B. van der Sloot & M. Lanzing[1]

The Continued Transformation of the Public Sphere: on the Road to Smart Cities, Living Labs and a new understanding of society?

Abstract

This chapter explores the transformation of the public sphere by Smart Cities and Living Labs. It explores this transformation by analysing three data-driven projects in cities around the world. These projects raise significant legal and ethical concerns because they transform and challenge valuable elements of the public sphere. The first section provides the reader with a theoretical framework for this chapter by briefly describing features of a meaningful public sphere as proposed by Jürgen Habermas and discussing the concepts of Living Labs and Smart Cities. In section two, three and four, three cases are analysed, namely the smart nation project of Singapore, Google's Living Lab 'Sidewalk' in Toronto, Canada, and the Living Lab 'Stratums Eind 2.0' in Eindhoven, the Netherlands. These cases will be used to revisit the concept of the public sphere and its transformations as proposed by Jürgen Habermas. Smart Cities and Living Labs challenge important features of an open, neutral and democratic public sphere. The new public sphere is coming, or is it?

Keywords: Smart Cities; Living Labs; Public Sphere; Surveillance; Behavioral Steering; Democratic Legitimacy; Privacy; Autonomy

0. Introduction

Smart Cities and Living labs are increasingly used as real life laboratories in order to pave the way for the implementation of smart technology in the physical environment. A public environment that is embedded with sensors and equipped with cameras that are always 'ON' may transform our understanding of the public sphere. This chapter explores this transformation by analysing the concerns that are raised by the development of smart cities and living labs. To this end, three projects are analysed that are currently up and running in different places of the world. Living Labs raise significant legal and ethical concerns because they transform and challenge valuable elements of the public sphere. In the first section, containing the theoretical framework, the features of a meaningful public sphere as proposed by Jürgen Habermas and the concepts of Living Labs and Smart Cities are discussed. In section two, three and four, three cases are presented. The first case, which is predominantly descriptive, discusses the smart nation project of Singapore and identifies three trends in smart city design.[2] This case is mainly aimed at providing the reader with an insight in the number of data processed, an understanding of the various data flows between the different actors involved in these types of projects and an idea of how data-driven applications are integrated in everyday life. The next two cases engage critically with these trends: Google's Living Lab 'Sidewalk' in Toronto, Canada,[3] and the Living Lab 'Stratums Eind 2.0' in Eindhoven, the Netherlands.[4] These two cases serve to

[1] Bart van der Sloot is senior researcher at the Institute for Law, Technology and Society, Tilburg University. Marjolein Lanzing is a researcher at the Radboud University. This chapter uses insights from previously published research in the Nederlands Juristenblad, 2017 (6) p. 374-382.
[2] https://www.smartnation.sg/
[3] https://www.sidewalklabs.com/
[4] http://www.openlivinglabs.eu/livinglab/eindhoven-living-lab

discuss the implications of Smart Cities and Living Labs for the ideal of the public sphere in terms of neutrality, democracy and respect for fundamental rights.

These three projects have been selected because they represent the various aspects of Smart Cities and Living Labs. First, these cases differ in size. Singapore is already a smart nation; 'Sidewalk' is a Living Lab limited to a neighbourhood in Toronto and Stratums Eind 2.0 is a Living Lab on a street in the city of Eindhoven. Second, they differ in terms of implementation. Singapore has already implemented many aspects in concrete technologies and applications to the extent that it may have exceeded the stage of 'Living Lab' (although many aspects and practices of this smart nation are experimental); Eindhoven is experimenting and testing; and in Toronto, the plans have not yet been implemented and tested. Third, they all represent democracies, but are located in different parts of the world: Asia, Europe and North-America. Although it is clear that this chapter cannot give a full and comprehensive overview of the various Smart Cities and Living Labs around the world nor of their potential legal, ethical and social implications, these three cases should enable the reader to get the general gist of new data-driven applications in cities of the future and their potential implications for the public sphere.

As a final step, these cases will be used to revisit the concept of the public sphere and its transformations as proposed by Jürgen Habermas. Living Labs and Smart Cities raise legal and ethical concerns with regard to maintaining and fostering the important features of a public sphere. This is significant for monitoring and evaluating (the development of) Smart Cities and Living Labs in the future.

1. Theoretical framework

1.1 Structural Transformations of the Public Sphere

In *The Structural Transformation of the Public Sphere* (1962), Jürgen Habermas describes the rise and transformation of the public sphere. In 1439, the goldsmith Johannes Gutenberg invented a printing press that enabled the production of affordable and large quantities of prints. By the sixteenth century, the spread of printing presses through Europe had resulted in the production of millions of copies. European citizens were increasingly able to easily access prints. Moreover, they started to congregate to discuss them. Habermas explains how these meetings, especially the salons of the eighteenth century, gave rise to the notion of the public sphere.

Within liberal democratic theory, the public sphere is traditionally distinguished from the private sphere.[5] The traditional account maintains that in the private domain, citizens can form their personality and develop their ideas and beliefs, while in the public realm, they can exchange those ideas and beliefs. Through discussion and the exchange of ideas that are originally formed in the private domain, public opinion is formed and on the basis thereof, laws are enacted. This is the ideal of the deliberative democracy. Hence, while they are separated, there exists an important and continued dialogical movement between the private and the public domain. Habermas describes this as follows:

[5] The traditional private-public divide has been notoriously criticized by feminist theory. For a long time the 'private' sphere was equated with the 'home', which was apolitical and 'free' from government interference. Philosophers like Carole Pateman (1989) and Catherine McKinnon (1989) have criticized the private sphere of the 'home' for being a place of necessity and domination and the public sphere as a space only accessible to (white) men. For that reason, they argued for erasing the distinction between the public and private spheres: the private is the political.

