The Impact of Smart City Initiatives on Human Rights

A Qualitative Research Study

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Foreword

This master's thesis report is the result from two students studying at the University of Agder (UiA) from the master's degree program in information systems. This has been an ongoing collaboration since our bachelor's degree at the University of South-Eastern Norway (USN).

The topic about smart cities is something we've had a common interest in since we were introduced to the concept from one of our professors at USN. We both decided to delve deeper into this fairly new concept to pursue our dream of working with smart city initiatives in the future. Writing a master's thesis on smart cities have been challenging, educational and fun.

The Fritt Ord Foundation and UiA advertised two scholarships for master's thesis that concerns freedom of expression, democracy and/or human rights. This is where we found our interest in how smart city initiatives might affect human rights. We applied and were granted one of the two scholarships. We are forever grateful.

The progress we've made and the ability to face challenges the best way possible is all thanks to our supervisor's guidance. We would therefore like to give a special thanks to Leif Skiftenes Flak (Professor at UiA) and Sara Hofmann (Associate Professor at UiA) who were both dedicating their time and effort to guide and encourage us this past semester. We could never ask for better supervisors. Finally, we would like to thank our friends and family for supporting us from start to finish and our informants for dedicating their time to this study.

This master's thesis was made possible thanks to all of you.

Kristiansand

30.05.2019

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Executive summary

Context: A smart city is a concept where municipalities use ICT to increase efficiency, sustainability and quality of life for its citizens and city operations. Smart city initiatives use IoT technologies, enabled by ICTs to gather large volumes of unstructured data, known as *Big Data.* The aim of any smart city initiative is to increase the quality of life in a city, but poses a threat to citizens *privacy, security* and *freedom of expression* due to the large volumes of data being collected in smart cities, potentially violating fundamental rights in the *Universal Declaration of Human Rights*.

Purpose: This thesis investigates the connection between smart city initiatives and human rights. To be able to understand this connection, this study is based upon the following research question; *"How can smart city initiatives affect human rights?".*

Methods: The methods that were used in this research were a qualitative research method and a literature review. The literature review is from different disciplines *such as Smart Cities, Internet of Things, Big Data, The Digital Divide* and *Human Rights.* This was necessary in order to understand the literature which exists in the research field of smart cities and to determine a definition of the smart city concept. The qualitative approach was gathered from interviews conducted in the Norwegian municipality Kristiansand from informants with central roles in smart city initiatives and citizens living in the municipality. The data that was gathered were validated by utilizing triangulation methods, mainly focusing on data triangulation. A total of 14 interviews were conducted, 4 municipal informants and 10 citizens. The interviews lasted from 20 to 72 minutes, getting in depth opinions on the how informants believe smart city initiatives may affect human rights.

Findings: Our results show multiple smart city initiatives in Kristiansand municipality which gives an overview of what a typical initiative is. The informants elaborated their understanding of what a smart city initiative is and how these initiatives can affect human rights. There is a common understanding on how smart city initiatives can affect the right to privacy, security and freedom of expression. The right to privacy is challenged by the increased use of GPS tracking, sensors and surveillance. The right to security is strengthened as GPS tracking and surveillance can warn against threats and catch criminals before they are able to act. But the right to security is also challenged as it will be easier to find individuals using GPS tracking and do them harm. Literature scarcely mentions how freedom of expression is affected in a smart city, but our results elaborate on multiple instances where this is the case. Freedom of expression is shown to increase citizens engagement and participation in municipal politics and online debates as online platforms is easier to access for many. But the right to freedom of expression is challenged as the increase of surveillance makes citizens not willing to express themselves publicly and for individuals who don't have the technological skills needed to utilize online debates.

Three new human rights that literature don't mention were found as well. These are the right to *adequate standard living*, *equal access to public services* and to be *presumed innocent until proven guilty*. The right to adequate standard living is strengthened as smart cities aim to improve the quality of life in a city and initiate initiatives to make platforms more accessible, manual processes automatic and to reduce carbon emission. The right to equal access to public services are challenged as vulnerable individuals such as the elderly and immigrants may not have the technological skills needed to utilize online services. This could potentially result in a digital divide. The right to be innocent until proven guilty is challenged as the increase of surveillance on all citizens to find a few criminals makes everyone a suspect until proven otherwise. This contradicts being innocent until proven guilty.

Conclusion and implication: Our study concludes that smart city initiatives do affect human rights either it being by strengthening its significance or by breaching the terms of the UDHR. This study contributes to a better understanding on how human rights are affected by smart city initiatives and which human rights should be taken into consideration when planning a smart city initiative. Implications for future research and implications for practice are suggested.

Key words: smart city; internet of things; big data; digital divide; human rights; privacy; security; freedom of expression.

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1 Introduction

Around 70% of the world's population is estimated to live in urban areas by the year 2050 (United Nations, 2014). This future faces many challenges concerning the wellbeing and quality of life of its citizens in different ways such as demographic shifts, gentrification, mobility, environmental impact, health care support, security, safety and sustainability in housing, food and water supplies (Oliveira & Campolargo, 2015). Finding solutions for these challenges has become a priority for city planners, and as a result, the concept known as *smart city* emerged.

A smart city 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 utilize common resources, increase cities productivity and reduce climate and environmental issues (Stenstadvold, Hegna, & Lanestedt, 2018). Some of the building blocks behind a smart city, and the key behind its success comes from 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). On a city scale, it is estimated that petabytes of data will be generated from sensors in everyday objects (Marinovici, Kirkham, & Widergren, 2016). This calls for the use of big data to store and analyze large volumes of data. Some of this data is made up of sensitive and personal information, creating knowledge about consumers, patients, clients, customers and products (Hoffman, 2018). Including data of current citizen location information, habits and preferences on a perpetual basis. Public services will move online and replace their traditional counterpart which will require that citizens have the necessary knowledge needed to utilize these services. If they don't, citizens may feel partially or completely left out of society due to their inability to adept. This is where the challenges concerning smart cities and human rights begin.

The purpose of this study is to connect literature about smart city and human rights and to perform a qualitative case-study of a Norwegian municipality and its initiatives. A systematic literature review was conducted to get the scientific background needed to address challenges concerning these two topics. This was necessary as smart city is still a fairly new concept. Technologies used in smart cities such as IoT and big data challenges citizens privacy, security and freedom of expression which are fundamental rights in the *Universal Declaration of Human Rights* (UDHR) (United Nations, n.d.). We will use this knowledge to find more about Kristiansand municipalities' handling of their smart city initiatives and find obstacles or barriers that could potentially affect human rights. This is made possible by conducting a qualitative study by interviewing representative informants in the municipality that works with smart city initiatives and citizens living in the municipality. This has led us to the following research question:

How can smart city initiatives affect human rights?

1.1 Motivation

Smart city developers can attain great value when applying and integrating advanced technology in public service initiatives. This new trend of developing city initiatives known as smart city initiatives has brought with it its own set of challenges that smart city developers must consider. The aim of any smart city initiative is to increase citizens' quality of life. Despite this, citizens all over the world have been vocal about their concerns for the increased appliance of technology in public services. Particularly challenges related to privacy, security and freedom of expression have been in the public spotlight, so much so that it might even halt the progress of smart city development. The actual impact of smart city initiatives remains at least partially unclear. To find more about the actual impact of smart city initiatives, we decided to investigate how smart city initiatives may affect human rights which smart city literature provides little insight to. For that reason, we decided to study the phenomenon of how smart city initiatives can affect human rights. We found the UDHR to be an interesting and good parameter to investigate this phenomenon, as the study would yield valuable results at an international level across borders.

1.2 Research structure

Chapter 2: Theoretical background

- Definition of central concepts based on a systematic literature review.

Chapter 3: Research method

- Elaborates the research approach for this study such as research design and data collection. How the data is analyzed and the validity and reliability is included.

Chapter 4: Results

- Presents a summary of the smart city initiatives in Kristiansand municipality and how the informants believe smart city initiatives may affect human rights.

Chapter 5: Discussion

- The results gathered is linked up to relevant literature. The discussion includes how smart city initiatives may affect the right to privacy, security and freedom of expression, as well as three new human rights literature don't mention. Limitations and further research is discussed.

Chapter 6: Conclusion and implications

- Presents the conclusion and implications of this study based on results of highest importance.

Figure 1: Research structure

2 Theoretical background

The theoretical background presented in this chapter is based on a literature review. This was done by following Webster & Watson's (2002) guidelines for writing a systematic literature review. Tables, figures and a concept matrix from the selection process is presented in the Annex.

Firstly, this chapter will elaborate the definition of important topics such as smart cities and its technologies. Secondly, an explanation of what human rights is and relevant human rights Articles are presented. Finally, we will draw a red line that connects the topics of smart city and human rights as they are not commonly used together in past literature. This is essential to be able to answer our research question on how smart city initiatives affects human rights.

2.1 Smart cities

The concept of smart city has become increasingly popular concept in scientific literature and international policies (Albino, Berardi, & Dangelico, 2015), and smart city is a relatively recent term (Ramaprasad, Sánchez-Ortiz, & Syn, 2017). The term was first introduced in a research article in 1999, in the case of Singapore (Mahizhnan, 1999). Since then, researchers have been searching for the best smart city definition by systematically reviewing the smart city literature (Ramaprasad, Sánchez-Ortiz, & Syn, 2017). Despite attempting to academically define and conceptually describe smart city over the years since then, a generally accepted academic definition has not emerged (Gascó, 2016) (Ojo, Curry, Janowski, & Dzhusupova, 2015).

As we conducted the literature review for this study, we found several definitions attempting to describe the term smart city. Some researchers attempt to define the term in their own research based on the characteristics that make up a smart city (Oliveira & Campolargo, 2015) (Marinovici, Kirkham, & Widergren, 2016), while other researchers simply adopt definitions used in other research (Bergh & Viaene, 2015). For this paper we have applied the smart city definition of Stenstadvold et al. (2018). This definition classifies smart cities as cities that:

«Use digital technology to make cities better places to live and work. Smart city initiatives aim to improve public services and quality of life of citizens, optimally utilize common resources, increase city productivity, and reduce climate and environmental issues in towns»

Stenstadvold's et al. (2018) definition of a smart city and smart city initiatives are used by the Norwegian Communal and Modernization Department for surveying smart cities and municipalities in Norway (Stenstadvold, Hegna, & Lanestedt, 2018). Transformational projects and initiatives in smart cities are called smart city initiatives, and their purpose is to serve citizens and to improve their quality of life (Chourabi, et al., 2012).

It is difficult to agree on a complete picture of the field partly due to the field's multidisciplinary nature (Ramaprasad, Sánchez-Ortiz, & Syn, 2017). However, there exists many frameworks that unilaterally define relevant factors that make up a smart city. Nam & Pardo (2011) suggest that there are three conceptual dimensions which make a smart city: technology, people, and community. In the context of this paper we are mostly concerned with the dimension of technology and its impact on citizens human rights, as technology is the key to transform life and work within cities (Nam & Pardo, 2011). Critical infrastructure components and services in smart cities rely on a collection of smart computing technologies which enable components and services to communicate. The use of ICTs in cities can increase the quality of life of citizens, but the impact is still unclear (Nam & Pardo, 2011). As well as enabling quality of life for citizens to be improved, inequalities can also increase and promote a digital divide between people (Nam & Pardo, 2011). Prevalent technologies which encompass smart cities are discussed in the following chapter.

2.1.1 Technologies

Smart cities are now a reality all over the world, in all continents, and they are moving towards smarter urban spaces using technology to face problems related to traffic, pollution, city crowding, and poverty (Dameri, 2013). Municipalities face an increased demand to incorporate smart technologies used to collect required data and analyze them for action in real time, which is further converted to usable knowledge (Jin, Gubbi, Marusic, & Palaniswami, 2014). This knowledge makes cities smarter as it enhances the decision making of city management and citizens (Jin, Gubbi, Marusic, & Palaniswami, 2014). The evolution of technology has improved the quality of life of citizens across many dimensions, though social cohesiveness of smaller groups appears to not be equally benefited (Oliveira & Campolargo, 2015). The purpose of this subchapter is to present the technological building blocks of smart cities that we find particularly relevant and helpful for formulating interview questions about the potentially positive and negative implications on human rights related to the technological aspects of smart cities.

At the core of smart city services, we find large volumes of unstructured data, known as big data which is rendered by IoT and stored in the cloud or data centers (Hashem, et al., 2016). Big data and IoT technologies such as sensors, data storage devices, and computers play a large role in the feasibility of smart city initiatives (Hashem, et al., 2016). Societies are becoming increasingly digital with the emergence of technological trends such as big data, open data and ICT, enabling new ways of living and sharing knowledge (Oliveira & Campolargo, 2015).

In the context of this paper, we found the IoT technologies and the implications of big data to be most relevant for investigation in finding out about the effects smart city initiatives may have on citizens human rights. We recognize that there are other technologies and trends that make up smart cities. Perhaps most important are ICTs, which are key drivers of smart city initiatives (Hollands, 2008), enabling communication within a global context (Zuppo, 2012), e.g. the Internet, wireless networks, and other communication mediums. We did not find it necessary to elaborate on ICTs as a separate speaking point during interviews. This is because we have emphasized the importance of ICT in the context of IoT, about the connectivity between devices and the communication technology that enables two-way communication between them.

Internet of Things

IoT is the communication between "things" such as sensors and actuators, and various devices and objects (Minch, 2015). The goal is to achieve some useful objective by equipping everyday objects with identifying, sensing networking, and processing capabilities which allows them to communicate over the Internet (Whitmore, Agarwal, & Xu, 2014). The integration of sensors and communication between things is the potential value IoT offer smart city initiatives by networking different services (Hashem, et al., 2016). For example, in Kristiansand municipality, such sensors are being deployed around the city to measure air quality. These sensors can gather real-time data about pollen and pollution levels in the air where individual sensors have been deployed, over the internet. The gathered data is analyzed and stored in the cloud or in data centers, enabling Kristiansand municipality to publish the data online in real-time as a service, or made available as open data for its citizens and local businesses.

Another example of how IoT devices can be utilized in smart cities are intelligent video surveillance systems which allow large numbers of cameras to be deployed as integrated safety and security solution in smart cities, capable of detecting and identify abnormal and alarming situations (Calavia, Baladrón, Aguiar, & Carro). In the same way sensors can gather real-time data of air quality, surveillance cameras can gather real-time surveillance data over the internet from wherever they are deployed and store it for analysis.

Jin, Gubbi, Marusic & Palaniswami (2014) proposes a framework for the realization of smart cities through IoT. The framework is presented in Figure 2 and presents the building blocks of smart city IoT infrastructure. This framework has been valuable to us in understanding IoT as the key technological enabler to smart cities. It introduces three different domains: network-centric IoT (communications), Cloud-centric IoT (management) and data-centric IoT (computation requirements of smart city development and deployment).

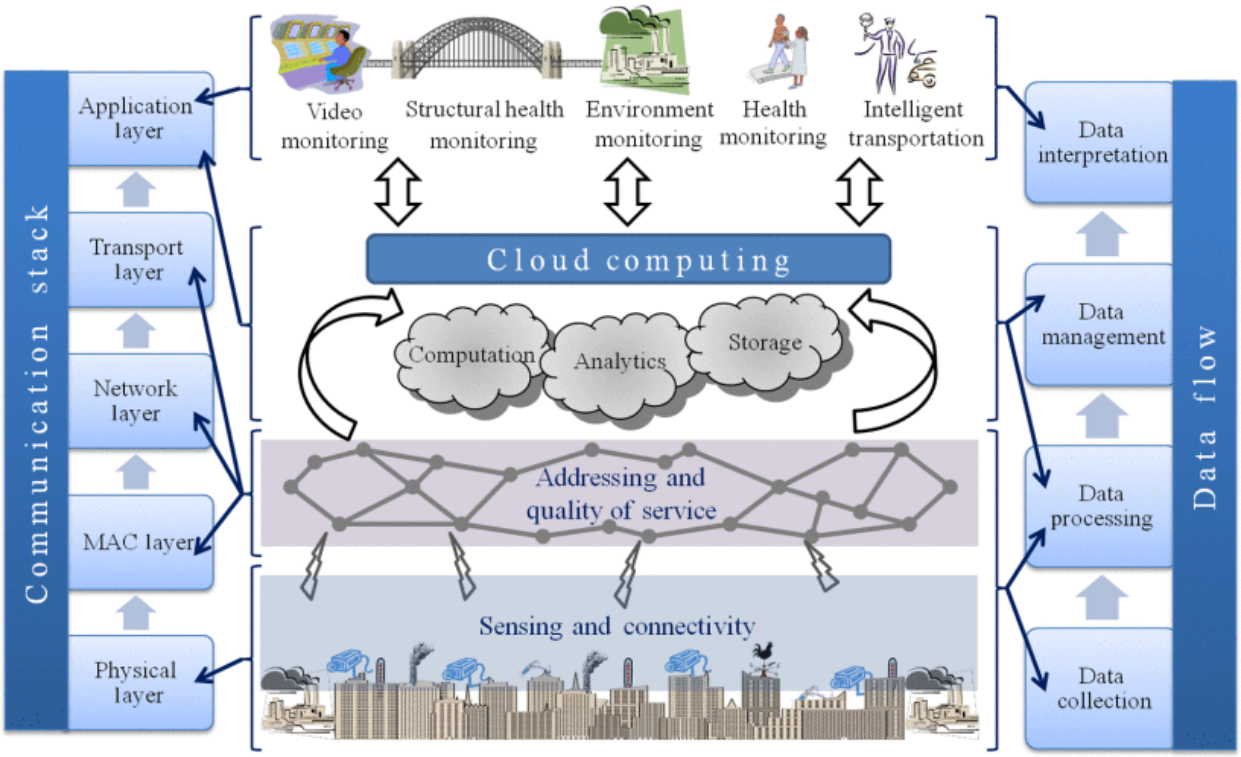

Figure 2: IoT infrastructure from three different domains (Jin, Gubbi, Marusic, & Palaniswami, 2014).

These three domains are the IoT infrastructure for a smart city. In Network-centric IoT, networking is the fundamental issue (Jin, Gubbi, Marusic, & Palaniswami, 2014). Figure 2 show the relationship between the proposed networking modules and communication stack.

Cloud-centric IoT emphasizes converting information to knowledge (Jin, Gubbi, Marusic, & Palaniswami, 2014), by offering infrastructure, platforms, or software as services to make large volumes of unstructured data understandable.

Large volumes of data are generated in a fully functional IoT, including collection, processing, storage, and visualization. Data-centric IoT emphasizes all these aspects of data flow (Jin, Gubbi, Marusic, & Palaniswami, 2014).

Big Data

Big Data offers potential value to cities by gaining insight into large volumes of unstructured data collected through various sources, such as sensor devices and other devices which are integrated with the cloud-computing infrastructure (Hashem, et al., 2016). Cities can gain insight into this data by using big data analytics, and in turn gain value by improving a single service or application (Borgia, 2014), and in turn become smarter.

Martin (2015) summarizes examples of beneficial and questionable uses of big data in Table 1. We included this table as it has been valuable to us in understanding the potential negative and positive uses of big data, as big data has been criticized as breach of privacy and potentially discriminatory (Martin, 2015).

Table 1: Examples of Beneficial and questionable uses of big data (Martin, 2015)

	Beneficial uses	Questionable uses
By technology		
License plate readers	Can be used to locate stolen cars or to provide tolls on the highway.	Can be used by private investigators or placed on a truck to broadly gather license plates.
Facial recognition	Has a possibility to locate terrorists even at large events.	Can be used by social networking sites to identify individuals by using a still-picture.
GPS	Can provide traffic predictions, coupons and offers from set location and map directions.	Location based stalking is easier
By context		
Healthcare	Suicidal thoughts have a potential to be identified within an individual. Treatment of cancer, health of pregnancy and Google Flu Trends. Gives an insight between medications from search terms and spread of infections within a hospital.	Discrimination in healthcare, apps knows how fit you are. Development of a health score from purchase habits and from search terms
Education	Instructions for students can be personalized. Students that have a potential to drop out of school can be identified before it happens. Accountability for performance by school.	Admission discrimination is made possible using collected data.
Electricity	Turning on/off electricity within a home.	Makes it easier for criminals to know if you are home or not. There is also a possibility to hack smart homes.
Law enforcement	Have the potential to identify crimes and potential suspects with the use of analytics. Fire departments can use data mining to predict problems.	Smartphones can be accessed without a warrant and it is possible to look up an individual's web browsing habits. Individuals can deny tracking participations which leaves them under scrutiny.
Retail	Can improve the layout of a store based on customer movements. Coupons and suggested items are personalized.	Movement and shopping habits has the potential to being tracked. Price discrimination.
Urban planning	Manage traffic better by with the use of smart grid technology. Makes it easier to identify road improvements within areas. Competitive sport activists can use apps which enables road planning.	Listeners to a radio station can be identified. Traffic lights has a possibility to be hacked. Focusing only on those who have mobile apps for road improvements.

The examples used for technologies in Table 1, i.e. license plate readers, facial recognition, and GPS, all have beneficial and questionable uses on how big data (large data sets) fits in a community, if at all. Ethical and social implications of big data is often ignored, and big data is mistakenly framed as ethically neutral (Martin, 2015). To make sense of large volumes of unstructured data, the data must be analyzed, but the field of data analytics excludes ethical analysis both in practice and academia (Martin, 2015). When ethical consideration is excluded, it enables, or opens up for questionable uses of the data.

Big data is highly relevant to the privacy and security aspect which may affect citizens human rights. The challenge of privacy arises from the large amounts of personal data being collected in smart cities, exposing it to analysis, sharing, and misuse, rising concerns about profiling, stealing, and loss of control (Tene & Polonetsky, 2012). This poses a security challenge in keeping these large volumes of sensitive data private, and out of the hands of hackers and thieves.

2.1.2 Smart city services

The use of information and ICTs can transform city infrastructure and services in fields such as economy, environment, mobility and governance (Bakıcı, Almirall, & Wareham, 2013). Anthopoulos et al. (2016) also states that the core elements of a smart city is comprised of smart services since they support the realization of smartness in aspects such as economy, governance, mobility, and living, aiming to enhance the quality of life within a city. Lee & Lee (2014) uses the term '*Smart city services' as referring to "innovative services using ICT in city planning and management*". Smart services differentiate from classical services because of their strong dependence on data, the development of smart services requires high agility and they are often cross-company and cross-sectoral (Marquardt, 2017).

Cities requires sustainable transportation solutions to address the increasing demand for mobility, while also mitigating potentially negative social, economic, and environmental impacts (Lim & Taeihagh, 2018). To solve this issue, autonomous vehicles (AVs), also known as driverless vehicles, have emerged as a potential solution for this increasing demand for mobility cities. AVs operating decisions and their ability to adapt to changing conditions relies on sensor data and artificial intelligence (AI) to interpret the data (Lim & Taeihagh, 2018). This is an example of how technology can help solve complex future demands cities, such a need for more energy and transportation efficient solutions, in the face immense population growth.

