SOCIAL IMPROVEMENTS IN SMART CITY HAMBURG

HOW COMMERCIAL PARTIES INFLUENCE THE SMART CITY DISCOURSE IN HAMBURG

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Abstract

The city of Hamburg cooperates with several commercial parties to meet Smart City goals. Interests of commercial parties and those of the citizens of Hamburg do not necessarily match. Previous studies showed that commercial parties not always do what is best for the citizens. Some vulnerable groups may be excluded. Also fear for the privacy violations by commercial parties exists.

Governmental, academic and commercial experts on Smart City are consulted in this research. Also, three active citizens of Hamburg are interviewed to check how well-informed they are about Smart City Hamburg and whether they believe that Smart City Hamburg improves their liveability.

Hamburg is doing well regarding data management but is not a perfect Smart City. Hamburg's city council should watch over that not just technological measures are taken. A balance should be found in involving commercial parties and being independent as a city council. Also, the visibility and participation of citizens should be improved.

Keywords: Smart City, governance, Hamburg, Germany, commercial parties, privacy, data, technologicalisation, urban planning

Table of contents

1. Introduction

1.1. Background

The city of Hamburg participates in an EU-funded five-year research and development project called mySMARTLife (mSL). The mSL experiment is located in the city district of Bergedorf with 130,000 inhabitants. Several Smart City experiments on housing, energy and mobility are taking place in Bergedorf. Mobility measures consist of smart adaptive lighting for bicycle roads, smart lampposts, e-mobility for bikes, buses and both public and private cars. Besides, the city council planned a multi-modal mobility concept and a parcel delivery system for car trunks (Späth & Knieling, 2020).

The city of Hamburg is expecting to grow by 100,000 inhabitants until 2030. To combat climate change, CO2 reductions are needed. The city council relies on technological solutions to improve the future sustainability of Hamburg (Hamburg.de GmbH & Co. KG, 2020). To meet this objective, the council signed a Memorandum of Understanding with the ICT company CISCO and car manufacturer Daimler (Cisco Systems, 2014; Späth & Knieling, 2020). These commercial parties brought in knowledge. However, researchers criticised the involvement of commercial parties. They fear those companies might become too influential. Commercial parties could push the project towards developments that are not in the interest of the general public. Therefore, these companies are likely to choose more technological and high-tech solutions since this fits their economic interest (Späth & Knieling, 2020).

1.2. Research problem

As is explained before, the city of Hamburg signed a MoU with CISCO and Daimler for the execution of mSL. With the involvement of these commercial parties the discussion on what a Smart City could look like may narrow down towards more technological measures since such measures are economically more attractive to commercial parties (Späth & Knieling, 2020). Some scholars argue that Smart City will automatically benefit everyone (Hollands, 2015). However, other researchers criticise that businesses use Smart City initiatives as a way to earn money without taking into account the needs of all citizens (Lefevre, 2014). Furthermore, it can be questioned who will profit from the Smart City and whether groups will be excluded (McLaren & Agyeman, 2019 & Provoost, 2013).

Research gap

Several scholars researched the potential negative effects of Smart City initiatives. The privatisation of urban planning (Lefevre, 2014 & Provoost, 2013), the exclusion of vulnerable groups (Lefevre, 2014; McLaren & Agyeman, 2019) and the infringements on privacy rights in Smart Cities (d'Almeida & Stewart, 2017; Streitz, 2019 & Tierney, 2019). For the Hamburg case, not much is known about the positive and negative effects of the Smart City and to what extent the Smart City discourse is influenced by commercial parties. This thesis therefore builds upon this research gap.

Research questions

Main question:

Q.1: To what extent is the current Smart City discourse in Hamburg, which is influenced by commercial parties, beneficial for the citizens of Hamburg?

Secondary questions:

Q.2.1: How are commercial parties influencing the discourse of Smart City Hamburg?

Q.2.2: To what extend is the privacy of the citizens of Hamburg at risk because of commercial parties owning newly generated data from Smart City Hamburg?

Q.2.3: How well informed are active citizens in Hamburg about the Smart City initiatives and do they believe that Smart City Hamburg improves their liveability?

Societal value

Smart City initiatives as in Hamburg can have a great impact on its citizens. Privacy infringements and the fear that commercial parties would not act in the interest of the inhabitants of a city are grounded by research (see theoretical framework). Research is therefore needed to give policy advice to governments to achieve social improvements in Smart Cities.

1.3. Thesis structure

In chapter 2 the theoretical framework is elaborated upon. Chapter 3 describes the methodology that is used to answer the research questions. This chapter also includes ethical considerations and how the data is analysed. Results of the interviews are summarized in chapter 4. Finally, in chapter 5, the research questions are answered and suggestion for future research are given.

2. Theoretical framework

2.1 Definition Smart City

Since there are a lot of different definitions of a Smart City, the concept is not easily defined. The definitions vary in popular media, among academic researchers and in city policies. Smart City and related terms started to establish in the early 1990s, with the beginnings of the internet. Related terms from this time are for example ‘cyber cities’, ‘digital city’, ‘ubiquitous city’ and ‘virtual city’ (Willis & Aurigi, 2018). In this research, the generic term *Smart City* is used. The definition of Hollands (2015), fits well with the Smart City principle that is being researched in this thesis.

> *"Effectively, a Smart City is made up of IT devices, industry and business, governance and urban service, neighbourhoods, housing and people, education, buildings, lifestyle, transport and the environment. [...] the unspoken assumption [...] suggests that the application of IT in cities will automatically benefit everyone, with prosperity and wealth being shared by all. [...] most smart initiatives [...] come from either corporations or urban governments, not from actual people who live and work in cities." (Hollands, 2015, pp. 64–70).*

Smart Cities are often associated with sustainability. However, this does not mean Smart Cities are always sustainable. D'Auria et al. (2018) elaborate on the differences between smart- and sustainable cities. Key elements for a Smart City are an upgraded service and the implementation of new technologies. For the sustainable city, you need to involve the people and make use of the natural system. Furthermore, they claim that how you can achieve a Smart City is mainly shaped by management and monitoring of big data and smart development. For the sustainable city, you need to have an equitable development based on the triple bottom line (people, planet and profit). Finally, the change in Smart Cities is mainly based on innovation and policies, while contributions on sustainable cities are focused on resilience and counteractions of the effects of climate change (D'Auria et al., 2018).

