CITIZENS' ROLE AND MOTIVATION TO PARTICIPATE IN SMART CITIES: A STUDY OF NORWEGIAN MUNICIPALITIES

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Foreword

This thesis marks the end of our master program in Information Systems at University of Agder (UiA), spring 2021. The study was conducted by Tobias Pedersen and Hallvard Lauvrak, who are students at Information systems of M.Sc.

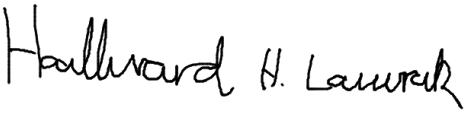
The purpose of this qualitative study was to identify citizens' roles in Norwegian smart cities, and what these cities do in terms of motivating its citizens to participate. A single-case study was conducted where 12 Norwegian municipalities were interviewed.

We would like to bring a special thanks to our supervisors Leif Skiftenes Flak & Sara Hofmann for guidance on this thesis. Without their constructive feedback and guiding in the right direction, this thesis would not have been possible.

We would also like to thank our friends and families, who have supported us during this thesis. Moral support has never been hard to come by, and for that we are grateful.

Finally, we would also like to thank the participating municipalities. Despite a demanding pandemic, the respondents have taken time from their hectic work life to help us collect data for this thesis.

Kristiansand,
04.06.2021



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Abstract

Smart cities have gained a lot of traction in the later years, where they can be used as a solution for complex problems in the city. In the topic of smart cities, citizens and citizen participation are viewed as important factors. Numerous research has highlighted the important citizen participation in the city. Despite the amount of research on citizen participation available, the perspective of the citizens' role in the smart city, and what should be done to motivate citizen participation is lacking. As a response, this thesis aims to identify citizens' roles and what is being done by the municipalities to motivate participation in Norwegian municipalities. The research questions are as followed:

> ***RQ1**: What roles do citizens have in smart city initiatives and projects in Norwegian municipalities?*
> ***RQ2:** How does the smart city motivate citizen participation in Norwegian municipalities?*

Our research is conducted as a qualitative single-case study of norwegian municipalities, using 13 semi-structured interviews to gather data about the phenomenon. Results of this study are obtained with a thematic analysis, where 5 roles for citizens and 8 types of motivation were identified. The roles of citizens in the smart city are categorized as *User of services, Co-creators, Stakeholders, Tester* and *Volunteers*. Types of motivations are categorized as *Rewards for participation*, *Personal motivation*, *Enlightening citizens*, *See the citizen*, *Sustainability motivation*, *Project selection*, *Targeted projects* and *Ease of Participating*. Finally, this research will contribute to understanding citizens' roles and what motivates citizen participation in smart cities.

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1. Introduction

Smart city is a concept that indicates whether the city actively pursues the use of modern technology to increase the quality of life in urban spaces, both by improving environmental conditions and providing better services to residents where strategies and citizen participation are important for this to work (Berntzen & Johannessen, 2016a). Smart city solutions can help cities to overcome challenges in areas like population growth, mobility in the city and sustainability (Skouby, K. E., Kivimäki, A., Haukiputo, L., Lynggaard, P., & Windekilde, I. M. 2014). The world's population is estimated to rise by 2 billion in the next 30 years going from 7.7 billion in 2019 and growing to 9.7 billion by 2050. The fastest growing age group is people over 65 years old and people over 80 years is estimated to triple from 143 million to 426 million (United Nations. 2019a). In 1950 just 30% of the population was living in cities, where 68% is projected to be urban by 2050 (United Nations. 2019b). This means that cities need to become smarter to tackle the challenges they are going to face in the next 30 years, and might require a stronger infrastructure that can withstand a bigger population.

In the area of smart city, citizen participation is considered an important aspect of digitalization by involving its citizens to adapt to the changes (Mellbye & Gierlof, 2018, Dameri, 2014, Berntzen & Johannessen, 2016a). According to Tadili & Fasly (2019), if a city is going to succeed in developing a smart city, citizens should be involved as an integral part. This is based on the aspect that the citizens are the users, decision-makers, consumers, source of data and information (Tadili & Fasly, 2019).

A definition of smart city can be challenging to find, as cities can be smart in different ways (Ramaprasad, A., Sánchez-Ortiz, A., & Syn, T. 2017). The main reason is that the smart city phenomen is not top-down, but bottom-up as the top-down process is a vision from the government rules and policies to reach a shared goal by using technology (Dameri, R. P. 2013). Citizens are neglected in the smart city definitions (Mohseni, H. 2020), but the three main dimensions of a smart city include technology, people and institutions (Nam, T., & Pardo, T. A. 2011). According to Caragliu et al. (2011)

a city is smart when investments in human, social capital, traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and high quality of life through participatory governance (Caragliu et al. 2011).

1.1 Research Question

The focus on citizens participation is not a new phenomenon. Despite this, the research on the roles of citizens and what the municipalities do to motivate citizen participation is something we found was lacking in the literature. Therefore, this thesis aims to broaden this view with the following research questions:

> ***RQ1:*** *What roles do citizens have in smart city initiatives and projects in Norwegian municipalities?*
> ***RQ2:*** *How does the smart city motivate citizen participation in Norwegian municipalities?*

With these questions in mind, we searched for municipalities that had smart city on their agenda with the purpose of seeing how they govern their smart city and help us to:

1. *Gain a greater understanding of the role of the citizen in a smart city*
2. *Find out what motivates citizens to participate in smart city initiatives*

By gaining a greater understanding of the citizens' roles it can help to build a better understanding between the citizens and the people governing smart city initiatives, and by understanding what successful municipalities do to motivate citizens. Knowing what motivates the citizens can benefit co-creation and solutions both parties are satisfied with.

1.2 Motivation for the Study

As the population in the world keeps increasing at this rapid rate, we find smart cities are more important than ever, as smart cities can contribute to handling challenges related to the city. The motivation for this study is to contribute to the field of smart

city research in the area of citizen participation. As elaborated in chapter 2, the literature around citizens' role in the smart city and what is being done to motivate citizen participation is an area which has not received huge focus in earlier research. Therefore, citizens' role and motivation are defined as our focus for this research. As we find previous research in this field lacking, we have conducted this research with a top-down approach. Thereby, data collected are from the view of municipalities instead of its citizens. With this approach, we are able to map definitions defined by the municipalities. Findings from this study could be used for further research in this field.

Furthermore, the structure of this thesis is as followed:
In the Introduction (1) we have looked at the purpose of this thesis following the research questions with some background and context of the topic. In the next chapters, we will go into the Literature (2) on smart city within the topics of citizen participation, citizens' roles and citizens motivation. Our Research approach (3) will be presented in the following chapter. Informant selection, data collection and data analysis are present. Furthermore, findings (4) are presented, where we present our findings from the study. Discussion and implications (5) will examine the findings related to previous literature on the topic. Lastly, we will have the conclusion of the study (6).

2. Literature

In this chapter, literature on smart cities is reviewed and presented in the context of citizen participation, citizens role and motivation of citizens in the smart city.

2.1 Smart City

The concept of smart city is not a new phenomenon. In fact, literature in the field of smart city dates back to as early as 1974 (Vallianatos, M. 2015), where it is possible that the concept is even older. This particular project was called "*A cluster analysis of Los Angeles*", which helped them to map out different areas in the city. They used data to shape urban development, by organizing them into different categories such

as crime and traffic (Vallianatos, M. 2015). The smart city concept has been described as digital, creative, intelligent and innovative which often links to technological, social and governmental change (Hollands, R. G, 2008).

As a result of the rapidly growing population and increased needs of health care for elderly, cities need to adapt Information and Communication Technology (ICT) to be able to overcome the challenges (Skouby, K. E., Kivimäki, A., Haukiputo, L., Lynggaard, P., & Windekilde, I. M. 2014). These solutions involve Internet of Things (IoT), big data and cloud computing, which can be used to connect the city (Kirimtat, A., Krejcar, O., Kertesz, A., & Tasgetiren, M. F. 2020), while also promoting a sustainable lifestyle with infrastructure, innovation and technologies that makes them efficient and self-sufficient (Chamoso, P., González-Briones, A., De La Prieta, F., Venyagamoorthy, G. K., & Corchado, J. M. 2020). Smart cities allow their citizens to participate in the governance and management, giving them the opportunity to influence and engage. As citizens become active users in their cities, quality of life is increased (Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., ... & Scholl, H. J. 2012, January). The smart city governance should be interactive to meet the needs, interests, values and ambition of their citizens (Gohari, S., Ahlers, D., Nielsen, B. F., & Junker, E. 2020). Cities are becoming computable and automated at every level of operation (Batty, M. 2017) and ICT technologies such as fibre optic, 5G networks, Artificial Intelligence (AI) and Internet of Things (IoT) have been seen as a solution to these problems. However, these technologies do not make a city smart. For a city to be smart, citizens must engage to use the systems for value to be received (Habib, A., Alsmadi, D., & Prybutok, V. R. 2020).

Smart city offers a wide range of definitions usually with a smart city aspect mixed with a technology aspect. Eremia, M., Toma, L., & Sanduleac, M. (2017) have illustrated the primary characteristics and tools available for citizens and municipalities which they think can help transform a city into a smart city. These are shown in Figure 1.

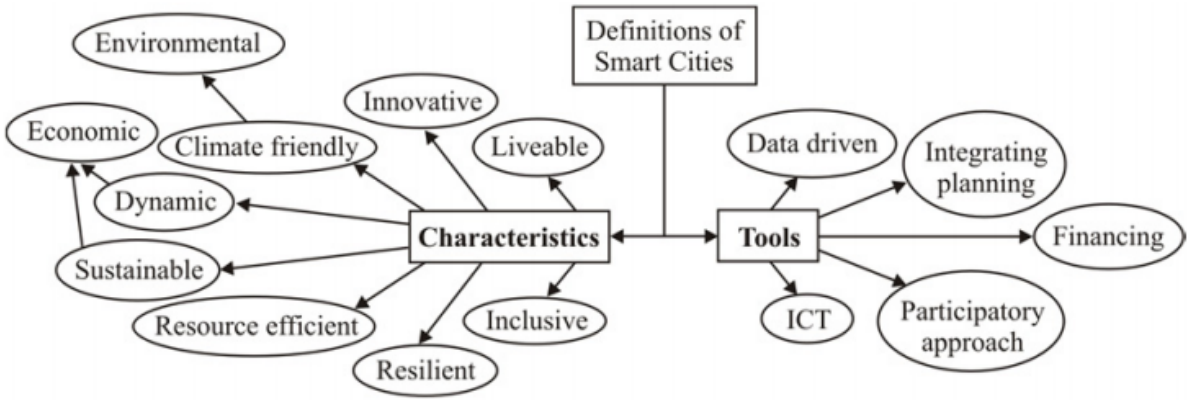

Figure 1 - Smart City Tools and Characteristics (Eremia, M., Toma, L., & Sanduleac, M. 2017).