> ‘ (…) it was private people who related to each other in [the public sphere] as a public. The public’s understanding of the public use of reason was guided specifically by such private experience as grew out of the audience-oriented subjectivity of the conjugal family’s intimate domain. Historically, the latter was the source of privateness in the modern sense of a saturated and free interiority.’[6]

The public sphere is described as an ideal, virtual and essentially social space accessible to *all* citizens, (regardless of race, class or gender) in which citizens can meet each other and can freely communicate and deliberate by exchanging ideas about different conceptions of the good life.[7] It is also the place where they can act according to their opinion and their conception of the good.[8] In so far as there are restrictions on the exercise of freedom, these are based on public laws that have democratic legitimacy: the result of public deliberation and an exchange of ideas.[9] Furthermore, this conception of freedom within Habermas’ deliberative democracy implies there must be room for minority views within a discussion and not one conception of the good imposed on its citizens. This also means that citizens are free to act according to their own conception of the good life.

Habermas describes how this conception of the public sphere originated from the eighteenth century coffeehouses, salons and tischengesellschaften. Although they differed in size and composition, the style of proceedings, the climate of debate and their topical organization, they all organized discussions among private people that tended to be ongoing and had several common features that resonate with the ideal of the deliberative democracy: equality, critique and inclusivity.

> ‘First, they preserved a kind of social intercourse that, far from presupposing the equality of status, disregarded status altogether. The tendency replaced the celebration of rand with a tact befitting equals. [] Secondly, discussion within such a public presupposed the problematization of areas that until then had not been questions. The domain of “common concern” which was the object of public critical attention remained a preserve in which church and state authorities had the monopoly of interpretation not just from the pulpit, but in philosophy, literature, and art, even just at a time when, for specific social categories, the development of capitalism already demanded a behavior whose rational orientation required ever more information. To the degree, however, to which philosophical and literary works and works of art in general were produced for the market and distributed through it, these culture products became similar to that type of information: as commodities they became in principle generally accessible. [] Thirdly, the same process that converted culture into a commodity (and in this fashion constituted it as a culture that could become an object of discussion to begin with) established the public as in principle inclusive. However exclusive the public might be in any given instance, it could never close itself off entirely and become consolidated as a clique; for it always understood and found itself immersed within a more inclusive public of all private people, persons who – insofar as they were propertied and educated – as readers, listeners, and spectators could avail themselves via the market of the objects that were subject to discussion.’[10]

Although these characteristics of equality, critique and inclusivity (through the market) have become deeply engrained aspirational values for deliberation in modern day democracies,

[6] Habermas, 1962/1989: 28
[7] Habermas 1962/1991: 1
[8] Habermas 1996: 25-26, 28
[9] Habermas 1996
[10] Habermas 1962/1989: 36-37

Habermas describes how gradually, the core characteristics of the public and the private sphere transformed to such an extent that the values of both the private and the public sphere became strained.

One of the reasons for this transformation was the commercialization of important actors and institutions during the twentieth century within the public sphere such as the media.[11] Newspapers developed into capitalist enterprises. Their commercialization rendered them susceptible to manipulation. The commercialization of the public sphere is at tension with the potential of this sphere for communication and deliberation. For instance, the commercialization of the media entailed that it became a 'gate through which privileged private interests invaded the public sphere'.[12]

Habermas describes two structural changes that dissolved the boundary between the public and the private. On the one hand, the private and the personal lives of citizens became increasingly more public and subjected to public reason, laws and general justice. On the other hand, the public realm became increasingly privatized by organizations and companies. Gradually, the private realm no longer corresponded with the ideals of a protected, closed-off sphere in which one could formulate their own conception of the good life. Gradually, the public realm no longer corresponded with the ideals of openness, neutrality, freedom and respectful deliberation. As a result, Habermas argues, the debate became exclusive and run by professionals who either represent the people or by organizations that stood above and outside the debate.[13]

So how does Habermas' analysis of the structural transformations of the public sphere relate to new technological developments? What kinds new transformations do they cause? And how should these transformations be judged? In contemporary political democratic theory, the idealised version of a meaningful public space has been attributed a number of assets allowing for an open debate and interactive dialogue. Habermas' previously mentioned description of the features of an ideal public sphere is a description of ideal ingredients for the ideal of a deliberative democracy.[14] Based on that description, without aiming to provide an exhaustive list, it can be roughly stated that: (1) the public sphere should be accessible to *all* people (regardless of race, class or gender), (2) should be neutral in the sense that no vision of the good life is presupposed or excluded, (3) in so far as there are restrictions on the exercise of freedom, these should be based on public laws that have democratic legitimacy, (4) that such laws should have democratic legitimation, (5) that such restrictions may never go so far as to integrally impose one idea of the good on society, there must be room for minority views, and that (6) as far as possible, human freedom should remain intact. The latter also entails that unpredictability and uncontrollability, as aspects of individual freedom, are part and parcel of the public realm.

This chapter will discuss how Living Labs and Smart Cities challenge valuable elements of the public sphere in new ways by transforming the design of the public sphere. Of course, the claim is not that an ideal public sphere as described above ever existed (or will ever exist), not in the 18th century, not in contemporary society and not in the coming community. The idea proposed in this chapter should also not be misunderstood as arguing that all transformations of the public sphere brought about by new technologies are problematic. For instance, the spread of the printing press spurred the physical public sphere of the salons and coffeehouses. The development of the Internet created a virtual parallel. Connected to and intertwined with the physical public sphere, online platforms allow citizens to voice their political opinions and

[11] Habermas 1962/1991: 181
[12] Habermas 1962: 185
[13] Habermas 1962/1989: 175-176
[14] Habermas 1962/1991: 1; Habermas 1996: 25-26, 28; Habermas 1996

to participate as well as manage and foster various other social relations.