After the signing of the MoU between the city of Hamburg and CISCO, the former mayor of Hamburg, Olaf Scholz, defines the Smart City for Hamburg as a continuation of that what Hamburg has already been known for: connecting technological progress with social improvements. Scholz is convinced that new technologies can improve the services and quality of life of the population of Hamburg (Scholz, 2014). Scholz assumes that the application of IT in the city will benefit everyone as is also mentioned in Hollands (2015) definition.

Data democratisation

An ideal Smart City should embrace data democratisation. Data democratisation stands for increased access to data for both citizens and city employees. With increased access to data, city councils can make better decisions and respond more quickly to real-time events. In New York City, for example, the police department receives real-time gunshot notification alerts from sensors. This makes early responses to criminal events possible (d'Almeida & Stewart, 2017).

2.2 Critiques on Smart Cities

2.2.1 Privatisation of urban planning

Some researchers worry about the privatisation and the reduced power of local city councils and thus less democratic urban planning (Lefevre, 2014 & Provoost, 2013). (Lefevre, 2014) suggests that commercial parties often do not prioritise the needs of the citizens. The Cambridge Analytica scandal has shown that some commercial parties do not put the interests of individuals in the first place (Rosenberg & Cadwalladr, 2018).

Provoost (2013) argues that a smart infrastructure is mainly marketed to cities to construct a privatised platform, thereby taking away power from local city councils. Besides, it is unclear what privatisation would mean a just society. Who will grant access to new Smart City technologies, and will people be excluded? She also argues that Smart City concepts usually follow a car-centric doctrine (Provoost, 2013), initiated by the influence of commercial parties. The mSL in Hamburg tends to adopt more technological and high-tech solutions for sustainable mobility since the private partners involved have strong economic interests. ICT company CISCO and car manufacturer Daimler are likely to prefer the classical growth theory and deliberately neglect alternative solutions such as economic sufficiency or changes of lifestyle (Späth & Knieling, 2020).

2.2.2 Exclusion of groups

Lefevre (2014) is also critical about the Smart City concept. He states that what makes a city exciting are the living organisms, not the number of sensors in town. Lefevre suggests

prioritising the needs of people in the new Smart City paradigm. According to Lefevre businesses often see the Smart City as an opportunity to 'take' tax-payers money for their interest. More transparency and constructive dialogue are needed between commercial partners, the citizens and the city council. It is also crucial that the city council comes up with solutions that are the best for the citizens (Lefevre, 2014). Smart Cities may lead to improved circumstances for the elite, whereas other groups may be excluded. The Smart City creates a new division in addition to the existing ones of class, income and race. In the new division, people are divided into the ones who profit from the Smart City and the ones who lack behind (McLaren & Agyeman, 2019).

2.2.3 Privacy

World War II and the data gathering practices of the eastern German state security instances led to a high valuation of privacy among the citizens of the European Union (EU), with Germany in particular. Privacy protection has therefore been recognized as a fundamental value of EU law. Besides, privacy is seen as a crucial element for democracy (Petkova, 2019). The Cambridge Analytica scandal showed how data mining can be used for political purposes. The data of over 50 million Facebook users was harvested without their permission, which made it one of the biggest data leaks in recent history (Rosenberg & Cadwalladr, 2018).

The collaboration between Google and the City of Toronto shows how the involvement of a commercial party can infringe on the citizens' right to privacy. The citizens of Toronto were promised that smart technology - which continuously and autonomously harvests citizen data - would make the city healthier, safer and better. Despite the possible positive effects, the project remains controversial among urban planners and citizens. By allowing a private technology company to gather citizens data, the city council allows the company to make urban consumers out of their citizens. Residents provide Google involuntarily with data without profiting from it themselves (Tierney, 2019).

"Privacy is at the borderline of turning into a commodity one pays for or one has to 'trade' (in exchange for personal data) - with the implication that privacy is becoming a privilege (Streitz, 2019, p. 800)".

According to Streitz (2019), the data that is being collected should remain property of the citizens and use of the data should be as transparent as possible.

The infringement of the citizens' right to privacy is a potential issue in a Smart City. Therefore, personally identifiable data should be anonymised. Current protocols for data protection concerning technical, legal and moral aspects should be discussed with the city council, commercial parties and the citizens in an open dialogue (d'Almeida & Stewart, 2017).

2.3. Conceptual model

Through the MoU and other cooperation's, commercial parties such as CISCO and Daimler are influencing Hamburg's Smart City policy. The former mayor of Hamburg, Scholz, said that the MoU would improve the social conditions for the citizens of Hamburg (Scholz, 2014) Research shows however that commercial parties are more likely to choose for more technological measures (Späth & Knieling, 2020). Different researchers suggest that Smart Cities can also have negative effects, such as the exclusion of certain groups (McLaren & Agyeman, 2019; Provoost, 2013), the violation of privacy rights (Streitz, 2019 & Tierney, 2019), and the loss of administrative power by city councils due to the privatisation of urban planning (Provoost,

2013). This thesis aims to answer the question of whether the Smart City policy in Hamburg leads to social improvements, or whether these negative effects dominate.