Effing & Groot (2016) specify that the best cities aren't the ones with the most advanced technology, but the ones that provide a sustainable city for citizens, companies and government. Smart cities usually focus on mobility, environment, economy, governance, quality of life, and education by using Information and Communication Technologies (ICT). However, they struggle to reach their goals if citizens, the end user, are not involved (Simonofski, A., Asensio, E. S., De Smedt, J., & Snoeck, M. 2017). Smartness is viewed as a technocratic concept, while overlooking the perspective of citizens, where technology has been seen as the goal (Kar, A. K., Ilavarasan, V., Gupta, M. P., Janssen, M., & Kothari, R. 2019).

Whether a specific city can be defined as a smart city seems to be a challenge since everyone can basically call their city "smart", as this title is not a reserved title. Through the research of Winkowska et al (2019) they refer to 6 elements that they believe a city must follow in order to call itself a smart city. These are: Smart economy, smart mobility, smart environment, smart people, smart living and smart governance (Figure 2).

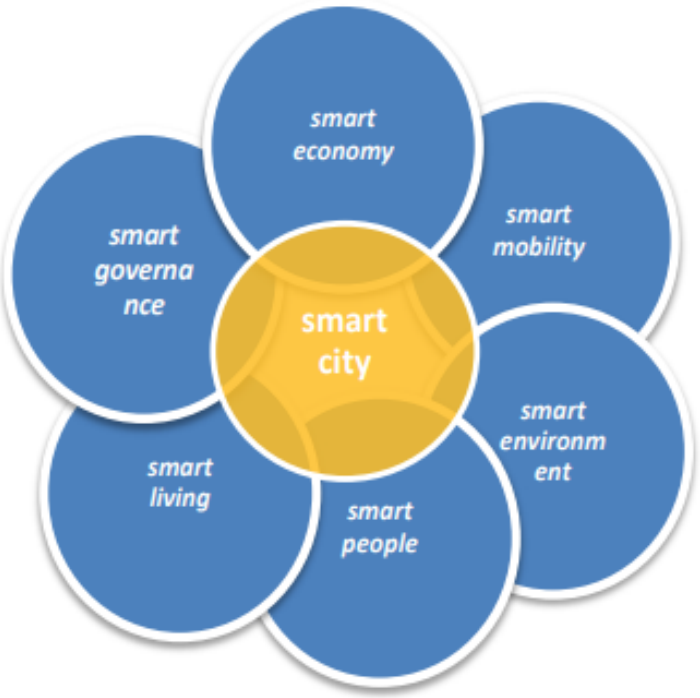

Figure 2 - Smart City Elements (Winkowska et al. 2019).

A smart city is also a humane city where creativity is a key factor, and the citizens are viewed as stakeholders and decision makers. By having a citizen-driven approach, the processes become more transparent to the citizens (Nam, T., & Pardo, T. A. 2011). People come before technology in the human smart city where the citizens contribute to the city by collaborating with the authorities with a more holistic approach to technology (Oliveira, Á., & Campolargo, M. 2015). Citizens' ability to contribute to urban development by collaborating with the municipality can help to solve problems, and is essential for a citizen-driven smart city (Oliveira, Á., & Campolargo, M. 2015).

2.2 Citizen Participation

In the area of smart city, citizen participation is considered an important aspect of digitalization by involving its citizens to adapt to the changes (Mellbye & Gierlof, 2018, Dameri, 2014, Berntzen & Johannessen, 2016a). According to Tadili & Fasly (2019), if a city is going to succeed in developing a smart city, citizens should be involved as an

integral part. This is based on the aspect that the citizens are the users, decision-makers, consumers and source of data and information (Tadili & Fasly, 2019).

Through participation, citizens are able to influence how their city is managed, developed and maintained. Berntzen & Johannessen (2016a) found three categories that constitute major reasons why citizens get involved in the decision-making process. These are "*Citizen competence and experience*", "*Collecting data through citizens' technology use*" and "*Participation as democratic value*" (Berntzen, L., & Johannessen, M. R. 2016a). Citizens' influence in participation can vary depending on the problem, and citizen participation increases the performance of services delivered (Allen, B., Tamindael, L. E., Bickerton, S. H., & Cho, W. 2020).

Arnstein's ladder (Arnstein, S. R. 1969) describes levels of participation and nonparticipation. This ladder contains eight levels, where lower levels indicate non-participation and higher levels indicate a higher influence of participation. At the bottom of the ladder we have nonparticipation, with the levels of manipulation and therapy, which is a top-down approach controlling the citizens and not enabling them to participate. Instead they are educated. In the middle we have degrees of tokenism, with the levels of informing, consultation and placation, where citizens can give inputs, but the city has the final say. At the top we have degrees of citizen power, with the levels of partnership, delegated power and citizen control. Partnership involves having an active role where decision-making is shared. Citizens can achieve delegated power where they have dominant decision-making over a project. Citizen control guarantees participants to govern projects, be in charge and manage the policy (Arnstein, S. R. 1969). An overview of Arnstein's ladder is shown in Figure 3.

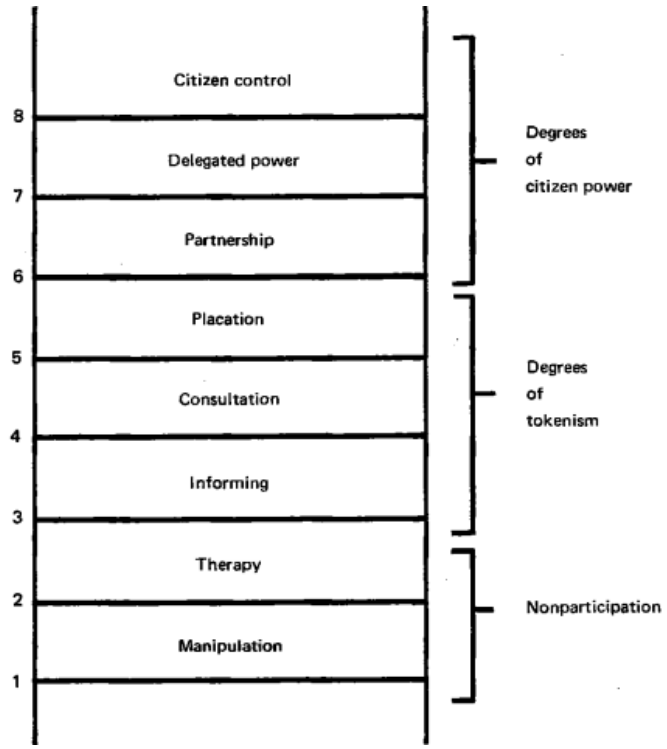

Figure 3 - Arnstein's ladder of participation (Arnstein, S. R. 1969).

In Denmark, the term "Municipality 3.0" has been launched as a term for a welfare strategy to promote active citizens and promote civil society involvement. Municipality 1.0 is an authority where you need to follow the municipality's regulations. Municipality 2.0 is an organization where the politicians set goals and financial frameworks with the inhabitants. Municipality 3.0 is a local community where the municipality is a service provider for the citizens (Guribye, E. 2016). The citizens' role can be split in two categories as either the consumer that participates in a user-driven innovation process or the political actors that matches the agenda of traditional public participation including policy-making, planning and governance processes. Citizen engagement must be more than providing information and feedback (Bull, R., Dooley, K., & Mazhar, M. 2019).

It is important for governments to know why their citizens engage voluntarily as citizens can be motivated to participate for different reasons. Either self-concerned because of something that annoys them, or the concern of others (Abu-Tayeh, G., Neumann, O., & Stuermer, M. 2018). Smart cities need to decide how they want to use their ICT infrastructure, which should be done with coordination with the citizens. The

main goal is to improve quality of life with a focus on citizen participation rather than technology. Citizens can be participants in decision making, co-creators or ICT users of smart city infrastructures (Simonofski, A., Asensio, E. S., & Wautelet, Y. 2019). Citizen participation can have positive effects on democracy as it contributes to inclusion of the individuals and rational decisions based on the public, which can increase the outcome (Michels, A., & De Graaf, L. 2010). The population size has an impact on how the citizens participate in municipalities where smaller municipalities have a more personal relationship with the citizens and local politicians and larger municipalities (Martins, M. R. 1995).

2.3 Citizens Roles

Smart cities represent a governance model based on collaboration between local stakeholders, citizen participation, experimental innovation and a holistic approach to local policy development (Nesti, G. 2020), but smart cities must start with people rather than technology (Gooch, D., Wolff, A., Kortuem, G., & Brown, R. 2015). By having multiple choices you can include more people in the activities so you can include more citizens. The benefits of engaging non-experts is that citizens are represented in the decision making, adapted to the situation and can give greater acceptance by involvement of citizens (Bull, R., & Azennoud, M. 2016).

The role of the government is to encourage the citizens to perceive, learn, adopt and accept the system and services provided by the smart city (Han, M. J. N., & Kim, M. J. 2021). Citizens' roles have also been seen as contributor and recipient. The recipient uses smart services to get information and the contributor participates in the decision-making by using services and evaluating them (Kopackova, H., & Komarkova, J. 2020). Citizens' roles can also be experts and volunteers where the experts share their competence and the volunteers share their time (Berntzen, L., & Johannessen, M. R. 2016a). Citizens' role in smart city initiatives changes, and evolves over time (Przeybilovicz, E., Cunha, M. A., Geertman, S., Leleux, C., Michels, A., Tomor, Z., ... & Meijer, A. 2020), therefore the role of the citizen should be developed in the individual projects and not entirely on a city level (Tomor, Z. 2020).

Cardullo & Kitchin (2019b) introduced “Scaffold of smart citizen participation”, which is a revised version of Arnstein’s (1969) ladder of participation. Compared to the original, they added the level Choice, which includes Consumerism.

The first type of participation is **Non-participation** which occurs when citizens are guided or directed in a specific direction. Interventions are mentioned as a form of Non-participation. Secondly, we have **Consumerism**, where citizens are offered services or products, and the choice is limited by already set variables. Thirdly, we have **Tokenism,** where citizens are informed of projects and can give inputs with different degrees of engagement. Lastly, we have **Citizen power** involving active citizens with different degrees of decision-making power (Cardullo, P., & Kitchin, R. 2019b).

These types are further defined with levels of participation, starting with **Manipulation and Therapy.** These levels are top-down approaches for controlling the citizens and not enabling them to participate, but instead educating them. **Choice** is where citizens are consumers of smart city services or the residents that are able to afford living in a smart building or district. **Informing, Consultation and Placation** is where citizens can give inputs, but the final say comes from people with higher power, for instance the municipality. Within the type of Citizen power, we have **Partnership** where citizens have the possibility to be part of the decision-making. Further we have **Delegated power,** where citizens can achieve dominant decision-making over a project. The top level of participation is **Citizen control,** where participants govern projects by being in charge and manage the policy (Cardullo, P., & Kitchin, R. 2019b, Arnstein, S. R. 1969).

An overview of this scaffold is shown in Table 1.