Smart waste management IoT solutions have already become a reality in many smart cities. Innovations can be applied to effectively manage waste generated by people, businesses, and city services (Neirotti, Marco, Cagliano, Mangano, & Scorrano, 2014). Offered as a public service, waste bins can be equipped with sensors capable of detecting the waste levels collected in individual bins, and if the bins are to become full, the sensor can communicate to maintenance that they need to be emptied (Medvedev, Fedchenkov, Zaslavsky, Anagnostopoulos, & Khoruzhnikov, 2015). Such solutions can save time and

money and make cities more energy efficient and environmentally friendly as resources don't have to be spent emptying bins that are not full, by controlling and observing waste levels remotely.

By 2020, China has implementing its much debated "Social Credit System", which has the potential to fundamentally change the life of Chinese citizens. Síthigh & Siems (2019) suggest that Chinese citizens could be given a score measuring their sincerity, honesty, and integrity, and that this score will greatly impact their lives in ways such as renting a flat, buying a flight ticket, or given preferred access to hospitals, universities and government services. This system has received harsh criticism for its potential negative implications on human rights for Chinese citizens. It could be argued that the Social Credit System should not be seen as a model, but as a counter-model for other countries (Síthigh & Siems, 2019). From this example we want to highlight the importance of considering ethical challenges when developing smart city services. The utilizing of technology brings about challenges that must be addressed.

Designing smart city services requires thorough planning and awareness of essential requirements for the initiative to be successful. Our assertion is that going forward with initiatives and implementing services which do not fully consider challenges and implications related to privacy, security and freedom of speech, may stand to provide unintended negative effects on human rights. The use of ICTs in cities can improve the quality of life for citizens, but they can also increase inequalities and promote a digital divide (Odendaal, 2003).

In the Taxonomy of the Smart City Elements by Pourzolfaghar & Helfert (2017), a definition for smart services is provided based on a thorough literature review: "*A 'Smart Service' is the one with the objectives corresponding to smart city goals and objectives to meet the quality factors and has a response to smart city stakeholders' concerns*." The taxonomy highlights a problem with how smart city services are often designed. That service developers often do not have an overall view on principles and standards of quality factors which require consideration when designing smart city services, namely interoperability, usability, security, availability, recoverability, maintainability, and confidentiality. Instead they follow common sense to consider quality factors (Pourzolfaghar & Helfert, 2017). Pourzolfaghar & Helfert (2017) calls this problem as "a lack of a comprehensive collection of all essential requirements".

A smart service should therefore meet quality factors and respond to the stakeholders' needs. The aim of this study is not to investigate whether Kristiansand municipality have indeed considered these quality factors, but it serves as an argument for how smart city services might affect the human rights of its citizens in unintended negative ways when services do fully consider all essential requirements.

2.1.3 Smart city stakeholders

The success of smart city development projects depends on identifying the stakeholders who can influence and contribute to the project (Jayasena, Mallawaarachchi, & Waidyasekara, 2019). Freeman & Mcvea's (2001) defines stakeholders as "*any group or individual who can affect, or is affected by, the achievement of the organization's objectives*". Pourzolfaghar & Helfert (2017) classify smart city stakeholders into three classes: 1) the Citizens; 2) The Authorities; and 3) the service developers. Referring to this definition, we have viewed citizens, authorities, and smart service developers in Kristiansand municipality as stakeholders of a selection of investigated initiatives in Kristiansand municipality.

In the literature of smart cities, we have found that citizen stakeholders of smart city initiatives are typically not categorized into different socio-economic groups or other factors which can be used for grouping categories of citizens, such as age, gender or digital skill levels. Rather, the term 'citizen' in the stakeholder context we found to typically encompass citizens as a single stakeholder. We found the literature on the digital divide to provide a better sense of the different people groups the term *citizens* may contain or encompass in the context of being a stakeholder of smart city initiatives.

The literature on the digital divide is specifically concerned with the types of people groups who are to a lesser degree capable of participating in the digital society. Because of this, the digital divide literature is highly relevant to us, as it can be helpful in identifying particular people groups who are all stakeholders of smart city initiatives but may to a greater or lesser degree have their human rights affected due to factors such as socio-economic status, digital skill levels, and age.

2.1.4 The digital divide

As mentioned in the chapter above, smart cities work for the greater good of its citizens with the use of ICT (Stenstadvold, Hegna, & Lanestedt, 2018). But as they claim to have the benefit of improving the quality of life of its citizens, there is also a possibility to increase the inequalities which promotes what the literature calls a *Digital Divide* (Odendaal, 2003). This is why the topic about digital divide is important to address in smart city literature as the increase of ICT within a city have the potential to increase inequalities which may lead to a digital divide (Odendaal, 2003). Djik (2012) explains that the digital divide can be understood as inequalities of four successive types concerning the access of digital technologies;

1. Motivation to use ICT
2. Physical access to ICT
3. Digital skills needed to use ICT
4. Different uses for ICT

The digital divide is often referred to as an absolute exclusion of access to digital technologies, especially in the earlier days and in developing countries (Dijk, 2012). This exclusion is still relevant in developed countries and often includes the differences regarding *"relative differences between people who already have access in a certain way or to a particular extent"* (Dijk, 2012). It is the digital divide concerning developed countries that will be relevant for our theoretical background as this case-study is located in the developed country of Norway.

Inequalities has the potential to increase in a smart city due to the increased use of ICT (Odendaal, 2003). Djik (2012) supports this statement and explains that unequal access to computers and the internet in general has shifted from motivation and physical access to the inequalities and the skills needed to actually use these technologies. This shift is supported by Abdelfattah, Bagchi, Udo & Kirs (2010) as well, who explains that the digital divide in the use of internet is a challenge even in developed countries. The inequality regarding the internet can be divided in two; citizens with no access to the internet (the digitally deprived) and citizens that are frequents users of the internet (intense users) (Abdelfattah, Bagchi, Udo, & Kirs, 2010). Two citizens might even have equal access to ICT, but the difference in skills might lead to a digital divide between those two (Ghobadi & Ghobad, 2015). Research also show that the adoption of ICT is not affected by gender, as it might have been a couple of decades ago (Abdelfattah, Bagchi, Udo, & Kirs, 2010).

The digital inequality of citizens can be differentiated depending on demographics, ethical background, nation, income and education (Hsieh, Rai, & Keil, 2011). These differentiations have shown to be the reason why some citizens are good at technology and can easily adapt, while others might feel excluded and have a hard time adapting (Hsieh, Rai, & Keil, 2011). For example, immigrants in Australia say they have the motivation needed to learn new technology, but are not able to because of high costs, language barriers and by not having the required digital skill needed (Alam & Imran, 2015). But it is exactly this motivation and willingness to adopt to ICT that could improve the lives of immigrants by allowing for better access to information, communication, services online and opportunities for employment and education (Lloyd, Antonioletti, & Sloan, 2016).

Especially one demographic is shown to suffer from exclusion and adaption of technology, and that is the elderly. The elderly is often called "older adults" and refers to citizens over the age of 60+, which is around the typical retirement age (Quan-Haase, Williams, Kicevski, Elueze, & Wellman, 2018). Literature concerning the digital divide often treats the younger population and the elderly as a homogenous group, overlooking the difference in digital skills between the age gaps (Quan-Haase, Williams, Kicevski, Elueze, & Wellman, 2018). There are however many elderly that actually wants to learn new technologies to be able to stay connected, but they feel overwhelmed and is afraid of wasting anyone's time teaching them how to use it (Quan-Haase, Williams, Kicevski, Elueze, & Wellman, 2018).

Research implies that the elderly is often excluded from receiving information because of their lack of knowledge of the digital world (Carvalho , Olivares, Roa , Wanka , & Kolland, 2018). It is highly suggested that city managers consider the factors concerning the digital divide, such as inequality, when planning a new initiative in the city (Odendaal, 2003). The topic about the digital divide is important as it refers to the inequalities in the use of ICT, which makes it relevant for this study as smart cities embraces these technologies. The next chapter will present all the relevant human rights citizens have in Norway which will provide a better understanding on how the digital divide and smart city technologies has the potential to affect human rights.

2.2 Human rights

In the period after World War II, human rights have been enshrined in international agreements both at global and regional level. The international agreements are heavily inspired by the UN's UDHR which is a milestone documents in the history of human rights and was proclaimed by The General Assembly in 1948 (Regjeringen, 2014) (United Nations, n.d.). According to the Norwegian government (2014), the idea of certain universal and inviolable rights gained its national breakthrough with the US declaration of Independence in 1776, the French Revolutionary Declaration in 1789, as well as several subsequent constitutions, among others, the Norwegian Constitution of 1814. There has been a desire to give international human rights conventions a strong legal position in Norway, and in 2014, when the Norwegian Constitution turned 200 years old, numerous new human rights provisions were included from the UDHR (Strand, 2019). The human rights in Norway is therefore not originally made for the country but are handpicked from the UDHR and included in the constitution.

After a thorough review of the UDHR we can determine that several Articles are of high relevance for this study. The selected Articles concerning human rights is presented in Table 2 below and will be referred to later in this thesis where they are of relevance.

Table 2: Relevant Articles from the Universal Declaration of Human (United Nations, n.d.)

Article 3	«Everyone has the right to life, liberty and security of person»
Article 11:1	«1. Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defense»
Article 12	«No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks»
Article 19	«Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers»

Article 21:2	«2. Everyone has the right to equal access to public service in his country»
Article 22	«Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality»
Article 25:1	«1. Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control»

As presented in the UDHR above, every citizen has a right to live, right to equal access to public services and a standard of living adequate while feeling secure in the public or in their own personal sphere. The Articles that are presented can also be found in the Norwegian constitution.

In the last chapter we mentioned that smart cities aim to strengthen the quality of life of its citizens (Stenstadvold, Hegna, & Lanestedt, 2018) but has the potential to increase the inequality as well (Odendaal, 2003). The next chapter will delve into frequently used topics in smart city literature and connect these to the topic of human rights.

2.3 Smart city and human rights

Literature reveals that challenges concerning human rights are linked up to big data and IoT technologies. These two technologies are part of what makes a city smart and is referred to as “smart city building blocks”. When we speak of a smart city, we will also speak of these two technologies as a smart city can’t be smart without them (Jin, Gubbi, Marusic, & Palaniswami, 2014).

Our structured literature review reveals that there are two concepts that are mentioned frequently in smart city literature, and that are the concepts about privacy and security. Both privacy and security have a strong connection to the UDHR presented in Table 2 above. The concept about freedom of expression is loosely mentioned in the literature, but due to relevance we will include and study this topic even further. By connecting the concepts of privacy, security and freedom of expression together will help us answer our research question on how smart city initiatives can affect human rights.

In this chapter we will give a further explanation on human rights that literature refers to in a smart city context. Tables of data law and Articles from the Norwegian constitution will be presented to get a deeper understanding on these concepts and deepens the theoretical foundation needed to understand how it can influence smart city initiatives in a Norwegian municipality.

2.3.1 Privacy

The rise of data collection in cities has led to increased concerns regarding privacy of those data. Privacy explains concepts that apply to both individuals and to society at a large (Grama, 2016). By being able to control its own data and specify how those data are collected, used and shared can refer to privacy at an individual level. In Norway, citizens are entitled to a private sphere where you can act freely without coercion or interference from the government or other people (Datatilsynet, n.d.). Hoffman (2018) explains that privacy can be defined as the right to access information about ourselves, which can be considered as our lives, as it is an integral part of our being. He continues to say that external agencies that handle these data have an obligation to protect and preserve it as they would with the person whom it belongs. Being proactive is essential to ensure the concept of privacy is not violated when dealing with new technologies (Hoffman, 2018).

The concept about privacy is highly important to address in the planning of smart city initiatives. We can see a potential link to how smart city initiatives can violate article 12 of the UDHR by possibly subjugating citizens to arbitrary interference in their lives. Marinovis, Kirham & Widergren (2016) states that citizens should be able to choose whether they would like the smart city initiatives to collect their data or not. Datoo (2014) states that smart city initiatives must protect their citizens from the increased level of data collection. With the use of smart city IoT technologies and big data, the data that is collected can possibly be used to trace and track individuals and monitor what they do. This poses a significant threat to the concept of human rights such as privacy, confidentiality and freedom of expression (Marinovici, Kirkham, & Widergren, 2016). Marinovis, Kirham & Widergren (2016) states that if we are able to solve the challenges concerning these three aspects of human rights, ICT can indeed help public services get more efficient, cheaper and achieve lower carbon-emission level.

According to Beresford & Stajano (2003) location privacy in mobile devices are well studied, but Minch (2015) adds that this study is not extended through an IoT context, which has the possibility to carry information far beyond users' awareness. Privacy concerning IoT is becoming an increasingly critical issue, and without proper regulations that ensures privacy, citizens will not be willing to adapt (Oleshchuk, 2009) (Mayer, 2009).

Data should be collected lawfully and in ways that addresses the citizens' rights to privacy. One way to do this is to seek permission whenever possible before the data is collected. The data that is collected should also have a means to an end, meaning that data that are not used to achieve specific city goals or to increase citizens quality of life, should not be collected. Data that are distributed should never be used for other purposes than those specified beforehand and should always follow laws and regulations. In Norway, a new Act regarding the processing of personal data was adopted June 15, 2018. The new Act implements the EU Privacy Regulation (GDPR) and makes the Data Protection Regulation into Norwegian law. Older Acts concerning data protection was repealed (Regjeringen, 2018).

Privacy has its roots in legal concepts and have a good understanding of what is permitted and prohibited is crucial to ensure citizens privacy. After a thorough review of the data protection law concerning right of privacy in Norway, we have presented a summary of Articles in Table 3 below sorted by category that are relevant to this study.

Table 3: Relevant data protection laws concerning privacy in Norway (Regjeringen, 2018).

Consent	The person who have access to personal data must be able to demonstrate that the data subject has consented. The data subject may also withdraw his consent at any time. The minimum age for consent for children was also changed to 13 years. Information about children under the age of 13 is only valid if it has been submitted or approved by the child's guardians when the purpose of the treatment is to provide information society services.
Rights	Information rights, including the right of access, the right to be corrected, deleted or restricted the processing of information, the right to have information transferred to alternative service providers (data portability), and the right to protest against the processing of own personal data is included in the Act. Some of these were already in the Norwegian law, but the right to demand deletion ("the right to be forgotten") and data portability is new. The right to demand deletion implies that the controller, if he has disclosed the personal data, must take all reasonable steps to inform data processors of the data subjects claim about deletion. Data portability means that if the processing is based on agreement or consent, and the personal information is contained din an automated processing system, the data subject has the right to have his or her information transferred to alternative service providers.
Profiling	Profiling is defined as automated processing to assess personal aspects of an individual's behavior, preferences or needs. Profiles can be used, for example, to analyze or predict work performance, financial situation, health, interests, reliability, or behavior. As a general rule, individuals have the right not to be subject to decisions based solely on the use of personal profiles and which have legal effects for or significantly affect the person concerned.

The literature about the privacy in smart cities mentioned above gives us a better understanding of how the privacy of citizens can both we strengthen, or the opposite, lessened. Smart cities might aim to increase the surveillance in a city to strengthen the citizens right for security, but this might be at the cost of their privacy, confidentiality and freedom of expression (Marinovici, Kirkham, & Widergren, 2016). This leads us to the next topic about human rights in a smart city, as it is nearly impossible to speak of privacy of citizens without mentioning their security as well.

2.3.2 Security

When we talk about security, we speak of the protection of data. Protection of data can come in all forms such as a technical control implemented into an IT-system or stored documents as a physical medium (Grama, 2016). This is what we call *information security* and includes data protection in all forms of threat such as malicious outsiders or individuals that have legitimate access to archives or systems storing data. Information security contains three concepts: *Confidentiality*, *Integrity* and *Availability* (Grama, 2016).

- Confidentiality: Protection of data in all forms from data creation to data destruction. Criminal and hackers are known threats, but there is always a risk that authorized personnel use their authority to access information they have no professional reason to. An example can be an employee who checks a celebrity's records for personal gain. Confidentiality is the most known information security concept that's involved when an organization faces a data breach (Grama, 2016).
- Integrity: Data integrity refers to the accuracy of data over its entire lifecycle. This means that there must be strict protocols within the systems and the organization to ensure that the users store data correctly and conflicts within the data are identified and resolved (Grama, 2016). Data integrity will ensure that only authorized personnel have the power to move, edit or delete certain types of data. Information used for decision making needs to be accurate to be able to ensure a satisfying outcome. It is therefore vital to achieve full data integrity.
- Availability: The availability of data means to ensure that the data stored in a system is available at any time when needed (even when disruptions occur), as well as the systems are operating reliably (Grama, 2016). IT-systems should be redundant, resident to attacks and backed up regularly to ensure data availability. As for the concern of IoT and big data in smart cities, quantities of devices and volumes of data is shown to be so great that data gathered is seen to be too large and too valuable to be stored on local databases (Minch, 2015). This will require the use of cloud computing, which will allow for global utilization. Global availability implies possible global exposure. Munné (2016) therefore states that it is of high importance that the municipalities must address these public security concerns before sharing data more openly for both the public and other governments and international entities.

Chatterjee et al. (2018) states that with the increased use of ICT within a city, the number of cybercrimes will also increase. Cybercrimes can be defined as criminal activity used with computers and other networked technologies (Wall, 2007). Examples of these crimes can be illegal access to systems or sabotage of equipment and data. Chatterjee et al. (2018) continues to argue that to be able to prevent these cybercrimes, citizens must be aware of the risks concerning this term which will make them more cautious. A study related to intelligent transportation systems in the UK and the Netherlands, which is a great step towards a smart city, shows that security and reliability of a system is of high priority for the public (Blanes , Paton, & Docherty, 2015). This was of much higher priority than the cost of a

system which has been emphasized prior to the study. We can see a potential link to how smart city initiatives can potentially violate article 3, 22, and 25:1 of the UDHR regarding security.

The concepts about information security and privacy are very closely related, and in some situations hard to exclude from each other. For example, we might have a system that is secure, but the data is not private. Maybe it was possible to collect data without the data subjects' consent or without the authority needed to do so. The same goes the other way around. We might be able to collect data from a data subject with legal consent. This data is stored on a system that has bad security, which leads to theft of personal data. In both instances the privacy and security are compromised. It is therefore important to take both these concepts and see them as one to be able to uphold human rights. The European digital agenda (2012) and Ebrahim & Irani (2005) states that the municipalities are required to rule down all new topics emerging from their smart city initiatives. Especially privacy and security requirements for cloud computing, which could be linked to big data, was listed as emerging topics.

Both privacy and security are two of the main aspects of a smart city purpose (Filipponi , et al., 2010) (Hernández-Muñoz, et al., 2011) (Anthopoulos & Fitsilis, 2010), but enhancing one aspect might decrease the other. The increase of surveillance and public technologies combined with predictive analytics to monitor citizens has the potential to increase security within a city by being able to prevent a crime before it happens (Power, 2016). To uphold human rights within a smart city can be challenging. How much privacy are the citizens willing to give up for better protection against terrorists and crime? Are citizens able to express their opinions on this matter in an ICT oriented city?

2.3.3 Freedom of expression

Being able to state one's opinion or ideas without the fear of retaliation is a human right in accordance with article 19 (United Nations, n.d.). This term is called freedom of speech, or freedom of expression. These two are differentiated by the medium used, as freedom of speech only work for the speech alone, while freedom of expression is not limited regardless of the medium used (United Nations, n.d.).

Literature have revealed few ties between the topics of smart cities and freedom of expression, at least comparably to privacy and security. Freedom of expression is loosely described as a challenge concerning technologies of the future, but a deeper explanation of the challenge is rarely described. However, Kammourieh et al. (2017) describes that the challenge occurs in the planning level of a smart city. They explain that freedom of expression is formulated at the individual level, while the restriction on the freedom on autonomy of citizens is taking place on either a group level or a general level. They continue to say that smart cities affect the environment of citizens without them being aware that choices are made to affect their behavior. The environment citizens live and grow up in will

be shaped by large data processes, profiling data, statistical correlations and so on (Kammourieh, et al., 2017).

One example is that if data can show that there is an increased risk for obesity in a specific city. Measures could then be made to motivate citizens to pick the healthier option such as putting the elevator in the far back of a building, and the stairs at the entrance. This is an example that can explain how citizens are systematically nudged and don't know which of their choices are affected and in what way.

The topic about the digital divide is of high relevance tied up to the human right of freedom of expression, or in other words, the inequality that promotes this divide. Digitization is known as the *"ability to turn existing products or services into digital variants, and thus offer advantages over tangible product"* (Gassmann, Frankenberger, & Csik, 2014) (Henriette, Feki, & Boughzala, 2015). This can be everything from receiving mail in an online postbox to discuss and debate online. One can assume that moving everything online might increase the quality of life for some citizens, but others might not agree.

The elderly was shown to be one of the vulnerable demographics who lacks the digital skills needed to utilize digital platforms provided by the government (Quan-Haase, Williams, Kicevski, Elueze, & Wellman, 2018). This has the potential to limit citizens freedom of expression as some might be unable to participate in online activities, like the elderly, who is already getting excluded from receiving information according to research (Carvalho , Olivares, Roa , Wanka , & Kolland, 2018).

Article 100 in the Norwegian constitution has grants citizens' freedom of expression since 1814 and is presented in Table 4 below.

Table 4: The Norwegian Constitution about Freedom of Expression (Lovdata, 2014)

	Freedom of expression, the Norwegian constitution
Article 100	«There shall be freedom of expression»
	«No person may be held liable in law for having imparted or received information, ideas or messages unless this can be justified in relation to the grounds for freedom of expression, which are the seeking of truth, the promotion of democracy and the individual's freedom to form opinions. Such legal liability shall be prescribed by law»
	«Everyone shall be free to speak their mind frankly on the administration of the State and on any other subject whatsoever. Clearly defined limitations to this right may only be imposed when particularly weighty considerations so justify in relation to the grounds for freedom of expression»
	«Prior censorship and other preventive measures may not be applied unless so required in order to protect children and young persons from the harmful influence of moving pictures. Censorship of letters may only be imposed in institutions»
	«Everyone has a right of access to documents of the State and municipal administration and a right to follow the proceedings of the courts and democratically elected bodies. Limitations to this right may be prescribed by law to protect the privacy of the individual or for other weighty reasons»
	«It is the responsibility of the authorities of the State to create conditions that facilitate open and enlightened public discourse»

This ends the chapter for theoretical foundation which works as a foundation for answering the research issue presented in this thesis. Defining the concept of a smart city gives us a better understanding of how cities are using IoT technologies and big data to achieve smartness to increase the quality of life of its citizens. But achieving smartness by increasing the use of ICT might potentially increase the inequality which promotes a digital divide.