At the same time, technologies support features that reform important elements of the public sphere. For example, online platforms allow (mostly private) parties to filter or block certain voices, options and actions.[15] Moreover, private parties structure most online platforms by determining the rules through their terms and conditions. Furthermore, the interest of Internet providers does not lie in providing citizens with maximum freedom and to create zones of experimentation. Rather, their interest lies in maximizing their profit, which can be facilitated through controlling and influencing citizens' behaviour.[16] Tensions are created in the process of the transformation of the public sphere as a result of new technologies that reshape the design of these spheres. This chapter will engage with Smart Cities and Living Labs to discuss their specific impact on the public sphere.

1.2 Living Labs and Smart Cities

A recent development in the transformation of the public sphere is the rise of 'Smart Cities' and 'Living Labs' in which the 'physical' public sphere will be transformed in such a way that it will always be 'online'. Smart cities can be roughly understood as the technological promise to redesign cities into smart environments that are governed by driven by algorithmic decision-making processes that rely on real-time Big Data. Smart cities can respond more efficiently to the needs of their inhabitants through the use of new technologies, the Internet of Things and various 'smart' applications. The 'smartness' then refers to the fact that these environments can learn from and adapt real-time to new circumstances based on new information. They can influence the creatures living and acting in those environments to optimize the safety, mobility, efficiency, sustainability or public health of the city:

> 'Smart cities are places where information technology is wielded to address problems old and new. In the past, buildings and infrastructure shunted the flow of people and goods in rigid, predetermined ways. But smart cities can adapt on the fly, by pulling readings from vast arrays of sensors, feeding the data into software that can see the big picture, and taking action. They optimize heating and cooling in buildings, balance the flow of electricity through the power grid, and keep transportation networks moving. Sometimes, these interventions on our behalf will go unnoticed by humans, behind the scenes within the wires and walls of the city. (…) All the while, they will maintain a vigilant watch over our health and safety, scanning for miscreants and microbes alike.'[17]

It is no longer the behaviour of citizens that changes and adapts to the environment, it is the environment that adapts to the citizens, in order to steer their behaviour in such a way that it becomes increasingly standardised. Actors behind smart cities aim to steer or 'nudge' citizens towards a particular conceptualisation of the good and a particular way of achieving this good. Common values that are mentioned in that respect are, for instance, 'sustainability', 'public health' and 'safety'. 'Living Labs' serve as a testing ground for various 'smart' products and technologies in the context of the development of Smart Cities. The Living Lab is characterized by the experiments that take place within an existing social and territorial context, so that the research can be carried out in a 'real' environment beyond the walls of the 'artificial' world of the laboratory. In other words, specific zones within the public sphere or entire cities become designated areas of experimentation. A Living Lab can be described as '(…) an open innovation environment in real-life settings in which user-driven innovation is the co-creation process for

[15] Vaidhyanathan 2011: 135-138
[16] Zuboff 2015
[17] Townsend 2013: xii-xiii.

new services, products, and societal infrastructures. Living Labs encompass societal and technological dimensions simultaneously in a business-citizens-government-academia partnership.'[18]

2. Singapore: Smart Nation

What do Smart Cities look like and what do they require? One of the most advanced Smart Cities in the world is the Smart Nation project in Singapore. The entire country of Singapore is conceptualised as a smart nation. The project aims at making Singapore 'an economically competitive global city and a liveable home. It is a whole-of-nation movement to harness digital technologies to build a future Singapore, to improve living and build a closer community, empower citizens to achieve their aspirations through good jobs and opportunities, and encourage businesses to innovate and grow.'[19]

This section briefly discusses three trends that show how the public sphere is transformed. First, there is the trend of datafication, meaning that increasingly, reality, people and objects are mirrored in data images. These data images are used to make decisions and predictions about reality. Second, as a consequence, there is a hybridisation of the public sphere. Physical reality is combined and integrated with smart products that are in constant connection with the Internet and that react autonomously to changes in their environment. Third, the public space is privatised. Citizens are encouraged to gather data for the police and prevent and deter crime and commercial parties are allowed to run projects and experiments in the public sphere.

2.1 Datafication

The Smart Nation project is one of the most open, transparent and well-documented smart cities around the world.[20] This endeavour consists of several projects. There are the National Digital Identity project, which aims to allow citizens and businesses to transact digitally in a convenient and secure manner and e-Payments project, which aims to allow everyone to make simple, swift, seamless, and safe payments. Furthermore, there are the Smart Nation Sensor Platform, in which sensors and other Internet of Things (IoT) devices are deployed in order to make Singapore liveable and secure and the Smart Urban Mobility project, in which data and digital technologies, including artificial intelligence and autonomous vehicles, are used to enhance public transport. Finally, there is the Moments of Life initiative, in which government services, across different agencies, offer personalised services to citizens at key moments of their lives in which they will have to adapt their lifestyle -such as the birth of a child. In order to facilitate these projects, Singapore promotes Open Data initiatives and various Living Labs.

There are fourteen apps that can be downloaded from the government site. These include apps for health and lifestyle, biodiversity, mobility, suspicious sightings, taxes, official statistics, the weather, municipal issues and immigration services.[21] There are also various initiatives to make Singapore the centre of technological innovation and digital creation. Huge investments are made in that respect:

---

[18] http://www.diva-portal.org/smash/get/diva2:979171/FULLTEXT01.pdf
[19] https://www.smartnation.sg/about/Smart-Nation
[20] Most of what is described in this section comes directly from the project's website or is a paraphrase thereof.
[21] https://www.smartnation.sg/apps; https://www.sgsecure.sg/; https://www.police.gov.sg/sgsecure; http://www.nea.gov.sg/; http://www.singstat.gov.sg/services/singstat-mobile-app; https://www.scdf.gov.sg/content/scdf_internet/en/community-and-volunteers/mobile_phone_technology.html; http://www.mnd.gov.sg/mso/mobile-about.htm;