Type	Level of participation	Role
Citizen power	Citizen control	Leader, member
	Delegated power	Decision-maker, maker
	Partnership	Co-creator
	Placation	Proposer

Tokenism	Consultation	Participant, tester, player
	Information	Recipient
Consumerism	Choice	Resident, consumer
Non-participation	Therapy	Patient, learner, user, product, data-point
	Manipulation	

Table 1 - Roles of Citizens (Cardullo, P., & Kitchin, R. 2019b)

Cardullo, P., & Kitchin, R. (2019a) point to the fact that projects with citizen-focus are on the lower end of the ladder with non-participation as a form of informing or consultation (Cardullo, P., & Kitchin, R. 2019a). The ladder is a view on how citizens are involved in the planning process (Cardullo, P., & Kitchin, R. 2019b).

2.4 Motivating Citizens

Citizen engagement and participation in the smart city can be influenced by motivation (Webster, C. W. R., & Leleux, C. 2019). The citizens are the primary drivers of change and empowerment, and motivation ensures that the major city challenges can be addressed (Oliveira, Á., & Campolargo, M. 2015). Citizens not only have to feel the need to participate, but the government also needs to encourage their citizens and show a response. If citizens are not satisfied, it could lead to lack of motivation in later contexts (Bolívar, M. P. R., & Muñoz, L. A. 2018). Motivation can also be achieved by lowering the obstacles. Someone with low motivation could be more willing to engage if obstacles are reduced or eliminated, as these obstacles could lead to more time consumption as citizens must learn to overcome them (Polst, S., & Elberzhager, F. 2020). Citizens' motivation to participate depends on the public value of the initiative to co-produce rather than selfish motivation (Castelnovo, W. 2016).

Smart cities need to have a close relationship between governmental, private sector and citizens to become successful. Smart citizens together with ICT are equally important elements. Citizens should also have a platform where they can give opinions, suggest solutions and ideas as smart cities are most successful when they focus on their citizens (Šiurytė, A. 2016). Smart cities are about increasing the quality

of life for their citizens and technology are a facilitator, but not a solution (Craglia, M., & Granell, C. 2014). Citizen engagement may not be influenced by smart city technologies but citizens should be provided opportunities where they can give feedback on services offered, including improvements (Levenda, A. M., Keough, N., Rock, M., & Miller, B. (2020). Copenhagen, Stockholm and Helsinki are some of the top nordic smart cities and define their citizens as open minded in terms of collaboration with the government. Helsinki has on-demand services which motivates their citizens to participate and increase their digital awareness, but also improve the bottom up collaboration (Feher, K. 2020). Citizen motivation can also be influenced by the convenience, financial or time efficiency offered by digital technologies (Malchenko, Y. A. 2020).

Psychologists have defined two types of motivation. These are intrinsic and extrinsic. Intrinsic motivation is the individual's desire, while extrinsic motivation comes from being rewarded (Benabou, R., & Tirole, J. 2003). The intrinsic motivation can be based on the individual's interest and enjoyment and can be found engaging with an inherent satisfaction, where extrinsic motivation can offer a reward but be experienced as controlled with no power as they need to comply. Extrinsic and Intrinsic motivation is presented in Table 2 (Ryan, R. M., & Deci, E. L. 2020).

Types of motivation	Extrinsic	Intrinsic
	External reward	Interest
	Compliance	Enjoyment
	Reactance	Inherent satisfaction

Table 2 - Types of Motivation (Ryan, R. M., & Deci, E. L. 2020).

2.5 Communication

Within the area of citizen participation, we find communication to be an important area since interaction between the municipality and its citizens is important for a good established relationship. In terms of communication, three levels of communication were used to categorize the communication between the municipality and its citizens.

The model used was originally developed by Organisation for Economic Co-operation and Development(OECD), and further adapted by Berntzen & Johannessen (2016b). In the first phase, the municipality utilizes one-way communication to inform the citizens. The second phase involves two-way communication between the municipality and its citizens. The third phase involves the citizen being given an active role. Compared to the second phase, citizens can raise issues and concerns as they wish or see fit (Berntzen & Johannessen, 2016b).

2.6 Summary of Literature

To summarize the literature, we find that smart city and citizen participation are areas richly referred to in the existing literature. Despite the amount of previous research available, research related to motivating citizens and the citizens' role are quite underrepresented. The importance of motivation is present, where mostly usability and ease of use stands out as focus areas for motivation. To elaborate the literature on motivation of citizens to participate, categories of motivation identified in this study are divided in terms of extrinsic and intrinsic motivation (Ryan, R. M., & Deci, E. L. 2020). In terms of citizens' roles in the smart city, the literature on the importance of involving citizens is present. With that said, more detailed literature on citizens' roles when participating is not. To contribute to this area, the "Scaffold of Smart City Participation" by Cardullo & Kitchin (2019b) was introduced, where roles identified from our findings are placed in this scaffold.

3. Research Approach

This study aims to acquire a deeper understanding of the roles of citizens in municipalities and what the municipalities do to motivate citizen participation. We have proposed the following research questions:

> ***RQ1:*** *What roles do citizens have in smart city initiatives and projects in Norwegian municipalities?*
> ***RQ2:*** *How does the smart city motivate citizen participation in Norwegian municipalities?*

This chapter is aimed to describe our research approach for answering research questions. Firstly, we will go through the research approach, where we opted for a qualitative approach. This section will also include the research paradigm chosen. Secondly, our research design, where we opted for a single case study design. Thirdly, the informant sampling where we used purposive sampling to find interviewees. Fourthly, the data collection where semi-structured interviews were used in addition to document analysis with documents provided by the represented municipalities. Lastly, our data analysis where we opted for a thematic analysis. This chapter ends with limitations, validity and ethical concerns with this study.

3.1 Qualitative Research Approach

As mentioned in chapter 2.2, the citizen participation in the smart city is highlighted as an important factor in the making and developing of smart cities. However, the research on motivation and the citizens' role in the smart city is somewhat lacking. With our chosen topic and research question, our intentions have been to study the phenomenon in depth to gain a greater understanding of the area of citizen participation. As stated by Creswell (2018), qualitative research is a tool for this exact purpose, where we want to explore and understand the meaning a targeted group assigns to a problem. In the case of this thesis, our targeted group are the municipalities and the problem revolves around citizen role and motivation.

Within the area of paradigms, there are three paradigms referred to in qualitative research. These are positivist, interpretivist and critical (Myers & Newman, 2007; Khan, 2014). As defined by Oates (2006, p. 292), interpretivism is about understanding the social context of a phenomenon. It tries to identify, explore and explain how factors in a social setting are related and independent. With interpretive research, we get a deep understanding of the phenomenon (Oates, 2006, p. 292). Critical research is concerned with social change by exposing through critique the illusions of social existence (Richardson & Robinson, 2007). Lastly, the positivist which seeks to verify a prior hypothesis, where relationships can be divided in causal and

explanatory factors, and outcomes. One of the goals of this paradigm is to generate explanatory associations or causal relationships that lead to predictions and control of the phenomena studied (Park, Konge & Artino, 2019).

In this study, we have adopted the interpretive perspective, since we are investigating a phenomenon, the roles of citizens and motivation for citizen participation, in Norwegian municipalities. We seek to understand the technological and social context of the phenomenon we are studying, and identify how a variety of factors comes into play within the selected municipalities in this study. For that, the paradigm of interpretivist is best suited.

3.2 Single Case Study

When deciding for a research strategy, case study emerged as a suitable approach. Yin (1994, p. 13) defines a case study as "*An empirical inquiry that (1) investigates a contemporary phenomenon within its real-life context, especially when (2) the boundaries between phenomenon and context are not clearly evident*". As for Yin's definition of a case study, the real-life context in this thesis is Norwegian municipalities and the phenomenon is citizens' role and motivation.

Within the area of qualitative case studies, researchers usually separate case studies into single case study and multiple case study for understanding the phenomenon (Gustafsson, 2017). One of the main differences between single and multiple case studies is the amount of cases. If a study involves more than one case, it should be completed as a multiple case study (Gustaffson, 2017).
We could have opted for a multiple case study, but found that a single case study would be better suited. Even though the evidence gathered from a multiple case study is stronger and more reliable, they can also be expensive and time-consuming (Gustafsson, 2017). Our aim for this thesis has been to gain a greater understanding of the phenomenon in the context of Norwegian municipalities, and if we were to do a multiple case study on the 12 municipalities included in this thesis, it would not be feasible as a result of the time-consuming process, and the amount of data we would

need from each municipality. In addition, each municipality has a different degree of smart city focus. Some were highly involved with smart cities, and some were less, where smart cities are treated as a partial project in some cases. With some of the less invested municipalities, we would have encountered problems with the amount of data required to a multiple case study. Therefore, we opted for a single case study, where the municipalities are case-objects in the case. As stated by Gustafsson (2007), we can conduct a single case study with embedded units. In this way, we can look at subunits in the case, which can be compared with analysis.

Single case studies have shown to be a measure to richly describe the existence of the phenomenon, and single case studies should be used over multiple case studies when the researcher wants to study an enclosed or predefined environment (Gustafsson, 2017).

3.3 Informant Selection

Interviewees were collected through purposive sampling, also called judgement sampling (Etikan, Musa & Alkassim, 2016). According to Etikan et al. purposive sampling is a sampling technique where participants are chosen deliberately as a result of the participants' qualities. Further, individuals or groups need to be identified and selected based on their knowledge and expertise within the phenomenon we are researching (Etikan et al. 2016).

The informant selection started out with acquiring knowledge about Norwegian municipalities involved with smart cities. The network Smarte Byer Norge emerged, which is a voluntary organization operating Norway and the Nordic region’s largest smart city network (Smarte Byer Norge, 2021a). The network provided us with information about municipalities involved with smart cities, and thereby we could begin the informant selection process (Smarte Byer Norge, 2021b). An overview of municipalities is shown in Table 3.

Municipality	Municipality size	Date of interview	Interview object's role
Municipality A	Large municipality	08.03.2021	Project manager Smart City
Municipality B	Large municipality	09.03.2021	Communication advisor, Smart City
Municipality C	Large municipality	10.03.2021	Coordinator Smart City
Municipality D	Large municipality	10.03.2021	Userneeds, digitalization and communication advisor
Municipality E	Medium-sized municipality	11.03.2021	Strategic advisor Smart City
Municipality F	Medium-sized municipality	11.03.2021	Municipal manager - Technical
Municipality G	Medium-sized municipality	17.03.2021	Leader for innovation and Smart City
Municipality H	Medium-sized municipality	17.03.2021	Municipal planner
Municipality I	Large municipality	18.03.2021 23.03.2021	Advisor for the department of culture Project manager for project strategy in city development

Municipality J	Large municipality	22.03.2021	Chief innovation and digitalization
Municipality K	Medium-sized municipality	24.03.2021	Assisting municipal leader for social development
Municipality L	Medium-sized municipality	25.03.2021	Smart City Coordinator

Table 3 - Municipalities Participating

3.4 Data Collection

Semi-structured interviews were conducted as our method for gathering data, in addition to document analysis on documents provided by the represented municipalities.

Semi-structured interviews utilize an incomplete script, where the researcher has prepared some questions, but must improvise if needed (Myers & Newman, 2007). Compared to structured interviews, the semi-structured interview allows the interviewee to provide additional information related to our topics during the interviews. In this way, new categories can be discovered (Myers & Newman, 2007).

