a smart city context consist of sensitive and personal information such as current location information, habits and personal preferences. This allows the owner of the data to create rich and in part personally identifiable knowledge about consumers, patients, clients, customers and products (Hoffman, 2018). In addition, public services in smart cities move online and replace their traditional counterpart. This will require citizens to have the necessary knowledge needed to utilize these services. However, if they do not, citizens may feel left out of society due to their inability to adopt. As a consequence, smart city initiatives have been criticized for their lack of focus on citizens and for their top-down, industry-driven decision mechanisms (Cardullo & Kitchin, 2019; Marsal-Llacuna, 2017).

While particular human rights such as privacy have been subject to analysis in the digital government field, a complete view on human rights in smart cities has so far been missing in our discipline. It is mainly studies from disciplines such as political science, urban development, and sociology that voice comprehensive concerns about potentially negative impacts of smart cities on human rights (see e.g. Herscovici, 2018; Reuter, 2019). However, they often lack the technological background. We believe that the digital government field can add value to this debate as it integrates both the social and the technological perspective.

Therefore, our aim in this study is to explore if, or how, smart city initiatives can impact the human rights of the citizens that live in a smart city. This work in progress paper summarizes the results of a pre-study that was guided by the research question: *How can smart city initiatives affect human rights?*

In order to get an initial understanding of the phenomenon, we conducted qualitative interviews with four experts working on smart city initiatives as well as ten citizens in a Norwegian city. Our results suggest that smart city initiatives can have a significant impact - both positively and negatively - on human rights. These findings will serve as the basis for a more in-depth analysis of this relationship. Further, our findings can serve to sensitize scholars from both the digital government and the information systems disciplines in their further endeavors.

2. Theoretical Background

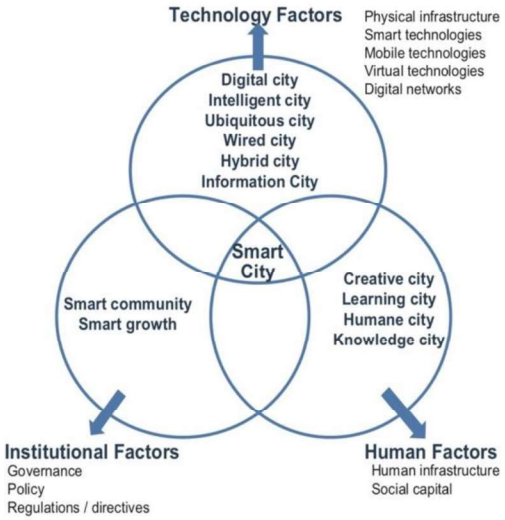
2.1. Smart Cities

The smart city phenomenon emerged in the late 1990s and has gained substantial attention after the turn of the century both among practitioners and researcher (Anthopoulos, 2017; Vanolo, 2014). The key motivation behind the focus on smart cities is addressing challenges related to the increasing urbanization worldwide. Already in 2008, 3.3 billion people lived in urban areas and it is estimated

that by 2030 the number will reach 5 billion (Nam & Pardo, 2011). The increase in population density is expected to challenge life quality in the urban areas in a number of ways, including energy consumption, transportation, pollution levels, waste management, public service provision and participation in democratic processes (see e.g. Hashem et al., 2016; Lombardi, Giordano, Farouh, & Yousef, 2012). To meet these challenges, urban areas need to become "smarter" in order to maintain a status as an attractive area to live, work and study (Canonico, Consiglio, Iacono, Mercurio, & Berni, 2015). The conceptual framework by Nam & Pardo (2011) (see *Figure* 8) suggests that smart city development can be viewed as the interplay between technology factors, institutional factors, and human factors.

Although several technologies are necessary in smart city development, it is generally agreed that smart city development is highly data driven. Phenomena like IoT (Internet of Things), Big data and Data analytics are often seen as key technological enablers of development (Hashem et al., 2016). IoT refers to the increasing number of Internet connected sensors that can be used for various measurements, e.g. energy consumption, traffic, maintenance needs, personal health monitoring and so on. Sensors need to be connected to the Internet to be useful. Connectivity indicates that networks and infrastructure are important factors in smart city development. Connected sensors generate huge amounts of data – often referred to as "Big data". Big data provide the foundation for data analytics – i.e. computerized analysis of large amounts of data. Data analytics are predominantly used for predictions but also as a basis for automation in several areas as suggested by Hashem et al. (2016).

Figure 8: Foundational Components of A Smart City (Nam & Pardo, 2011)



Both practical development of smart cities and most of the research literature in the Information Systems domain seem to assume a techno-optimist stance, meaning that smart city development is considered more or less exclusively positive. Definitions and conceptualization such as the model above consistently use positive terms such as "smart", "creative", "humane" and so forth. However,

as infrastructure and services become increasingly data driven, the potential for harmful consequences such as negative influence on human rights increase.