> ‘Singapore is transforming to become a Smart Nation, where citizens live meaningful and fulfilled lives empowered by digital technology, where digital connectivity leads to stronger community bonds and many more opportunities for Singaporeans to pursue their aspirations and contribute to Singapore’s future. This is a whole-of-nation journey that Singapore is embarking on, enabled by digital technologies. Digital technologies will impact how we live our daily lives, open up new possibilities for the way we manufacture goods and deliver services, expand healthcare options, and revolutionise the way we plan and run our city.’[22]

For instance, the National Electronic Health Record (NEHR) is a patient data–sharing platform that enables healthcare professionals to access their patients’ healthcare history.[23] But, the data of such platforms may also be used for other purposes like congestion control.[24] Mention can be made of no less than eight open data platforms (between government agencies, between businesses and the government) on transportation, economic and social demographics, financial institutions, statistics, press releases, and local, governmental services and information.[25] The promises of an ‘open-data society’ lie in the realm of public health and the improvement of city governance. [26][27]

This description of Singapore’s Smart Nation project, however brief, indicates a trend towards datafication. This means that increasingly large amounts and varieties of data are gathered about personal lives and the affairs in both public and private sphere. Data and the data image about reality are becoming increasingly important. Profiles and data-analytics become increasingly dominant. Within the Smart Nation project, this is viewed as a positive development. Data-driven applications are described by the Smart Nation project as more open and transparent towards citizens and more efficient and effective in terms of operation. Through data-driven applications, citizens and the community can share information and together build the nation they strive for. Although Singapore’s Smart Nation project may be an extreme example, datafication is a general element in most smart cities and living labs. A second element general to such project is hybridisation, that is, the amalgamation of offline and online. This trend will be central to the next sub-section.

2.2 Hybridisation

Real and virtual, offline and online, physical and digital are increasingly merged in Singapore’s Smart Nation project.[28] To begin with, the physical city is studded with cameras, sensors and other objects that can gather data.

> ‘In Singapore we started building our own network of sensors, especially CCTV cameras, some time ago. The Police installed CCTVs at HDB void decks and [o]ther agencies have different sensors. PUB has sensors to detect water levels in drains to know whether it is likely to flood or not. LTA has cameras to monitor traffic conditions and deter illegal parking. [] We are building an integrated national sensor network. We are

[22] https://www.nrf.gov.sg/rie2020
[23] https://www.scientificamerican.com/products/singapore-a-smart-nation/singapore-a-smart-living-laboratory/
[24] http://brandinsider.straitstimes.com/hitachi/implementing-the-smart-city/ - COE likely stands for Certificate of Entitlement https://www.lta.gov.sg/content/ltaweb/en/roads-and-motoring/owning-a-vehicle/vehicle-quota-system/overview-of-vehicle-quota-system.html
[25] https://www.smartnation.sg/resources/open-data
[26] https://www.scientificamerican.com/products/singapore-a-smart-nation/singapore-a-smart-living-laboratory/
[27] https://www.nrf.gov.sg/programmes/virtual-singapore
[28] https://www.tech.gov.sg/-/media/GovTech/Media-Room/Speeches/2017/5/Factsheet-Smart-Nation-Sensor-Platform.pdf

> making "every lamp-post a smart lamp-post", meaning it can mount different types of sensors on any of the lampposts. We are installing more CCTV cameras in public places. We are combining inputs from different sources – police, LTA, hotels and commercial buildings, even handphones, which are effectively sensors on the ground. [] So if I have 10,000 cameras, I do not need 1,000 people watching those cameras. I just need maybe just 10 people. Each person can watch 1,000 cameras and if the AI detects that something funny is happening, it will pop up and the man can pay attention and a response can be direct.'[29]

The second step is to integrate data-driven devices in the physical world and to make objects and environments contextual, meaning that they correspond to activities or the state of affairs in which they play a role. This entails that these objects can communicate with other devices over the internet and that they can adapt and make decisions based on profiles and patterns distilled from previous data collection and analytics. Singapore has several relevant projects in this sense in the area of health,[30] urban life,[31] mobility[32] and public services.[33]

Health projects include various initiatives. One initiative promotes the usage of robotics in healthcare, which are believed to help seniors and those with disabilities through 'automated bathing machines and autonomous droids that can interact and monitor patient progress'.[34] Another initiative enables users to access their medical records and useful health information and share it with their caregivers.[35] In addition, it offers self-tracking apps and virtual elderly monitoring services that alerts caregivers when abnormalities are detected.[3637] In the category living, one particular app that stands out is the smart homes project.[38] With approximately 80% of Singapore households living in public housing, the government promotes smart homes equipped with sensors. Moreover, a number of private sector-driven smart home trials have been launched.[39]

Mobility is also increasingly becoming smart. In public transport, autonomous technology and public transport data support mobility on demand. [4041] Another project uses public data sets and data analytics to assist the government and Singaporeans to cooperate on urban transport planning and transport solutions.[42] Finally, there is a project of self-driving vehicles.[43]

Most public services are digitalized. Digital government services include public service