3.4.1 Semi-Structured Interviews

Data collection in qualitative research can be done in several ways. For this thesis, we have opted for semi-structured interviews as our main source of collecting data. The interviews were conducted in the period of March 2021, where each interview lasted from 30 to 50 minutes. In advance of the interview, literature on the topic of smart city, citizen participation, motivation and citizens role was reviewed to gain more information about the topic. This information was then used to create the interview guide (Attachment 1). With the use of an interview guide in the semi-structured interviews, it allowed us to stay on track, while the interviewee also had the opportunity to provide additional information.

We would have prefered to conduct the interviews face-to-face, but as a result of the ongoing pandemic, travel cost and timeframe, we opted to conduct the interviews digitally with a video conference software. The use of video was a requirement, so that we could observe the interviewees reaction and body language. The interviews were recorded, both with audio and video recording. After the data collection, the interviews were transcribed for further data analysis. The data were anonymized to preserve the interviewees' privacy.

There are several benefits with conducting interviews in qualitative research. Paré (2004) mentions some of the benefits. These are: interviews are (1) targeted-focused directly on the topic we are researching, and (2) it is insightful, and provides perceived causal inferences (Paré, 2004). With the benefits in mind, we found interviews to be suited for our data collection. With interviews, we can interview relevant employees in the municipality, which makes it more likely that we can obtain the data relevant for this study.

For the interviews, we have followed Myers and Newman (2007) seven suggested guidelines for the researcher/interviewer:

- ***Situating the researcher as actor***. Before the interviews, both researchers "situated" themselves to make it as close to a natural interaction as possible. Myers and Newman (2007) suggested asking questions like who the interviewee are and what role they have, and so we did. This led the interview to feel more like a normal social interaction.
- ***Minimise social dissonance***. Throughout the interviews, both researchers paid close attention not to cause the interviewee unnecessary social dissonance. We made sure we presented ourselves professionally, dressed appropriately and spoke in a controlled professional-like way. All depending on the interviewee.
- ***Represent various "voices"***. To avoid elite bias, we made sure that our selected informants from the municipalities had different job titles in their smart

city work. People with different positions may have other perspectives relevant for the study.

- ***Everyone is an interpreter***. Interviews are mostly an unusual event for the subjects. Subjects are creative interpreters of their worlds as we are of theirs. Interviews will lead to one or more texts, for instance interview transcripts, which leaves room for different interpretations.
- ***Use mirroring in questions and answers***. During the interviews, we mirrored the interviewees' words and phrases. We found this to be a good practice, as we paid more attention to what was said than what should be said next. It also made it easier to do follow-up questions. We started off with broad questions defined in our interview guide, and further narrowed it down in the areas relevant for the interview.
- ***Flexibility.*** As a part of semi-structured interviews, it is important to be flexible, improvise if needed and to be open. During the interview, we paid close attention to the interviewees' attitude, so we can act accordingly. For instance, if the interviewee showed signs of uncertainty, we tried to facilitate the interview further to suit the interviewees' needs.
- ***Confidentiality of disclosures.*** Transcripts and recordings are stored securely, where only the researchers have access to it.

3.5 Data Analysis

In this study, we opted for an inductive approach with a thematic analysis. As defined by Clarke & Braun (2014), thematic analysis is a method for identifying and analyzing patterns, or themes, in the qualitative data. We opted for a thematic analysis as it is flexible, provides rich and detailed data, does not require a detailed theoretical and technological knowledge of other qualitative approaches, which offers a more accessible form of analysis (Nowell et al. 2017). We find that a flexible type of analysis which provides rich and detailed data is suited for this study as we don’t have a lot of prior experience of analysing qualitative data at this size. As Nowell et al (2017) also mention, they find this type of analysis to be easier to grasp and relatively quick to learn for those early in their research career.

> "*Thematic analysis is a useful method for examining the perspectives of different research participants, highlighting similarities and differences, and generating unanticipated insights*" (Nowell et al, 2017, p. 2)

As quoted by Nowell et al. (2017), we find this form of analysis to be suited for our research, as we are interested in examining the perspectives of smart city workers in the municipalities, where the data generated can be used to compare the municipalities with one another. Despite this study not being aimed to compare the Norwegian municipalities, our findings can be used as a learning experience for the municipalities, potentially improving their smart city in terms of recognizing citizens' roles and motivational factors for participating.

With thematic analysis, Nowell et al. (2017) also mention some disadvantages. These are:

- Lack of literature on thematic analysis, which can make the researcher feel unsure of how thematic analysis is conducted.
- Compared to other methods, thematic analysis does not allow us to make claims about language use.
- Can lead to inconsistencies and lack of coherence when themes are developed as a result of its flexibility.

Despite the disadvantages of thematic analysis, we found the advantages to outweigh disadvantages. Still, we find it important to be aware of these disadvantages when conducting the analysis.

For the thematic analysis, we have followed the 6 phases suggested by Nowell et al. (2017). These are (phase 1) familiarizing yourself with your data, (phase 2) generating initial codes, (phase 3) searching for themes, (phase 4) reviewing themes, (phase 5) defining and naming themes and (phase 6) producing the report. In addition, we utilized the NVivo software which provides a structured environment to conduct the analysis.

Familiarizing Yourself With The Data

In the first phase, we have to familiarize ourselves with the data. As we utilize textual data from interview transcriptions, these were loaded into NVivo so that we could start the process of familiarizing ourselves with the data. Initially, the data was roughly reviewed to get a general impression of what data we had, and further we started the planning of potential themes in the data. As mentioned in 3.4, we also conducted some document analysis in addition to the analysis of interview data. The document analysis was used to verify what was being told in some of the interviews where documents were provided.

Generate Initial Codes

In this phase, our familiarization of the data was complete and we started with producing codes. The coding was done by identification of important parts of the interview data, and then attaching them to labels. Initially, we underestimated this phase as we found it somewhat challenging to review the amount of data we had gathered. We started off by reviewing the data in an unstructured way, where it was a challenge to be thorough. This resulted in the data being reviewed several times by both researchers, to make sure not any important data were left out.

Search for Themes

In this phase, the codes generated from phase 3 were sorted and extracted into themes. The themes were developed by bringing together codes closely related in the same categories. For instance, motivation was defined as a theme, where subthemes were used to keep track of the different types of motivation in the municipalities, with codes belonging in the subthemes.

Reviewing Themes

In this phase, we reviewed the themes obtained from phase 3. The concept of this phase is to consider whether the coded data was forming a coherent pattern. Some themes were too broad and were further divided into smaller themes, and some

themes were removed as we found no use for it, or it was covered by other themes. We also removed the themes with not enough data to support the theme.

Defining and Naming Themes

In this phase, we reviewed our themes and named them according to their content. We looked at what aspect of the data each theme presented, and developed a story of what each theme told us. We continued to improve defining and naming of the themes until we were satisfied with the result. This process demanded several reviews before being completed.

Producing the report

In the last phase, the themes are completed and we were ready to use them in this thesis.

3.6 Limitations

This research has some limitations, which are important to address. Firstly, in terms of interviews, we would have opted to conduct face-to-face interviews. As a result of the currently on-going pancemic, this proved to be difficult. As a solution we opted for digital interviews with the use of video of both researchers and the participants. Even though we found this solution to be as close to the prefered way as possible, there is a possibility that this limited us, for instance, with picking up social cues by the interviewee.

Secondly, we conducted one single interview with each of the representatives. For one municipality, two interviews were required as the interviewees had different responsibilities within the themes being researched. The use of one interviewee might have limited us in regards to the variety and depth of the data collected. When planning the interviews, we found that one representative was sufficient, since we included interviewees with different job titles. As a reflection after the research was completed, the use of 3-4 representatives within relevant fields of work in the smart

city might have given us more depth to our data. We are not in doubt that our findings are significant, but we find it important to mention this as a potential limitation.

Thirdly, this study includes medium-sized and large municipalities. Within the represented municipalities, none of them was categorized as small (less than 10,000 inhabitants) (Kommunesektorens organisasjon. 2019). This might be seen as a limitation, as we intended to look at citizens' role and motivation with a holistic view.

Lastly, some categories of motivation and citizens' roles were hard to define as a few categories only were present in a few of the municipalities. Even though less frequently referred to, we find the resulting categories to be sufficient.

3.7 Validity

Within the area of qualitative research, validity is an important part of making the research trustworthy. The term is concerned with the researchers measuring what should be measured or how truthful the results are (Golafshani, N., 2003).

With a case study, Yin (1994, p. 33) mentioned four tests for validity which are suited for testing validity in the research. These are:

- Construct validity, which evolves around establishing correct operational measures for the concepts being studied.
- Internal validity, where we look at certain conditions, and if it leads to other conditions in a casual relationship. Can we conclude that an observed relation is casual.
- External validity, which is concerned with generalizability, and the findings can be applied to a part of the population or group involved.
- Reliability, which is concerned with how reliable the research is. Data collection is mentioned as an example. For the research to be reliable, the data collection can be repeated with the same result.

3.8 Ethical Concerns

Within the area of ethics, it is important for a researcher to conduct the research in an ethical manner. Oates (2006, p. 60) summarizes a set of duties, or responsibilities, of an ethical researcher. These are as follows: (1) No unnecessary intrusion, (2) behave with integrity, (3) follow appropriate professional codes of conduct, (4) no plagiarism and (5) be an ethical reviewer. In this thesis, an ethical reviewer is excluded hence we have not published any research and are not classified as established researchers.
As far as Oates (2006, p. 60) set of responsibilities of an ethical researcher, these have been taken into consideration when doing this thesis. Intrusion is dealt with in several ways. First of all, we have ensured that the knowledge we are seeking is not already available. We have also designed the interview-guide appropriately, with no unnecessary questions which do not provide value to the research (Attachment 1).

Integrity is dealt with in several ways. First of all, the data collected are reported as it is. This means that we are not manipulating data to get the result that we seek. The data is also securely stored with encryption of files on a cloud server, where only the researchers have access to the data. We also do not seek to shame or embarrass any participating municipalities for their lack of focus or investments in smart cities. The data is anonymized to eliminate any concerns for the interviewee in this area. The smart city focus is not a mandatory focus area for Norwegian municipalities, and therefore their investments vary.

Plagiarism is unacceptable, and should not be done in any state or form. Information from other publications and other sources must always be credited to the original author, with an adequate reference style, so that the reader can find the original work. In this thesis, APA-6th is used to ensure proper citations and references for the reader.

4. Empirical Findings

In this chapter, we present the empirical findings from the qualitative semi-structured interviews on the Norwegian municipalities. Categories of both citizens' roles and what the municipalities do to motivate their citizens to participate in the smart city development are presented.

Firstly, we present information about the municipalities and their smart city work. This section focuses both on their smart city history and concepts we find important and related to both citizens' roles and motivation.

Secondly, we present the citizens' roles in the Smart City. These roles are presented in the form of categories obtained from the data analysis on the qualitative interviews. In total, five roles were identified of citizens' roles.