Multiple challenges and opportunities concerning privacy, security, freedom of expression and inequality of citizens can be linked up to UDHRs. This can refer to challenges concerning the increase of security at the cost of privacy, or the increase digital platforms at the cost of inequality and freedom of expression.

3 Research approach

This chapter describes our chosen research approach for answering the study's research question. Firstly, we explain the study's philosophical paradigm which contain the scientific assumptions we use as a basis. Our chosen strategy and justification of our choice is then presented. Later we present a discussion of our research design and how the study has been conducted, including discussion of why we have chosen the specific approach. Finally, the methodical approach is presented, which includes descriptive account of the analyzation of collected data and a discussion of the study's quality.

3.1 Philosophical paradigm

Paradigms are ways of thinking and sharing assumptions about some aspects of the world as other groups of people, or communities (Oates, 2006). This means that there are several different views of how the world works (ontology), and how knowledge about the world can be acquired (epistemology) (Oates, 2006). *Creswell* (2014) use the term *"worldview"* to replace the term "*paradigms*", defining it as "*a basic set of beliefs that guide action*" (Guba, 1990). The meaning of the two terms are the same, but we have chosen to use paradigms as we have simply seen the concept been described more often using the term '*paradigm*'.

Different approaches for conducting research can vary greatly depending on the type of research which is being conducted. Researchers must therefore consider which philosophical paradigms is more suitable or appropriate for a chosen research. There are three different philosophical paradigms that information system (IS) and computing research is based on, namely positivism, interpretivism and critical research (Oates, 2006). Critical is considered riskier and not recommended for novice researchers, since critical research in IS far behind the development of positivism and interpretivism research (Oates, 2006, s. 304). Due to this recommendation, we decided to exclude critical research for consideration.

In the following paragraphs we present the two philosophical paradigms of positivism and interpretivism, and we explain our perspective on these two paradigms and a justification for our choice. According to Oates (2006), a positivistic paradigm views the world as ordered and regular, and we can investigate the world objectively by proving or disproving a hypothesis. The scientific method of positivism makes two assumptions (Oates, 2006). First, that the scientific method seeks to find regularities in laws or patterns. Second, that researchers can rise above personal interests and emotions and accepting disproval of researchers' pet theories for the greater cause. Interpretive studies on the other hand, is not concerned about proving or disproving a hypothesis, but tries instead to identify, explore and explain how all factors in different social settings are related and interdependent (Oates, 2006, s. 292). Klein and Myers (1999) classifies IS research as interpretive if knowledge of reality is assumed to be gained solely through social constructions like language, consciousness, shared meanings, documents, tools, and other artefacts.

Through the lens of a positivistic worldview, we can view smart city initiatives in the context of this study as services which aim to improve the livability of cities, or as yielding only positive effects. We are not trying to only prove or disprove the positive or negative effects of any smart city initiatives, but rather to identify, explore and explain a phenomenon. The phenomenon is the observed effects smart city initiatives may have on citizens' human rights, be it positive or negative. For this reason, we found that having an interpretive worldview would be most suitable for the study.

3.2 Research strategy

A research strategy describes the study's research approach that can be used to conduct a study of a phenomenon (Oates, 2006). These strategies have various characteristics and qualities which are suitable for different applications. Field studies, case studies, experiments and surveys are examples of different strategies. For this study we have used a qualitative case study to answer the papers research question. In the following chapters we justify this choice.

3.2.1 Qualitative method

The effects smart city initiatives can have on human rights has to a lesser extent been highlighted in previous research, as shown in the conducted literature review. For this reason, we considered it to be most appropriate to use a qualitative approach due to the lack of existing quantitative data available on the subject in the research literature. We also found it desirable to go into depth of the subject to achieve a greater and more comprehensive understanding of the phenomenon we were investigating. Qualitative methods are suitable for such in-depth analysis (Creswell, 2014).

Qualitative methods are also flexible (Jacobsen, 2005). We found this to be advantageous, as qualitative methods have less prerequisites for knowing what information would come about throughout the process. It was quite likely that the research question may change as we were conducting the study. When using a qualitative method, a research question can be changed as you get to know more about a phenomenon (Jacobsen, 2005). It was essential for us to have the freedom to reshape the research question as we conducted the study.

3.2.2 Case study

A case study was used for this thesis. According to (Oates, 2006), a case study focuses on one instance of a unit of analysis, such as an organization or a department. This instance is studied in-depth using data generation methods such as interviews. The aim of using interviews as a tool to generate data, is to gain detailed insight into the 'life' of a particular case, and to its relationships and processes which are often complex (Oates, 2006).

In Table 5, Yin (2006) displays three conditions related to five major research strategies:

1. The type of research question posed
2. The researcher has little or no control over the phenomenon being investigated
3. There is a focus on contemporary events

Table 5: Relevant Situations for Different Research Strategies (Yin, 2006, s. 6)

Strategy	Form of research question	Requires control over behavioral events?	Focuses on contemporary events?
Experiment	How, why	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Archival analysis	Who, what, where, how many, how much	No	Yes/no
History	How, why	No	No
Case study	How, why	No	Yes

By studying Table 5, we found that conditions related to adopting a case study as our chosen strategy correspond the most to our research question and our situation. Our research question is a 'how' question, and we have no control of the investigated phenomenon. In addition to this, the research question focuses on contemporary events, meaning that we focus on events, or cases which are occurring at the same time.

Adopting a case study strategy gives us the opportunity to study the practices of management and development of smart city initiatives in Kristiansand municipality. Thus, giving us a foundation for answering the research question by obtaining an understanding of the mindset of managers and developers of smart city initiatives in Kristiansand municipality.

3.2.3 Selection of case

This paper is concerned about a single case, the case of Kristiansand municipality, making it a single case study. In the case of Kristiansand municipality, we investigate the management and development of smart city initiatives in Kristiansand municipality by interviewing key informants in the municipality who can give us insightful information and rich answers about how citizens humans rights can be affected by these initiatives. Within the single case of Kristiansand municipality, we investigated several smart city initiatives by the city. We were selective in choosing which initiatives to investigate, as it was not possible to tie some initiatives to influencing citizens human rights.

Kristiansand municipality claims that "*a smart city is based on inhabitants' needs and uses new technology to make the city a better place to live and work*". This definition is used in their portfolio of current smart city initiatives (Norwegian Smart Cities, 2019). Some of these initiatives are offered as services, such as their open data initiatives where public documents from 2005 can be searched online. In contrast, documents often disappear from the net after only 3-6 months in other municipalities (Norwegian Smart Cities, 2019).

By conducting interviews with service developers and managers in Kristiansand municipality, we learned that these initiatives are not classified as smart city initiatives or services, but rather as digitalization initiatives, or as services aimed at increasing citizens quality of life by utilizing technology. They do however consciously aim at becoming smarter and they recognize that their initiatives, particularly those which are listed (Norwegian Smart Cities, 2019), can be defined as smart city initiatives and services, as they share the same traits as smart city initiatives and therefore fall under the provided definition of smart city.

The case of this study is the management and development of smart city initiatives in Kristiansand municipality. The case of Kristiansand municipality is an interesting one, as the municipality is working towards becoming a smart city. Several smart city initiatives have been implemented or are planned to be implemented by Kristiansand municipality. Through interviews we have gained insight into several initiatives. We present these initiatives in Chapter 4.

3.3 Research design

Yin (2006) describes two dimensions in the design of case studies. One concerns the question of whether one works with one single case or multiple cases. The second dimension is concerned with questions about whether one or more analysis units are used.

We are concerned about how our research question is interpreted and answered by citizens living in Kristiansand municipality as well as managers of said initiatives, as they are both stakeholders of Kristiansand municipality's smart city initiatives. To make this possible, we investigated several smart city initiatives in Kristiansand municipality concerning the effects they may have on citizens human rights.

Concerning the second dimension, we have several units of analysis. This is because we are not solely studying Kristiansand municipality (a single case) as a whole, but also individual citizens who are stakeholders of the smart city initiatives implemented or planned by Kristiansand municipality. This gives us two levels of analysis units, one at the expert level, which is the Kristiansand municipality workers, and one at a consumer level, which are the citizen stakeholders living in Kristiansand municipality.

Figure 3 below illustrates the research design of this paper. The figure illustrates that we first drafted a research question and based on a systematic literature review of smart cities, formulated a new research question. Based on this updated research question and our understanding of the phenomenon we set out to research, we formulated an interview guide for smart city service developers in Kristiansand municipality. The results of the smart city service developer interviews were used to gather data about smart city initiatives in Kristiansand municipality and our chosen research question, which both affected the following citizens interviews. After obtaining all the data we set out to gather, we analyzed the data, presented the results and concluded based on our findings, which answered the updated research question.

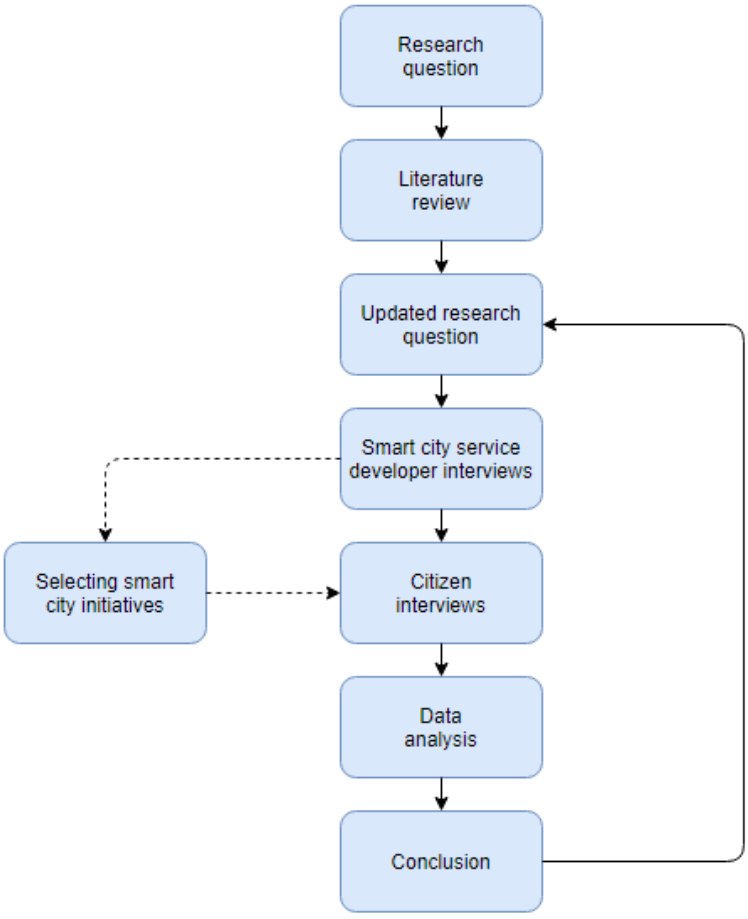

Figure 3: Research design

3.4 Selection of informants

The study is based on interviews by municipal employee respondents in roles related to the smart city management and development in Kristiansand municipality. In qualitative studies, the sample is often drawn randomly, so that researchers can do statistical generalizations. However, it is not common, and usually unacceptable, to recruit the informants randomly during qualitative investigations (Johannessen, Christoffersen, & Tufte, 2009). Through a vetting process we were able to hand-pick participants through discretionary selection of individuals deemed most relevant for the study.

Various methods were used in recruiting desirable informants relevant to the study. Initially we got our first lead of potential informants by *word of mouth* through the supervisors of this master thesis. This lead was followed up by contacting the potential informants through e-mail. The e-mails contained important information about the purpose of the study and a request for interview.

We also recruited informants using a form of snowball sampling. This is a convenience method for studying hard-to-reach populations (Heckathorn, 2011). The informants we are interested in interviewing are people with specific roles related to smart city development in Kristiansand municipality. Networking with already recruited informants and requesting their help in identifying other potential informants was of tremendous help. This enabled us to get in touch with the smart city community in Kristiansand.

In addition to this, we also selected ordinary citizens living in Kristiansand as informants for the study. We did this to further understand citizens attitude and understanding of the research question. This was essential to the study as it gave us an understanding of how different people groups in different social and economic situations may be affected by smart city initiatives. These informants are the people groups who are directly or indirectly targeted and affected by smart city initiatives managed and developed by our informants working in Kristiansand municipality.

3.5 Data collection

Qualitative interviews were conducted as our chosen data gathering tool. The interviews were conducted with face-to-face verbal interchange between the interviewee and researcher. Data collected for this study were done in the period of January 2019 to May 2019. Qualitative interviews can be structured, semi-structured, or unstructured (Fontana & Frey, 2000). In structured interviews, all respondents are asked the same preestablished questions which leaves the respondents with little room for variation in responses. While unstructured interviews allow for more open-ended questioning of the interviewees which provides a greater breadth of data (Fontana & Frey, 2000).

We chose to conduct semi-structured interviews for this study. Semi-structured interviews have incomplete script, though some questions can be prepared beforehand while still leaving a need for improvisation (Myers & Newman, 2007). Unstructured and semi-structured interviews is also the type most commonly type of interviews used for qualitative

research in information systems, and it is the type of interview focused on in Myers and Newman (2007) seven guidelines for qualitative interviewing, which is our chosen guidelines for the use of qualitative interview in this research.

3.5.1 Interview method

It is important to be aware of the potential problems and pitfalls when conducting qualitative interviews, however when it is used to its full potential it is a powerful data gathering technique (Myers & Newman, 2007). In IS literature and in various PhD programs, qualitative interviews are treated as unproblematic (Myers & Newman, 2007). Our chosen interview method is based on a Myers and Newman (2007) seven guidelines for qualitative interviewing, which is a model that aims to address these potential problems and pitfalls of qualitative interviews in IS research literature. The seven guidelines are derived from the dramaturgical model developed by Erving Goffman (1961). The theory is used to interpret any face-to-face interaction involving social exchange (Myers & Newman, 2007). The seven guidelines for qualitative interviewing are shown in Figure 4 below.

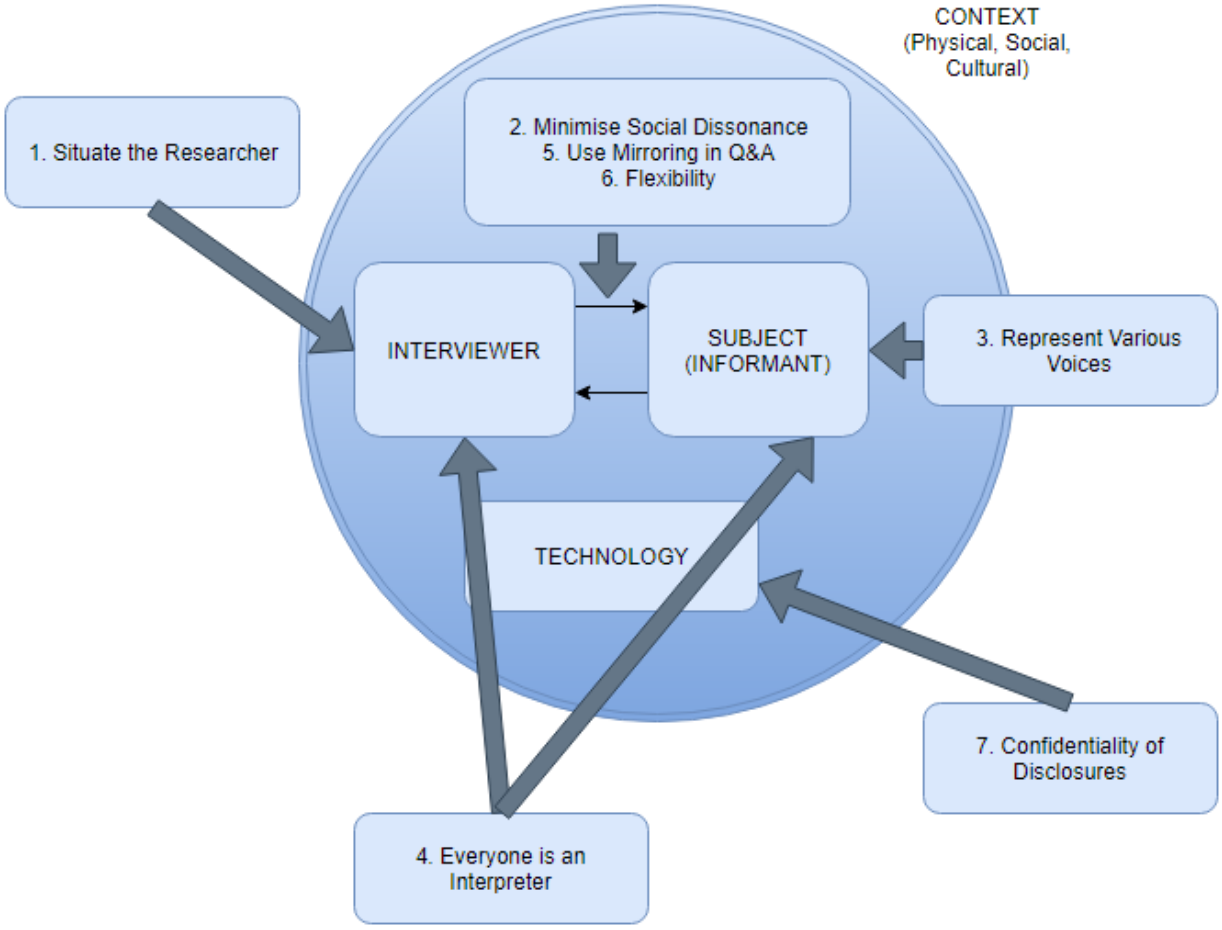

Figure 4: Guidelines for the qualitative research interview (Myers & Newman, 2007, s. 16)

We have followed Myers and Newman (2007) following guidelines:

- *Situating the researcher as actor.* Situating the interviewer as well as the interviewee before the interview. This is done to make the interview more like a natural social encounter where questions such as *who we are, what our roles are, and what our backgrounds* are known to both the interviewer and interviewee.
- *Minimize social dissonance.* Do whatever possible to make the interviewee not feel uncomfortable. Usually handled by being polite and managing first impressions, speaking appropriately and wearing appropriate clothes.
- *Represent various "voices".* Avoid elite bias and attempt to interview a variation of people who can speak with different voices.
- *Everyone is an interpreter.* Recognizing that the interviewee are interpreters of their worlds, as the interviewer are for theirs. This is to sensitize the interviewer to the interpretive world of the interviewee.
- *Use Mirroring in questions and answers.* The interviewee is to describe and explain the understanding of their world with their own words. Asking open questions, listen, prompting, encouraging and directing the conversation.
- *Flexibility.* Since semi-structured interviews have incomplete scripts, they require flexibility, improvisation, and openness. Depending on the subject's attitude, the interviewee should respond accordingly.
- *Confidentiality.* Keeping confidential and secure transcripts/records and the technology is important.

3.5.2 Data sources

Data sources used in this study is informants of either central roles within the smart city initiatives in Kristiansand municipality or the initiative users, namely the citizens within the city.

The chosen informants are summarized, and the date and time of the interviews are presented below. Smart city informants from the municipality have various roles, but all central roles in the smart city initiatives. Citizens with various backgrounds will be included to get an overview on their perspective of smart city initiatives initiated concerning their wellbeing. Citizens age and occupation is presented to illustrate diversity and to see if this will affect how they view smart city initiatives. Municipality informant's occupation will not be presented to maintain anonymity. All data that has been collected is anonymous for privacy and security reasons. Informants will be referred with numbers, such as "Municipality informant 1" and "Citizen 1".

Table 6 presents an overview of the informants that we interviewed from Kristiansand municipality. Each representative will be categorized as "Municipality informant" and differentiated with numbers. We started of with an interview of a central person connected to the smart city initiatives within the city to get an overview of what is being initiated as

well as already implemented initiatives. This later lead us to other informants in the form of a snow-ball sampling.

Our main informants from the municipality mentioned several cases of interest, but didn't have all the knowledge needed to get a deeper understanding of the topic. The informants then gave us contact information of someone who could most likely answer these specific questions. These specific questions were done in form of e-mail or in the phone as the questions were so specific and few that an formal interview was of little need. The municipality informants will not include their current role in smart city initiatives as this will lead to a violation of their anonymity as we already know where they work. The table also include date and duration of the interviews.

Table 6: Summary of municipal informants

#	Smart city representative/ citizen	Age and occupation	Date	Duration
Municipality informants				
1	Municipality informant 1	---	04.04.2019	62 minutes
2	Municipality informant 2	---	26.04.2019	58 minutes
3	Municipality informant 3	---	02.05.2019	72 minutes
4	Municipality informant 4	---	03.05.2019	38 minutes

Table 7 presents an overview of all the citizen informants that were interviewed for this study. Each representative will be categorized as "Citizen" and differentiated with numbers. Furthermore, citizens will be presented with age and occupation to illustrate diversity and to see if this will influence how they value smart city initiatives. The table will also include date and duration of the interviews.

Table 7: Summary of citizen informants

#	Smart city representative/ citizen	Age and occupation	Date	Duration
Citizen informants				
1	Citizen 1	31 years old, Financial controller	15.04.2019	35 minutes
2	Citizen 2	27 years old, Revisor	15.04.2019	31 minutes
3	Citizen 3	74 years old, Retiree (retail)	17.04.2019	17 minutes
4	Citizen 4	27 years old, Engineer	19.04.2019	20 minutes
5	Citizen 5	53 years old, Industrial worker	21.04.2019	25 minutes
6	Citizen 6	67 years old, Retiree (electrician)	15.04.2019	39 minutes
7	Citizen 7	56 years old, Psychiatrist	15.04.2019	52 minutes
8	Citizen 8	31 years old, Unemployed	17.04.2019	31 minutes
9	Citizen 9	28 years old, Nurse	18.04.2019	28 minutes
10	Citizen 10	33 years old, Construction engineer	22.04.2019	37 minutes

3.6 Analyzing the data

Our data analysis will have two purposes:

1. *Organizing data by theme:* We aim to reduce, systematize and organize data. Our goal is to provide a good basis for analysis without losing important information.
2. *Analyze and interpret:* We aim to develop interpretations and perspectives on the information contained in the data. Additionally, we aim to identify the themes and patterns in the data that can be communicated through a form of report.