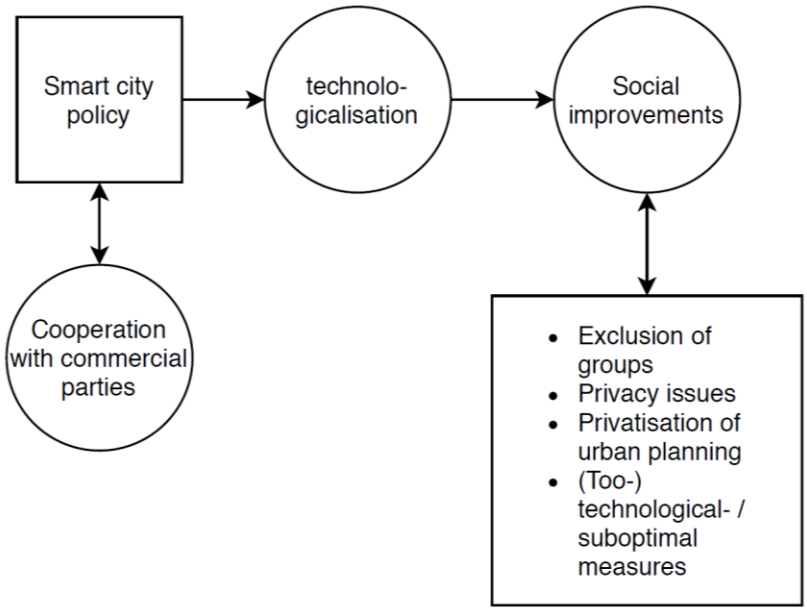

Figure 1 Conceptual model.

2.4. Hypothesis

It is expected that the Smart City experts will generally be more positive about the Smart City Hamburg initiatives than the active citizens that participate in the interviews. Some of the above-mentioned critiques on Smart Cities may be mentioned by some experts. It is expected that active citizens mainly worry about privacy issues and will not know much about the potential benefits of Smart Cities due to general poor information provision for the citizens.

3. Methodology

3.1 The data collection instrument

Commercial parties were likely to have a great influence on the Smart City Hamburg, mainly on issues that were mentioned in the conceptual model. The qualitative approach was chosen because this allows for analysing the views of participants in-depth (Punch, 2014). A semi-structured interview is regarded to be the most suitable for this research. Both because this type of interview can be encoded more easily, and because it leaves more room for open responses (Longhurst, 2016). These interviews were held with relevant governmental actors from Dataport (E3, E4 & E5), a scientific assistant from a university in Hamburg (E2), a commercial actor who contributed to Smart City Hamburg (E1) and a communication expert on new urban mobility (E6).

Semi-structured qualitative interviews were also held with active citizens of Hamburg. This was done to estimate how well-known Smart City Hamburg is among active citizens and whether they believe that Smart City Hamburg is of added value for them. Among the active citizens of Hamburg are a high school geography teacher (AC1) and two volunteers for active mobility organisations (AC2 & AC 3) (see chapter 4).

The semi-structured interviews give deeper insight into the topic. Since Smart City Hamburg is under development, the interviews gave new insights into the topic.
Interview partners for the qualitative interviews were recruited by e-mail. Face-to-face interviews would have been the most ideal. However, due to the corona crisis, it is not desirable to travel to Hamburg and meet people in person. Therefore, interviews were conducted by telephone or through online telecommunication programs. Some interview questions, as seen in appendix I, were adapted slightly to the interview. Figure 1 shows how the primary data was analysed. Transcribing and coding were done with the use of Amberscript and Atlas.Ti.

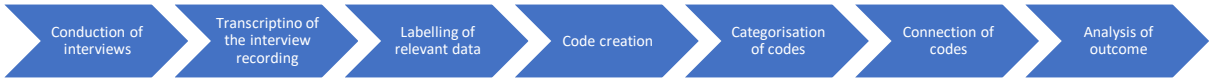

Figure 2 Data analysis scheme.

3.2 Ethical considerations

The power relations between the expert- and active citizen interviews differ. For expert interviews, those who work with Smart City are interviewed. It is expected that active citizens have less knowledge about the topic. In both the expert- and the active citizen interviews, the author is an outsider, since he does not live in Hamburg and is therefore not directly affected by the Smart City initiatives (Longhurst, 2016).

The research is a critical reflection on the role of some of the experts. Therefore, the answers of the interviewees must be handled with care. To protect the interests of the respondents, their responses are anonymised. This does not affect the quality of this thesis. In some cases, given information is part of a political discussion and should be handled with confidentiality. Participants should also remain the right to withdraw from the research at any time. The obtained data will always be saved on cloud storage secured by a password (Longhurst, 2016).

Several Dutch academic organisation set up a code of conduct for research integrity. This is based on five principles. Honesty, scrupulousness (using the best scientific methods), transparency (about what data research is based on and how it is obtained), independence (from non-scientific considerations e.g. commercial or political interest, which is especially important in this research) and responsibility (conducting research that is relevant for the society or scientific field). This research follows the mentioned principles (KNAW et al., 2018).

4. Results

This chapter summarises the results of the qualitative interviews with experts and active citizens. The outcomes are sorted by the main concepts of this thesis. Not all statements from the interviews could be backed up by academic literature due to the novelty of this research.

Interviewee	City	Gender	Age	Profession	Date
Expert 1 (E1)	Berlin	Male	41-50	Principal business consultant Smart Cities	05/06/2020
Expert 2 (E2)	Hamburg	Male	31-40	Scientific assistant	04/16/2020
Expert 3 (E3)*	Hamburg	Female	41-50	Senior project manager mobility and digitization	05/11/2020
Expert 4 (E4)*	Hamburg	Male	31-40	Solution architect IoT	05/11/2020
Expert 5 (E5)*	Hamburg	Female	31-40	Consultant for the digitalisation of municipalities	05/11/2020
Expert 6 (E6)	Hamburg	Female	41-50	Communication expert new mobility	04/28/2020
Active citizen 1 (AC1)	Hamburg	Male	61-70	High school geography teacher, city photographer	04/06/2020
Active citizen 2 (AC2)	Hamburg	Male	31-40	Volunteer cyclists'- and mobility organisations, head of business development energy start-up	04/24/2020
Active citizen 3 (AC3)	Hamburg	Male	51-60	Volunteer cyclists' organisation, editor	04/28/2020

*Expert 3-5 work at the same company and participated in the same interview.

Figure 3 Descriptive statistics interview respondents.