Lastly, we present categories of motivation to motivate citizen participation in the municipalities. We identified eight categories of motivation. Before we review our findings, our research questions are mentioned to be kept in mind while reading this chapter. These are as followed:

> ***RQ1:*** *What roles do citizens have in smart city initiatives and projects in Norwegian municipalities?*
>
> ***RQ2:*** *How does the smart city motivate citizen participation in Norwegian municipalities?*

4.1 Case Description

The participating municipalities are all classified as smart cities. In this section, we aim to enlighten the reader of the status of the municipalities discovered through our data collection.

The participating municipalities were selected for their involvement in the smart city network. A total of 22 municipalities were contacted based on the information provided by Smarte Byer Norge. These municipalities were contacted with additional information about our research to ensure their expertise in the field of Smart Cities. Out of these 22 municipalities, 12 agreed to meet with us for interviews. Population-wise, the range of citizens in each municipality was from 20,000 to about

400,000. This leaves the municipalities to be categorized as medium-sized and large municipalities in a Norwegian context. Medium-sized municipalities have a population of 10 - 50,000, and large municipalities have a population greater than 50,000 (Kommunesektorens organisasjon, 2019). The participating municipalities can be viewed in Table 3.

Most of the municipalities started working with Smart City between 2017 and 2019, where one municipality started as early as 2014. Even though 2014 is not classified as early in Smart City history, the interview data showed us that this was quite early in a Norwegian context. As a general observation, the reasoning for the investment in Smart City stems from trends within the EU, where many of the participating municipalities initially got involved with Smart City for this reason.

> *"There has been a lot of EU funds tied to Smart City, and that might be a part of the reason why Smart City has become so big. In all of Europe really, but also in Norway, and many municipalities have joined this trend. For many municipalities, it's not about doing something new, but more so about gathering what we already do under the umbrella of Smart City."*
> - Municipality H

4.1.1 Smart City Strategy & Status

In this section, we asked if the municipalities had strategies for both Smart City and citizen involvement. We also asked them how they place themselves compared with other municipalities in terms of Smart City. We found that 3 municipalities have a dedicated strategy for Smart City. Despite this, all municipalities have strategies they follow, where the aspects of Smart City are integrated in other types of strategies. Most commonly occuring are innovation, communication, the societal part of the municipality plan and strategy for citizen involvement. Multiple municipalities also mentioned a Smart City roadmap, developed by DOGA (2019), which they follow as a strategy for Smart City. As we found the lack of a dedicated strategy puzzling, we asked the municipalities without a strategy why this was the case. One municipality said the following:

“When we became a smart city, we chose not to create a strategy. It stems mainly from the quick changes, and we realised that if we were to sit down and work on a strategy, it would be completely different in a year or so. And that was the case. In recent years, there have been a lot of changes. Of course, trends like citizen focused have been there all the way.”

- Municipality A

We also asked the municipalities to compare themselves to other municipalities, to get an idea of how they see themselves performing in the Smart City network. Many of the municipalities acknowledge that they are somewhat behind, both in what they want to do with the Smart City and compared to other municipalities. A few claim to be among the best in terms of Smart City in Norway, where most see themselves as average performing. Two municipalities claim to be far behind.

Collaboration between municipalities was present for almost all of the municipalities. Most municipalities gain inspiration from the top performing ones, and we found that some, especially the smaller ones, collaborate closely with their nearby municipalities.

The municipalities with lower population (around 20,000) mentioned resources as a big problem, influencing their Smart City status. Most of them have ideas for areas of improvement, but resources are a challenge to realise these ideas. One municipality said the following:

“We are a medium-sized municipality, and we see that the larger municipalities have more muscles compared to us, in terms of them having a broader Smart City investment. They can be ahead on all fronts, and with us, we have to balance our project as a result of limited resources in the municipality. In some projects, we are at the top of Norway. In terms, other projects have less resources available and can’t be competitive compared to larger municipalities.” - Municipality L

4.1.2 Smart City Organization

Within the organization of Smart City, most municipalities have utilized pre-established departments to incorporate Smart City Work. Departments most reoccurring are social development, innovation, citizen and communication. A few municipalities have 1-3 employees working with smart cities as a full time job. Some of these also have project managers and developers working in reduced positions. Within the least invested municipalities, Smart City was not incorporated as a part of other departments, whereas Smart City was treated more like projects than incorporated work practices. Two municipalities have their own department for Smart City work, with an average of 10 employees.

4.1.3 Smart City as a Focus Area

To gain a deeper understanding of each municipality's Smart City investment, we asked the municipality why they have invested in the Smart City. As mentioned in section 4.1, most of the municipalities got involved with Smart City as a result of this trend all over Europe and Norway. With more municipalities investing in Smart City, others felt like they had no choice but to invest as well, as they felt it was a necessity to continue collaborating with other municipalities. One municipality said the following:

> *"Smart City is kind of a buzzword in the public sector and in general in Norway... The public sector shall work together with the citizens and the municipality is there for the citizens. The starting point is that the needs of citizens are taken into account, where we use new technology to make the city a better place to live and work in... It's not a clear strategy that obligates us to invest in Smart City, but we see that it is important to keep up with it. It is what the others do. How we are going to collaborate with other municipalities, and therefore it is natural for us to invest in Smart City as well."* - Municipality D

In the more recent years, the perspective seems to have changed. Several of the municipalities experience the benefits with Smart City in a new way. For instance, one municipality said the following:

> "*It is a complex reason why we do what we do (Smart City). We see that more and more people wish to live in the city, so that leads to more pressure on our provided services, and a very ambitious climate- and environmental goals both locally and internationally*" - Municipality B

> "*We know that an age wave is right around the corner. I guess it is in 2022 or something like that. We have to think differently with the elders in mind, to gain a lower pressure in nursing homes.. And we look at mobility. How people travel in the city. We have a need for more coordination, and the pace of technological changes are going very fast. Citizens now have different expectations to the municipality. They expect that our services are as easy to use as other services they are using. Why should the municipality operate on paper and heavy systems when they can solve all of this so much easier themselves? So in a way, we must keep up.*" - Municipality B

> *"I think that people emphasize sustainability more than being smart, but I see these two as the same. In the definition, it's about the creation of smart sustainable cities. "* - Municipality A

As an endpoint, some of the municipalities mention the reasoning as a kind of aid to gain better insights on the municipalities services, with the perspective on what they are doing and what can be done better. One municipality said the following:

> *"I think that an initiative like smart city helps to make the municipality aware of what we actually do, why we do it, and what works and what can be done better"* - Municipality H

4.1.4 Citizen Involvement

Citizen involvement is an important area for the Smart City. The municipalities have throughout the data collection told us what is being done to involve citizens. We asked them if they could do more to engage in citizen participation. The result we got was unanimous. All municipalities claimed they could do more to get citizens to participate. Some municipalities thought citizen participation as an area of great improving potential. Others were quite satisfied but still thought there were areas of improvement. One municipality said the following:

> "*We can do more. We can always do more. It is absolutely clear.. What should I say? It is really important, and we should do it in all of our subject areas in all contexts. That is when there will be good results. So yes, we can do more. We can use more time on it, and we can acquire more competence and more experience and better tools, so yes, there are many opportunities ...* "
> - Municipality K

In the area of citizen participation, we also asked how they see the effect of initiatives the municipality takes to involve their citizens. Most municipalities claim to see the effect on initiatives established for citizen participation. Mostly, these effects are viewed as a comparison between earlier initiatives and the use of feedback from the citizens. A few of the municipalities utilize Key Performance Indicators (KPI) to measure performance on their citizen involvement initiatives.

4.1.5 Communication

Most municipalities try to adapt communication based on each project or initiative in focus. In some cases, they find one-way communication as the best practice. In others they find active participation as the best suited.

Channels and platforms for communication are quite similar between the municipalities. Most municipalities have a website used for both information sharing, but also to report problems or deficiencies. Some municipalities also have integrated other smart applications in their website which utilizes areas like real-time data and sensor data.

> "*The municipality is good at informing through the municipality app and social media. We publish news several times each day about what's going on, so from being quite bad at the area, the communications department have done a great job.*" - Municipality G

4.2 Roles of Citizens

To gain a greater understanding of citizen engagement and participation in the municipalities of this study, we asked what roles citizens have in their city. A greater part of the municipalities say that they don't have defined roles for their citizens, where a few say that they have. Even though most municipalities have not defined the roles of their citizens, they are still participating in the smart city in various ways. One municipality said the following when we asked for citizens roles:

> "*No, not yet. We work a lot with citizen involvement, and what is called co-creation. But no defined role other than what I said we are working on. In each project, we will have a degree of citizen involvement*"
>
> - Municipality B

In this section, we present an overview of roles we discovered citizens have in the Smart City. The roles we discovered are: *User of Services, Co-creators, Stakeholders, Testers* and *Volunteer*. Since most municipalities did not have defined roles for their citizens, these roles are constructed as a result of analysis on data gathered from the interviews. An overview of citizens' roles are shown in Table 4.

Role	Description
User of Services	User of services are the most common role in the municipalities, where the citizens are users of Smart City services provided by the municipality.
Co-creator	Co-creator is a role where citizens are co-creators in the smart city development.
Stakeholder	In the Smart City, citizens are viewed as stakeholders in terms of services and initiatives provided by the municipalities.
Tester	The role as tester is defined by testing Smart City services provided by the municipalities.
Volunteers	In a few of the municipalities, citizens can have the role as volunteers for Smart City services.

Table 4 - Citizens Roles in the Smart City

User of services is the role most occuring within the municipalities. This role revolves around being a citizen in the smart city and utilizing smart city services for improved life quality. In this area, services are referred to as initiatives and projects within the Smart City, both created locally by the municipality or developed by a third party. Throughout the interviews, several types of services were mentioned. For instance, applications for real time tracking of snow plowing, platforms for alerting the municipality about faults and omissions, and applications for informing citizens about important tasks, like when the next garbage disposal is. The digital services were mostly stand-alone, where one municipality had an integrated platform with most of their geo-related services integrated. To mention a few, live tracking of busses, snow plowing and ferries in the municipalities. One municipality said the following related to User of services:

> "*An example is the snow plowing map, a digital snow plowing map which we have introduced where cars are using GPS. When cars plow snow in a street, the map is updated with real time data*" - Municipality F

This application mentioned in the quote was an example of a service available for the citizens in Municipality F.