We started with the systematization and arrangement of data, then proceed to the analysis and interpretation work. Organization and systematization are the prerequisites for understanding.
We started organizing the material we had to identify any possible patterns. This enabled us to understand the connection between the data collected from the interviews. To organize this data, we used a cross-sectional or category-based analysis (Johannessen, Christoffersen, & Tufte, 2009). This gave us a description of what each piece of text contains and was useful to guide us through the text. This was particularly useful with an interview guide with topics (and questions) we would like to talk about. An interview guide can act as a continuous categorized data sharing by sorting and categorizing all data from the informants under each main theme, or, even more detailed, during each question in the interview session. We made sure that the categories for the data wasn't too broad or too predefined. The data was read in a literal way, meaning, that we will treat it as an analysis and highlight themes and points talked about in the interview.

We developed two different interview guides for this study. One was used for smart city representatives in Kristiansand municipality, and one for its citizens. This was necessary as these two groups have different knowledge concerning the topic of smart cities, both of great value. We developed the interview guide for the smart city representatives first to get the answers we were looking for to be able to answer the research question for this study. But only after these interviews were conducted, we developed the second interview guide for the citizens. The reason for this is that we needed to get an overview of smart city initiative cases within the Kristiansand municipality before we could ask the citizens opinion on the case. But even though these two interview guides have different questions, they were developed with the same purpose in mind.

The questions asked in the interview guide for smart city representatives where developed with the theoretical background we achieved in Chapter 2 (Theoretical background). We used the theory of smart city technologies used in smart city initiatives and theories concerning human rights and their challenges to be able to achieve the answers we need.

The interview guides for smart city representatives and citizens are presented in Annex 6 and Annex 7.

We conducted 14 interviews in total and their duration varies from 20 to 72 minutes. The interviews were conducted in Kristiansand and were all face to face in either the city hall or in a more social setting such as a coffee-shop or citizens homes. The reason for this is that we believe this will give us a better flow in the interviews and it is easier for us to observe potential body languages that may influence the answers provided. We had two different roles in these interviews. One asked the questions written in the interview guide, while the other took notes. Even with provided roles, we were both able to ask follow-up questions from the answers provided. Our interview structure is summarized in Figure 5.

Figure 5: Summary of interview structure

3.7 Validity and reliability

Reliability are criteria for evaluation of the research quality. Researchers must test and demonstrate the credibility of their studies. In qualitative research the researcher is the instrument of the study, meaning that the credibility of qualitative research depends on the efforts and abilities of the researcher (Guion, 2002). Credibility, transferability, and trustworthiness are common terminology that are used to describe reliability and validity in qualitative research, as qualitative research does not treat the two terms separately (Golafshani, 2003). They are however two separate concepts with separate meanings. When testing or maximizing the validity of a qualitative study, the reliability is also tested or maximized as a result (Golafshani, 2003).

The generalizability of results, and the testing and increasing validity or trustworthiness of research is related to the quality of a research (Golafshani, 2003). We therefore need to test the validity (trustworthiness) of the findings in the study to evaluate the quality of the study. The validity in qualitative research is related to whether the findings of the study are true and certain (Guion, 2002). Guion (2002) defines “true” as the sense of accuracy in the findings in how they reflect the real situation, and “certain in the sense that the findings are backed by evidence. If the findings are “certain”, then doubting the results has no good grounds because the evidence supports the conclusion of the study.

Triangulation methods are typical strategies used for evaluating findings and improving the validity and reliability of research (Golafshani, 2003). We use a triangulation method to check the validity of our findings. Data triangulation is our chosen method to establish validity for the study’s qualitative evaluations.

Data triangulation means to collect data or look at data/information from two or more different sources (Guion, 2002). If each of those data sets is giving the same results, then we have confidence in our findings. Guion (2002) suggest the following strategy for data triangulation:

Interviews are conducted to gain insight on what the stakeholders perceive as outcomes of a program, or in the case of this study, a smart city initiative. Representatives of each stakeholder group is interviewed, and the researchers must triangulate by looking for agreed upon outcomes by all stakeholder groups. The stakeholders are looking at the issue from different points of view, and if they see the same outcome then that weight of evidence suggest that it is likely to be a true outcome (Guion, 2002).

3.8 Ethical guidelines

Researchers must adhere to a number of guidelines when conducting research involving the retrieval of data from people. Oates (2006) provides the following ethical guidelines for qualitative research interviews:

The respondent has a right not to partake in the interview: If a respondent should choose not to participate in the interview, he/she is not entitled to partake. The respondent is not to be blamed for compromising the study as a result of his/her decision to partake.

The respondent has the right to withdraw from the interview: The respondent has the right to withdraw from the interview at any moment. The decision to partake in the study is not final until the study is published. The respondent also has the right to not participate in all parts of the study, by for example refusing to give an answer to certain questions.

The respondent must give informed consent: The respondent must be thoroughly informed about the purpose of the study prior to the interview, before the respondent can consent to participate in the study. This is a pivotal step in order to receive informed consent from the respondent to participate in the study. Prior to the interview, the respondent is to be informed of the following:

- The purpose of the study. Informing of the background of the study and why it is performed, as well as what kind of results are expected.
- The researchers involved in the study
- Briefly describe the process of how the interview is to be conducted and expected timeframe.
- Incentives to participate in the study such as monetary compensation or a copy of the results of the study.
- How data from the interviews will be used, such as ensuring anonymity and integrity.

The respondent has the right to be anonymous: All participants of the study have the right to be anonymous. All wishes of not wanting to be identified must be respected.

The respondent has the right to keep the data confidential: If the respondent agrees to provide sensitive and identifiable data such as name, workplace, or position, then the respondent must consent to that this data can be included in the study. Voice recordings is also identifiable data. Consent must therefore be provided in order for a recording to take place. The respondent has the right to keep all data collected from the respondent confidential. The respondent therefore has the right to prevent being quoted. Being confidential of the collected data means that it is not to be shared with any other persons. It is therefore important to protect the data from prying eyes and accidents resulting in leaking the data online or to another party.

3.9 Limitations

This research had some limitations which may affect the quality. The research is limited to initiatives and citizens from Kristiansand municipality. More initiatives and opinions of how they may affect human rights could be increased if multiple municipalities were included. Increasing the quantity of citizen interviews could also broaden the opinions on the topic. However, this was not possible with municipality informants as these were the people that represented each smart city team.

By including more citizen interviews, the possibility of representing minority groups would increase. Adding more elderly and immigrants could elaborate further on the vulnerable groups suggested by literature and make a research were these groups got more attention.

Using only snowball-sampling could have affected our research as we might have gotten in touch with informants only focusing on how their initiatives have no fault. We will argue that this was not the case, as the informants from the municipality showed great interest and concern in the challenges smart city initiatives could affect human rights and how much resources they use to identify such challenges. We argue that the snow-ball sampling was still beneficial in our research as it got us in touch with employees in central roles which would be hard reach otherwise, as the initiatives are not classified as smart city initiatives.

Another limitation is how we formulated the interview guide. The interview guide asks general question of benefits, challenges and the informants thought in how it affects certain topics. Asking about more specific challenges to a specific topic could result in more in detail answers. We argue that the interviews were conducted in an open dialogue, and questions were added in the word of mouth to go more in detail on topics we would like to know more about.

4 Results

In this chapter, we present the results from the qualitative interviews gathered from smart city representatives in Kristiansand municipality and citizens. We identified several categories within the predefined main themes of a smart city and human rights which is further elaborated in this chapter. This chapter will include experiences from implementing and using services categorized as a smart city initiative and personal thoughts on the topic from municipality informants (who have worked with the initiatives), and the municipality citizens (who are meant use them).

First, general information about Kristiansand municipality and its population will be presented to get an overview of the city scale these smart city initiatives are initiated.

Then, we elaborate our findings in terms of smart city initiatives that are being, has been or is going to be initiated in Kristiansand municipality. The informants from the municipality work in different smart city teams which gives us a diversity of initiatives. Each of these teams will be explained further.

Furthermore, we ask all the informants how they believe smart city initiatives will affect their privacy, security and freedom of expression. We will categorize smart city initiatives from Kristiansand municipality under which human rights they have a possibility to affect. The municipality informants will elaborate on challenges concerning initiatives and human rights, and citizens will share their thought in how they believe it may affect them.

Lastly, we will elaborate limitations in our research and discuss further research.

4.1 Kristiansand municipality

Kristiansand was established as a municipality in 1837 as part of the introduction of the local government and lies in the southern region of Norway in the county of Vest-Agder (Store Norske Leksikon, 2018). The municipality has had a strong growth in the population over the past 200 years and had tripled in the 19th century, increasing by about 3.7 times in the 20th century. The growth was particularly high in the first decade after World War II in the period 1946-1970. In the ten-year period of 2005-2015, the population had a strong growth of 1.4 percent annually and continues to grow as the years pass by (Store Norske Leksikon, 2018).

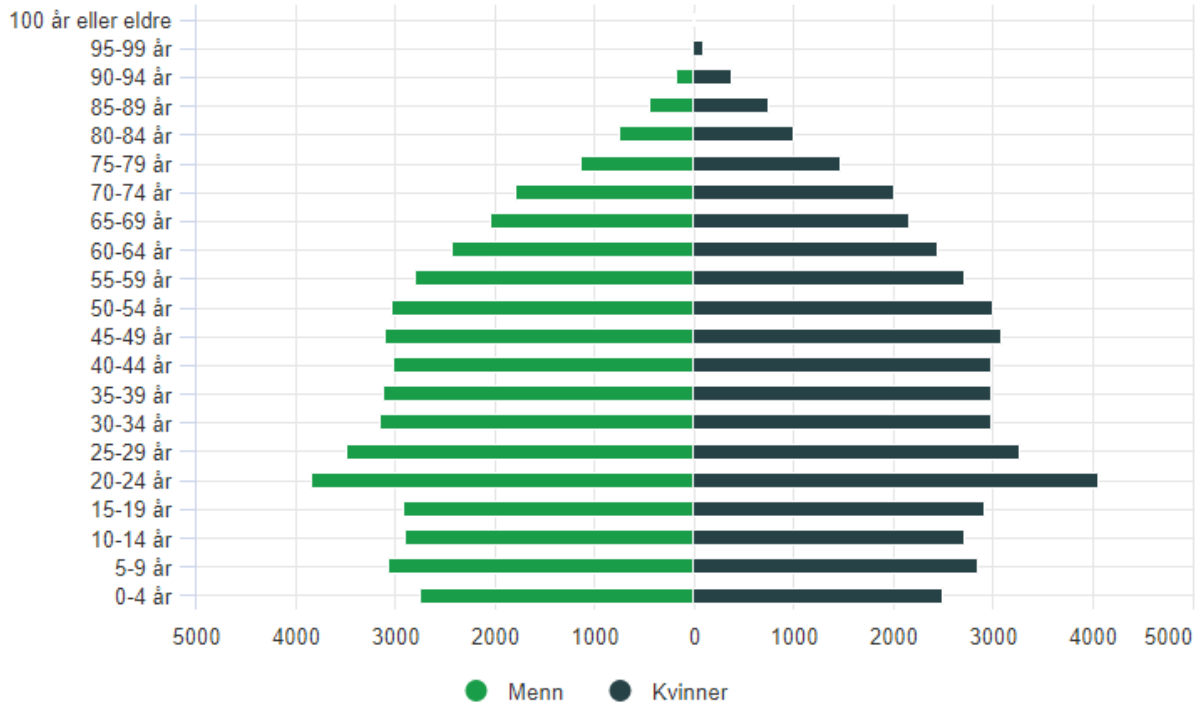

Figure 6: Age distribution in Kristiansand municipality (Statistics Norway, 2018)

Figure 6 illustrates the age distribution in Kristiansand municipality from the 1st of January 2018. The amount of men is illustrated in green, and women in black. This results in a total of 92 282 citizens in the municipality where 19 088 is above the age of 60. Multiple literature sources states that the older generation (60+) have a hard time adopting to new technologies and the internet in general because they feel excluded from the digital world, denial or feel overwhelmed or afraid to waste anyone's time (Quan-Haase, Williams, Kicevski, Elueze, & Wellman, 2018) (Fox & Connolly, 2017) (Carvalho , Olivares, Roa , Wanka , & Kolland, 2018).

It is estimated that there will be around 102 719 citizens by the year of 2030, and a total of 109 797 by the year of 2040 (Store Norske Leksikon, 2018). The increased growth of citizens calls for an ICT orientated city to be able to increase and maintain the quality of life within the city as the population keeps growing.

According to Monica Mæland (2018), immigrants are part of a vulnerability group when it comes to competence required to use digital tools and services. There is a total of 6173 immigrants in Kristiansand municipality today. Unfortunately, we don't have enough interviews that can represent this minority group and will work as a discussion material.

Kristiansand municipality is involved in multiple projects that can be defined as a smart city initiative, and in some cases in colabboration with other municipalities in Norway. The next chapter will elaborate further on the smart city initiatives that are being or has been initiated in the municipality.

4.2 Smart city initiatives

In this chapter, we present what the informants believe a smart city initiative is. Citizens general opinion will be presented first. The municipality informants will thereafter elaborate their knowledge about smart city initiatives further.

Few of the citizens interviewed had heard about the concept of a smart city. The few who are familiar with the concept had recently heard it from a family member, without knowing what it really meant. But as soon as they connected the word "smart" with other technologies such as Smart Phone and Smart TV they got some ideas of what a smart city could be.

A common thought is how cities will utilize technology to automate processes, increase sustainability, reduce greenhouse gas emissions and digitize services. Self-driving cars, automatic waste management and buildings producing their own power is mentioned as possible initiatives in a smart city. The interviews show little distinction between citizens and municipality informants' thoughts of what a smart city initiative is. The goes for citizens background where age, gender and occupation show little differences in answers.

One of the municipality informants mentions that the concepts of a smart city is a challenge itself. The concept quickly become undressed as the emperor's new clothes where the citizens expect something they have never seen before. This is not the case as a smart city is seen as an umbrella term that are used to cover a broad of other concepts. The informant continues to explain that smart city initiatives is something they have worked with for many years but is not categorized as a smart city initiative. The citizens interviewed are familiar with the concept of digitization, which is seen as one concept under the umbrella of a smart city. Therefore, the concept of a smart city itself is seen as a challenge where citizens expect something new, but it's really something that have been in progress for many years just using other names such as digitization. It is also stated that citizens don't really care much about a smart city, but more of what happens in the city.

«*Citizens care about if they can use the pedestrian zone even if its heavy snow, if the roads are plowed, if the trash cans are emptied or if they can use their bicycles. How it works is not interesting for them but knowing that it works is enough. That is our role as a smart city municipality, to secure the roles between various tasks*» - Municipality informant 1.

Citizens had various views on what a smart city initiative is. We asked the municipality informants on their thought on what a smart city initiative should be and what initiatives they are initiating in the municipality today.

«*A smart city initiative is a project that uses modern technology to develop the city to the best of its inhabitants. You must have a city- and technology element that will serve the citizens. That's the most important thing in a smart city initiative*» - Municipality informant 2.

Collaboration between the municipality and its citizens is stated to be essential to succeed in a smart city initiative to be able to increase citizens quality of life. It is also important to plan for the future. A smart city needs good and healthy competition between the businesses, environmentally friendly vehicles and production, as well as utilizing areas available best way possible.

«*A smart city initiative is about how we use areas in the municipality and avoid using untouched nature. We must build a future city with many qualities that is great to live in, without the need of destroying nature because we want to live in a detached house*» - Municipality informant 3.

A common understanding from a smart city initiative seen from the perspective from smart city representants in the municipality is that it must serve the citizens to make their life easier to manage within the city. This includes making it easier for citizens to express themselves and to increase the trust between them and the municipality.

«*I believe we can work smarter to get a better dialogue with citizens. Make sure their voices and visions are heard. There is less confidence in politicians today and smart city initiatives can make it more transparent which might increase this trust*» - Municipality informant 4.

These are the municipality informants' opinions on what a good smart city initiative is and what they should aim for in their planning of smart city initiatives. Table 8 below summarize smart city initiatives explained by the municipality informants to get a better overview of what the city are working with.

Table 8: Smart city cases in Kristiansand municipality

GPS tracking snowplow and sweeper truck:	The municipality provides a map online that shows where the snowplow and sweeper truck is driving. This is to provide a better overview for the citizens of where the truck has removed the snow or pebbles. The data collected exist only internally and are not published. This means that the map is not updated in real time, but it is possible to see where the truck was three, four or ten hours ago.
GPS tracking city bikes:	The initiative for city bikes is not yet something that is implemented in the city but is a work in progress. This initiative makes it possible to rent a el-bicycle within the city that citizens can use whenever they would like to. This enables the choice of using a vehicle that is environmentally friendly over personal owned car. These bicycles will be tracked by GPS to ensure that they are not lost and to map out potentials routes that can be improved if used allot.
Crisis management GPS tracking:	An initiative concerning crisis management will inform citizens about special cases that they should know about and relate to, such as

	flood, power outages or more serious things such as forest fires and terror. This will work by sending the citizens a SMS based on their geographical area. There is probably a collaboration with telecom operators that sends out an SMS that reaches all the cellphones in certain geographical areas.
Measure air quality:	A newly implemented smart city initiative is measurement of air quality. There are two large and heavy air quality stations that measure air quality and dust particles in the city. These stations must be maintained by a person who ensures that everything is in order and publish the data online. It is not possible for residents to go in and check how the air quality is in real time, but how it was yesterday at 15.00pm. This is something they aim to improve by cooperating with municipalities such as Bergen, Oslo, Drammen and the Norwegian Institute for Air Quality by putting micro-sensors in addition to the two big ones that are already implemented. This will give a bigger and better picture of the air quality in real time by using many small and cheaper sensors and should provide a better image for citizens and professionals in the department to see how the air quality really is at the given time.
SMELT:	Markensgate is a popular pedestrian zone in the city and since last year it has been implemented heating cables in the ground that are linked up to a weather forecast site called Yr. This initiative is called SMELT. This enables the cables to heat when needed, and not only turn on in winter months. It's possible to save electricity this was as there might not be necessary to heat the ground every day in winter months as there might not be any snow at the time.
iKRS: Citizen involvement app:	iKRS is an app that aims to improve citizen involvement within Kristiansand municipality. By using push notifications, the municipality can ask citizens on their opinions concerning the city's strategy. This app enables the citizens to share their personal thoughts on a case within in the city, ask questions, share pictures and much more.
Min stemme ut: Listen to young immigrants voices:	Kristiansand municipality uses social media such as Instagram and Facebook to mobilize young people with minority backgrounds to participate in the social debate. They work to overcome linguistic and cultural barriers and that young people dare to stand up for what they believe in.
Noise cancellation at the harbor and electrification vehicles:	The harbor in Kristiansand is undergoing many changes to reduce noise, automate and use electricity gathered from renewable energy resources. There is an eagerness to start the innovation of new cargo containers that will make less or no sound when put down. Automation is one suggestion for containers using modern

technology, but special pillows might solve the noise issues. Electrification is already well advanced.
The municipality also cooperates with the country concerning public transportation. They work actively to electrify the bus operation within the city. Four busses are already fully electrified and operating.

The initiatives listed above is our results gathered from our interviews with the municipality informants in Kristiansand municipality. This enabled us to get a better overview of what initiatives the municipality qualify as smart. There is a wide diversity on which part of the city these initiatives affect. Some aim to measure air quality while others works on increasing citizen participation. The smart city initiatives in Kristiansand municipality is therefore categorized into teams. These teams will be explained in the next chapter.

4.3 Smart city teams

It was revealed from the interviews that Kristiansand municipality have organized the work concerning smart city initiatives in teams. These teams are categorized depending on which part of a smart city they affect; mobility, business dialogue, open data and citizen dialogue.

Mobility includes initiatives that affects transportation of goods and people, business dialogue to improve innovation and competition in businesses, open data to share data with citizens and citizen dialogue to improve the dialogue between the municipality and its citizens. The teams follow an organizational theory in matrix meaning that they have a coordinator who coordinates the activities that can be linked to smart city across all organizational units, and four participants in the teams who are responsible for their subject in their respective organizational units.

The following chapter will elaborate these teams even further as explained by municipality informants.

4.3.1 Mobility

The team for mobility focuses on both transport of goods and people. Transport without a driver, electrification of transport, mobility as a service and what this mean for transport and public communication systems are popular topics. Transport can also be differentiated whether they are traveling on land, water or flying in the air. The municipality explains that they ask themselves what role drones will have in the future, and if it is time to consider having parking spots on the roofs. Possible planning of municipality interventions in the airspace and co-operation with national authorities is a possible future for the mobility in smart cities.

Urban development and plot development are also central topics concerning mobility. *"Will there be a need of more parking plots and new tracks for busses?"* It is emphasized that it is important to not think of the city as just two dimensions, but to add a third that takes

airspace into consideration as well. Some of these developments such as air transport must be decided on a national level, but the municipality will be responsible if anything happens.

Testing driverless transport in the city has been arranged, but there is also a dialogue concerning freight transport. *"How do we transport goods in the city?"* There are very futuristic ideas on how to solve these challenges, and some of them includes transport of cargo containers with drones or hyperloop, which is transport aiming to eliminate the concept of distance and time. These solutions are still in development and may be a long step in the future. There is however a solution that is referred to as *"boring"* compared to the others. DHL-bicycles can transport goods that are relatively heavy and are used for package delivery in Kristiansand. This is still a newly implemented transportation option in the city and is more environmentally friendly.

For the first time last year, the city of Kristiansand arranged a conference called "Way to Go" which involves how transportation-technology affects urban development and vice versa. Urban developers, architects, humanists and people who are interested in gadgets usually don't talk much with each other and have few meeting places in general. The conference enabled and encouraged these groups to meet and talk. The Way to Go conference will be arranged again later this year due to its success.

4.3.2 Business dialogue

Business dialogue was also referred to as *supplier development* and how the supplier market can deliver solutions that contributes to smart city development. The informants explain that the municipality needs to be aware of their needs to make this happen.

«*We need to be good customers and be clear about what our challenges are to find the best solutions*» – Municipality informant 1.

It is mentioned that the public sector must use their purchasing power more consciously and strategically, linked to other goals in urban development such as lower emissions, not to deal with corruptions and to treat employees properly. These are some examples of requirements that could and should be set before purchasing.

It is also important to ask questions about purchasing. A classic example of public procurement is to operate with too many requirement specifications. An example that was given explains how the municipality orders a new light bulb.

«*The light bulb we want must be X number of watts, it needs to be this big, it must have this many lumen and must be this warm*» – Municipality informant 1.

What this example describes is how very tight the delimitations of what to buy is. The marked suppliers will give you the exact item you described where the only variables are perhaps the price of an item. This is some of the idea behind a good business dialogue, where the municipality should rather say that *"we have this space, and we need to light it. What can you deliver that can help with that?".* This gives the supplier marked an

opportunity to develop solutions that do not exist or is still unknown to the world. This is what needs to be done if we are to develop a smart city as it encourages innovation rather staying with old solutions.