The result matrix summarizes some of the main codes. The positive codes have a green dot, the critiques are marked with a red dot and the codes about data have a blue dot. All interviewees, both experts and active citizens criticized cooperation with commercial parties to some extent. Open-source data was mentioned by three experts as a way to achieve data sovereignty. Better cooperation between cities was only mentioned three times, whereas intelligent urban planning was mentioned 15 times.

Result matrix	E1	E2	E3,4,5	E6	AC 1	AC2	AC3	Totals
● Ideal SC: Cooperation between cities	1	1	0	1	0	0	0	3
● Critique: citizen participation/ visibility	0	3	3	0	2	3	2	13
● Critique: cooperation with commercial parties	3	4	5	2	5	1	8	28
● Critique: lack of cooperation between city departments	0	0	3	0	0	0	0	3
● Critique: private companies making profit with public goods	2	0	0	0	2	0	2	6
● Goals SC: not just technological, intelligent urban planning	2	0	1	5	0	4	3	15
● Data protection: generate anonymous data	2	2	0	0	0	0	0	4
● Data sovereignty	3	0	2	0	0	0	0	5
● Open source	4	10	0	1	0	0	0	15
Totals	17	20	14	9	9	8	13	92

Figure 4 Result matrix semi-structured interviews.

4.1. Definition Smart City

Expert 1 (E1) states that he would always ask the city planner what they want to achieve and what development goals the city in question has. Due to surrounding mountains, a city may have severe air quality problems. Their main objective to mitigate the problems could be to reduce car traffic within the city. E1 states that a city planner should ask themselves: "What problems does our municipality have and how can we solve them?". The solutions do not necessarily have to be digital. Sometimes analogue measures are much better. As also pointed out by (Späth & Knieling, 2020). E1 explains that in Berlin, for example, you have many narrow bike lanes. When a cyclist wants to pass another cyclist, cars sometimes pass by so closely and with such a high speed that the cyclist almost crashes. In such situations, one should build cycling infrastructure further away from fast-moving traffic, without the danger and harmful emissions. When E1 wants to explain Smart City to an outsider he says that the central goals are to help citizens in making their lives easier. E.g. developing a cycling app that shows the most convenient and safest routes through the city, thereby avoiding dangerous spots and traffic lights. It is key to come up with solutions that improve liveability for citizens. In this process, it is also important to let the citizens participate. They may come up with better routes and can tell you what is important for them. What is needed should be discussed locally (Expert 1, 05/06/2020).

E2 says he would stress the importance of protecting vulnerable data and the advantages of democratic participation in the SC. Smart City also brings new possibilities for evidence based-politics. He stresses that democracy, privacy protection and citizen participation must be taken seriously, as was also underlined by different authors (E2; d'Almeida & Stewart, 2017; Streitz, 2019 & Tierney, 2019). E2 says that outsiders should get an overview of the different aspects of the Smart City and must be informed about the current discourse on positive and negative aspects of the SC. Positive aspects are the new opportunities for citizen participation that arise in the Smart City. The transparency law of Hamburg was implemented in 2012. This relatively old and extensive law led to the publication of a lot of data that is available online on an open-source basis. Citizens can actively contribute and use data from the Urban Data Hub (UDH). The UDH is part of the Landesbetrieb Geoinformation und Vermessung (LGV) in cooperation with the CityScienceLab (CSL) and HafenCity Universität (HCU) (Expert 2, 04/16/2020).

According to E3, Smart City is nothing more than making the city more liveable with technological measures for all citizens, companies and city administration by exploiting potentials for economy and ecology. She argues that participation should be as inclusive as possible for everyone, no matter the age, gender and social class (Expert 3, 05/11/2020; (McLaren & Agyeman, 2019).

4.2 Main research question.

This chapter elaborates on the main research question:

Q1: To what extent is the current Smart City discourse in Hamburg, which is influenced by commercial parties, beneficial for Hamburg's citizens?

4.2.1. Ideal Smart City

According to E1, an ideal Smart City is a city that shapes itself more efficiently through digitalisation. This definition is similar to (Hollands, 2015) definition. According to E1, the goal of an ideal Smart City should be to improve the quality of life of its citizens through digital

efficiency. With the help of digital efficiency, the sociological, ecological, technological and economical aspects are balanced. It is thereby important to not over-engineer; there should be a good balance on the economical level as well. Besides, the goal of a Smart City should not just be to maximise profit. Thus, not a Google City that exploits the data of its citizens (Expert 1, 05/06/2020). Additionally, the ecological aspect should be taken into account. As (D'Auria et al., 2018) stated, a Smart City is not necessarily a sustainable city.

E1 also underlines the importance of a Smart City to have an open ecosystem. Ideally, the municipality operates the ecosystem and has responsibility for it. The operation of the system can be outsourced to a commercial party. However, this party should just be a technological operator. The municipality must make sure that the data belongs to themselves. Therefore, they must prevent industrial companies from using the data for other purposes. This data sovereignty is achieved through an open ecosystem. In a Google city, the ecosystem is not open and not in the hands of the municipality. The digital measures should also be combined with analogue measures, as stated before (4.1.1.). The Smart City can only be successful when different parties, such as knowledge institutes, commercial parties, cities and their citizens successfully cooperate (Expert 1, 05/06/2020).

E2 sees the ideal Smart City as a city that gives new use to sensors in urban space. Sensors can mainly be useful in the fields of traffic and energy. Also, newly accumulated data opportunities give way to new forms of citizen participation and evidence-based politics, as already explained in 4.1.1. (Expert 2, 04/16/2020).

As reported by E3, an ideal Smart City is a city with a high quality of life for everyone. The city and its citizens have sovereignty over their data[1]. E3 says that neighbouring municipalities should cooperate in the developing of Smart City tools. In that way, they are not dependent on commercial parties and have sovereignty over their data. E5 mentions that it is extremely important to include the older, non-digital native generation in Smart City initiatives. No groups should be left out from profiting from Smart City initiatives (McLaren & Agyeman, 2019). E4 adds to this that Smart Cities should not be limited to technological measures, as was also mentioned by E1. Cities should be planned in such a way that they are compact and easy to navigate in. It is complicated to implement this in the existing cities as a retrofit solution but for newly planned cities these are measures you should take according to E4 (Expert 3; 4 & 5, 05/11/2020).