Co-creation involves citizens being an active part of the development of projects or initiatives in the Smart City. For the citizens to take an active part of the development, several initiatives are mentioned by the municipalities for this purpose. Among others, workshops and living-labs are commonly used to enable this role. One municipality said the following about Co-creation:

> "*We wished to be seen as transparent by the citizens, so that they could feel that they had the chance to influence, and that they see that a role is present. This was the foundation of why we wanted a city-lab, because we wished to take the citizens seriously, where co-creation is being done in a new way that has not been done before*" - Municipality A

In the Smart City, citizens also have the role of **stakeholder**. As citizens are a crucial part of any city, it also makes them crucial stakeholders. In the end, the Smart city is developed for its citizens, and therefore citizens should be able to influence the development. Several municipalities define their citizens as stakeholders, where the importance of their influence is crucial. One municipality said the following:

> "*Citizens are important stakeholders, and we have to know their needs in addition to their participation in development and testing activities*"
>
> - Municipality L

Tester is the role where a citizen, or a group of citizens, are used to ensure quality, usability, userneeds and other similar areas for a Smart City initiative. The role of tester is executed in several ways, where we found that testing is involved before, during and after a smart city initiative is completed. In the first phase, often planning-phase, the role as a tester often includes proof of concept, user-needs definition and other forms of feedback. During the development of the project or initiative, testing is done mostly with user testing of the parts completed or closely completed. After the project is completed, testing is mostly done with citizens testing the service and giving feedback to the municipality. One municipality said the following about the role as Tester:

"*When a project is implemented, we have a test panel among citizens, which are testing the solutions or apps being developed. The testing is organized with the municipality... For instance, plow drivers test the app while doing their job... we receive feedback on UX and content, if notifications are accurate and such.*" - Municipality L

[The second part of the quote were in the context of an application used by plow drivers to monitor roads plowed with real time data]

Lastly, citizens can also have the role of **volunteers**. This role involves citizens themselves taking actions on matters that are in need of change, maintenance or improvement. Throughout the interviews, we got several examples of what this role entails. One example we got of this was the use of citizens as active co-citizen in the municipality. Instead of being a typical service-oriented municipality, they were given responsibilities for certain areas, where citizens are responsible for mobilizing what has to be done. There were also examples of less extensive actions. In one municipality, citizens were responsible for placing buoys with sensors in the ocean for measuring temperatures during the summer. This data could further be used in other Smart City services.

"*We have volunteers involved with sensors measuring swimming temperatures during the summer. These sensors are placed on buoys, which volunteers helps with placing them out during the summer, and further they help with the maintenance*" - Municipality J

4.3 Motivation

To gain a greater understanding of what the municipalities are doing to motivate citizen participation, we asked them what they think of motivation and what they are doing in terms of motivating citizens to participate. Several initiatives emerged from the interviews, which are categorized in this section. In total, eight types were defined: *rewards for participation*, *personal motivation*, *enlightening citizens*, *see the citizens*,

sustainability motivation, *project selection*, *targeted projects* and *ease of participation* which can be viewed in Table 5.

Motivation	Description	Type of motivation
Rewards for participation	This form of motivation is about giving the citizens rewards in exchange for them participating in different areas.	Extrinsic motivation
Personal motivation	This motivation stems from the citizens personal interest for the initiative in focus, which leads to the citizen wanting to participate and influence the direction for personal gain.	Intrinsic motivation
Enlightening citizens	This motivation involves enlightening citizens that they are able and what areas they are able to influence.	Extrinsic motivation
See the citizens	This motivation stems from trust, both that the municipality shows that they use feedback and that citizens see that they can make a difference	Intrinsic motivation
Sustainability motivation	Similar to personal motivation, sustainability motivation stems from personal interest, but within the area of sustainability.	Intrinsic motivation
Project selection	This motivation is about selecting initiatives and projects popular for the citizens. With popularity comes higher probability to participate	Extrinsic motivation
Targeted projects	Like the last one, this is kind of similar but instead of going for “popular” projects, selected groups are chosen for specific projects.	Extrinsic motivation
Ease of participating	Enable ease of participation with the use of Smart City services	Extrinsic motivation

Table 5 - Types of Motivation

In terms of motivating citizen participation in the municipalities, **Rewards for participation** were the first category we unfolded from the interviews. The concept of rewarding is about the municipality trading gifts or experiences for the citizens participation in different areas of the Smart City. For most municipalities, rewards are typically some form of dining at the event, where tickets to cultural arrangements also

were mentioned as a type of reward. One municipality said the following about rewarding citizens for their participation:

> *“In some projects, we have chosen to reward citizens for sharing input on smart city matters. Rewards are usually drawing of gift cards, cinema tickets or something like that”*
>
> - Municipality L

Personal motivation is about citizens being motivated to participate as a result of their own willingness, personal needs or interests. As we find personal interests to be quite general, this type of motivation is quite broad and can influence several areas in the Smart City. From our findings, the citizens' geographical location seems to play a somewhat big part in willingness to participate. If a Smart City initiative is planned in an area of close proximity where the citizens live, they are more likely to participate. One municipality said the following about personal motivation:

> *“In a lot of cases, the opportunity to participate in itself is enough motivation for the citizens to participate.”*
>
> - Municipality L

> “*What engages are what you are concerned with, and what you experience in daily life. People engage in things that concern them*”
>
> - Municipality L

Enlightening the citizens is about making the citizens aware that they have an opportunity to participate, and how they are able to participate. The concept of enlightening the citizens is that citizens may not know that they have the opportunity to participate, and what areas, and therefore enlightening them could lead to an increase in citizen participation. One municipality said the following about enlightening citizens:

“In regards to motivation, it’s more that we need to get the citizens to realise that they have an opportunity to influence in some way. And that we are interested in listening, and that we can make better services and areas for the citizens if they share their insight with us.” - Municipality B

See the citizen revolves around that the citizen feels that their contributions are seen and taken seriously by the municipality. It can be viewed as a form of trust, where it is important that the municipality shows that actions and feedback from the citizens are being used, and taken seriously. When citizens feel they are being seen and taken seriously, several municipalities claim that they are more willing to participate. One municipality said the following about seeing their citizens:

“*I think the most important we do regarding motivation is that citizens feel like their input are heard*” - Municipality G

“We see good motivation for example for students, when they get the opportunity to participate through school assignments. For them, it’s not just any school assignment. When they are done, they get to present the assignment to business life, which leads to the first steps towards participation, and the students get to follow the processes. They see that we actually listen to them, and take their suggestions into consideration, which we build upon further. So that is a really good motivating factor for some groups.”

- Municipality A

Sustainability, similar to personal motivation, is defined as a willingness to participate as a result of personal interest. In this area, citizens are willing to participate as a result of the sustainability-focus on the Smart City initiative. Despite its internal connection with personal motivation, sustainability emerged as a greater category within personal motivation, and therefore we defined it as its own category. Municipalities claim to see more willingness to participate if sustainability is a focus area in the initiative, since citizens find this area important. In some municipalities,

they see that especially younger citizens, like students, are more concerned about sustainability. One municipality said the following about sustainability as a motivation:

> "*I think the youth are better at thinking holistically. To think about the whole society and see the future. If you visit a school-class, they view it as they are going to inherit the future. They think about sustainability for the municipality*"
>
> - Municipality L

Project selection involves mapping projects and initiatives which are viewed as important for the citizens. These initiatives are selected in different ways, where some municipalities mention surveys and workshops as an important arena for gathering this information. When the municipality identifies initiatives popular among its citizens, they often see increased participation. One municipality said the following about Project selection:

> "*For instance, we utilized hackathons... The main group for one of the hackathons were students and business life... This hackathon was utilized to map citizens' needs, where citizens had the opportunity to provide feedback and ideas, which is a way of participating. From this hackathon, we used the feedback to decide which projects to initiate. This was one of 15 hackathons arranged by the municipality for this purpose*" - Municipality L

Targeted projects are somewhat similar to project selection, but in this type of motivation, the project is already selected and the municipality invites targeted groups to participate in the planning or mapping phase. By using suited groups for this purpose, "relevant" citizens get to participate in projects, and thereby should be more interested in participating. One municipality said the following about Targeted projects:

> "For instance, we had a workshop for disbaled citizens, one for immigrants, one for sports, one for youth etc. We targeted groups and collected their needs, which resulted in a mapping of needs, which then were compared with

criterias from the politicians. So we make sure that projects initiated by the municipality actually are needed by the citizens.” - Municipality L

Lastly, we have **ease of participation**. This type of motivation involves the municipality facilitating ease of citizen participation with the use of Smart City services. With ease of participation, the goal is to facilitate participation for citizens that otherwise would not, or rarely, would participate. With the use of these services, citizens that do not have time for typical public meetings might find the time to participate with the aid of digital services. One municipality said the following about ease of participation:

> *“Many citizens have opinions in several areas, but they don't engage in participation. I think the clue is how to lure these citizens to participate. There are also citizens who engage too much, who often have special opinions in different areas. The use of digital platforms enables ease of participating. For instance, families with young children. They are often very busy, so flying around to physical meetings is often not prioritised. If these families or others get the opportunity to participate digitally, it would make it easier for them to participate. The information is provided quickly, and from there they can decide if they want to share their opinion. I think the most important part is that as many as possible are being heard, and not just the same regulars.”*
>
> - Municipality G

5. Discussion and Implications

Findings from our research identified 5 categories of citizens’ roles and eight categories of motivational factors used by the municipalities to motivate citizen participation. In this chapter, the aim is to discuss our results, connect the findings to our research questions and supplement our findings with existing literature in the field of citizens’ roles and motivation to participate in smart cities. The research questions for this study is as followed:

RQ1: *What roles do citizens have in smart city initiatives and projects in Norwegian municipalities?*

RQ2: *How does the smart city motivate citizen participation in Norwegian municipalities?*

5.1 Citizen Participation in Norwegian Municipalities

In this section, citizen participation in the municipalities are discussed. Firstly, we will discuss how municipalities perceive their citizen participation, and what they do to involve them in smart city projects, processes and initiatives. As mentioned by Berntzen & Johannessen (2016a), participation should be a mix of activities with technology using discussion forums and social media, but also town hall meetings (Berntzen, L., & Johannessen, M. R. 2016a). As our findings point out, all of the participating municipalities utilize town hall meetings, in addition to other types of participation, both digitally and physically. With the use of different platforms and measures to participate, the municipalities claimed to involve more citizens than before. The increased amount of participation was not measured, but most municipalities claimed to perceive more engagement when introducing different ways of participating.

In terms of involving citizens, most municipalities claim to involve citizens where they see participation appropriate. Berntzen & Johannessen (2016a) mentions three reasons for why the citizens get involved. These are as a result of their competence and experience, data collection through citizens and participating as democratic value.

Municipalities claim that if projects are going to succeed, they need external competence from their citizens. The more experience, the better the results. According to the municipalities, citizens who are regularly involved understand more than citizens that are not involved. Citizens can often report to a service center, where inputs are routed to relevant departments. Just being able to participate increases the democratic value as citizens are able to give their inputs about the projects, and thereby might be able to influence the decision making. In terms of democratic value, Michels & De Graaf (2010) claims that citizen participation can have positive effects on

democracy as it contributes to inclusion of the individuals and rational decisions based on the public which can increase the outcome. The outcome can be that the citizens are satisfied with the solutions the municipality has offered them since they have been involved in deciding what they need and what the municipality can do to improve their services.

In regards to citizen participation in norwegian municipalities, most claim to see the effects of participation from their citizens. This is mostly in forms of feedback from earlier smart city initiatives, but the citizens also participate in workshops, city labs, projects and through networks for collaboration with the municipality. Citizens have the opportunity to take part in planning processes where they are seen as an important stakeholder by the municipalities and want to have them involved in the development.