---

[29] http://www.pmo.gov.sg/national-day-rally-2017
[30] https://www.smartnation.sg/initiatives/Health
[31] https://www.smartnation.sg/initiatives/Living
[32] https://www.smartnation.sg/initiatives/Mobility
[33] https://www.smartnation.sg/initiatives/Services
[34] https://www.smartnation.sg/initiatives/Health/assistive-technology-analytics-and-robotics-for-aging-and-healthcare
[35] https://www.smartnation.sg/initiatives/Health/healthhub-portal--a-digital-healthcare-solution
[36] https://www.smartnation.sg/initiatives/Health/national-steps-challenge--an-app-towards-healthy-and-active-lifestyle
[37] https://www.smartnation.sg/initiatives/Health/telehealth--integrated-and-seamless-healthcare-services-at-home
[38] https://www.smartnation.sg/initiatives/Living/smart-homes--tech-enabled-solutions-for-homes-in-singapore
[39]http://www20.hdb.gov.sg/fi10/fi10296p.nsf/PressReleases/F93B15F80588397748257D500009CE6C?OpenDocument
[40] https://www.smartnation.sg/initiatives/Mobility/contactless-fare-payment-for-public-transport-in-singapore
[41] https://www.smartnation.sg/initiatives/Mobility/mobility-on-demand--real-time-demand-driven-transport-through-apps
[42] https://www.smartnation.sg/initiatives/Mobility/open-data-and-analytics-for-urban-transportation
[43] https://www.smartnation.sg/initiatives/Mobility/self-driving-vehicles-sdvs--future-of-mobility-in-singapore. See also: https://www.smartnation.sg/initiatives/Mobility/spearheading-research-in-standards-for-self-driving-vehicles-sdvs

chatbots,[44] the Moments of Life initiative, that was previously mentioned,[45] and various financial technology projects.[46] Consequently, the city as well as the home and the public as well as the private sphere, are increasingly hybrid environments. Objects, sensors and cameras constantly gather data and react to the activities and state of affairs within those environments, contributing to smart governance with automated decisions.

2.3 Privatisation

A final trend that can be witnessed in the Smart Nation project in Singapore is the privatisation of the public sphere. The public sphere is increasingly owned and controlled by private parties, which can be either commercial organisations that commercialise and exploit data or private citizens that are granted special rights, positions or privileges to act in the public sphere. 'Public-private partnerships are essential for the successful development of a smart city.'[47]

One of the projects that received funding is the Corporate Laboratory@University Scheme, which is described as the establishment of key laboratories by industries in universities. [48] Research and Development is conducted in collaboration between universities and companies, which ensures that universities achieve impact by developing cutting edge solutions for problems faced by industry.[49]

Also in other sectors, public-private partnerships are encouraged. The underlying rationale is that the public and public institutions benefit from such collaborations because private organisations help in promoting public goals, produce knowledge and introduce services that facilitate citizens in their everyday life. Public officials in Singapore state that:

'We strongly believe in the value of public-private partnership because in the space of smart cities (…) government policies and support can strongly influence how companies innovate in those spaces.'[50]

In their turn, private organisations are allowed to enter the public sphere and use powers traditionally in the hand of governmental institutions in order to gather data and to control public life. The National Research Foundation of the prime minister's office of Singapore states on their website: 'Businesses can tap on the wealth of data and information within Virtual Singapore for business analytics, resource planning and management and specialised services.'[51]

2.4. Conclusion

[44] https://www.smartnation.sg/initiatives/Services/digital-government--public-services-made-more-seamless-with-technology

[45] https://www.smartnation.sg/initiatives/Services/moments-of-life-initiative-begins-with-supporting-every-young-child

[46] https://www.smartnation.sg/initiatives/Services/regulatory-sandbox-for-innovative-fintech-experimentation. See also: https://www.smartnation.sg/initiatives/Services/towards-a-smart-cashless-society-with-contactless-payment

[47] http://brandinsider.straitstimes.com/hitachi/implementing-the-smart-city/

[48] https://www.nrf.gov.sg/programmes/corporate-laboratory@university-scheme

[49] One of such collaborations is in the area of promoting cyber security. https://www.nrf.gov.sg/Data/PressRelease/Files/20161024123259 5116-2016-1022%20NUS-Singtel%20Corp%20Lab%20-%20Press%20Release%20(final).pdf

[50] https://www.opengovasia.com/articles/7182-exclusive-fostering-public-private-sector-partnerships-in-singapore

[51] https://www.nrf.gov.sg/programmes/virtual-singapore

Three essential characteristics of smart cities have been described on the basis of the Singapore Smart Nation project. First, they rely heavily on datafication. Reality is mimicked in data profiles; these data profiles subsequently replace reality in decision making processes. Second, smart cities transform the physical reality into a hybrid space, in which objects are equipped with sensors and camera's in order to gather data about citizens and their affairs and in which these objects are connected to the internet, making them smart objects that resonate with the context within which they function. Third, smart cities allow for a privatization of the public sphere. Private organizations are allowed to gather data in public and commercialize part of that sphere. In the next two sections, discussing the cases of Sidewalk Toronto and Stratums Eind 2.0, these characteristics are taken as a given when reflecting on the implications in terms of transforming the meaning of the public sphere.

3. Toronto: Sidewalk Toronto

On the eastern side of the Toronto Waterfront lies Quayside. Quayside is the projected site for Sidewalk Toronto: a joint urban innovation venture between the local community, urban development non-profit corporation Toronto Waterfront and Google's Sidewalk Labs. It aims to turn this area into an 'affordable, eco-friendly, smart neighbourhood' (Sauter 2018). Already 50 million has been committed to a one-year process and Sidewalk's design plans extend beyond the initial Quayside location, stretching along the entire Waterfront. This case will be used to highlight how the goal of improving the quality of life relates to a particular conception of the good life and how a dominant private party may shape this conception. Moreover, it discusses how this relates to the transformation of the public sphere from the perspective of a deliberative democracy. First, Sidewalk Labs exemplifies that within Living Labs as public-private partnerships, it becomes possible for powerful third parties to 'run' the city without having been part of a democratic procedure involving elections. Secondly, the case study shows that within these partnerships, the neutrality of the public sphere is challenged because a particular (commercially driven) conception of the good life may permeate every corner of the public sphere. Finally, this also means that the private sphere is affected too, because the boundary between these spheres is increasingly dissolved.