> *„Von jedem Ort in der Stadt dauert es nicht länger als x Minuten, um das Kind zum Kindergarten zu bringen. Oder man kann den Stadtteil in der Zeit verlassen, um im Grünen zu sein, weil es da direkt etwas Grün gibt. Das ist dann eben nicht nur technologisch, sondern auch, dass man eine Auszeit bekommen kann und, dass einem die Gestaltung des Tages einfacher fällt."*
>
> *„From any place in town, it does not take longer than x minutes to bring the kid to the kindergarten. Or you can leave the neighbourhood to be in a green environment. It is not just about technology, it is also about having some time to relax and that your daily life gets easier." (Expert 4, 05/11/2020).*

As an expert on new mobility, E6 takes the argument of E1; E2 & E4 that Smart City is more than digital solutions further. She says dense urban space should be more designed on a human

[1]See Tierney (2019); Streitz (2019) for more information on data sovereignty.

scale, as was also advocated by urban designer Jan Gehl (Gehl, 2011). This also relates to (Lefevre, 2014), who states that cities should take measures that are the best for its citizens. E6 believes that the room between the city facades should become more liveable (Gehl, 2011). We should think more about energy efficiency and climate adaptation (E6 & (D'Auria et al., 2018). Car-centric cities should be something from the past. The ideal Smart City needs a new way of thinking about urban spaces. For this, we need people who come up with fresh input (Expert 6, 04/28/2020).

> *„Das heißt aber nicht, dass du als Verkehrsminister Technik verliebt auf dem Buzzer drückst und den ersten Monocopter freigibst, sondern du musst halt ein Bedürfnis erfüllen."*
>
> *"That does not mean that you, as a Minister of Transport, blinded by the love for technique, hit the button of the first mono-copter. You rather have to fulfil a need." (Expert 6, 04/28/2020).*

Most Smart City techniques are already there and do not have to be reinvented, according to E6. For this, cooperation between other cities is needed. The rise of autonomous cars shall not be a reason to build car-centric cities. Technological advancements should not mean that cities will be planned around autonomous vehicles, thereby taking pedestrians and cyclists out of the equation. Smart City also has to mean that liveability is not just improved in one city, whilst cities in third world supplier countries suffer from bad working conditions. This ethical aspect, which was also described by (McLaren & Agyeman, 2019), also belongs to the ideal Smart City in E6s opinion (Expert 6, 04/28/2020).

4.2.2. Is Hamburg a Smart City?

Experts were also asked to what extent they believe Hamburg is a Smart City. According to E1, Hamburg can be partly seen as a Smart City. Mainly the improved efficiency of the digitalised harbour area with the Smart Port Logistics is a good example of the Smart City concept. Also, Hamburg has participated in several subvention projects such as MySMARTLife. Several other topics are also in the pipeline, such as cycling routes. Regarding open data, Hamburg is a pioneer in Germany. In the UDH the city of Hamburg relies on open data. In general, E1 says that Hamburg is well on track to become one of the smartest cities in Germany, although he would not argue that Hamburg is a perfect Smart City (Expert 1, 05/06/2020).

E2 points out that Hamburg won the Smart City award in 2019. He also says that Hamburg publishes a lot of data online since the introduction of the transparency law of 2012. According to (Streitz, 2019), data usage should be transparent. The good thing about this data is that it is all open source. The Landesbetrieb Geoinformation und Vermessung (LGV) interchanged the commercial party ESRI for open standards. For the UDH, this data can be used for citizens, politicians and commercial partners. Also, sensors measuring traffic flow and availability of charging stations of electric cars are extensively implemented. When it comes to data collection, the city of Hamburg builds upon the privacy by design principle. This means that generated data cannot be tracked to individual people. This was also mentioned by E1 (Expert 2, 04/16/2020).

E3 also believes that Hamburg is on the right track to becoming a Smart City. Especially concerning the Intelligent Transport Systems (ITS) congress that is planned in 2021 and new urban development projects such as the Hafencity and the newly build Smart City district in Bergedorf. She also likes that the IT departments of the universities of Hamburg cooperate. E3

would, however, improve the participation of citizens (E3). Sometimes it is just too complex to make the data accessible for the citizens (E4). A transparent usage of data, as (Streitz, 2019) suggests, is therefore not always possible. But in general, Hamburg is doing quite well on different Smart City components. Better than some of the smaller municipalities in Schleswig-Holstein Dataport works with (E4). E5 adds that Hamburg could improve the cooperation between the different city authorities. The Smart City would be much better, for example, when the traffic agency would use data of the environment agency and vice versa. Dataport developed a Roadshow platform to help their clients finding their way in Smart City themes. This Roadshow could also help neighbouring municipalities learning from each other (Expert 3, 4 & 5, 05/11/2020).

In E6s opinion, a Smart City should be a liveable city. A liveable city is a calm city with fresh air and human interaction. Currently, cities such as Hamburg are known for their hectivity, emissions and noise. A lot of space is used for parking cars. According to E6, the average car only drives 45 minutes a day, usually with one person in it. The rest of the day it takes away valuable urban space. Also, Hamburg can be much smarter by using smarter logistics and wasting less energy (D'Auria et al., 2018) to meet the Paris Agreement (Expert 6, 04/28/2020).

4.3. Secondary research questions

4.3.1. influence of commercial parties on the Smart City Hamburg discourse

Q2.1: How are commercial parties influencing the discourse of Smart City Hamburg?

Q.2.2: To what extend is the privacy of the citizens of Hamburg at risk because of commercial parties owning newly generated data from Smart City Hamburg?