2.2. Human Rights and Smart Cities

Human rights refer to univeral and inalienable rights of every human being. They have been institutionalised in the Universal Declaration of Human Rights by the United Nations General Assembly after the second world war in 1948 (United Nations, n.d.). Todate, almost 150 countries in the world have acknowledge the declaration.

Human rights have played a special role in urban areas beyond the realm of the smart city context. This becomes manifest in the two narratives that particularly link the concepts of human rights and cities: the rights in the city and the right to the city (Reuter, 2019). Both positions ground their eligibility in the perception that a city belongs to all citizens that inhabit an urban space. While the rights *in* the city refer to the implementation of the universally acknowledged human rights within a city, the right *to* the city encompasses the idea that all citizens should be able to take advantage of the city life and to contribute to it. Several national and international charters such as the European Charter for the Safeguarding of Human Rights in the City (UCLG, 2012) and Global Charter-Agenda for Human Rights in the City (UCLG, 2016) have taken up these ideas and especially focus on human rights in urban areas (Marsal-Llacuna, 2017).

With the ubiquitous implementation of ICT in smart cities, new opportunities to enhance human rights arise. Technology such as mobile applications could, for example, facilitate the inclusion of marginalized groups such as disabled people (Reuter, 2019) and thus contribute to the "right to a standard of living adequate for the health and well-being" (United Nations, n.d., Art. 25). Another example is the use of data mining and analysis in schools that can contribute to more effective teaching. This 'smart education' can help to enhance the right to education (Gomede, Gaffo, Briganó, de Barros, & Mendes, 2018).

However, the increased use of ICT brings several threats to human rights. As seen from a technical perspective, the individual's right to privacy is severely affected. IoT applications massively collect data such as the identity of the user, position or personal communication, which - if being transferred without consensus - violate the human right of privacy (Berrehili & Belmekki, 2017). It is further criticized that rather than including marginalized groups of people such as disabled or elderly citizens, technological solutions even further exclude these stakeholders, thus depriving them of their right to the city. To take advantage of smart city services, citizens need to adapt to the technological procedures but not everyone is able to do so. In the research domains of human rights, urban planning, politics, and sociology, smart cities are recurrently criticized for prioritizing the needs of wealthy and well-educated citizens while neglecting the less privileged ones (Reuter, 2019).

Rather than grounding on political, social and civil rights and the common good, smart city solutions are criticized for being most often market-led (Cardullo & Kitchin, 2019). Another driver are cities and governments aiming to use the label of a ‘smart’ city in order to market themselves and display their modernity (Herscovici, 2018). Although proclaiming that they will increase the life

of their inhabitants, smart city initiatives are said to neglect a human-centric approach and ignore the citizens' needs and wishes (Marsal-Llacuna, 2017). Rather than being able to actively take part in smart urban development, citizens are often left with the role of passive consumers and data providers (Reuter, 2019) and are sometimes even perceived as an obstacle to the smart city vision and need to be forced into doing what is good for them (Herscovici, 2018).

From a digital government and information systems perspective, the tensions between human rights and the opportunities offered by technology in smart cities has not been discussed comprehensively. Therefore, the goal of our research is to move beyond the techno-optimist stance and to shed light on the relationship between smart city initiatives and human rights also in our discipline.

3. Research Approach

This study is considered a pilot to explore if, and eventually how, smart city initiatives can influence human rights. Given the exploratory nature of the research, we adopted a qualitative research approach (Walsham, 1995). Both researchers are interpretivists, curious to study emerging phenomena in their natural context and understand how smart city initiatives are perceived by different stakeholders. To this end, we adopted a qualitative case study design in the city of Kristiansand, Norway. Norway is considered a suitable context to study smart cities and human rights as it is among the most digitalized countries in the world and since it is a high-trust society where human rights are highly valued. Kristiansand was selected as case as the city is in the process of experimenting with a number of smart city initiatives. We used a snowballing approach to selecting respondents, starting with the person responsible for smart city initiatives in Kristiansand. This person pointed us to 3 more respondents, working with smart city initiatives. Additionally, we interviewed 10 citizens representing variation in age, gender, profession and cultural background. The duration of the interviews varied but typically lasted around 40 minutes. All interviews were recorded and partially transcribed. The data were then analyzed using EnVivo software. In addition to the interview data, we collected written material from Kristiansand describing their smart city initiatives. The document analysis enabled a simple form of data triangulation.

4. Preliminary Results

Kristiansand is a city and municipality in the southern part of Norway. In January 2020, Kristiansand merged with two neighboring municipalities as part of a larger, national process to reduce the number of municipalities in Norway. Kristiansand is currently Norway´s fifth largest city with about 112,000 citizens. Kristiansand has prioritized digitalization for years and the merger created new opportunities in this area. The city is currently experimenting with smart city initiatives to better understand how technology can contribute to improved city life and better citizen dialogue. Up to now, however, no comprehensive smart city strategy exists.