Many creative solutions were excluded from the beginning when the municipality ordered specific light bulbs, and this is what they mean with innovative public procurement and business dialogue dimensions in a smart city. It is the municipality's interest that the business sector grows and create jobs and value creations within the city, but this does not always apply for innovative public procurement as there is not a certainty that local suppliers have the solutions to the challenges they have. The municipality must think both locally in value creation, but at the same time find the best solution that exists, and that may be in other places in the world or in the country. Therefore, the business dialogue team can be divided into two dimensions. The first one is supplier development and value creation, the second is the municipalities focus on being good buyers, know their own needs and be clear about them before ordering.

4.3.3 Open data

Open data is explained to be the new oil as there are some very good examples where someone has earned their riches in data mining. The municipality informant emphasizes that there is one important premise we must never forget, and that is that public sector uses the tax means. Therefore, it is an important starting point to say that *"everything that can be done publicly should be made publicly available"*. It is however given that personal data is not made public, such as data from nursing homes and kindergarten at a personal level. But it is possible to publish data at aggregate level. This is explained as it is possible to collect data concerning how many kids there are in a kindergarten as it ensures anonymized data and can safely be published. The informants continue to explain that it is given that the municipality use public money to acquire and use the data collected. *"It is logical that the data must be available to anyone, whether you are a researcher looking for material for a research or someone who is going to make money out of it, or the other government agencies".* It is explained as a *"hygiene factor"* that must be there.

«*There is a possibility that data gathered are redeemed useless in our eyes, overlooking how some of these data may be helpful for others if they were shared openly*» - Municipality informant 1.

Data gathered comes is many formants and they are not as accessible as the municipality wish them to be. There is a lot of internal work that need to be done to make open data work. This includes to collect the data and to make it available to other people outside of the municipal office walls. *"One challenge we have encountered in a project in a collaboration with the Fædrelandsvennen (local newspaper) is a bit like the hen and the egg. The local newspaper explains that they don't know data we have, and we answer that we don't know what data they want. So where do we start?"*. It is therefore emphasized by the municipality informant that all data that is gathered from the municipality should be made

public if it has the authority to be read by everyone. It is explained that this is a heavy process where they must work with the culture as to why we want to make data public, and why it has not been public before now.

«*This is something that we in the municipality must clarify*» - Municipality informant 1.

4.3.4 Citizen dialogue

The last team in smart city development in Kristiansand municipality is the dialogue with the citizens. This is the most challenging of the four mentioned teams as it is *"hard to specify, but again could be the core of it all".* We must then ask why the municipality work with smart city initiatives. They explain that this is to develop a city to the best of its citizens and use today's technology to develop a sustainable city with residents in the city center.

«*I know that some people have a much more technology-centered smart city vision. A smart city is connected to the person who is in the center of this development, not vice versa. These may be some good words, but one can imagine what this means in practice. That is something we are working on right now in the municipality*» - Municipality informant 1.

Citizen dialogue is also about changing the traditional method of sending out documents to be heard and put them out in the city hall and hope for replies, to engage in involvement and co-creation and reach out to those who can contribute and want to contribute to something. But there are still some difficulties for a municipality that is a large bureaucratic organization to find good ways to involve citizens. But a smart city is not about complicity, but more about thinking smart.

«*We could just use the arenas we have, for example school places, volunteers, use the cultural arena and ask, "what do you need" and "how can you contribute?" and take this seriously*» - Municipality informant 1.

The smart city initiatives initiated in the municipality requires to solve a specific need and must be put into practice. If they focus on initiatives that no one uses, there will be no point for it. That is why the municipality ask themselves early *"What are we to find out, what is the need and how can we solve it?"*.

By the end of next year, Kristiansand will have a fusion with Søgne municipality and citizen dialogue will be in a much bigger focus. This is referred to as "the new Kristiansand". The new director of culture will not only be responsible for culture, but also for volunteerism and citizen dialogue. There will be a director that is responsible for this, and a separate municipal manager who will be responsible for the bureaucracy scheme "*which we have great expectations to".*

We now have a better overview of smart city initiatives in Kristiansand municipality and the four different teams that works on these. We asked the informants to further explain some of these initiatives as they would seem to have a direct link to the human rights that were explained in the literature; privacy, security and freedom of expression. The initiatives that

weren't shown to have a direct link to these will be discussed further in Chapter 5 as they have a potential to affect other human rights that were not mentioned in literature. The next chapter will delve further into how citizens believe smart city initiatives may affect human rights.

4.4 Smart cities impact on human rights

Literature mentions three human rights that has a potential to be affected in smart city technologies. These are privacy, security and freedom of expression. We asked the informants how they believe smart city initiatives might affect human rights. Their answers will be categorized under each heading that represents the three human rights literature supports. Literature loosely mentions how smart city affects freedom of expression. The results show a significant connection and will elaborate this further.

4.4.1 Privacy

The informants were asked how they believe smart city initiatives could both strengthen and weaken the privacy of its citizens. None could answer how the initiatives had the potential to strengthen the privacy, but the opinions on the latter were many.

There is an agreement that privacy of citizens in a smart city will be affected negatively. GPS tracking of their cellphones and surveillance cameras where popular topics that were of most concern. It is explained that tracking citizens phones has the potential to know where individuals are located which makes little room for a private life. The same goes for surveillance cameras, where there is a concern that every city corner will be under watch by Big Brother. There is a strong connection to how informants believe their lack of privacy will strengthen their security, but this will be discussed in the next chapter.

China was mentioned as an example of how a smart city will decrease citizens privacy as it does not take human rights into consideration. China was mentioned to be one of the more advanced countries concerning the concept of a smart city and have started giving their citizen points to evaluate how *"good they are".* It was explained to us that citizens will be given negative points if they walk on a red light in the street, which will give them a negative score. If the score is too low, consequences such as being unable to travel or you won't be able to apply for the specific school you wish to study, might happen.

It is stated in the interviews that this will affect citizens privacy as their government watch their every move to be able to give them points. Playing too many video games where also included in the score boards, where it is seen as a negative point. Collecting private data concerning individuals is seen as unavoidable in today's society, but it is how the municipality and governments will use these data the concerns lies. The perspective from China is an example on how these data are used that might harm their citizens. Citizens might be at the wrong place at the wrong time which result in consequences that are severe for the future that will uphold their quality of life. The municipality in Kristiansand municipality is optimistic and states that they will never compare themselves to China.

«*The way we use technology will be a lot more positive compared to China*» Municipality informant 2.

But the municipality is still aware that there is a challenge to maintain the privacy of citizens. Municipality informant 2 explain that Datalagringsdirektivet (DLD) gathers data from many innocent people in the traffic because they want to find a few guilty ones disobeying the traffic laws.

«*This breaks the principle of being innocent until proven otherwise*» - Municipality informant 2.

But citizens attitude towards data gathering in the traffic is nevertheless seen from the positive side, as it could potentially catch criminals that would make the roads much safer to use.

Informants attitude towards privacy in smart cities still varies. Some are afraid of how much data the municipality will gather, while others have a more laid-back attitude where they trust the municipality to use these data properly. It is stated that the municipality should embrace the challenges concerning data gathering, and the citizens should have a better attitude towards the municipalities data gathering. The difference in cultures are brought up as an explanation to why data gathering could have a better chance to succeed in Norway compared to other countries. Municipality informants 1 explains that Norwegians tend to trust public sector more than their own neighbor, while other countries with a history of being corrupt will have a harder time getting citizens trust. It is stated that the Norwegian public sector works for the best for its people and have no hidden agenda to use the data gathered from its citizens to earn money themselves.

«*I believe the development of a smart city can go further in Norway than in other countries, because Norwegian citizens don't have the skepticism towards the government and are more open to new technologies*» - Municipality informant 1.

There will also be various cultures inside the country boarder as well. Not everyone trusts the public sector. The municipality and the government are seen in different lights where some trust the government, but lack confidence in the municipality.

«*I don't trust the people working in the municipality. I don't mind that there is a possibility that people will know where I am at all time, but I don't trust the municipality to keep these data private. I trust private sector more than public sector as there is too much incompetence and elected people in the municipality*» - Citizen 1.

There is shown to be some uncertainties to how the municipality will ensure that citizens privacy will be kept in a smart city. Citizen 7 stated that the public shouldn't have access to these data as it will most likely be misused to spy on other individuals. It is also brought up that there must be someone who will handle the data, so how can we keep these people from misusing them? Strict regulation on the people that will handle these private data are

mentioned as a necessity. The data should be confidential, and if public authorities misuse the data for personal gain, they should be punished accordingly. One of the municipality informants' states that there are still some challenges concerning whether the data is located in Norway or has found its way outside of the country boarder. It is explained that Kristiansand municipality will most likely not be the ones that will handle the data they gather from their initiatives, but most likely an external company from the private sector. An agreement with the municipality and the external company must be made. The informants continue to explain that it is important to demand that the data must be located within the country boarder, if not, it might pose a great threat to citizens private life. The external company might be located in Kristiansand, but there is no certainty that the company originated from the same country. The company might have an office in Kristiansand, but the company can still be American. If that is the case, it will be the American law that applies. If so, the American government might demand full access to data from Norwegian citizens.

«*Putting the right demands in a procurement is really serious work and extremely important. The data we want them to handle applies to our citizens and we can't afford to tamper with them*» - Municipality informant 2.

Private banks annually pay billions because some data has gone astray. The informant explains that this is sad, but then again, it is just money. It is explained that if your bank account is taken over by others and is emptied of money, the bank will just take the blame and fill your account again. There will be a different story if data concerning the privacy of an individual is leaked. If this information is leaked on the internet, there is no way to fix it. The municipality informant continues to explain that the municipality will have no chance to pay affected citizens out of the situation, as the information concerning privacy is more valuable than any amount of money and has the potential to ruin an individual's life.

«*The municipality can't afford to lose any private data. I am convinced that the public actually knows its responsibility to uphold human rights and properly handles data concerning personal information*» - Municipality informant 2.

Interviews show that many haven't even considered the negative consequences of smart city initiatives because they trust the municipality to put the citizens needs first or they lack the knowledge to understand how this might affect them. It is stated that there should be easier to access information concerning the consequences of data gathering. The municipality need to share all information concerning new smart city initiatives to their citizens, not just focus on the positive sides. It is equally important to explain why it is important to gather data and what benefits the citizens will be provided agreeing to this. This might open the eyes of many citizens.

«*What is even more strange is that people are so concerned that the data that is gathered about should not be sold of shared, but then they buy pulse watches from China. Who owns the data then? You won't own them, because it will all go straight to China. Who do they sell*

it to? Maybe insurance companies. There is very large potential that they will misuse your data» - Municipality informant 2.

By summing up the results shows that there are great concerns of how privacy will be affected in smart city initiatives. The focus is mainly of how it will affect citizens on the negative side rather than the positive. This means that informants believe that smart city initiatives will decrease their privacy and not strengthen it.

4.4.1.1 Snowplow and sweeper truck initiative

The initiative concerning GPS tracking of snowplow and sweeper trucks in the municipality was explained to have a potential to affect both privacy and security. The map is not updated in real time, which means that it is only possible to see where the trucks were three, four or ten hours ago. This was explained by the municipality as necessary because a chart that is live-updated has the potential to violate the privacy and security of the truck driver. Citizens can potentially follow the truck driver around and stop it in its way preventing its work or to harm the driver. The smart city initiatives are said to put the citizen in the center to provide the best possible services that will improve their quality of life. We asked the citizens on their thought on the initiative and if they see the potential in an app that won't be updated in real time.

Citizens opinion on the snowplow and sweeper initiative in the city are quite alike, depending on which it is referred to. Seven out of ten citizens find the app for snowplowing useless. They explain that knowing where the snowplow truck was 3 hours ago gives nothing of value and *"not everything needs to be predictable, we don't need to know everything at any given time*"*.*

The majority agrees on the snowplow truck, as they explain that *"even 20 minutes can be enough for the road to be full of snow again, so knowing where it was 3 hours ago is as useless as it gets".* There is however some who still see the use for knowing where the snowplow truck was hours ago. It really depends on the day. You can just look out of your window and check of its snowing outside, if it hasn't been snowing all day, you know the app can be trustworthy. There is also a possibility to reduce the time from three hours to one hour. It will be hard to locate where the truck is if there has been an hour since it was at that specific area.

The sweeper initiative is seen in a more positive light. Not every citizen interviewed find the snowplow truck useable, but they do see a better use for the sweeper truck. Unlike snow, pebbles won't come back after being swept away. This is seen as very useful for people who use bicycles in the city either for work or sports.

«*This is also very useful for people with allergies to plan ahead as there will be allot of dust in the air*» - Citizen 7.

The reason why real time data couldn't be used in this initiative was to secure the privacy and security of the truck driver. This limits the benefits of the service to its citizen. The

municipality were afraid that if live data were provided, some might use this to attack the driver or hinder their work as they would try to guide them to streets that would benefit them more.

«*We will accept poor quality for the end user to protect personal information and the security for the ones who drive the trucks*» - Municipality informant 1.

There are several opinions of the privacy of the truck driver. Many agree that this was a good call by the municipality as a person's privacy and security is of high importance. But not all saw it this way.

«*So, what if I know where he is at any given time? He is paid for the job he does, which is serving the municipality. This has nothing to do with his privacy*» - Citizen 7.

Most citizens interviewed don't see the usefulness of an app that shows where the snowplow truck was hours ago as snow pile up fast over a short period of time. The same app for sweeper truck were seen in a different light as the roads usually stays clean after being swept. There is a common understanding of keeping the privacy and security of the truck drivers, but questions were made if a truck driver working for the municipality should be anonymous in working hours.

4.4.1.2 City bikes initiative

The city bikes in the municipality will probably have GPS tracking as they have a potential to be quite expensive due to innovative thinking. The municipality explains that they need to know where the bikes are, so they don't get lost and collect GPS data to keep a track on cost per hour, kilometers and other essential information. It is still not certain who will own these data, the municipality, or the creators of the bikes. The municipality states that they might not even be the owners of the city bikes, but just order a mobility solution where the subcontractor will be the owner. The municipality will still have a responsibility for the data that is collected and ensure they are not misused to spy on individuals. This is connected to the payment of the rented bikes. If the citizens use their credit cards, it will be possible to link the users of a bike to a specific individual. In other words, it will be possible to see where you as an individual are, at any given time. This has a potential to affect citizens privacy in the future as the credit card enables tracking of the city bikes on a personal level. The initiative is nonetheless positively agreed upon by the citizens and several of the respondents came up with their own solution to these challenges. A whole ten out of ten citizens understand why the municipality needs to track their city bikes as they are costly and belongs to their property.

«*It's my choice if I want to use these bikes or not, and I already know the general risk of using a credit card. I trust the owners of these bikes to handle the data they collect according to the law*» - Citizen 10.

It is a common understanding that the city bikes are the municipalities property, and the need of location tracking to avoid theft or misplacements. It is to believe that tracking

property or giving the citizens a choice of being tracked or not lowers the threshold of data gathering. Citizens have a choice whether they would like to use the city bikes or not. The key to this challenge is to inform every citizen that the bikes will be tracked before they rent it. This gives the opportunity to back away if they feel uncomfortable. GPS tracking of city bikes does not only affect citizens privacy. Some believe that the city bikes have the potential strengthen citizens security as well and is a worthy trade.

«*I do not see it as being negative in any manner for any age. It is in fact a good way to ensure security for teenagers and children*» - Citizen 4.

Credit card is an easy payment method which is often available for most person at any time. If the owner of the credit card is registered, it will be possible to see where that person is while using the bikes. This has a potential to violate the user's privacy. The citizens don't believe that there will be anyone who are interested in seeing where they as individuals travel, but it's more about being able to see a pattern that can be used to give benefits to the citizens later. This pattern doesn't need personal information. But this does not mean that it will never happen, there might be some employees that handles these data that can misuse the system for personal gain or use it for a different purpose.

«*I worked as an electrician a few years back, and they have tracking on their cars. This is to get a better overview of which car is closest to a possible emergency. This was misused one time, as the person who overlooked these cars followed a specific one and found out that the driver was at a place he should not have been. The driver got in big trouble for this. This led to a big uprising at my workplace as people felt like they were being watched*» - Citizen 6.

The story of the electrician is still different from the GPS city bikes as there still is an opportunity to not violate citizens privacy. A solution to this problem were provided. The municipality should offer additional paying methods such as monthly passes or punch cards. This wouldn't affect the privacy of the citizens as the data handlers wouldn't be able to know who used the bikes, only that someone was using them. This ensures that the data gathered will not be on a personal level. That means that even if the citizens want to use the city bikes, they don't have to be afraid of being followed.

4.4.2 Security

Security in a smart city is both praised and feared by the informants. Popular topics that is being brought up is camera surveillance in the city and apps that enables GPS tracking. Smart cities are even praised for increasing citizens security within the city.

«*I don't feel less secure in a smart city, but quite the opposite. I believe that a smart city will ensure that criminals will be caught faster and maybe even before they are able to commit bad acts*» - Citizen 10.

While interviewing the informants about the topic about security in a smart city, privacy is also taken into consideration. There is an awareness that if the security is increased in a city, the privacy of the citizens might be decreased. Citizens are afraid that the government will use cameras to follow every step they do. The municipalities might collect data on citizens habits and use this against them later. The municipalities and government are explained to not be the only one that has the potential to misuse private data, but hackers as well. The risk of data theft is mentioned as an increased threat as data might be considerably increased in value. It might be easier so track people down, increasing the threat of kidnappings and the demand of ransoms. But there is also a question whether decreasing privacy to achieve increase security is good or bad.

«*It's a perversion of it all, which is an eternal philosophical discussion of whether it serves the society at the expense of those who do not adhere to the norm. It's great if nobody kills and steals, but of you restrict personal freedom of security is hard to say. It's hard to tell of something is right or wrong. There are laws and regulations today that violate my freedom to protect the superior community and the greater good. It's really the same*» - Municipality informant 1.

It is stated that while the city is becoming smarter, so will the surveillance cameras. Smart surveillance cameras have the potential to find individuals in a crowd of thousands of people. People might feel safer as huge crowds are often targeted concerning acts of terrorism.

«*I feel unsafe wandering in huge crowds and will not travel to the capital at the time being due to the increased acts of terrorism in Europe. Terror is always on my mind, even in Norway where I should feel a lot safer. I would absolutely feel safer in a city if cameras could find potential terrorists before they can act*» - Citizen 7.

But not every citizen believe that it is necessary to use resources on security as they believe it is already safe enough in the country of Norway.

«*I don't want to be monitored at any time as I believe my security is already being well taken care of. I've been alive for 28 years and everything has gone well. Acts of terrorism and war are extremely rare, so I feel no need to be concerned of either. I personally think there is too much digitization in our daily life*» - Citizen 9.

There's still is a sense of priority considering a secure city and a private life by the majority of informants interviewed in this research. People tend to see the positive outcomes from increased surveillance rather than the negative. There are still some regulations that needs to be considered by the municipality and where citizens need to accept what happens to data that are stored for security reasons.

«*I do not sense any danger in letting my personal information to be used for my security and for a better future for the next generation. I of course, do not want business to profit from my data and do not want my data to be broadcasted publicly without my consent*» - Citizen 4.

If the municipality can ensure that citizens can feel secure in the city, they don't seem to mind that it will lessen their privacy if the data is used considerably. Citizens are aware that decreasing the privacy might be a possible outcome, but security is often prioritized over privacy as multiple sources states that they *"have nothing to hide".* But if the municipality wants to increase the surveillance in the city, they need to inform the citizens first. It's important to state why the surveillance is important, what they wish to achieve, how citizens daily life is affected and inform which other parties that are involved and how they will contribute. One informant from Kristiansand municipality states that it's important to publish this information so that it will be available to all citizens in the city. The citizens might even feel unsafe with the increased surveillance cameras as they don't know where they are deployed and when they are being watched. An informant from Kristiansand municipality states that they inform citizens about their data collection on traditional media channels like the press, webpages and social media.

An app called "113" is mentioned by two citizen informants as a perfect example on how important GPS tracking of cell phones can be to increase the security of an individual on the cost of privacy. The app is explained as a tool that enables the emergency service to know exactly where you are if an emergency emerges. The name "113" is the emergency number for the Norwegian ambulance. This is a Norwegian version of the famously emergency number "911". This will work by calling the number, but also if someone is reported missing.

«*The emergency service could easily track a person down if someone was reported missing. This is something I would appreciate if the missing person was my children or friends so I could find them again. This affects our security*» - Citizen 7.

It is explained that the app can track you even the phone is out of service. GPS tracking of cellphones limits the possible areas a person may be located which in a best-case scenario can prevent a possible death. There have been cases where it has taken too long for help to arrive and death were the outcome.

«*It gives closure to find the body of a missing person, especially if this person has been missing for a long time and the family already predicted them to be dead. But we still hope for the best possible scenario and would do anything to prevent their death, and this app*

might be the tool we need to achieve this in many cases where it takes too long for the help to arrive» - Citizen 7.

There would seem that citizens see a link between how their security is increased if their privacy is decreased. There is a common belief that smart city initiatives have a potential to increase the security within the city as GPS tracking can find missing people and surveillance cameras get smarter. This would seem to benefit those who have nothing to hide.

4.4.2.1 Crisis management GPS tracking initiative

The initiative for crisis management in Kristiansand municipality affect both the security and privacy of their citizens. The initiative is explained as a system that will send out information regarding crisis situations to people in exposed geographical areas. Older systems sent the same messages to people that are registered as citizens in the municipality. This results in many people, such as many students and tourists not getting critical information if a crisis occurs as they are not registered as citizens in the municipality. Therefore, GPS tracking of cellphones became necessary to increase security of every person within the municipality. This is where the challenges concerning human rights occur. GPS tracking poses a challenge to citizens privacy as it is possible to track down where individuals are located. Many cellphones are registered on the owner's name and can be used to find individuals. If this system is misused, it can help decrease the security of people even if its purpose was the opposite. This can be by tracking down a target or use the systems to send out false information.

«*There is also a possibility that someone will send out false information. This can be used as scare tactics by criminals and might lead in unnecessary chaos*» - Citizen 10.

The citizens interviewed for this thesis strongly believe that a crisis management system with GPS tracking is necessary even if it poses challenges concerning their security and privacy as well.

«*Just the thought of me being in a foreign city where natural disasters occur, and I don't get the message is scary. I do believe that people around me who did get the message would inform me, but maybe I don't understand their language, or I might get the information too late to be able to save my belongings or secure my family's life*» - Citizen 6.

Few citizens discussed the possible challenges this initiative poses to their human rights. Possible concerns regarding privacy were brought up by us to get a better overview of their opinion on the topic. The majority could see how it posed a challenge to both their privacy and security but states that this is necessary for the greater good.