3.1 Neutrality

Ideally, the public sphere of a democracy should be 'neutral'. In a liberal democracy, the idea of state neutrality applies. This means that not one dominant perspective on the 'good' life should be imposed on the citizens by either a government, company or other powerful actor(s). Without this proviso, citizens will have a difficult time to freely discuss different versions of the good life or to experiment with dissenting ideas. In the case of Sidewalk Labs, the neutrality of the public space is challenged. While the government always tries to influence the behavior of citizens, it uses laws and regulations that leave the choice to the public as much as possible. Citizens should be free to pursue an alternative version of the good life.

In the case of Sidewalk Labs, there exists a significant power imbalance between the actors within the public-private partnership. This means that it is likely that the city will be shaped according to the vision of the most powerful actor, which is in this case a commercial actor. Google's vision with regard to the quality of life reflects an idea about what it means to live the good life. In other words, their suggestions with regard to the quality of life are not neutral, but normative. Sidewalk Toronto is the materialization of a dream that has been held by the founders of Google for a long time: to have a city and to be in charge (Dingman 2017). The wish to 'be in charge' relates to Google's ambition to accelerate urban innovation in order

to improve quality of life. Sidewalk Labs is the pilot for many cities to come (Crawford 2018). It aims to benefit its citizens by improving the sustainability, safe mobility, economic opportunity, affordability of housing, community building and reclaiming public space for social connection of the area. Sidewalk Labs explicitly states this on their homepage accompanied by attractive visuals of a green neighbourhood alive with social interaction.[52]

Google's interventions with regard to shaping the city and designing it to respond to the needs of its citizens are designed according to a certain norm associated with a particular conception of the good life. For example, altering the light on the smoker's patio to an annoying electric blue, based on the value of public health, constitutes a normative interference with a person's desire to enjoy a cigarette. The same holds true for the protection of public order and safety; although safety is one of the most commonly shared ideals and generally seen as a precondition of a 'good life', there is still a part of the population for which a good night life experience certainly does not exclude a bar fight. And even if everybody on the planet would agree that values like climate protection, public health, safety and responsible energy use are worth pursuing, there might still be disagreement about the realisation of these values in the form of concrete normative interferences.

Smart environments increasingly dissolve the boundary between the public and private sphere. This means that conceptualizations of the good life as proposed by Google also infiltrate what used to be called the 'private' sphere. This also has an impact on the development of and, as a result, on the diversity of conceptualizations of the good life that are available for discussion in the public sphere. Minority, including dissenting, views or behaviour may not be accommodated or recognized by the smart systems embedded within the environment due to a normative blind spot. In addition, the normative interferences may be economic or state incentives that do not necessary have the best interest and well being of the public at heart.

3.2 Democracy

Of course what usually legitimates governments to surveil public spaces and promote a certain conception of the good life is that it has democratic legitimation. Sidewalk's CEO Dan Doctoroff expressed that Google's systems, which require a large amount of sensors and camera's in the public sphere, could actually improve on democracy (Crawford 2018). While Doctoroff does not explain how democracy could be improved, some suggestions can be found that may resonate with this goal on the Sidewalk Labs website. The website identifies with a quote about the relationship between open data and democracy: 'Democracies provide pathways for government to learn from their citizens. Open data makes those pathways so much more powerful.'[53] In this reading of a democracy, the government can use democracy, which presupposes the outcome of deliberations and discussions in the public sphere, to learn about what their citizens want in terms of leading their lives. By collecting data about their citizens, the government is able to respond more effectively to the needs of their citizens that they can deduce from patterns in the data. Democracy itself is reduced to an instrument of the government to effectively organize society.

This view on the role of the public sphere differs from the conceptualization of the public sphere within a deliberative democracy. Within a deliberative democracy, a public sphere entails active discussion between citizens about a multitude of different versions of the good life and how this should be realized in society. Argumentation and citizen participation is key for a discussion and for persuading other citizens whilst respecting their autonomy.

[52] https://www.sidewalklabs.com/
[53] https://www.sidewalklabs.com/blog/the-tremendous-untapped-power-of-data-to-reinvent-city-services/

Conceptualizing the public sphere as a space that can be mined, in which the collection of data and the deduction of dominant 'patterns' are considered as reflective and representative of the needs of citizens, changes its meaning. One of the implications of such a transformed conception of the public sphere is that the question 'why' matters less and less. Data, however valuable, does not inherently provide an explanation or justification (boyd & Crawford 2012; Mayer-Schonberger & Cukier 2013).

Sidewalk Labs more or less circumvents this concern by forming a partnership with the local community. It has developed a civic engagement plan that features meetings, workshops and events in which citizens can discuss and offer ideas about issues related to the city. These do not only encompass their views on realizing the values of mobility or sustainability, but also values and issues such as social inclusion. There is even a Sidewalk summer camp for children. Sidewalk Labs also plans to launch innovation trials across town, not only in Quayside to familiarize people with the concept of a smart environment.

The problem remains that, despite the effort to include public participation and co-creation, the values for quality of life that arise from these meetings are not safeguarded by a formal democratic procedure. Regardless of the well-meant intentions, the power imbalance between the municipality, its citizens and Google is too great to ensure that the input from citizens is heard and acted upon (in the future). In that sense, its dominant and powerful status prevents it from actually being able to serve public interest.

3.3 Commodification

Google's ambitions are realized by extensive real-time data collection enabled by an unprecedented digital network of sensors. Sidewalk Labs will run on 'a traffic-sending network that will collect data from smartphones, embedded sensors and cameras to identify areas that could use more bike-sharing slots, or where a self-driving vehicle should be routed, or where a future pop-up store could find a market for its wares' (Dingman 2017) in order to control anything from 'the ambient temperature of buildings to crosswalk signals to assigned uses of adaptable private and publics spaces' (Sauter 2018). In order to experiment with different technologies synchronically, a substantial amount of different types of sensors will be installed. Sidewalk Labs has the potential to become an intensively surveilled place.