E1 gives the following answer to the question of what the influence of commercial parties is on Smart City projects in Hamburg:

> *"[den Einfluss von kommerziellen Parteien] finde ich, wenn das in Deutschland betrachte, eigentlich recht gesund […] In Deutschland gibt es ein hohes Bewusstsein für das Thema Datenschutz und Datensouveränität."*
>
> *"[The influence of commercial parties] is, when I look at Germany, rather healthy […]. In Germany, there is a lot of awareness of data security and data sovereignty." (Expert 1, principal business consultant Smart Cities) (Expert 1, 05/06/2020).*

E1, claims that one sometimes has to cooperate with industrial partners. Ideally, there is a healthy balance between local partners, industry and international operating partners. Those big companies just have more scaling options and more knowledge because they can generate more know-how from different sources (Expert 1, 05/06/2020).

E2 believes that cooperating with commercial parties has both advantages and disadvantages. An advantage could be that, for example, CISCO and Siemens have tools that can be ready in two months. For the municipality, this would take about two years. The disadvantage is that the municipality does not generate its knowledge, which reduces the transparency of data usage (Streitz, 2019). E2 states that it makes cities dependent on commercial partners. When one wants to stop cooperating with a certain partner, it takes years to get back to the same level as before. It does not mean that one has to do everything themselves as a municipality. Dataport

is an institute of public rights that can function as an alternative for the services of commercial parties (Expert 2, 04/16/2020).

E3 criticizes that commercial parties often have the sole knowledge about SC. Municipalities are still learning. She believes that it is important that city councils broaden their knowledge. Currently, mainly VW uses the test track for autonomous vehicles. In her opinion, it would be good when there are more diverse suppliers for Smart City activities so that not only one company has the sole knowledge and a set its standards.

E3, 4 and 5 work at Dataport. They also believe that Dataport can be an alternative for commercial parties. E3 criticises that the traffic agency of Hamburg placed the order for managing parking spots to T-Systems, a company that places sensors. However, to her knowledge, the City of Hamburg has no access to the parking data. Dataport, however, partly belongs to the City of Hamburg. When Dataport is responsible for the collection of information, the data remain the possession of the city. Another advantage is that Dataport can be commissioned without the need to implement procurement regulations (Expert 3, 4 & 5, 05/11/2020).

Figure 5 German states that are part of Dataport (Source: Dataport, 2020, state names added).

E6 worries that commercial parties, such as big car companies, will not represent the interests of people who do not want to or cannot drive a car (some groups will be excluded (McLaren & Agyeman, 2019)). She assumes that many people from the automobile industry do not ride bikes in everyday life and therefore does not know what cyclists need. Therefore, civil society and related associations should become more influential when it comes to accessibility. This

also applies to the parents using a stroller, blind people, or people that have trouble walking (Expert 6, 04/28/2020).

4.3.2. Active citizen perspective

Q.2.3: How well informed are active citizens in Hamburg about the Smart City initiatives and do they believe that Smart City Hamburg improves their liveability?

To get a broad idea about how well-known the Smart City concept in Hamburg is, I interviewed three active citizens (see appendix III). For the list of questions see appendix II.

Active citizen 1 (AC1) is a geography teacher and hobby photographer in Hamburg. He was not informed about the Smart City initiatives in Hamburg. In general, he welcomes the developments. The harbour of Hamburg is so crowded that you must digitalize to keep the harbour competitive. He compares it with the Business Improvement Districts in Hamburg (BIDs). Shop owners in BIDs invest to make their street more attractive. In this way, urban redevelopments are made possible that the city could not have afforded on its own. The downside, however, could be that commercial parties want something in return for their investments. In the expensive shopping street "Neuer Wall" in Hamburg, for instance, parts of the street are privatised. This gives private security companies the possibility to send off homeless people, demonstrators or photographers such as AC1 (exclusions of groups (McLaren & Agyeman, 2019)). AC1, however, does not see the storage of data as problematic.

> *„Wenn man Daten sammeln nicht zulässt, kann man sich auch nicht bei Facebook und Co. anmelden."*
>
> *"When you do not allow the storage of data, you can also not sign up for platforms like Facebook." (Active citizen 1, 04/06/2020).*

AC2 lobbies at mobility organisations for modes of transport that take up less space and use as little resources as possible. AC2 believes that cities should not aim for as many as possible autonomous cars in the city. He was informed about some Smart City initiatives in Hamburg and is interested in the technique. In his opinion, Smart City could also be beneficial for cyclists. For example with an app that tells the cyclist when the traffic lights jump to green. The cyclist can then adapt his or her speed and does not have to make a full stop at the traffic light (Active citizen 2, 04/24/2020).

For AC2, a Smart City should not just be about technology. It should be about resource-efficient mobility. More space for pedestrians, cyclists and public transport users. The walkable city, wherein people live close to their work and amenities. The ITS congress 2021 will be mainly about technological Smart City measures. Alike E6, AC2 worries that cities will be built around the autonomous car, even though autonomous driving is not 100% safe yet. He also worries that the city council will make the same mistakes again as 50 years ago with the implementation of the car-centric city. He also assumes that commercial parties not necessarily do what is best for the citizens. About privacy concerns, he believes that current German laws will protect the citizens' privacy sufficiently (Active citizen 2, 04/24/2020).

The cyclists' organisation in Hamburg that AC3 works for is critical about the ITS congress 2021. He wishes that the city itself and media outlets would report more often about this congress and other Smart City activities. After all, mobility in a city such as Hamburg is a really important topic for many of its citizens (AC3).

AC3 is informed about some Smart City projects due to his work as a volunteer at a cyclists' organisation. The organisation is critical about the city of Hamburg closely collaborating with commercial parties without informing the general public about the consequences of such partnerships (Active citizen 3, 04/28/2020).