«*We as citizens must always evaluate possible challenges these initiatives pose to our daily life. I can see how this initiative poses a challenge to my privacy, but I believe that the system will be secure, and I am willing to take this risk as it greatly increases my security in return. I feel more at ease knowing that there is a system that will inform me of critical information*» - Citizen 7.

It is shown that the initiative for crisis management is welcomed with open arms. Being able to increase the security of people by giving up private locations would seem like a little price to pay concerning possible life's at stake. However, there seem to be a concern if this system would be misused to send out false information to the citizens, causing unnecessary chaos.

4.4.2.2 Measure air quality initiative

Measuring the air quality in Kristiansand requires sensors deployed throughout the city. There are two sensors that are in use today, but there might me more in the future as the municipality plan to start measuring air quality in a bigger area. One informant from the municipality predicts that they will receive feedback from the citizens elaborating on how electromagnetic radiation from sensors will ruin their health. There have been no complaints on the two sensors that are deployed today. These sensors are also tied up to being monitored by the municipality.

«*I imagine it will create fear of surveillance for some people if we have sensors deployed in different areas*» - Municipality informant 2.

Some sensors are deployed just to count the people passing by. It is therefore given that there won't be any other data collected from that person. What most people don't know is what a sensor can and can't do. Even if a sensor is deployed just to do counting, it has the potential to collect much more data than just that.

«*When you walk past a sensor which picks up data from your phone, we can in theory collect all information about that person, but we have only used it for counting. I can imagine that there will be more challenges with the increase of sensor use*» - Municipality informant 2.

This was something the citizens were not aware of, as they don't know they potential the sensors have. They explain that when it is deployed for a certain task, it will only do what it is deployed to do. This is also explained by the municipality and will not be used for other things it was not meant to do. But the increase of sensors is believed to face more challenges that they do today.

After the citizens are elaborated about the possibility of sensors collecting all the data they want from their phones, the first thought that came to mind was; hackers.

«*I trust the municipality to only collect data that won't hurt me as an individual, but what if someone hacks into these sensors? I store allot of pictures of me and my family, I wouldn't want them to be published online*» - Citizen 7.

Citizens expect high security and that the municipality informs them about what the sensors are for, why this is necessary, what data they will collect and how it will be used. The municipality answers:

«*To the degree we use sensor technology, we must publish a lot of information about it so that people can figure out what we do and don't*» - Municipality informant 2.

The sensors used for measuring air quality has the potential to gather data from passing citizens even if it is deployed for a different purpose. This was not a common knowledge by the citizens, but they seem to trust the municipality to collect only the data they are set to do. There is still a concern if hackers get access to these sensors.

4.4.3 Freedom of expression

The rights to freedom of expression is the last of the human rights literature mentioned has a potential to be affected in which drew a connection to a smart city. Freedom of expression as a human right were mentioned in the literature but were not elaborated. We have asked citizens of Kristiansand municipality how they believe it might be affected in the ever-increasing digital city they live in.

A link to surveillance cameras were made that could possible affect citizens freedom to express themselves. While discussing the topic about smart cameras, the ability to record sounds are mentioned. Without knowing for a certainty, recording sound while monitoring the city might be possible to make it even more effective. This might increase citizens security as it is possible to find criminals not just by their actions, but also by their conversation. But this is believed to have plenty of drawbacks as well. Not only does it affect citizens privacy by listening to their conversations, it also has the potential to affect their freedom of expression. One of the citizens explains that new rules are made every year of what people can say and not. This includes words and conversations that are not socially accepted. Surveillance cameras that records sounds might make people more conscious of what they say while being in public.

«*We have to be more careful of what we express in public. Some people might even be afraid to tell a little joke because it can be offensive to others. This is a violation of citizens freedom of speech because people don't feel like they can say what they really want to say when they are out in public. I think it becomes harder to express yourself when you know "big brother" is watching*» - Citizen 8.

But how to solve this challenge is not an easy topic. It's expressed that it's easier to focus on the challenges rather than how to fix them, but both are equally important as identifying is the first step so solving it. Having clear rules of what can be said under the freedom of expression is suggested.

«*We must have clear rules for what one can and cannot say within the freedom of expression, but I believe this is impossible, because if we need rules for what we can say and not, it will be a violation of freedom of expression anyway. I believe this will be difficult to regulate in smart cities*» - Citizen 8.

One municipality informant explains that if citizens freedom of expression is affected, it's not the cities fault. False facts and access to technology are mentioned as the limited factors. False facts are explained as a factor that might limit what is heard in a media context, not limit the freedom of expression itself. It's easier to bring the attention to

rumors and so called “false facts” on social media rather than express these same rumors on the streets. The publisher will suddenly get a lot more attention with likes and reactions from equally angry persons. This is not limited to the social media online, but the newspapers as well. When posts on social media gets allot of attention, the traditional media often print and escalates it even further out of proportion and amplify it to their viewers and listeners. Digital communication is believed to bring more attention to voices and opinions that are plausible and provocative because they can keep it short. Longer reasonings are more challenging to express as many don’t want to read a long thesis on social media.

«*People’s attention is hard to maintain and keeps getting shorter. The pace goes faster in digital communication than in traditional communication. This does not mean that it restricts citizens freedom of expression but might make it more challenging for people to be heard*» - Municipality informant 1.

Access to technology is explained as not only a limitation to physical access, but also the having the required skills needed to be able to use technologies and services provided by the municipality. The elderly and immigrants are mentioned as possible vulnerable groups.

«*The elderly is one group that may have a difficulty with new technologies as they were not born into a digital era. But refugees coming to Norway may also be a vulnerable group if they come from a developing country with little culture for modern technology*» - Municipality informant 4.

This has a potential to limit citizens freedom of expression from vulnerable groups in the city because they don’t have the digital skills needed to access digital services and join debates online. One solution that was mentioned was to not move everything online, but to keep traditional counterparts such as buildings used for debates, newspapers and other services. The municipality states that they are working on helping the vulnerable groups.

«*All public entities have a support desks that can help you. We can also help those who do not have a digital ID such as immigrants who have not been given a social security number yet*» - Municipality informant 2.

The informant continues to explain that the percentage that uses the support desks is decreasing every year.

One of the citizens interviewed is 74 years old and is afraid of the digitization is the city.

«*I’m afraid that I won’t be able to use services that requires technological knowledge as everything is too advanced for me. It becomes harder for me to participate in society*» - Citizen 3.

Some citizens believe that this is a problem that will solve itself within time as there will soon be a generation shift. How to solve the potential exclusion of the elderly is particularly

discussed. One solution that was mentioned was to get help from friends and family if an individual without digitals skills would like to express an opinion on social media.

«*My mother is 94 years old and don't know anything about social media. She uses her children and grandchildren to express herself and they will publish it online for her. There will be a shift in generations soon, and she is not willing to use her remaining time on earth to learn new and modern technologies*» - Citizen 6.

But smart city initiatives do not only violate citizens freedom of expression but is expressed to have the potential to increase it as well. The smart city initiatives in the municipality aims to open more channels that will easier connect citizen to the politicians and the other way around to reach out to more people. Being able to use digital platforms that will directly send you to a form where you can express yourself directly to the municipality or a live-chat is explained as how smart city initiatives can help increase citizens freedom of expression.

One of the citizens interviewed was born in a city two hours away from Kristiansand and explains that the municipalities debate room is equipped with cameras that can be accessed by any citizens.

«*I think it is great that I can follow municipality debates from my couch if I am not able to go to the meeting myself. You can send in topics you would like them to discuss. This has enabled me to participate even more as I can sit home and watch. This have increased my freedom of expression*» - Citizen 7.

We asked Kristiansand municipality if they had the same system with live cameras in their debate rooms as this was a positive way to involve more citizens in open debates. The answers we got lead to even more challenges. One of the municipality informants explains that there have always been hearings in the municipality where citizens can send in letters with opinions and questions. This is now done by e-mail which made it easier to express themselves. However, they usually won't broadcast the debates for citizens to watch back home. There was an incident in a public meeting a short while back where everything was broadcasted without consent from the municipality or the people who participated. There were around 200 people participating in this meeting.

«*If we broadcast public meetings and hearings it will be stored online forever, even in places you wouldn't know about. This may prevent people from expressing themselves or asking questions. Filming in public spaces can be a problem and may affect citizens freedom of expression*» - Municipality informant 3.

Municipality informants and citizens have many suggestions to how freedom of expression might be affected in a smart city compared to what we could find in the literature concerning this matter. One of the municipality informants adds as a last comment on the topic that a smart city can't be smart without ensuring that all these potential challenges are dealt with beforehand.

«*A smart city is not "smart" if it restricts citizens freedom of expression, period*» - Municipality informant 1.

In contrast to the literature, municipality informants and citizens had many opinions on how their freedom of expression might be affected in a smart city initiative. Both the bright and the dark side was explained. The municipality informants explain how they work to increase the dialogue with citizens, and citizens answers and sees the potential of opening more online services to express themselves. However, there is a concern that the increase of surveillance in a city will results in citizens who are afraid to express themselves and vulnerable groups such as the elderly will not have the technological skills needed to access debates and dialogues online. The municipality states that if freedom of expression is limited, they will not be able to call the city for a smart city.

4.4.3.1 iKRS citizen involvement app initiative

Kristiansand works on a municipality plan for the community called "Kristiansand towards 2030" which is an considered the most important strategy for the city. This strategy was approved in 2017. Many people want to contribute to the work of developing Kristiansand to become a more inclusive, diverse, green and urban city. It was therefore necessary to think smart while improving citizen involvement in the city. This was the start of a citizen involvement app which is called iKRS.

The app is explained as a smart way citizen can share their personal thoughts concerning building plans in the city and where the municipality can use these feedbacks to improve city and dialogue. The app uses a heatmap and timestamps to see where and when the user is answering. This is anonymous and will only be linked to the users ID. Using IDs such as numbers enabled the app the ask a follow-up question based in the last answer they published. Geo-fencing is also used, which is explained that if you walk past the library in the city, your phone will give you a push notification with a question such as *"Do you like the looks of the library?"* or *"How do you like the opening hours of the library?".* This enables the user to give feedback which will be processed by the municipality. This will affect citizens freedom of expression as it makes it easier for people to involve themselves in happenings in the city.

«*It's an app that is very potent. You can submit free text, multiple choice answers, pictures, rankings and questions you would like to ask*» - Municipality informant 1.

However, what questions should be asked in the app was explained to be a challenge itself. The app focuses on questions related to strategy, and these are questions that will not be easy to formulate in a short sentence. Questions like these will not focusing on the library's opening hours, but more on *"What do you believe is important to focus on within culture?"* or *"How can we ensure that possible dropouts will stay in school?".*

«*These are difficult questions in a complex context which are challenging to put in one sentence*» - Municipality informant 2.

It was not expedient to ask leading questions such as *"This is our strategy, what do you think?"* as it puts the users focus on a small area of a bigger topic. This was explained to be a violation of the Plan and Building Act. There was a need of more open questions where citizens can elaborate freely on the whole topic without being led a certain way. Developing an app where citizens can free their minds on whatever they want is not an option either as there will be no choices concerning topics. The Plan and Building Act requires that all contributions must concern themselves on political matters. It's therefore required that citizen argue on why their opinion is as it is, and the municipality is obligated to answer why this might not be a suitable suggestion.

«*There is a whole lot of process requirements concerning this app if we will use it for hearing*» - Municipality informant 2.

This app was tested for about a year in collaboration with students at the University of Agder. The first round of testing faced many challenges and is still not open for the public. There are still some challenges what needs to be addressed before it can be fully released. We were told that the municipality might try a new test of the app this upcoming autumn with a different process concerning experiences and the preparation of plans. It is suggested that this is where most of the participation happens.

Where this initiative is going is still up for discussion within the municipality, but one thing for sure is that it aims to improve citizens involvement in the city. We asked citizens in Kristiansand on their thoughts on the initiative and they are much in agreement.

«*I believe this app has a potential to increase my involvement within the city. It's much easier for me to pick up the phone after a push notification and answer a multiple-choice question as it won't require too much time*» - Citizen 9.

It is also suggested that the app can be used on smaller issues too such as *"What color should we use on this building?"*.

«*It would be so much fun if the citizens could vote on smaller projects such as statues and color of buildings. It doesn't have to be big strategy plans to make me feel involved and for my voice to be heard*» - Citizen 8.

Citizens see the potential of the iKRS initiative as a way to increase their freedom of expression of contributing to city decisions and strategy.

4.4.3.2 Min stemme ut: Listen to young immigrant's voices initiative

Kristiansand municipality uses social media as Instagram and Facebook to mobilize young people with minority backgrounds to participate in social debates. The initiative is designed for the admission school for immigrants where they can use social media to communicate with each other and express their concerns. The municipality works through the project to overcome linguistic and cultural barriers and encourages young people to stand up for what they believe in. This was explained to be a smart way of thinking to ensure that even minority group have a place they can express themselves freely.

We asked the citizens on their thoughts in this app and how it may affect their human rights.

«*I believe this initiative is wonderful. It's not easy to express yourself when you don't know the language the majority of the citizens speak. You are still free to express yourself but are not able to. It's important to include everyone in the society, and I am so happy to hear that they aim to do so*» - Citizen 9.

Unfortunately for this study, we don't have representatives for this minority group who can speak from personal experience. Citizens are still very positive for an initiative that aims to include everyone.

5 Discussion

In this chapter, we discuss our findings and compare it to existing literature and prior research from Chapter 2.

The literature found prior to this chapter will be used as a confirmation for our statements in the discussion. We will start by discussing the three human rights literature has confirmed can be affected in technologies used in smart cities. Due to the impact of directly understanding the phenomenon between smart city and human rights, three new human rights were found that can potentially be affected by smart city initiatives. This potential will be discussed in the last subchapter.

5.1 Smart city initiatives and the right to privacy

The results gathered from the qualitative interviews show that there is a great concern on how smart city initiatives can potentially violate citizens privacy. The initiatives in Kristiansand municipality uses IoT technologies and to gather large amounts of data which can be used to influence strategic decisions to help improve citizens quality of life. However, data gathering at this level poses a threat to citizens privacy as well. This is supported by Marinovici, Kirkham and Widergren (2016) which state that IoT and big data has a possibility to track individuals and poses a significant threat to citizens privacy. We argue that it would not be an unreasonable to assume that just about every cellphone that are in the hands of Norwegian citizens today are equipped with a GPS tracker that can be used to track individuals. This has the potential to violate citizens privacy depending on how it is used.

We will use initiatives concerning city bikes and measure air quality from Kristiansand municipality as examples. The city bikes are not made to track individuals, but it has a potential to do so depending on the payment method. If the user of these bikes pays by using a credit card, the choice of staying anonymous is nullified. The credit card may not be owned by the user, but the card will be owned by an individual either way. This results in the potential of being followed by the ones who surveillance the bikes, or potential hackers of the system. This will be a constant challenge if the system is updated in real time. But what if initiatives such as city bikes uses the snowplow and sweeper truck initiative from Kristiansand municipality as an example of how it could be done? This would mean that the system would not be updated in real time but would update where the bicycle was last seen in 3 hours. This was done in Kristiansand to ensure the privacy and security of the person driving the truck. There is a need for GPS tracking the bikes to avoid theft, payment options and to map out where the bicycles travel to improve biking trails. Taking out tracking technology would therefore not be a reasonable option. The question is why the municipality would need to update the data in real time. Payment option is a fair argument, as the user would like to pay as soon as they finished using the city bikes. If they are charged per hour, there should be no need to use GPS technology in real time as the bicycles could have an internal counter that does not need to be connected to the internet. The data could

be transferred and updated to the databases when the bicycle was first back at the renting stations. This would help to ensure the users privacy.

There is also the option of not using credit cards for payment but using monthly passes. Punch cards does not sound like a reasonable option as it would be difficult to estimate charging prices from each punch. The municipality wouldn't need data used for strategic decisions every minute, as they would have to look at data gathered over a greater period of time. However, not updating in real time is not entirely optimal as it could potentially decrease the quality of the initiative by ensuring privacy. It could be more difficult to track down stolen bicycles on the run. We would argue that the bicycle would have to stop sometime but getting it back would take more time. It would also be more difficult to find the culprit if there is no way to track the information back to an individual. It will also lessen the efficiency of tracking the bikes from a user's view. There would most presumably be an app that can be used by the citizens to locate available bicycles. If the app is not updated in real time it would make it more difficult for the citizens to plan ahead. They might go to the renting stations just to find out that there are no city bikes available at the time, where it would be better to know this beforehand. One solution could be that the renting stations for the bicycles would update the app as soon as a bicycle are in the station. There would be no need for citizens to know where other users are at any given time, which could potentially violate the user's privacy and security, even without being able to identify them. The owners of these city bikes and the municipalities needs to consider opportunities and challenges concerning GPS tracking updated in real time. GPS technology is a great threat to citizens privacy and security, but we will argue that there are many of these challenges can be solved by not updating in real time but rather an hour or so later. This would help strengthen user's privacy and security, at the cost of little quality of the initiative.

Sensors in general poses a great threat to citizens privacy as they have the potential to gather information from passing cellphones. This does not mean that the municipality will use their sensors to gather these data, but it poses a significant threat to citizens privacy if the system is hacked or if private sensors are deployed within the city. We argue that as the technologies get more advances, so will the regulations for keeping the data secure. This might have the potential to increase the privacy of citizens as the systems might get more secure over time. But as the systems get more secure, hackers will get better to crack the systems. So, the need of always having up to date systems and the newest form of security and protocols in necessary. Ensuring that rogue sensors is located it also crucial.

We mentioned China's 'Social Credit System' as an example of how a smart city services may serve as a model of how not to develop smart city services. Kristiansand municipality promises to use technology in a far more positive way. We assume that this means that they will not inherit a point system to grade citizens and to not use data gathered against them. Grading citizens might help guide them in the rights direction, meaning that they will follow the law and do what is valued as "good" in the society. This might even increase the motivation of doing something positive, and to not waste time on video games that will

probably not help the society as a whole. Video games are something that often happens inside citizens homes, which will be defined as their private sphere. Article 22 in the UDHR (United Nations, n.d.) states that no one should be subjected to arbitrary interference with his privacy or home. We will argue that monitoring if a citizen is playing video games and not is a clear interference with the persons private life and to Article 22. If a country following the UDHR were to implement an initiative like this, it would be a clear violation of their privacy.

However, even if the municipality does not intend to violate citizens privacy, circumstances may follow that they are forced to do so. If the municipality does not intend to handle the data gathered themselves, precise regulations and agreements with outsourced company is crucial. If not, it poses a significant threat to citizens privacy as these data can be sold or is stored outside of the country border. As an example, if the data is stored in The United States, their government can require access to data on Norwegian citizens as Norwegian laws does not apply for these data anymore. This is a great threat against citizens privacy as they may lose all rights in their own personal data which may even destroy a person's life. Hoffman (2018) refer to personal data as an internal part of our being. We will back up Hoffman's statement that businesses that handle these data have an obligation to ensure that they are safe. Private data that are leaked have the potential to not only violate citizens privacy, but also decrease their quality of life as the data can be misused in the wrong hands. It is therefore crucial that if the government or municipalities cannot ensure the privacy of data gathered, they will not succeed in a smart city initiative as citizens will not be willing to adapt. This is supported by both Oleshchuk (2009) and Mayer (2009) which argue that proper regulations is necessary to ensure that citizens will be willing to adapt to new technologies.

5.2 Smart city initiatives and the right to security

In contrast to privacy, security is believed to be increased in a smart city. This does depend on which aspect of the initiative we investigate. Referring to the discussion from the previous chapter concerning privacy, security has a potential to be decreased with GPS tracking of individuals. This is due to the fact that if this data is misused, security will be decreased at an individual level as it would be easier to track the people and potentially do them harm. This could either be people who have no authority to the system, personnel which uses it for personal gain or if the data is sold or leaked elsewhere. However, by embracing new technology and innovative thinking, security has the potential to be increased as it opens for new opportunities that were not possible before.

Crisis management is one example where security has the potential to be increased in a smart city. Using Kristiansand municipality as an example, GPS data is used to locate all citizens within certain geographical areas and establish contact with affected citizens accordingly. The previous system was based on data from the Norwegian population register. This means that students, tourists and any other persons that are not registered as a citizen of Kristiansand municipality, would not get the warning. This posed a threat to

many people's security as they might not know when or where to evacuate, while the GPS location in crisis management aims to turn this table around and increase it by being able to contact all phone users in danger zones. However, this system poses multiple challenges that needs to be addressed by similar initiatives. The European digital agenda (2012) and Ebrahim & Irani (2005) states that the municipalities are especially required to rule down all new topics concerning privacy and security in cloud computing, which would be these initiatives.

As we discussed earlier, GPS tracking has the potential to decrease citizens privacy if these data are misused or if the system is hacked. It's nearly impossible to discuss security without mentioning privacy. These two concepts are like two sides of one coin where we can't talk about one without mentioning the other as the topics align. It is therefore a risk that if security is increased within a city, it might be at the cost of privacy. This is supported by Filipponi et al. (2010), Hernández-Muñoz et al. (2011), and Anthopoulos & Fitsilis (2016) that states that enhancing one aspect might decrease the other. If this system is misused, citizens at an individual level might be monitored and put at risk for potential attacks.

We argue that systems made to increase the security within a city, might potentially do the exact opposite. If the system is hacked, it might not be to locate individual citizens, but to send out false information. This can potentially create unnecessary panic and fear. Even worse, send out information telling citizens to gather at one specific place due to a crisis and perform a terrorist act. Chatterjee et al. (2018) stated in their research that the increase of ICT use in a city might lead to an increase in cybercrimes. We suggest that initiatives that uses technologies to easier reach out and track individuals might be the reason for this. It makes it easier to find information in one place that can make a profit or to act disregarding the law. This enables the greater reason to hack a system. It is therefore necessary to have the best security in systems that could have devastating outcomes of being misused to minimize the risks.

Other applications such as using GPS location to find missing and injured people was also mentioned in the results. This has the potential to increase citizens security as it would make it much easier for the health central and search parties, such as the police, to locate missing and injured people. This is at the cost of privacy as it is possible to see where individuals are located. However, similar initiatives do not need to monitor where citizens are at any given time. It should be possible to use this app to call for help, or only be accessed if the person is confirmed missing. Without GPS location on this app, finding missing persons would be a lot more challenging. Finding the exact location would take much more time, which in a worst-case scenario, could results in death because he or she was not treated in time. Article 12 in the UDHR (United Nations, n.d.) states that everyone has the right to life, liberty and security. An app using GPS location for health personnel have both the potential to increase the security of a person, as well as to increase their possibility to live if an accident occurs.