The main incentive for Sidewalk Labs is commercial. Google has pledged to invest 10 million dollar in the project, as long as the government signs up for a plan that benefits the company (Crawford 2018). Google has offered to share the data that they collect with the city, but it remains to be seen how much of this data actually benefits the government. In the meantime, Google has access to a substantial amount of data and can learn about all sorts of aspects of urban life including (predictive) patterns with regard to social service distribution, mobility and energy use. This creates opportunities for commodification of that data and new products may be developed by Google based on these insights (Zuboff 2015). In Living Labs, as public-private partnerships, the distinction between public and private interests becomes blurred.

Google's dominant market position and its large financial resources, make Google an interesting partner for governments with limited resources, but also a powerful and dominant actor in shaping the terms and conditions of a project like Sidewalk Labs. In the case of Sidewalk Labs, Google is effectively allowed to run the city according to their vision on improving the quality of life, which presupposes a certain conception of the good life. This entails a shift away from the public sphere and democratic decision-making that stems from its discussion. Living Labs provide an opportunity for powerful private actors to shape the city without being elected through a formal democratic procedure as the representative that acts on

behalf of the public interests.

Moreover, Google's plan for civic engagement has been criticized as a way to normalize societal experimentation and the idea of being a 'guinea pig' in Sidewalk's experiments so as to ensure a smooth transition and familiarity with these technologies so that when these pilots are later integrated within a built-environment, citizens will have no qualms inhabiting smart housing and neighbourhoods (Dingman 2017). This concern relates to considerations regarding privacy and fairness. The people who will inhabit the affordable Sidewalk Lab are likely to be vulnerable individuals such as children and people who need affordable housing (Sauter 2018). They may not agree with Google's terms and conditions but find themselves forced to accept them due to their socio-economic circumstances. While the question whether the commodification of personal data and the steering of behaviour should be allowed is already a controversial debate, circumstances of inequality may indicate a particular form of harmful and inappropriate commodification (Roessler 2015: 149; Satz 2010: 98). While Google presents it is a trade-off of interests, this frame represents a very particular view on information that is, first and foremost, in the interest of a powerful commercial entity.

3.4 Conclusion

This section discussed Sidewalk Toronto, the Living Lab run by Google in cooperation with the local government and its citizens. This case has been examined from the perspective of a deliberative democracy and highlights how state neutrality with regard to conceptualizing the meaning of 'the good life' becomes strained in public-private endeavours such as Living Labs and Smart Cities in which they aim to improve quality of life. This is largely due to a power imbalance between powerful private actors, citizens and local governments. Moreover, the absence of a neutral public sphere problematizes democratic discussion amongst multiple different versions of the good life. The absence of a neutral public sphere, however well intentioned, may not recognize minority views or behaviour. The freedom to formulate alternative views or to behave alternatively might become increasingly reduced and limited, which is problematic from the viewpoint of a deliberative democracy. Powerful private actors may, due to their position, undermine the rule of law that constitutes the legitimacy of democratic procedure and increasingly compromise the neutrality of the public sphere.

4. Eindhoven: Stratums Eind 2.0

The city of Eindhoven aims to increase security and decrease the number of incidents (night life violence) in the nightlife area called Stratumseind through the use of a Living Lab.[54] The project, called Stratumseind 2.0,[55] is a partnership between the municipality of Eindhoven, Eindhoven University and companies such as Phillips, which is specialised in lightning, personalised healthcare and smart products.[56] In order to maximize security, the area is monitored permanently by cameras, heat sensors, object recognition is deployed and the data are combined with live Twitter feeds and social media post. In addition, those data are combined with existing databases owned by the municipality.[57] On the basis of all these data, predictions

[54] <http://www.openlivinglabs.eu/livinglab/eindhoven-living-lab>. <http://www.midpointcsi.nl/powered-by-social-innovation/wp-content/uploads/2016/07/LLTrillion2015.pdf>.
[55] <https://e52.nl/een-kijkje-in-het-lab-van-het-stratumseind/>.
[56] <http://www.smartdatacity.org/stratumseind-living-lab/>.
[57] http://www.philips.nl/a-w/about/news/archive/standard/about/news/press/20131209-Stratumseind-Eindhoven-wordt-proeftuin.html>.

are made about citizens' behaviour and preventive measures are taken. In addition, behaviour is manipulated by various experiments performed at citizens. Will coloured light make people less aggressive than bright white light (Haans & de Kort 2014)? Will people behave more relaxed when tangerine scent is sprayed in the streets?[58]

There are three aspects of this case that are at tension with our initial description of a meaningful public sphere. First, the projects undermine the fundamental rights of citizens, such as the right to privacy and the right to data protection. These rights are not only bestowed on citizens by democratic means, they are described as preconditions for developing one's character and personality and hence for active and engaged citizenship. Second, there is often no or very limited legal basis for the experiments conducted or allowed by the government, which challenges one of the fundamental principles of the rule of law, namely that governmental action is based on democratic rules. Third and finally, Living Labs are zones of experimentation. This means that the behaviour of citizens is tacitly influenced. This may undermine citizens' freedom and autonomy, and consequently, the preconditions for democracy. Moreover, citizens have very limited influence on the design of Living Labs (Chesbrough 2006).

4.1 Privacy and data protection

In Europe, citizens are granted the right to privacy and the right to data protection.[59] The right to the protection of personal data, is embedded in the General Data Protection Regulation (GDPR) of the European Union.[60] The right to data protection will apply to large parts of projects such as Stratumseind 2.0, data processing being a central element in most Living Labs. Several examples will be provided on how data processing within smart cities will be evaluated from the perspective of the GDPR.

First of all, the GDPR requires that data should be gathered for a specific and concrete purpose.[61] A concrete purpose exists, for example, when a pizza delivery service needs a person's home address to be able to deliver the pizza just ordered. Many living lab projects do not have such a concrete an specific purpose for gathering data, but rather pursue general and vague purposes such as 'maximising security' or 'optimising traffic flows'.