Communication between the municipalities and its citizens' are important for citizens participation. Channels for communication in the municipalities are usually on platforms such as Facebook, Twitter and Instagram, but the municipalities also utilize their homepage for communication, in addition to emails and other forms of communication. Several municipalities mention the use of Decidim, which is a digital platform designed for citizen participation. In this platform, the citizens are able to participate in the smart city. As stated by Levenda et al. (2020), citizens should be provided opportunities where they can participate. In this research, all municipalities utilize several different ways for engaging their citizens to participate.

Multiple municipalities mentioned Municipality 3.0 as a continuous goal, where the municipality is a service provider for the citizens (Guribye, E. 2016). With Municipality 3.0, citizens are co-creators to mobilize and merge the possibilities and areas, so they can think together.

5.2 Roles of Citizens in the Smart City

In this section, we will discuss the roles citizens have in smart city initiatives. Based on our findings, five roles were identified that will be used to answer RQ1. To summarize these roles, these are as follows: *User of Services, Co-creators, Stakeholders, Testers* and *Volunteer.*

To categorize the roles, we applied them to Cardullo & Kitchin's (2019b) "*Scaffold of Smart City Participation*". This scaffold is an adapted version of Arnstein's (1969) ladder of participation. The scaffold can be used to see which smart city initiatives are citizen-centric and examine the roles of the citizens in smart cities. The adapted version has the original types and levels of participation (Figure 3), but added Consumerism and Choice (Table 1). Table 6 shows an overview of types and levels of participation, in combination with the roles identified from our findings.

Type	Level of participation	Role
Citizen power	Citizen control	-
	Delegated power	Volunteer
	Partnership	Co-creator, stakeholder
Tokenism	Placation	Tester
	Consultation	-
	Information	-
Consumerism	Choice	User of services
Non-participation	Therapy	-
	Manipulation	-

Table 6 - Roles of Citizens Compared to Levels of Participation (Cardullo & Kitchin, 2019b)

The citizens' role as a **stakeholder** is viewed as an important role, where citizens are viewed as stakeholders in terms of services and initiatives provided by the

municipalities. The municipalities need to know their citizens' needs and the citizens are usually involved in the planning processes. Cardullo & Kitchin (2019b) claims that planning is a top-down approach which doesn't consider citizens' needs. Compared to Cardullo & Kitchin (2019b), we discovered quite the opposite, where citizens are involved in planning processes so that their needs are heard. Workshops and city labs were mentioned as typical forms of participating in planning processes, where the involvement of stakeholders was viewed as a prerequisite for succeeding in the development planning. Nesti (2020) also mentioned stakeholders as an important role in the collaboration between stakeholders, citizens participation, experimental innovation and a holistic approach to local policy development (Nesti, G. 2020). As citizens are a crucial part of any city, it also makes them crucial stakeholders. In the end, the Smart city is developed for its citizens, and therefore citizens should be able to influence the development. The role of stakeholder is considered as important. As stated by Gooch et al. (2015), the cities should start with people rather than technology. Whether defined as stakeholder or other roles, people are important to include as they are the citizens and users of the city, which also makes them stakeholders. By having a citizen-driven approach, the process becomes more transparent to the citizens (Nam, T., & Pardo, T. A. 2011), which in terms increase both quality in their services, and increased user satisfaction with participation.

The role as stakeholder is categorized under the Citizen power (Partnership) as this role has the potential to influence the development, and municipalities see stakeholders as important in the development of their city. According to Przeybilovicz et al. (2020), citizens' role in smart city initiatives changes from place to place, and situation to situation. While we cannot confirm this nor deny it, our findings suggested that the role as stakeholder was defined as an overall role where specific tasks and actions were not defined by the municipalities. Tomor (2020) mentions that citizens' role should be developed in the individual projects and not entirely on a city level (Tomor, Z. 2020). While this might be the case for the role as stakeholder, we found this not being the case for all other roles. For instance, the role of a tester. As this role can be viewed as systematic, where testing techniques might be transferred between projects.

The role where a citizen, or a group of citizens are used as a **tester** to ensure the quality, usability and user needs in the development of smart city services. Citizens are involved in the smart city services offered by the municipality with forms of consultation, where citizens can say what worked well and what did not. The tester can be involved in all stages of a project from planning, during or after the project is finished. Testers are active citizens which are able to influence by giving feedback and ensure the quality of the services. Allen et al. (2020) also found that this type of participation can increase the performance of services, which in terms, citizens can benefit from. According to Cardullo & Kitchin (2019b), testers usually don't have the opportunity to decide which services they want as they usually are included in the production phase. While this might be true for our case as well, there also were cases of citizens testing services for the sake of improving further services. The role as tester is placed under the category of Tokenism (Proposer) as this role involves testing the smart city services offered by the municipality and gives feedback on the services.

The municipality involves the citizens to be an active part of the development of projects or initiatives and have the role as a **co-creator** . The co-creation between the municipality and the citizens occurs in workshops, city labs and one municipality mentioned hackathons. Citizens can be democratic participants as co-creators to propose better solutions (Simonofski, A., Asensio, E. S., & Wautelet, Y. 2019), contributing in the decision making but it is the city council that makes the final decision. The role as co-creator is placed under the category of Citizen power (Partnership) as this role takes part in co-creation with the municipality and come up with solutions together.

The role as a **volunteer** involves citizens taking action into their own hands, and are eager to give input and opinions for change or improvement. The volunteers are involved in different stages, but not always clear where they can be involved since it depends on the degree of difficulty of the process. Citizens' role as volunteers share their time (Berntzen, L., & Johannessen, M. R. 2016a) in co-creation with the municipality projects and the motivation for participation can vary depending on the cause. The role as volunteer is placed under the category of Citizen Power

(Delegated power) as this role involves the municipality giving up a degree of control to the citizens, where citizens are accountable and responsible for areas like management of the task in focus. From our findings, one example of this role was managing buoys for measuring temperatures in the summer. It is important for the municipality to know why their citizens engage voluntarily as citizens can be motivated to participate for different reasons, either self-concerned because of something that annoys them or other-orientation to help others (Abu-Tayeh, G., Neumann, O., & Stuermer, M. 2018).

The most common role found was **User of Services** where citizens are utilizing smart city services offered by the municipality. The citizens' role in the smart city may not yet be clear, but the role of the government is to encourage the citizens to perceive, learn, adopt and accept the system and services provided by the smart city (Han, M. J. N., & Kim, M. J. 2021). One municipality mentioned that they have a project for digital competence development to make sure the residents keep up with the development and can use the services offered by the municipality. Smart cities are mainly tokenistic where urban governance and services are controlled by municipalities and businesses (Cardullo, P., & Kitchin, R. 2019b). The role as user of services is placed under the category of Consumerism; choice since User of services are citizens that will use the services provided by the municipality and therefore are defined as consumers.

5.3 Motivating Citizens

In this section, we are focusing on what the municipalities do to motivate their citizens to participate in the smart city. From our findings, 8 categories within motivation were discovered. These categories will now be discussed, where RQ2 is to be answered. Further, these categories will be discussed based on the previous literature provided in chapter 2. To summarize the categories of motivation, these are: **Rewards for participation**, **Personal motivation**, **Enlightening citizens**, **See the citizens**, **Sustainability motivation**, **Project selection**, **Targeted projects** and **Ease of participating**.

In the field of motivation, one usually separates motivation in terms of extrinsic and intrinsic motivation. Extrinsic motivation comes from being rewarded and intrinsic motivation is based on an individual's desire (Ryan, R. M., & Deci, E. L. 2020). To separate the different types of motivation obtained in this research, we have categorized these motivations in terms of extrinsic and intrinsic motivation in Table 7.

Extrinsic Motivation	**Intrinsic Motivation**
Rewards for participation Enlightening citizens Project selection Targeted projects Ease of participating	Personal motivation See the citizens Sustainability motivation

Table 7 - Categorization of Extrinsic and Intrinsic Motivation

As shown in Table 7, the majority of motivational types found are defined as extrinsic motivation. In advance, this was something we anticipated since we are looking at these phenomenons from the perspective of the municipality.

Motivation has shown to be an important factor in regards to citizen participation, where motivation can influence the citizen engagement and participation in the smart city (Webster & Leleux, 2019). From our findings, most municipalities claim that reaching out to the citizens is a challenge. As stated by Castelnovo (2016), citizens' motivation to participate depends on the public value of the initiative rather than selfish motivation. As obtained from our findings, this seems to not always be the case. What Castelnovo (2016) categorizes as selfish motivation can be viewed as **Rewards for participation**. As described in chapter 5, this type of motivation is about giving citizens goods in exchange for participating. However, the underlying reasoning for citizens participating as a result of rewards or goods is not clear, as this study does not include the perspective of the citizens itself. What we know is that several municipalities utilize rewarding citizens for their participation, but motives for citizens, whether selfish or public value, would require further research.

In terms of **Enlightening citizens**, which involves enlightening the citizens on what they are able to and in which areas they are able to influence. As stated by Bolívar et al. (2018), it is important that the government encourage their citizens and show that participating is a meaningful experience. If citizens are not satisfied, it can influence their motivation (Bolívar, M. P. R., & Muñoz, L. A. 2018). In terms of encouraging the citizens, several municipalities claimed that encouraging and acknowledging that citizens are able to participate in the smart city is motivation enough for them to participate.

Personal motivation stems from the citizens intrinsic motivation to participate on the basis of their own willingness, personal needs or interest in the smart city. From our findings, numerous municipalities reported personal motivation as an important motivator for participating in the smart city. In terms of literature on personal motivation in the field of smart cities, not much is mentioned. This category can also be tied to Castelnovo (2016), which said that the motivation depends on the public value of the initiative rather than selfish reasons. As for this category, whether the intentions are selfish or focused on public value is unclear, and would require further research with the perspective of citizens. Personal motivation can also be linked to Targeted Projects and Project Selection. **Project selection** is defined as mapping of projects and initiatives which are viewed as important for the citizens. These projects and initiatives are then chosen for development, if approved by the municipality. **Targeted Projects** can be linked to Project Selection, as it involves using targeted groups to help plan and identify key elements of the project. In several of the municipalities, Targeted Projects were a result of project selection. First, projects were chosen with Project selection, where citizens participated by giving opinions on what projects should be carried out. Secondly, citizens participated further with Targeted projects, where the municipality chose targeted groups they found suitable for participating in that specific project. These citizens then gave their input and suggestions regarding the initiative. In terms of literature on these types of motivation related to smart cities, hardly any literature mentions this area. We found this surprising as almost half of the municipalities mentioned the use of these types of motivation.