Surveillance within the city is also a topic that has the potential to increase security of citizens, at the price of privacy. Taking smart cameras into consideration, these cameras have the potential to track out an individual in a huge crowd which enables the municipality or government to prevent a crime before it happens. This is supported Calavia et al. (2012) that states in their research that that smart surveillance cameras in a smart city can detect and identify abnormal and alarming situations. Power (2016) supports this and states that surveillance combined with predictive analytics makes tracking individuals in a huge crowd a reality. This has the potential to increase security within a city where citizens can feel safe walking the streets knowing that the crimes are less likely to happen as it will be easier to be find and track the criminal. This does require that citizens are willing to be monitored at all time within the city, which decreases their privacy. The government will know where the citizens are located, where they stop for lunch and what stores they decide to shop in. This might not be the desired agenda of the surveillance, but a possible hidden agenda. This would depend on the city and country this is deployed and whether they follow the UDHR or not. If the data is sold from a hidden agenda, targeted advertising have the potential to be increased even further. This could also potentially be used to target individuals by only using pictures. It is therefore possible to access information about individuals by only using a random picture as the surveillance camera is smart enough to use face recognition. This has the potential to affect citizens privacy and security if misused.

The results show that most citizens interviewed here in Norway priority security over their privacy. A common sentence that is used is that they have nothing to hide, so it won't harm them in any way. This might be true for some citizens, but this goes against the principle of being innocent until it is proven otherwise, which will be a discussion for later. Why citizens would priority security over privacy is up for discussion. This might be that they see that being secure enhances their quality of life even further than securing their privacy. It might also be that the culture affects how citizens prioritize. It is stated is our results that most citizens in Norway trust public sector and where the government is built upon trust. This might be the reasoning for the priorities. By increasing the security within the city does not mean that privacy will for a fact decrease, but it has the potential to do so if it is misused or hacked. There is a possibility that seeing increased security as a fact exceeds the potential treats that might never happen. We will argue that if citizens from a corrupt government were asked the same question, the same priority might not have been equally one-sided as we have seen here in Norway.

5.3 Smart city initiatives and the right to freedom of expression

Freedom of expression was the human right that was barely mentioned in literature with little explanation. We will bring back the topic concerning surveillance cameras as an initiative in a city. As we discussed before, surveillance cameras have the potential to affect citizens security in a city. Smart cameras have the potential to find individuals even in a huge crowd. It would be fair to assume that these cameras will have the functionality to record sounds as well, and with good quality compared to previous models. If surveillance in a city were used to record sound as well, it would have the potential to affect citizens freedom of expression. Article 19 in the UDHR (United Nations, n.d.) states that everyone has the right to freedom of opinion and expression. Citizens might not be willing to express themselves in public if the municipality or government listen to everything they say. This does not only apply to citizens who would like to express political opinions in public, but also everyday talk where personal conversations would be limited even if it may be out of the government's interests. Article 19 states that people have the right to express themselves without retaliation (United Nations, n.d.). We may argue that even in countries that uses the UDHR as part of their law such as Norway, the fear of 'big brother' listening may still be of concern. It might not be used against you but knowing that some unknown person is listening to a private conversation would put a stop on the conversation even in normal circumstances.

The surveillance cameras aim to keep citizens safe, but just as Filipponi et al. (2010), Hernández-Muñoz et al. (2011) and Anthopoulos & Fitsilis (2010) stated, at the cost of something else. We will use a local debate house as an example as Calavia et al. (2012) mentions in their research that surveillance cameras will be deployed in large numbers in smart cities. It is therefore highly likely that debate houses will be monitored as well. Putting surveillance camera outside of a debating house has the potential to increase the security for the people inside. This would help prevent political acts that could harm people inside the building. But placing the camera outside could also potentially decrease citizens freedom of expression as some might not want to be seen at that certain place or certain time. As an example, one citizen might support a political party that align to their own belief. This party is not so popular in the public because of recent scandals. Being identified at the debating house would therefore not be as appealing, and the citizen might not be willing to go there to express themselves as people will know who and what they support. We can argue that participating in public debates would most likely identify a citizen even without the surveillance camera, but not all countries would ensure that the video recording would stay private.

Which leads us to the next topic to discuss which is surveillance cameras inside of the debating houses. One of the citizens in our interviews claims that freedom of expression was increased in the municipality after they implemented surveillance cameras inside the debating houses. This means that citizens could easily watch the debates online without the need to travel any distances. We will argue that this has a great potential for people who

have a hard time leaving the house for different reasons and citizens who can't find the time to travel certain distances to participate. It was shown that citizens who don't really engage themselves in politics started to participate after getting easier access to online platforms. However, there is also a downside. Just as we mentioned earlier, surveillance might stop people from expressing themselves. People located at the debating house might hold back as unknown people will listen and judge their opinion. As this will be streamed online, there is a potential danger of the debate being recorded and published other places outside of municipal and government control. This has the potential of decreasing citizens freedom of expression and privacy. We will argue that even security has the potential to be affected, as different political views might lead to violence.

Smart city initiatives use ICT to make processes more efficient (Stenstadvold, Hegna, & Lanestedt, 2018). We may assume that in the future, most manual processes will be moved online. There are already initiatives initiated to move debating online as it is easier so open a dialogue with other people and politicians. This has the potential to increase freedom of expression as we mentioned earlier as more people will be able to participate. But what about those who don't have the technological skills needed to participate? The elderly and immigrants are said to be vulnerable groups. This is supported by Quan-Haase et al. (2018), Carvalho et al. (2018), Hsieh, Rai & Keil (2011), Alam & Imran (2015) and Lloyd, Antonioletty & Sloan (2016). If smart city initiatives move everything online could affect these groups freedom of expression. The elderly did not grow up using technologies, and the same could be said for the immigrants depending on where and how they grew up. Moving everything online could limit their freedom of expression as they wouldn't have the skills needed to participate in online debates.

Removing the traditional counterpart such as debate houses would limit this even further, and a city in full surveillance could potentially violate the freedom of expression to a full degree as there would be no other options left to express themselves. Seeing it from a different perspective, moving services online could potentially make the services cheaper and more environmentally friendly. These resources could therefore be used on other initiatives in the city to improve citizens quality of life. Kristiansand municipality mentioned in the interview that there should always be a counter part that will not be moved online to ensure that no one is left behind. This is what Odendaal (2003) calls for a digital inequality which will lead to a digital divide. We support this statement and argue that if initiatives limit debating to online services, freedom of expression will violate groups like the elderly and immigrants, and other individuals who don't have the digital skills needed to participate online. There is a possibility that in the coming generation shifts, technical skills will be a fact for most citizens. But this does not mean that the challenge of inequality is gone. We will assume that as the year passes, technologies will be more advances and the required skills to use these will be different from what we know of today. This means that people that have advanced technical skills today, might have a difficulty to adapt to technical skills needed in the future.

Which leads us to our final topic concerning whose fault it is if freedom of expression is limited in a smart city. One of the municipality informants stated in the interview that if freedom of expression is limited in the city, it is not the municipalities fault. The municipality are the ones initiating the smart city initiatives in the municipality. Without their initiatives, traditional counterparts of services would most likely stay the way they are today rather than being moved online. We will argue that the municipality do have some fault in potential limitation of freedom of expression if they do not ensure that all citizens are able to use services initiated. One of the municipality informants stated that the municipality must keep traditional counterparts to make sure no one is left behind, but this might not be the case for every other smart city in the world. However, citizens might have some fault themselves as they may not be willing to adapt to new technologies and freely choose to limit their own freedom of expression. This does not always have to be the case depending on the individual. We will argue that the elderly does not always choose to stay out of the digital society because they are not willing to learn, but because they do not know where to start. This is supported by Quan-Haase et al. (2018) which states that the elderly is willing to learn but are afraid of wasting the time of other people to teach them. In contrast to the younger generation, the elderly did not grow up using these technologies and might have a harder time to adapt. We will therefore argue that it is the municipalities responsibility to make sure that everyone has the technological skills needed to either access their online services or have other methods of expressing themselves before initiating services exclusively online. If they do not ensure that everyone is willing to adopt to their new initiative, we will argue that it is their fault if freedom of expression is limited in a smart city.

5.4 Smart city initiatives and other human rights

By comparing the literature review and the qualitative interviews that were conducted, three new human rights that has a potential to be affected emerged. This is an impact of directly understanding the phenomenon of how smart city initiatives may affect human rights. In this chapter, we will discuss these three human rights and how they have a potential to be affected by smart city initiatives.

5.4.1 Smart city initiatives and the right to an adequate standard living

Article 25:1 in the UDHR (United Nations, n.d.) states that everyone has the right to a standard of living adequate for the health and wellbeing. Smart city initiatives aim to improve citizens quality of life, which should be a perfect representation of Article 25:1 (Stenstadvold, Hegna, & Lanestedt, 2018). We have discussed how these initiatives may increase public safety, make it easier for people to express their opinions, make inefficient processes smarter and to cut carbon emissions. This has the potential to increase the quality of life of citizens, which again would give adequate standard living. This concept becomes more challenging the more people who live in the city. Kristiansand municipality houses over 92 000 citizens today and works towards becoming a smart city, while bigger cities in the world may house millions of people. We would assume that the more people live in the city, the right to an adequate standard living becomes more challenging. Houses will be

swapped with presumably smaller apartments, private gardens will be swapped with public parks, pollution will increase due to the increase of vehicles and much more. This has the potential to decrease citizens quality of life. This is, however, much of what the ICT in smart cities will used for to be able to improve citizens life even in cities housing millions of people.

We will argue that having a detached house and a personal garden becomes more of a "freedom of want" where it's not a necessity to a standard living. The reduction of carbon emissions is of high priority, which will lead to a city with less pollution. Initiatives using sensors will also be able to measure air quality and heat up frozen ground and share these data with citizens. Kristiansand is a city with under 100 000 citizens, where other cities in this world houses millions. The potential for measuring air quality due to pollution has a great potential in bigger cities, where small cities like Kristiansand does not have this high level of pollution compared to other cities. However, these sensors do not only measure pollution, but also pollen and melts snow which makes it more pleasant to walk in the streets. People with pollinosis will as a result know when to stay home or if they need to bring preventive drugs. This will have a great affect even in smaller cities as the pollen amount may be as great as in bigger cities. We will argue that this has a potential to greatly improve their quality of life. We will argue that smart city initiatives will increase the right to adequate standard living even further, even if the basic standards were there already, such as a job, access to public services and a home to live in. But this will only be possible if other aspects of human rights such as privacy, security and freedom of expression is upheld. Having heated streets are great, but the standard of living will still be too low if the city shares personal data and is lacking in security and the freedom of expression.

5.4.2 Smart city initiatives and the right to equal access to public services

Act 21:2 in the UDHR (United Nations, n.d.) states that everyone has the right to equal access to public services in his country. Like we discussed before, services are moved online as part of smart city initiatives to increase participation and to improve efficiency in a city. Elderly citizens and immigrants are vulnerable groups that may lack the digital skills needed to participate in the digital society. Services that are moved exclusively online has a potential to affect the right to equal access to public services as vulnerable groups wouldn't have the skills needed to utilize them. This does not only apply for services concerning debates, but many more. Being excluded from digital technologies will cause a digital divide according to Dijk (2012). Odendaal (2003) supports this and states that the increase of inequalities will promote a digital divide. Public services can be defined as the initiatives that are initiated by public sector such as services for the fire brigade, police, health care, education and much more. We will assume that the elderly use health care services regularly as the increase of health problems due to age. If the option to book an appointment with the doctor is limited to a calendar app, many seniors would have a hard time adapting. This would not give them equal access to the public service of health care as the younger generation who would assumingly adapt more easily and might cause a digital

divide between individuals and generations. Technology education programs could be challenging for younger immigrants, making it harder to learn in school.

We will argue that having equal access to public services depends on the initiative and how the municipalities and government value inequality. There is always a possibility to force adaptations on vulnerable groups to save money and make processes more efficient. This could potentially violate their right of having equal access to public services but ensuring that a digital divide will not happen. Or, they could provide traditional services if needed and let adaptation happen over time, which would give all equal citizens equal access to public services. Either way, proper education and help to adapt should be provided to ensure negative effects never happen.

5.4.3 Smart city initiatives and the right to be innocent until proven guilty

Article 11:1 in the UDHR (United Nations, n.d.) states that everyone has the right to be presumed innocent until proven guilty. Surveillance is an ever-increasing topic in smart cities where data is collected and analyzed, and the city is monitored to keep citizens safe. Initiatives such as monitoring traffic is initiated to catch individuals breaking the law in a much easier and efficient way. The same goes for monitoring citizens history online and what they do and where they go. As we discussed earlier concerning surveillance, monitoring has a potential to increase the security of citizens as it will be easier to catch potential criminals, even before they are able to act. We will argue that this kind of surveillance poses a threat to the right to be presumed innocent until proven guilty. If the government monitor all citizen activities to find a few criminals mean that they suspect everyone until they find proof of guilt.

This could be explained as the governments mistrust in innocent individuals. We will argue that it should be of equal interest for the government to trust their citizens as the citizens are encouraged to trust the government. Our results show that trust is the key to a successful initiative. The increase in security might justify the need of greater surveillance at the cost of trust, privacy and freedom of expression. Being suspected guilty even though if innocent might be a trivial matter if an act of terrorism could be avoided before it happens. Citizens interviewed for this study often claims they have nothing to hide, to surveillance wouldn't harm them. We will argue that this depends on the trust citizens and governments have to each other, and how safe this system would be from hackers. Any cybercrimes have the potential to harm the victim, depending on the information they are after. However, even if citizens accept being monitored to increase security, it would till affect Article 11:1 in the UDHR. Monitoring citizens makes it easier to find faults which might result in multiple charges with no connection to presumed criminal activity. We will therefore state that surveillance and monitoring of citizens could affect the right to be presumed innocent until proven guilty.

6 Conclusion and implications

The purpose of this thesis has been to contribute to increased understanding of what smart city initiatives are and how they potentially affect human rights. To find out, the following research question was formulated:

«How can smart city initiatives affect human rights? »

The research question was answered by conducting 14 qualitative interviews from smart city representatives from Kristiansand municipality and citizens living in the city who will be the affected by the initiatives. The systematic literature review done prior to this study revealed that there are three human rights that have the potential to be affected in a smart city initiative. These are privacy, security and freedom of expression. The results from this study support how smart city initiatives will affect these three human rights. Our results add to existing literature how privacy, security and freedom of expression is affected by smart city initiatives.

Privacy; Our results show that the right to privacy is challenged in a smart city due to the increased use of GPS tracking with real time updates, sensors which collects data from passing individuals and the increased use of intelligent camera surveillance that can identify individuals in a huge crowd. Private data are exposed to hacking and misuse which may lead to data sold outside of citizen and governmental grasp.

Security; Our results show that the right to security will be strengthened in a smart city due to the increased surveillance which will keep the citizens safe from potential danger by being able to catch criminals before they may act and being able to send out warnings to all people in areas posed by danger. This is at the cost of citizens' privacy, but the results show that citizen value their security over privacy. The right to security is also shown to be challenged due to the increased collection of private data which may put individuals in danger by being able to find out who people are or where they are located at any given time.

Freedom of expression; Freedom of expression was loosely mentioned in the literature, but the results in this thesis showed multiple connections to how smart city initiatives will affect freedom of expression. The results show that the right to freedom of expression is strengthened in a smart city due to the increased digital platforms provided by the municipality. This has shown to increase citizens engagement and participation in municipal politics and debates. Freedom of expression is also challenged for individuals who lack the technological skills needed to participate online and due to increased surveillance, which result in people not being willing to express themselves in concern of unwanted attention or retaliation.

Additional three human rights were found that can be affected by smart city initiatives. These were not mentioned in literature and will be this study's contribution to smart city and human rights literature.

Adequate standard living; Our results show that the right to adequate standard living is strengthened in a smart city due to the increased public safety, increased platforms to express opinions, smart processes and less carbon emission in a city. Upholding this human right is more challenging the bigger the city, but also increases the need of thinking smart. Smart city initiatives can increase citizens adequate standard of living but might prove challenging if other human rights such as privacy, security and freedom of expression are violated.

Equal access to public services; Our results show that the right to equal access to public services is challenged in a smart city as some individuals don't have the technological skills needed to utilize public services that are moved online. This could potentially lead to a digital divide between citizens if proper training is not given, or traditional counterparts are taken away.

Innocent until proven guilty; Our results show that the right to be innocent until proven guilty is challenged in a smart city due to increase surveillance to find criminals. This would mean that all citizens are suspects until proven guilty, which is a contradiction to being innocent.

We can thus conclude that smart city initiatives do affect human rights by either strengthening or breaching the terms of the UDHR. The affected human rights are; The right to *privacy, security, freedom of expression, adequate standard living, equal access to public services* and being *innocent until proven guilty.*

6.1 Implications for future research

The purpose of this study was to focus on how smart city initiatives may affect human rights using a qualitative method in a Norwegian municipality. We focused in total on six human rights, where three was this thesis contribution to the subject. Further research on how smart city initiatives affect other human rights are needed and data that supports our contribution to three new human rights affected. Identifying challenges and possibilities works as a first step in a process. We suggest further research focus on how challenges and possibilities in a smart city initiative should be addressed by the municipalities, governments and citizens. This is a limitation to our research question where time limit on the thesis were prioritized. Literature also mentioned vulnerable groups such as the elderly and immigrants to adapt to new technologies. We suggest further research focus on these vulnerable groups and find informants which can represent these groups in a bigger scale. Using a mixed-method or quantitative method connected to hypothesis could results in interesting answers to hypothesis. Focusing on multiple municipalities in different countries could also contribute to how smart city initiatives affect human rights on a bigger scale and might see a connection to how culture is relevant.

We will therefore sum-up what we believe further research could focus on to add to the field of smart cities and human rights;

- Further explore which human rights are affected by smart city initiatives and collect data that supports our contribution to three new human rights affected
- Focus on how challenges and opportunities in smart city initiatives should be addressed by the municipality, government and/or citizens
- Focus on vulnerable groups in an in-depth study
- Conduct a research using a mixed-method or quantitative study to get a better overview on how smart city initiatives affect human rights
- Focus on multiple municipalities and initiatives in other countries to understand the phenomenon of how smart city initiatives affect human rights. Culture differences should be taken into consideration.

6.2 Implications for practice

Our main aim for this study was to address the lack of research done on how smart city initiatives may affect human rights. Accordingly, we have contributed to the much-needed empirical data on how representative smart city workers and citizens believe human rights will be affected by smart city initiatives. This information is of high value as other studies don't focus on other challenges concerning smart city initiatives besides privacy, security and freedom of expression. By focusing specifically on human rights, we found three new Articles that can be affected. Municipalities and other businesses who are working with smart city initiatives or digitization can therefore see the opportunities and challenges and include human rights in planning of new initiatives to minimize the risk that human rights being violated. This is to ensure that smart city initiatives will improve citizens quality of life rather than to decrease it. Evaluation of initiatives that are already implemented is also possible. At least six human rights are provided that should be taken into consideration when working on smart city initiatives. We shed light on the topic for citizens living in a city with smart city initiatives to provide a better understanding of how their life are affected by the initiatives, either it being positively or negatively.

The final important implication for practice is the uniqueness of the knowledge informants from Kristiansand municipality brings. Kristiansand is a small city with only 92 282 citizens compared to other smart cities who have millions of citizens. Our results show a specific attitude towards smart city initiatives and human rights in a city still in progress of being acknowledged as a smart city. This attitude is targeted at initiatives already initiated in the city and initiatives still yet to be implemented.

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8 Annex

8.1 Annex 1: Literature review - Conferences used

Table 9: Conferences from literature review

Conferences	Journals
International Conference on Information Systems (ICIS)	European Journal of Information Systems
European Conference on Information Systems (ECIS)	Information Systems Journal
Pacific Asia Conference on Information System (PACIS)	Information Systems Research
Mediterranean Conference on Information Systems (MCIS)	Journal of AIS
Scandinavian Conference on Information Systems (SCIS)	Journal of Information Technology
Americas Conference on Information Systems (AMCIS)	Journal of MIS
Hawaii International Conference on System Sciences (HICSS)	Journal of Strategic Information Systems
	MIS Quarterly
	Communications of the Association for Information Systems
	Information and Organization
	Information Technology and People
	International Journal of Information Management
	Scandinavian Journal of Information Systems
	MIS Quarterly Executive
	Computer Supported Cooperative Work

8.2 Annex 2: Literature review - Keywords and explanation

Table 10: Explaining keywords and strings used to find relevant literature

Keyword	String	Explanation
Smart City	Smart + City	As one of our main topics is about smart cities, using this as a keyword is only natural. This enabled us to get an overview on what literature had been addressed in the IS field concerning smart cities, as it still is a concept in its early stage.
Smart City	+ Human rights	The second topic in this research is how smart cities has the potential to affect human rights. By using smart city and human rights as a string, we were able to see if this was an issue that were already addressed in other research.
Smart City	+ Privacy	Privacy issues was our first thought when we started this research concerning human rights. We strongly believe that rights concerning privacy has a potential of being violated.
Smart City	+ Challenges	We did not find much research concerning smart cities and human rights but searching for smart city challenges has a possibility to reveal research that can be relevant for our topic as well.
Smart City	+ Acceptance	Smart cities are driven by smart technology, and technology needs to be accepted to be able to work as they are intended. We believe that a search string containing these two keywords has a possibility to reveal research concerning a digital divide in a smart city context.
Smart Citizens	Smart + Citizens	We believe that a city needs smart citizens to be able to achieve a smart city. Citizens are a major driver in these cities, and literature on this will be relevant in our case as well. By using Smart AND citizens as a string higher the possibility of containing a citizen centric research in a smart city context.
Public Values	Public + Values	Including public values was a suggesting from our supervisors. This will add a new layer to human rights. This string was used to get an overview of what topics are addressed in the IS field concerning public values.
Public values	+ Smart City	Setting public and smart city in a string gives the potential to reveal possible public values literature in a smart city context.
Technology	+ Human rights	Smart city and human rights as a string did not give the results we hoped for. But as smart city is still a fresh concept, we wanted to try technology in this string instead.