> *„Das Konzerne sich sozusagen mit ihren Profitinteressen so in öffentliche Belange einmischen. Darüber sollte doch breit und kritisch diskutiert werden. Den Eindruck habe ich definitiv nicht."*
>
> *"That corporations so to say, with their profit interests, get involved in public matters. There should be a broad and critical discussion about that. I definitely do not have the impression that that is happening." (Active citizen 3, 04/28/2020).*

AC3 does not believe that commercial parties operate in the interest of Hamburg's citizens. Also, he thinks that it is unacceptable for commercial parties to get their hands on private data just for the sake of earning money (Active citizen 3, 04/28/2020). The Matter of Understand of the city of Hamburg with CISCO and Daimler was new for all active citizens that were interviewed.

5. Conclusions

5.1. Motivation and methods

The city of Hamburg cooperates with several commercial parties to meet Smart City goals. Previous studies have shown that commercial parties do not always act in the interest of the citizens. Some vulnerable groups may be excluded. Also, some fear of privacy violations by commercial parties exists. Additionally, active citizens were interviewed on their knowledge about Smart City Hamburg.

Four experts and three active citizens participated in semi-structured interviews. Qualitative interviews were a good method due to the novelty of the researched topic. However, it would have been nice to be able to speak with policy-makers in Hamburg about what they think about the cooperation with commercial parties in Smart City initiatives. Because of the pandemic, the authority of economics, traffic and innovation of Hamburg did not have time for an interview. Also, the low number of interviewees makes it problematic to draw firm conclusions.

Initially, it was difficult conducting research due to travelling bans and not being able to speak with interviewees in person as a result of the measures against COVID. But eventually, the interviews over teleconferencing programs or by phone worked out fine.

5.2. Results

This thesis answers questions for a topic that has not been researched before, therefore not all statements from the interviews can be backed up by academic literature.

Q1: To what extent is the current Smart City discourse in Hamburg, which is influenced by commercial parties, beneficial for Hamburg's citizens?

Some aspects of Smart City Hamburg are beneficial for Hamburg's citizens. E1 states that in the harbour area and around the city many initiatives are taking place that make the city more efficient and improve the quality of life of its citizens as in (Hollands, 2015) definition. Hamburg

is at the forefront of open data and transparency compared to the rest of Germany, as pointed out by E1, E2. The importance of open source data management and data sovereignty is emphasized by E6, Streitz (2019) and (Tierney, 2019). Open data opens opportunities for active citizens to participate in planning processes.

Too technological measures

Several interviewees mentioned that the city of Hamburg should make sure that they do not focus on just technological measures (E1, E4, E6, AC2 & AC3). This is a reasonable fear as explained by (Späth & Knieling, 2020). Cities should make sustainable modes of transport more attractive. For example, by building safe bike paths (E1), cities should improve life between buildings (Gehl, 2011). Besides, cities should not be dominated by motorised traffic with its negative side effects (E6).

Citizen participation and cooperation

The citizen participation should be improved in Hamburg as mentioned by E2 and E4. As stated by (Lefevre, 2014): what makes a city liveable are the people living in there. Also, cities should take measures that are the best for the citizens (Lefevre, 2014). Knowing what is best for the citizens can only be found out by active citizen participation. Additionally, cooperation between both different city departments and other cities helps to develop a successful Smart City (E4).

Visibility

The lack of visibility of the Smart City developments was also criticised by both experts (E2 & E4) and active citizens (AC1, AC2 & AC3). A Smart City should be beneficial for everyone (Hollands, 2015; McLaren & Agyeman, 2019), data should belong to the people and usage of this data should be transparent (Streitz, 2019). Also, the legal and moral aspects of the Smart City projects must be discussed in an open debate (d'Almeida & Stewart, 2017).

Policy recommendations

Hamburg is doing well regarding data management but is not a perfect SC. The city council of Hamburg should stay aware that not just technological measures are taken. A balance should be found in the involvement of commercial parties and an independent city council. Also, the visibility and participation of citizens should be improved.

5.2.1. Secondary research questions

Q2.1: How are commercial parties influencing the discourse of Smart City Hamburg?

According to E1, the influence of commercial parties on the Smart City discourse in Hamburg is rather healthy because of the high awareness for data security and data sovereignty in Germany. E3 states that the influence of commercial parties is often quite high because they usually have the sole knowledge of the techniques used. According to interviewees the cooperation with commercial parties can have advantages and disadvantages. The advantage is that commercial parties have more resources and implement Smart City projects quicker (E1 & E2). The disadvantage is that the city itself is not in control of the data (E2 & E3), thereby becoming more dependent on the external parties. By cooperating with commercial parties you risk that only technological measures are implemented, whereas other measures might have a bigger effect on sustainability and liveability, as also explained in 5.1. (E1; E4; E6; AC2; AC3; (Gehl, 2011; Lefevre, 2014; Späth & Knieling, 2020).

Alternative for commercial parties

According to E2 and the employees of Dataport (E3; E4 & E5), Dataport can be an alternative for commercial parties. This institute of public rights combines knowledge of digital solutions. It also helps the municipalities learn from each other. When Dataport is deployed, it is guaranteed that data remains the possession of the municipality.

Q.2.2: To what extend is the privacy of the citizens of Hamburg at risk because of commercial parties owning newly generated data from Smart City Hamburg?

In Germany, there is a high awareness of data security (E1). With the transparency law of 2012, the city of Hamburg obliged themselves to publish a lot of data online, which makes it more visible for the citizens of Hamburg to control what data is generated (E2). Furthermore, the privacy by design principle is used. This means that data cannot be tracked back to individual people (E1 & E2). The institute of public rights, Dataport, can function as an alternative for commercial parties. Allowing municipalities to involve in Smart City initiatives without being dependent on commercial partners. It does not seem that people in Hamburg have to fear for their privacy. Although the cooperation with commercial parties and the general handling of data must be carefully considered.

Q.2.3: How well informed are active citizens in Hamburg about the Smart City initiatives and do they believe that Smart City Hamburg improves their liveability?