See the citizen is defined as the motivation received by citizens feeling their contributions are being seen and taken seriously by the municipality. As a result, what can be established as trust occurs, which the municipalities claim to motivate citizens to participate. As stated by Bolívar & Muñoz (2018), it is important that the governance shows a response when citizens participate. In this way, the citizens receive a meaningful experience, and if citizens are not satisfied it can influence their motivation to participate later. This type of motivation might seem fairly manageable, but could prove to be a challenge. Some municipalities mentioned resources as a challenge in cases where an extensive amount of citizens participated. These types of participation were usually in the form of surveys with open-ended answers. In these cases, some municipalities reported not having sufficient resources to manage these huge amounts of data. In terms, this resulted in not every citizen being heard. Despite this challenge, we find this type of motivation to be especially important as if the citizens feel that there is no use in participating, why should they bother participating at all.

Sustainability motivation is defined as motivation to participate as a result of sustainability-focus on the initiative in focus. This type of motivation is also relatable to personal motivation, as the citizens willingness to participate stems from personal motivation. From our findings, not many municipalities reported this as a type of motivation. We found this strange, as sustainability is a huge focus area. Both in a smart city context, as well as other areas. This might be influenced by our perspective, as data was provided by represenants of municipalities instead of citizens. Similar to Targeted Projects and Project Selection, the literature provided in this area is restricted. As previous research states, sustainability is defined as one of the smart city elements (Winkowska et al. 2019). With a rich amount of research on sustainability in the smart city, surprisingly little was discovered in terms of motivating citizens participation.

In terms of **Ease of participating**, this type of motivation is about enabling ease of participation with the use of smart city services. From our findings, all municipalities have a form of facilitating for easier and efficient participation. In the lower end of this

category, the municipalities utilize reporting forms. These are usually found through the municipality's website, where citizens can report or request matters they find important or need improvement. In what we find to be the higher end of the scale, municipalities utilize platforms for citizen participation. As stated by Šiurytė (2016), citizens should have a platform where they can do these things. Whether it evolves giving opinions, suggesting solutions or ideas. Šiurytė (2016) claims that the cities focusing on their citizens with involvement and engagement are the most successful. Some municipalities also utilize what we find to be more non-traditional methods for Ease of participation. In some of the municipalities, the employees responsible for citizen participation utilize non-digital methods, in addition to other digital methods, to engage in citizen participation. Some municipalities define the target area or group, and show up physically in that area to speak with citizens, or stakeholders, for the project in focus. The municipalities report that this is effective, as they are able to reach and speak with citizens thay may not otherwise be interested in participating. As stated by Levenda et al. (2020), the engagement may not be influenced by smart city technology, but citizens should be able to provide feedback on smart city initiatives, which is the case for these municipalities. In terms of Ease of participating, by lowering the obstacles, someone with low motivation is more easily engaged (Polst, S., & Elberzhager, F. 2020). In terms of obstacles, our findings suggest that time-consumption and geographical location are two of the greater obstacles for participation. As citizens live their lives, most might not prioritize participation as a result of these obstacles. With physical town-hall meetings, travel distance for the citizen might influence the willingness to participate as it can be time consuming. In addition, families with young children, who often are involved in some form of leisure activity, also can struggle to prioritate their time for participating. Some municipalities have acknowledged these obstacles and used technologies to make these meetings more accessible. Most frequently mentioned was the use of live streaming of town-hall meetings. The use of digital alternatives can be viewed as solutions, where citizens' motivation could be influenced by convenience, financial or time efficiency offered by the technology (Malchenko, Y. A. 2020).

5.4 Implications for Further Research

In terms of further research, it would be interesting to apply our research on the greater smart cities in Europe and other parts of the world. Even though some of the cities included in the thesis are viewed as big cities in a Norwegian context, they would fall short compared to other big cities throughout Europe.

In addition, this study was conducted where data was retrieved with a perspective from the municipality. For further research, our research could be used as a basis for doing the same study with the perspective of citizens in the smart city. By conducting such research, more categories might emerge, or already defined categories might be discarded.

6. Conclusion

In this thesis, the purpose has been to identify citizens' roles, and what the smart city does to motivate citizen participation in the smart city. A qualitative case study was conducted, using 13 semi-structured interviews to gather data from 12 Norwegian municipalities categorized as smart cities. Thematic analysis was used on the interview data, where 5 citizen roles and 8 categories of motivation were identified.
The roles of citizens in the smart city were identified as: **User of services**, **Co-creator**, **Stakeholders**, **Testers** and **Volunteers**. From these roles, User of services were the most commonly referred to of these roles. Volunteers were the least referred role.
In terms of motivation, 8 categories of motivation were identified. These are: **Rewards for participation**, **Enlightening citizens**, **Project selection**, **Targeted projects**, **Ease of participating**, **Personal motivation**, **See the citizen** and **Sustainability motivation**.
Out of these categories, Rewards for participating and ease of participating were the most occurring within the municipalities. The categories for Sustainability motivation, Project selection and targeted projects were the least occuring categories within the municipalities.

Finally, we expect that our contribution has implications for research as it provides the fundamentals for understanding citizens' role in the smart city, and what the smart city does to motivate citizen participation. Our research could then be used further to map the context in other smart cities, and lay the ground for this relatively unexplored field of roles and motivation in smart city participation. In terms of practical implications, we expect that the municipalities involved and other smart cities can use our findings to further improve their own citizen participation in terms of citizens' roles and motivation.

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Attachments

Attachment 1

1. **Intervjuobjektet**
    a. Hva er dine arbeidsoppgaver/rolle?
    b. Hvor lenge har du arbeidet med smart byutvikling?
2. **Smartby - Forhistorie**
    a. Hvordan har fokuset på smartby vært i kommunen de siste årene?
        i. Følger utviklingen av smartbyen samme stil (initiativer og prosjekter)?
    b. Har dere en definert strategi for utviklingen dere følger?
        i. Hvem har definert den?
        ii. Hvordan er den utarbeidet?
    c. Med tanke på utviklingen av smarte byer. Hvordan tenker dere at deres kommune ligger ann i forhold til andre norske kommuner?
    d. Har dere noen som er ansvarlig for Smart City? Hvordan er det organisert?
    e. Hvem er aktørene, og hva slags rolle spiller de i utviklingen?
3. **Rollene til innbyggere**
    a. Har innbyggere definerte roller i smartbyen?
        i. Hva slags roller tenker dere innbyggere har i smartby initiativer eller prosjekter?
            1. Har dere noen konkrete eksempler på initiativer eller prosjekter hvor innbyggere deltar innenfor denne rollen/disse rollene?
        ii. Hvem har definert disse rollene?
        iii. Blir innbyggere tatt med i dialog for å definere innbyggernes rolle?
        iv. Hva er rollen i de ulike delene av prosjekter: planlegging, gjennomføring, evaluering. Hvor er innbyggerne mest involvert?
        v. Har dere definerte strategier for å involvere innbyggerne i utviklingen?

b. Tenker du at det er hensiktsmessig at innbyggerne har en definert rolle i utviklingen?
    i. Hvordan deltar de? For eksempel workshop eller lignende
    ii. Har du noen erfaringer rundt innbyggerdeltagelse i prosjekter?
    iii. Hvordan tenker du at innbyggerinvolvering påvirker prosjektene?
        1. I hvilke deler av prosjektene?
c. Hvordan kommuniseres innbyggernes rolle til innbyggerne?
    i. Informasjon fra kommunen til innbyggerne, konsultering mellom innbyggerne og kommunen, eller aktiv deltagelse?
    ii. Er innbyggerne klar over hva de kan/ikke kan være med på å påvirke?
    iii. Hvilke kanaler/plattformer/teknologi brukes for å kommunisere med innbyggere?

4. Motivasjon

a. Hva gjør kommunen for å motivere innbyggere til å ville involvere seg i utviklingen?
    i. Har dere konkrete tiltak for å få innbyggere til å involvere seg?
b. Ser dere en effekt av tiltakene dere gjør for å involvere innbyggere?
    i. Hvordan måles dette?
    ii. Hvor lett/vanskelig er det å få innbyggere til å delta?
c. Ser dere en sammenheng mellom innbyggernes behov i samfunnet og motivasjon for å delta?
    i. Hvordan? Er de som påvirkes mest ivrig på å delta?
d. Tenker du at kommunen kan gjøre mer for å motivere innbyggerne til å delta?
    i. Hvis ja, hvordan?

5. Avsluttning

a. Er det noe mer du ønsker å nevne innenfor disse temaene som vi ikke allerede har vært gjennom?

Generelle oppfølgingsspørsmål:

1. Hva tenker du er grunnen til at det er slikt?
2. Har du noen eksempler på dette?

Attachment 2

Informasjonsskriv til intervju

Citizens' role and motivation to participate in smart cities

A study of Norwegian municipalities

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å kartlegge innbyggeres rolle og motivasjon til å delta i utvikling av smarte byer.

Formål
Formålet med prosjektet er å undersøke rollen til innbyggere i smart city prosjekter, og hva norske kommuner gjør for å få innbyggere til å delta i smart city prosjekter. Intervjuet skal benyttes som datagrunnlag i en masteroppgave i Informasjonssystemer ved Universitetet i Agder. Opplysningene skal kun benyttes til dette formålet.

Hvem er ansvarlig for forskningsprosjektet?
Universitetet i Agder er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?
Du har fått invitasjon til å delta i et intervju fordi du er involvert i smart byutvikling i din kommune.

Hva innebærer det for deg å delta?
Opplysningene som skal samles inn omhandler bevissthet rundt utvikling av smarte byer («smart cities»). Informasjonen vil bli samlet inn via video/lydopptak og transkriberes til skriftlig format.

Dersom du velger å delta i prosjektet, innebærer det at du deltar i et intervju. Det vil ta ca. 45-60 minutter. Intervjuet inneholder spørsmål om:

- Forhistorie rundt smart byutvikling i en valgt kommune
- Rollen til innbyggere
- Motivasjon for å få innbyggere til å delta

Det er frivillig å delta
Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.
Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket.

Kun prosjektgruppe og veiledere vil ha tilgang til datagrunnlaget. Datagrunnlaget vil bli lagret på et tilgangsstyrt filområde og ikke være tilgjengelig for andre enn prosjektgruppen og veiledere. All data vil bli anonymisert. Deltakere av studien vil dermed ikke kunne gjenkjennes i publikasjonen.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent, noe som etter planen er 04.06.2021. Etter dette vil datagrunnlaget slettes.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke.
På oppdrag fra Universitetet i Agder har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

- Universitetet i Agder ved Hallvard Lauvrak (hallvl16@student.uia.no) eller Tobias Pedersen (tobiap18@student.uia.no). Veiledere i prosjektet er Leif Skiftenes Flak (leif.flak@uia.no) og Sara Hofmann (sara.hofmann@uia.no). • Vårt personvernombud: Leif Skiftenes Flak (leif.flak@uia.no).

Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med: • NSD – Norsk senter for forskningsdata AS på epost (personverntjenester@nsd.no) eller på telefon: 55 58 21 17.

Med vennlig hilsen

Hallvard Lauvrak (Forsker)

Tobias Pedersen (Forsker)

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *[Citizens' role and motivation to participate in smart cities: A study of Norwegian municipalities]*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐ å delta i intervju

☐at mine personopplysninger lagres etter prosjektslutt, til oppgaven er avsluttet/godkjent

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

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(Signert av prosjektdeltaker, dato)