		Smart city is driven by ICT, so this has the potential to results in relevant literature.
Technology	+ Citizen rights	Changing the keyword to citizens' rights may lead to different results of literature.
IoT	+ Human rights	As past searches have clarified, IoT is one of the building blocks for a smart city. Linking this up to human rights can result in interesting literature relevant for our research.
IoT	+ Privacy	Privacy keeps showing up in literature linked up to human rights with the use of technology. Connecting this to IoT can give a different variety of literature than past strings.
IoT	+ Acceptance	As we also mentioned above, acceptance of technology gave be one of the challenges regarding a smart city. As this might have a potential of violating human rights, it is relevant for us to search for literature regarding this issue.
Digital Acceptance	Digital + Acceptance	Past strings have shown that technological acceptance is referred to as "digital acceptance". We used this as a keyword and string to get an overview of research that has been conducted regarding this topic in the IS field.
Digital	+ Democracy	Digital democracy is the use of ICT to promote democracy. Past strings have revealed that privacy is a concern regarding technology used in smart cities. But what about other rights, such as freedom of expression? Addressing past literature on digital democracy in the IS field has a potential to reveal relevant articles that can be tied up to a smart city context.
Digital	+ Rights	Digital rights are a term that describes the human tights regarding the access and use of ICT. Rights to privacy and freedom of expression is relevant for this topic and will be in our research as well. Addressing literature on this topic in the IS field is of high relevance.
Big data	+ Privacy	Big data is also one of the building blocks in smart cities and is linked up to the right of privacy in past literature. Having a good overview of this challenge on the topic is of high relevance for our research.

8.3 Annex 3: Literature review - Databases and results

Table 11: Scopus literature results

Keyword	String	Database	Limitations	Results	Results after limitations	Results after picking relevant heading
Smart city		Scopus	Subject areas, year	75	52	31
Smart	+ City	Scopus	Subject areas, year	75	52	-
Smart city	+ Human rights	Scopus		1	-	1
Smart city	+ Privacy	Scopus	Year	8	8	1
Smart city	+ Challenges	Scopus	Subject areas, year	19	13	4
Smart city	+ Acceptance	Scopus		0	-	-
Smart citizens		Scopus	Subject areas, year	27	18	7
Public values		Scopus	Subject areas, year	280	186	27
Public	+ Values	Scopus	Subject areas, year	280	186	-
Public values	+ Smart city	Scopus	Year	7	7	1
Technology	+ Human rights	Scopus	Subject areas, year	128	86	17
Technology	+ Citizen rights	Scopus	Subject areas, year	28	20	6
IoT	+ Human rights	Scopus	Subject areas, year	3	-	2
IoT	+ Privacy	Scopus	Subject areas, year	12	-	7
IoT	+ Acceptance	Scopus	Subject areas, year	3	3	2
Digital acceptance		Scopus	Subject areas, year	79	50	12
Digital	+ Acceptance	Scopus	Subject areas, year	79	50	-
Digital	+ Democracy	Scopus	Subject areas, year	8	4	1
Digital	+ Rights	Scopus	Subject areas, year	334	34	6
Big data	+ Privacy	Scopus	Subject areas, year	30	26	8

Table 12: Web of Science literature results

Keyword	String	Database	Limitations	Results	Results after limitations	Results after picking relevant heading
Smart city		Web of Science	Subject areas, year	33	25	19
Smart	+ City	Web of Science	Subject areas, year	33	25	-
Smart city	+ Human rights	Web of Science	Subject areas, year	8	2	1
Smart city	+ Privacy	Web of Science	Year	7	1	0
Smart city	+ Challenges	Web of Science	Subject areas, year	13	6	5
Smart city	+ Acceptance	Web of Science	Year	7	1	0
Smart citizens		Web of Science	Subject areas, year	14	7	6
Public values		Web of Science	Subject areas, year	27	18	7
Public	+ Values	Web of Science	Subject areas, year	27	18	-
Public values	+ Smart city	Web of Science	Year	7	1	0
Technology	+ Human rights	Web of Science	Subject areas, year	12	5	1
Technology	+ Citizen rights	Web of Science	Subject areas, year	8	1	1
IoT	+ Human rights	Web of Science	Subject areas, year	7	1	0
IoT	+ Privacy	Web of Science	Subject areas, year	10	4	1
IoT	+ Acceptance	Web of Science	Subject areas, year	8	1	0
Digital acceptance		Web of Science	Subject areas, year	15	5	3
Digital	+ Acceptance	Web of Science	Subject areas, year	15	7	3
Digital	+ Democracy	Web of Science	Subject areas, year	10	2	2
Digital	+ Rights	Web of Science	Subject areas, year	20	10	1
Big data	+ Privacy	Web of Science	Year	10	4	1

Table 13: Oria literature results

Keyword	String	Database	Limitations	Results	Results after limitations	Results after picking relevant heading
Smart city		Oria	Subject areas, year	67	46	10
Smart	+ City	Oria	Subject areas, year	65	43	0
Smart city	+ Human rights	Oria	Subject areas, year	10	5	0
Smart city	+ Privacy	Oria	Subject areas, year	21	17	3
Smart city	+ Challenges	Oria	Subject areas, year	39	9	3
Smart city	+ Acceptance	Oria	Subject areas, year	28	11	3
Smart citizens		Oria	Subject areas, year	46	46	3
Public values		Oria	Subject areas, year	648	64	5
Public	+ Values	Oria	Subject areas, year	646	62	0
Public values	+ Smart city	Oria	Subject areas, year	38	14	3
Technology	+ Human rights	Oria	Subject areas, year	223	37	1
Technology	+ Citizen rights	Oria	Subject areas, year	40	14	1
IoT	+ Human rights	Oria	Year	2	2	0
IoT	+ Privacy	Oria	Subject areas, year	5	5	0
IoT	+ Acceptance	Oria	Year	5	4	0
Digital acceptance		Oria	Subject areas, year	207	59	4
Digital	+ Acceptance	Oria	Subject areas, year	207	59	-
Digital	+ Democracy	Oria	Subject areas, year	60	25	4
Digital	+ Rights	Oria	Subject areas, year	123	25	2
Big data	+ Privacy	Oria	Subject areas, year	85	36	3

8.4 Annex 4: Literature review - Selection process

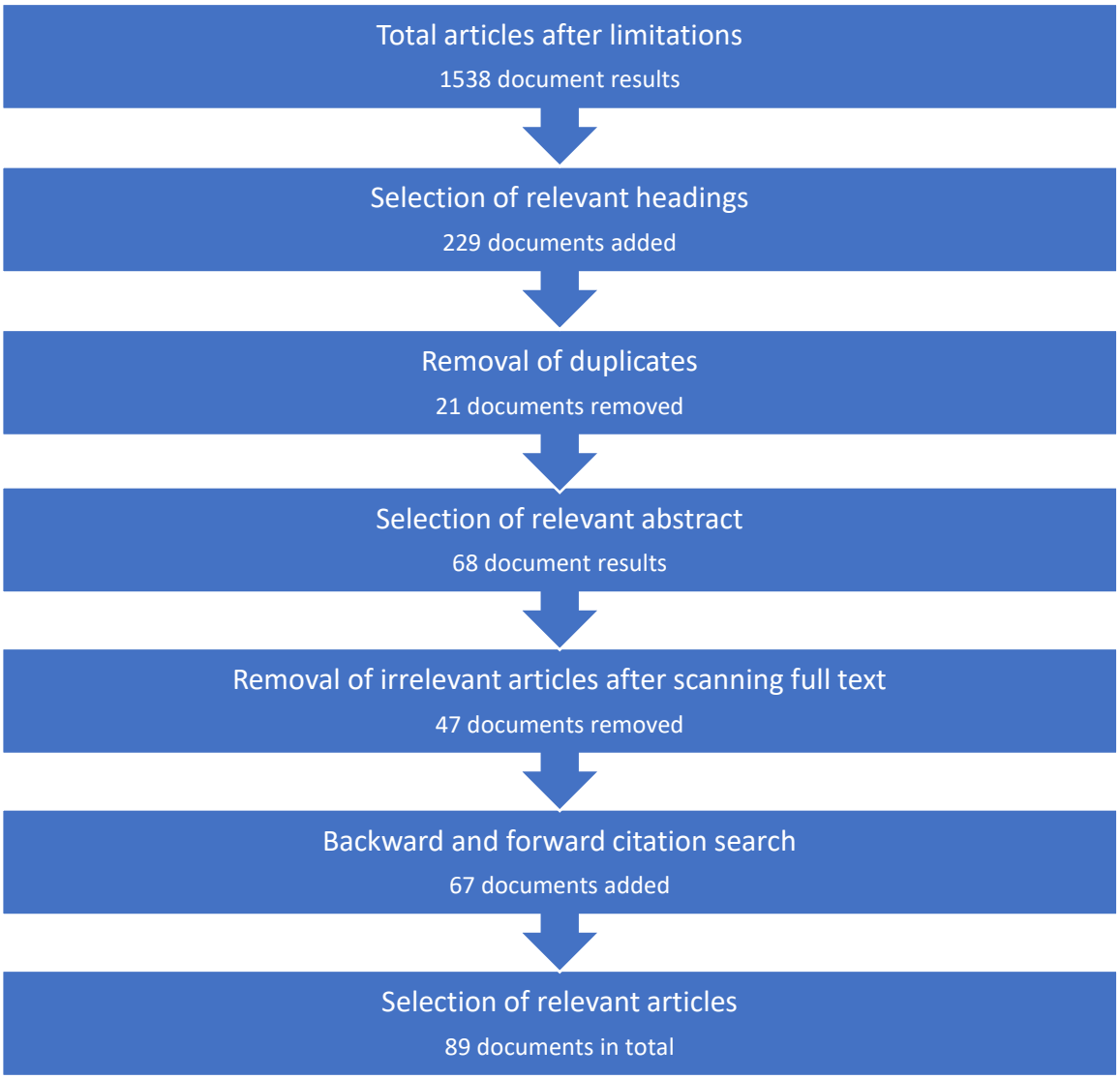

Figure 7: Selection process of literature

8.5 Annex 5: Literature review - Conceptual matrix after selection process

Concepts	Topic						Opportunities					Challenges						Solutions			
Sub-concepts	Smart City	Human Rights	Public Values	Internet of Things	Big Data	Open Data	Sustainability	Security	Livability	Community	Mobility	Security/ Cybercrime	Privacy	Ethics	Confidentiality	Freedom of Expression	Inclusion and Participation	Collaboration	Strategy Changes	Integrity/due process	Policy changes
1	x						x		x	x	x							x			
2	x			x			x	x	x				x		x			x			
3	x						x	x	x	x	x	x					x	x	x		
4	x						x	x	x		x						x	x	x		x
5	x			x		x	x		x	x							x	x	x		
6	x		x	x		x	x		x	x		x	x		x	x		x			x
7	x				x	x	x										x				x
8	x						x										x	x	x		x
9	x							x				x	x	x	x				x	x	
10	x						x		x	x	x	x	x				x	x			
11	x						x		x		x							x			
12	x						x	x	x	x	x							x	x		x
13	x																x		x		
14	x					x			x	x							x	x			
15			x			x	x	x	x	x	x	x						x			x
16			x	x								x		x					x	x	x
17				x				x					x							x	x
18				x	x							x	x							x	
19		X		x	x			x					x	x							x
20		x			x			x					x		x			x		x	x
21	x			x	x	x		x				x	x						x		
22					x		x			x				x						x	

8.6 Annex 6: Interview guide – Municipality

Intervjuguide og forberedelser til intervjuprotokoll – Smart city representanter

Formål med masteroppgaven:

Formålet med denne studien er å få et innblikk i Kristiansand kommune sine smartby initiativer. Dette vil gi oss en bedre forståelse for hvilke fordeler og ulemper disse potensielt kan ha mot menneskerettigheter. Utover dette vil vi undersøke deres smartby strategi og hvilke tiltak som blir gjort for å unngå kjente utfordringer fra litteraturen. Vi ønsker også borgere sitt innblikk i deres formeninger om smartby initiativer og hvordan disse kan påvirke menneskerettigheter.

Forskningsspørsmål:

"Hvordan kan smartby-initiativer påvirke menneskerettigheter?"

Viktige konsepter og teorigrunnlag:

Teorigrunnlaget baserer seg på smart city og deres teknologiske byggeklosser (IoT, Big Data). Dette blir knyttet opp mot teori som menneskerettigheter og et digitalt skille.

Forskningsdesign:

- Case-study

Bakgrunnsinformasjon – informant/deltager:

- Navn:
- Kjønn:
- Utdanningsbakgrunn:
- Posisjon i bedriften:
- Antall år i nåværende posisjon:
- Antall års arbeidserfaring i bedriften:

Informasjon om bedriften:

Bedrift Avdeling

Dato og tidspunkt for intervjuet:

Intervjuets lengde: 40-60 minutter

Intervjutype og lokasjon:

Opptak: Lydopptak vil brukes hvis godkjent av informant. Transkribering vil bli gjort av lydopptaket.

Spørsmål

Åpningsspørsmål – NB! Informere informant om hvordan dataen hentet fra intervjuet vil bli behandlet. Hvis bruk av digitale opptak og transkripsjoner så vil dette bli oppbevart forsvarlig og vil ikke bli delt noe annet sted. Informanten må godkjenne bruk av sitater i oppgaven før bruk. Hvis

ønskelig, så har informant rett til å lese igjennom rapporten før innlevering. Informant har rett til å trekke enkelte svar eller intervjuet sitt til enhver tid før innleveringsfrist.

- Presentere oppgaven
- Informere om hvor langt intervjuet vil ta
- Forklare hva denne studien skal bidra til og hvordan informanten kan hjelpe.

Faktainformasjon - Hente inn noen enkle fakta om bedriften (10min)

- Spør om mer bakgrunnsinformasjon om bedriften om det er noe vi ikke har klart å finne ut av selv.
- Kan du fortelle litt om deg selv?
- Hva er din rolle i bedriften?
- Hva går denne rollen ut på?
- Hvis kommune: Er det for det meste kommunen som står for smart city initiativer?
    - **Hvis NEI**:
        - Samarbeider dere mye med privat sektor? Hvis ja, på hvilken måte?
        - Samarbeider dere med andre kommuner? Hvis ja, på hvilken måte?
        - Er det noen sektorer dere samarbeider mer med enn andre? (Olje, elektro, helse osv)

Hoveddel: Spørsmål relatert til studien for å kunne svare på problemstillingen (ca. 40min)

Smart City

Et smart city initiativ er initiativer, eller prosjekter som jobber mot en smarte by. Dette inkluderer data som blir hentet fra borgere, enheter og eiendeler som behandles og analyseres for å overvåke og administrere alt fra trafikk, avfallshåndtering og andre samfunnstjenester. Ved bruk av IoT så kan byoperasjoner og tjenester optimaliseres. Det gjør det mye enklere å overvåke hva som skjer i byen og hvordan byen utvikler seg, samt økt kommunikasjon mellom borgere og kommune.

- Kan du fortelle oss hvilke smart city initiativer du driver med nå?
    - Eksempler:
- Kan du fortelle oss om hvilke smart city initiativer du har jobbet med tidligere?
    - Kan du gi oss et eksempel på et lett og et vanskelig ett?
- Kan du fortelle oss noe om deres smart city strategi?
- Hva mener du er de største fordelene med en smart by?
- Hva mener du er de største utfordringene med en smart by?
- Har dere møtt på noen utfordringer underveis i et smart city prosjekt?
    - **Hvis JA:**
        - Hvilke utfordringer er typisk å støtte på?
        - Hvordan håndterer dere disse?
- Har noen smart city initiativer vært fullstendig eller delvis mislykket?
    - **Hvis JA:**
        - Kan du fortelle om ett prosjekt dette har skjedd?
        - Hvilke utforinger?
        - Hvordan håndterte dere disse utfordringene?
- Kan du fortelle oss hva du tenker rundt smart city og hvordan borgere imøtekommer disse nye «teknologiene»?

- Gjør dere noen studier eller andre tiltak for å bli kjent med brukerne for å utvikle de beste løsningene
    - **HVIS JA:**
        - Gjelder dette for alle borgere, uansett bakgrunn eller funksjonshemning?
        - Pleier dere å involvere borgere i å utvikle løsninger? (f.eks åpen dialog)

- Har dere opplevd stor motstand fra borgere tidligere når dere prøver å implementere noe nytt relatert til en smartere by?
    - **HVIS JA:**
        - Hva gjorde dere i en slik situasjon?

      HVIS NEI:

      Er det en grunn til at dette ikke har skjedd? (åpen dialog/inkludering)

Privacy

- «Fortelle hvordan privatlivet er en fordel men også en utfordring hentet fra litteraturen i forhold til smart city»
    - Hvordan mener du smart city initiativer kan være med på å styrke privatlivet til borgere?
    - Er du enig i at privatlivet til borgere er en utfordring for smart city Initiativer?
        - **Hvis JA:**
            - Har du noen eksempler der dere har støttet på utfordringer knyttet til privatlivet til borgere?
            - Hva gjør dere for å unngå disse utfordringene?

          Hvis NEI:

            - Hvorfor tror du ikke dette er en utfordring?

Security

- «Fortelle hvordan sikkerhet er en fordel men også utforing hentet fra litteraturen i forhold til smart city tilpass for at smart city også skal hjelpe å styrke sikkerheten»
    - Hvordan mener du smart city initiativer kan være med på å styrke sikkerheten til borgere?
    - Er du enig i at sikkerheten til borgere er en utfordring for smart city Initiativer?
        - **Hvis JA:**
            - Har du noen eksempler der dere har støttet på utfordringer knyttet til sikkerheten til borgere?
        - **Hvis NEI:**
            - Hvorfor tror du ikke dette er en utfordring?

- Er det dere I kommunen som behandler all data som hentes inn, eller er det en tredjepart?
    - **HVIS JA:**
        - Hvordan kan dere være sikre på at denne tredjeparten behandler dataen i henhold til sikkerhet og ikke selger dataen videre til andre?
    - **HVIS NEI:**
        - Hvilke tiltak/protokoller gjør dere for å holde informasjonen i et system sikkert? (hackere?)

- Spør dere om brukeres tillatelse for å lagre data fra dem?
    - Har brukere muligheten til å slette informasjon om seg selv fra systemene deres?

Freedom of expression

- Tror du smart city initiativer har potensiale til å krenke borgeres ytringsfrihet?
    - (eventuelt komme med et eksempel)
    - Utdyp svar for JA eller NEI

Ekstra:

- Er det noen andre menneskerettigheter du mener står i fare for å bli krenket av smart city initiativer?
- Hva mener **DU** er et godt smart city initiativ?

Avsluttningsspørsmål (ca. 5 min)

Takk informanten for å ha stilt opp til intervju og for å bidra til at studien kommer i mål. Eventuelt høre med informant om han eller hun kjenner til flere relevante personer vi kan snakke med (snowball-sampling). Hvis et nytt intervju er relevant, avklare et nytt tidspunkt.

Spørre om vi kunne fått se på noen cases (dokumentasjoner?).

8.7 Annex 7: Interview guide – Citizens'

Intervjuguide og forberedelser til intervjuprotokoll – Borgere

Formål med masteroppgaven:

Formålet med denne studien er å få et innblikk i Kristiansand kommune sine smartby initiativer. Dette vil gi oss en bedre forståelse for hvilke fordeler og ulemper disse potensielt kan ha mot menneskerettigheter. Utover dette vil vi undersøke deres smartby strategi og hvilke tiltak som blir gjort for å unngå kjente utfordringer fra litteraturen. Vi ønsker også borgere sitt innblikk i deres formeninger om smartby initiativer og hvordan disse kan påvirke menneskerettigheter.

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- Utdanningsbakgrunn:
- Posisjon i bedriften:
- Antall år i nåværende posisjon:
- Antall års arbeidserfaring i bedriften:

Dato og tidspunkt for intervjuet:

Intervjuets lengde: 20-60 minutter

Intervjutype og lokasjon:

Opptak: Lydopptak vil brukes hvis godkjent av informant. Transkribering vil bli gjort av lydopptaket.

Spørsmål

Åpningsspørsmål – NB! Informere informant om hvordan dataen hentet fra intervjuet vil bli behandlet. Hvis bruk av digitale opptak og transkripsjoner så vil dette bli oppbevart forsvarlig og vil ikke bli delt noe annet sted. Informanten må godkjenne bruk av sitater i oppgaven før bruk. Hvis ønskelig, så har informant rett til å lese igjennom rapporten før innlevering. Informant har rett til å trekke enkelte svar eller intervjuet sitt til enhver tid før innleveringsfrist.

- Presentere oppgaven
- Informere om hvor langt intervjuet vil ta
- Forklare hva denne studien skal bidra til og hvordan informanten kan hjelpe.

Faktainformasjon - Hente inn noen enkle fakta om bedriften (10min)

- Hvor gammel er du?
- Hva er din okkupasjon?

Hoveddel: Spørsmål relatert til studien for å kunne svare på problemstillingen (ca. 40min)

Smart City

- Er du kjent med konseptet «smart by»?
- Hva mener du er en «smart by»?

Privacy

(fortelle hvordan litteraturen sier at smarte byer både kan styrke og svekke privatliv)

- Hvordan tror du smart by initiativer i kommunen kan påvirke ditt privatliv?

(fortelle om GPS case fra Kristiansand)

- Syns du det er kjekt at du kan se til enhver tid hvor brøytebilen var for 3 timer siden?
- Hvordan tror du dette kan påvirke menneskerettigheter?

(fortelle om sykkelcaset fra Kristiansand)

- Er du komfortabel med at «sykkelbedriften» kan se hvor du er til enhver tid når du sykler rundt i byen?
- Hvordan tror du dette kan påvirke menneskerettigheter?

Security

(fortelle hvordan litteraturen sier at smarte byer både kan styrke og svekke sikkerhet)

- Hvordan tror du smart by initiativer i kommunen kan påvirke din trygghet?

(Fortelle om Crisis management caset fra Kristiansand)

- Hva tenker du om at Kristiansand bruker GPS for å sende ut varslinger?
- Hvordan tror du dette kan påvirke menneskerettigheter?

(fortelle om measure air quality caset I Kristiansand)

- Hva tenker du et slikt initiativ kan bidra til?
- Hvordan tror du dette kan påvirke menneskerettigheter?

Freedom of expression

(fortelle hvordan litteraturen sier at smarte byer både kan styrke og svekke ytringsfriheten)

- Har du tenk noe over hvordan dette kan påvirke din ytringsfrihet?
- Føler du deg komfortabel med alle de nye digitale plattformene som brukes nå i dag? (Sparebank, Altinn, Digin osv)
    - **Hvis JA:** Bruker du de ofte?
    - **Hvis NEI:** Foretrekker du de mer tradisjonelle løsningene? (komme med eksempel)

(fortelle om iKRS caset i Kristiansand)

- Hvordan tror du dette kan påvirke menneskerettigheter?

(fortelle om Min Stemme Ut caset fra Kristiansand)

- Hvordan tror du dette kan påvirke menneskerettigheter?

Avsluttningsspørsmål (ca. 5 min)

Takk informanten for å ha stilt opp til intervju og for å bidra til at studien kommer i mål. Eventuelt høre med informant om han eller hun kjenner til flere relevante personer vi kan snakke med (snowball-sampling). Hvis et nytt intervju er relevant, avklare et nytt tidspunkt.