The visibility of Smart City activities in Hamburg should be better. AC1 has not heard about Smart City and AC2 has heard about it to some extent. AC3 has also heard about some Smart City initiatives but wishes that the city is more open in their communication. He believes that the citizens of Hamburg have the right to be informed about what the city of Hamburg does in their cooperation with commercial parties and that commercial parties would not act in the interest of Hamburg's citizens. AC1 worries that more power of commercial parties in the city could also mean that some groups will be excluded (McLaren & Agyeman, 2019). As a geography teacher, AC1 will follow future Smart City developments.

For AC2, the biggest fear is that commercial parties push to technical measures that are not necessarily in the interest of the city (also: E6; Späth & Knieling (2020)). He is, however, highly interested in the developments and thinks that Smart City can be beneficial for the inhabitants.

5.3. Learning outcome and contribution to research

In this researched I got more in-depth knowledge about how commercial parties influence the Smart City discourse in Hamburg and how Smart City is perceived in general. With this thesis, a critical reflection on the role of commercial parties in the Smart City discourse in Hamburg is given.

5.4. Recommendations for further research

Smart City Hamburg and the cooperation with commercial parties is an ongoing process. Future research should focus on the process Hamburg goes through toward the ITS congress 2021 and future developments. Also, a more quantitative study amongst citizens on how they want their city to develop is needed to learn more about citizens needs and desires.

Active citizens additionally reported that they wanted more information and some experts suggested that Smart City Hamburg needs more citizen participation. The possibilities of more

citizen participation and information should, therefore, be researched. This research is needed to guarantee social improvements in Smart City initiatives comparable to Hamburg, in contrast to representing purely the interests of commercial parties.

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Appendix I

Interview guide expert interview

Introduction

Ich möchte mich erstmal herzlich bedanken, dass Sie sich zeit genommen haben mit mir über dieses Thema zu reden. Ich werde mich erstmal kurz vorstellen, mein Name ist Tom Kloos und ich schreibe im Rahmen meines Pre-Master Studiums (Environmental and Infrastructure Planning bzw. Stadtplanung) an der Rijksuniversiteit Groningen meine Abschlussarbeit über die Anwendung des Smart City Konzeptes in Hamburg. Meine Arbeit mit dem Titel, *Social improvements in Smart City Hamburg – How commercial parties influence the Smart City discourse in Hamburg*, untersucht inwiefern der Smart City Diskurs in Hamburg von kommerziellen Unternehmen beeinflusst wird, und ob Hamburgs Bürger davon profitieren.

Consent

Es würde die Auswertung dieses Interviews erleichtern wenn ich es aufnehmen könnte. Wäre das für Sie in Ordnung?

START RECORDING

Warming up

- Was ist Ihre berufliche Funktion?
- Wie lange gehen Sie schon dieser Arbeitstätigkeit nach?
- Was ist für Sie eine Smart City?
- Inwiefern glauben Sie das Hamburg eine Smart City ist?

Exploration of present aspects

- Welche Unternehmen beteiligen sich an der Smart City Hamburg?
- Welche Ziele hat die Stadt Hamburg bezüglich des Smart Cities gesetzt?
- Was sind ihres Erachtens die Vor- und Nachteile der Smart City Hamburg?
- Wie wichtig ist, Ihrer Meinung nach, die Beteiligung von kommerziellen Partner bei der Umsetzung der Smart City Hamburg?
- Wie schätzen Sie den Einfluss von kommerziellen Partnern auf die Smart City Hamburg ein?
- Wie werden Datumschutzrechtliche Maßnahmen werden durchgeführt?

Closing questions

- Gibt es irgendwas, was Sie dem Interview hinzufügen möchten?
- Haben Sie noch Fragen an mich?
- Wie Fassen sie Smart City Konzept zusammenfassen mit den expertern players. Wie würden Sie das den Bürgern transportieren?
- Danksagung, informieren über weiteres Vorgehen und eventuelles Teilen der Ergebnisse.

Appendix II

Interview guide active citizen

Introduction

Mein Name ist Tom Kloos. Ich möchte mich erstmal herzlich bedanken, dass Sie sich Zeit genommen haben mit mir über dieses Thema zu reden. Ich werde erstmal kurz erzählen was ich mache. Ich schreibe im Rahmen meines Pre-Master Studiums, Stadtplanung an der Rijksuniversiteit Groningen meine Abschlussarbeit über die Anwendung des Smart City Konzeptes in Hamburg. Meine Arbeit behandelt den Einfluss den kommerzielle Unternehmen haben auf den Smart City Diskurs in Hamburg, und ob Hamburgs Bürger davon profitieren.

Consent

Es würde die Auswertung des Interviews erleichtern wenn ich es aufnehmen könnte. Wäre das für Sie in Ordnung? Die Auswertung erfolgt selbstverständlich anonym.

- Was machen Sie beruflich?
- Wohnen Sie in Hamburg? Wenn ja, in welchem Stadtteil?
- Sind Sie bekannt mit dem Begriff Smart City?
- Beschäftigen Sie sich in ihrer Arbeit oder privat mit dem Thema Smart City?

<u>Kurze Erklärung über Smart City Hamburg</u>

- Wussten Sie das Daimler und CISCO eine Absichtserklärung (Memorandum of Understanding) unterschrieben haben mit der Stadt Hamburg?

Ja	Nein

- Inwiefern glauben Sie dass, das Smart City Konzept die Stadt Hamburg lebenswerter machen wird?
- Glauben Sie das die Beteiligung von Kommerziellen Unternehmen beim Thema Smart City einen positiven Einfluss haben wird auf die Lebensqualität Hamburgs?
- Glauben Sie, dass kommerzielle Unternehmen die Interessen aller gleichermaßen berücksichtigen werden?
- Inwiefern glauben Sie, dass der Datenschutz genügend geschützt wird in der Smart City?
- Gibt es irgendwas, was Sie dem Interview hinzufügen möchten?
- Haben Sie noch Fragen an mich?
- Dann sind wir schon zum Ende des Interviews gekommen. Vielen Dank für Ihre Bemühungen. Ich werde Ihre Daten selbstverständlich vertraulich und anonym verarbeiten. Wenn Sie mögen kann ich Ihnen das Endergebnis zuschicken.

Appendix III