The interviews with city officials revealed that the city has 8 ongoing smart city projects. They emphasized different motivation factors for why the city engaged in smart city initiatives, including

improved service quality, citizen centric development, environmentally sustainable city development and improved citizen dialogue. This input was used to develop a thorough understanding of the type of smart city initiatives Kristiansand was working on. This understanding was later communicated to citizens as we invited them to reflect on positive and negative consequences related to human rights. Our findings corroborated existing literature in that smart city initiatives can have both negative and positive impact on the right to privacy, security and freedom of expression. Further, our findings indicate that such initiatives may also affect the right to adequate standard of living, equal access to public service and the right to be innocent until proven guilty. An overview of smart city initiatives and their potential impact on human rights is showed in Table 1 below.

Table 1: Smart City Initiatives and Their Impact on Human Rights

Smart City Initiative	**Description**	**Impact on Human Rights**
GPS tracking snowplow and sweeper truck	Municipality provides an online map with the location of snowplows and sweeper truck to inform where the truck has removed the snow or pebbles.	Negative impact on security for snowplow drivers. Positive impact on quality of service for citizens.
GPS tracking city bikes	Work in progress. The initiative enables citizens to rent a GPS tracked e-bicycle in the city to use whenever they like to.	Negative impact on privacy. Positive impact on quality of service.
Crisis management GPS tracking	SMS service to inform citizens about emergencies, such as floods, power outages, wildfires and terror.	Positive impact on security. Potentially negative impact on privacy.
Measure air quality	Real time air quality measures using small sensors to provide a better overview for citizens and professionals of the actual air quality.	Negative impact on privacy. Positive on quality of service and standard of living – but only for some. May increase inequality.
SMELT	Heated cables in the ground of pedestrian areas linked to the weather forecast site Yr to be turned on when the weather dictates it.	Positive on quality of service and standard of living – but only for some. May increase inequality.
iKRS: Citizen involvement app	Collecting citizens' opinions concerning the city's strategy using push messages. This app enables citizens to share their thoughts on a case within in the city, ask questions, share pictures etc..	Positive and negative on freedom of expression. Potentially negative impact on privacy.
Listen to young immigrants voices	Municipality uses social media to mobilize young people with minority backgrounds to participate in debates.	Positive and negative impact on freedom of expression. Potentially negative on privacy.
Noise cancellation at the harbor and electrification vehicles	The harbor in Kristiansand undergoes many changes to reduce noise, automate and use electricity gathered from renewable energy resources.	Positive impact on quality of service and standard of living for those affected.

5. Discussion and Outlook

Our results sugget that every smart city initiative may affect human rights, either positively, negatively or both. The most frequently affected rights are *privacy* and *security*, which is in line with findings from the literature (Berrehili & Belmekki, 2017; Gomede et al., 2018; Hoffman, 2018). While *privacy* is typically challenged by smart city initiatives such as GPS tracking, sensors and surveillance, *security* is likely to increase due to the same measures. However, also *security* can be challenged as GPS tracking allows finding individuals and harming them. In our case, citizens were able to track the location of snowplowers. Frustrated citizens approached the drivers, challenging them to prioritize the roads that were important to them - often in a threating or unfriendly manner. This caused the city to introduce a delay in the tracking to protect the safety of the drivers. We furthermore identified the *freedom of expression* to be affected by smart city initiatives, which has rarely been discussed in the smart city literature. *Freedom of expression* is assumed to increase by citizens' engagement and participation in municipal politics and online debates as online platforms offer easier access for many. In contrast, *freedom of expression* is challenged as the increase in surveillance can lead to citizens being less willing to express themselves publicly. Furthermore, the technical soluations can form barriers for individuals without the technological skills needed to take part in online debates, who, thus, are excluded. Similarly, our respondents were concerned that the right to *equal access to public services* is challenged as marginalized citizen groups such as the elderly and immigrants may not have the technological skills needed to use online services. The problem relates to the longstanding research theme of digital divide. The right to *adequate standard of living* can be strengthened as smart cities aim to improve the quality of life in a city and to make platforms more accessible, to automize manual processes and to reduce carbon emission. The SMELT case in Kristiansand can serve as an example of how standard of living may improve for residents of central Kristiansand. However, some of our respondents reflected that this might also lead to increased differences as heated streets were limited to the city center.

Since our sample in the study is quite small and we did not consider smart cities as a holistic concept but only shed lights on single smart city initiatives, the results cannot be generalized. However, our findings already provide evidence for human rights violations. Our pilot study provides examples how smart city development can affect human rights both positively and negatively, but more in-depth studies are certainly needed to fully understand these consequences. Although some attention has been paid to this issue by scholars from other disciplines, our preliminary findings suggest that the issue deserves a more prominent place in the digital government field.

A variety of angles can be considered in the pursuit of a better understanding of how smart city development can affect human rights. However, as cities are for citizens, a stakeholder approach might be appropriate. Studies identifying the different interests that motivate development may be contrasted with studies analyzing the broad impact on different stakeholder groups in the city. This is likely to uncover conflicts of interest and potentially dysfunctional or unintended consequences. Further, studies from techno-optimist perspectives may be contrasted with critical studies highlighting with potentially damaging outcomes to the future development of urban societies.

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