Secondly, the GDPR requires that the data collection should be necessary and effective to achieve the concrete and specific purpose.[62] However, many Living Labs, including the Stratumseind 2.0 project, are based on experimentation, as will be discussed below. It is often unsure whether and to what extend the experiments will in fact promote the goals selected.

Also, the GDPR requires that when data are collected for a specific purpose, they should not be re-used for other, unrelated purposes.[63] However, in Living Labs, public-private partnerships are nourished more often than not, and data which are gathered, for example, to promote security, may be shared with private companies that want to use the data to test products.

Furthermore, the GDPR requires that data gathering and processing must be limited to

[58]<https://www.cursor.tue.nl/fileadmin/user_upload/Magazines/PDF_jes_Nederlands/57/Cursor_04__NL_spread.pdf>.
[59] http://www.europarl.europa.eu/charter/pdf/text_en.pdf
[60] Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).
[61] Article 5 paragraph 1 sub b GDPR.
[62] Article 5 paragraph 1 sub a GDPR.
[63] Article 5 paragraph 1 sub b GDPR.

the minimum[64] and that data must be deleted when the goal for which they were gathered has been achieved.[65] With respect to Living Labs, however, the trend is to gather as much as data possible and to store them for as long as deemed useful.

Finally, the GDPR requires that citizens must be informed about the fact that their data are gathered and why, by whom and how their data are processed.[66] In reality, citizens are mostly unaware of the fact that so many data are gathered about them and remain oblivious about the fact that they enter a Living Lab area. There is no information, such as a small sign, that informs citizens. This also may clarify the lack of an intensive public debate about Stratumseind. Nevertheless, a small sign at the beginning the street, such as Stratumseind 2.0, stating 'You are now entering a Living Lab' or 'Data about you can and will be collected if you enter this street' is not enough to be GDPR compliant.[67]

More generally, the right to privacy contains the right to develop one's personality and flourish to the fullest extent (Van der Sloot 2015). Such a right may be undermined because people will restrict their behavior if they know or fear that they might be watched in public spaces. This is called the chilling effect. The argument that citizens' can chose to avoid certain Living Lab areas, and thus avoid limitations to their privacy (or put stronger, that they have consented to privacy limitations by entering that area) has been squashed by the European Court of Human Rights. Inter alia, in a case in which the municipality of Amsterdam had designated an area as a risk zone, in which people could be randomly selected for a search, the Dutch government argued that the complainant in that case was not frisked and thus could not claim to be a victim. The Court, however, ruled: [68]

> '(…) that the applicant was engaged in lawful pursuits for which he might reasonably wish to visit the part of Amsterdam city centre designated as a security risk area. This made him liable to be subjected to search orders should these happen to coincide with his visits there. (…) It follows that the applicant can claim to be a "victim" within the meaning of Article 34 of the Convention and the Government's alternative preliminary objection must be rejected also.'

Consequently, if people have to avoid city centers in order not to be monitored or subjected to privacy infringing activities, they can be seen as victims by that very fact.

4.2 Legality and legitimacy

One of the core principles of the rule of law and democratic reign is that governmental conduct should be based on a law and those laws should have democratic legitimacy. The people decide what the government should do, not the other way around. This principle is also embedded, inter alia, in the European Convention on Human Rights, which holds that the right to privacy may only be limited if necessary in the pursuit of a public interest and based on a law. The ECtHR has specified that laws must be public, accessible and understandable and should contain limits to the use of government power. Thus, laws may not provide a blanket power to the state, but must set conditions for the use of powers, mechanisms for oversight and possibilities to challenge governmental action before a court of law.[69] This principle is put under pressure by the tendency to call Living Labs 'experiments'; it is often argued that such

[64] Article 5 paragraph 1 sub c GDPR.
[65] Article 5 paragraph 1 sub e GDPR.
[66] Article 5 paragraph 1 sub a GDPR.
[67] Article 12, 13 and 14 GDPR.
[68] ECtHR, Colon v. the Netherlands, application no. 49458/06, 15 May 2012
[69] https://www.echr.coe.int/Documents/Guide_Art_8_ENG.pdf

experiments are not in need of an explicit legal basis, as is the case with Stratumseind 2.0.

In addition, the scientific standards for doing experiments on study objects, such as normally conducted in artificial surroundings, such as labs in university buildings, are often pushed aside. It is clear that experiments in Living Labs come into conflict with many of those standards (Beauchamp 2011). Two standard principles are (1) that people are informed about the experiment and (2) that they consent to being part of that experiment (APA 2010; BPS 2014; Hansson 2003). A traditional experiment on a university premises would entail a special lab or room designed to conduct an experiment and test subjects explicitly entering the lab, knowing that they will be part of an experiment (even though they may not be informed in full about what type of experiment or which type of research the test is conducted for). In Living Labs, it is often difficult to ask permission from the research subjects, as this requires a very tedious process and would undermine the 'naturalness' of the test environment. In addition, being transparent about which data are collected, how and for what purposes is often impossible, because Living Labs are often hybrid projects being in constant flux. The experiments may change constantly, as well as which data are gathered and why (Pols 2016). Consequently, two of the most basic preconditions for legitimate experiments are often neglected in Living Lab projects such as Stratumseind 2.0.

In addition to these principles, other safeguards are included in the traditional guidelines on research ethics that aim to protect the autonomy of citizens. For example, both the American Psychological Association (APA) and the British Psychological Society (BPS) apply strict criteria with regard to the deliberate misleading of participants within an experiment. Misleading or secretly collecting data can only be justified within a research plan (a) if it is essential to obtain the intended research results - and there are no alternatives - (b) if the research objective has a very high scientific value and (c) if there is a good plan for risk management and harm reduction in case of undesirable results (BPS 2014: 24; APA 2010:11). In addition, the research must be carried out in such a way that the dignity and autonomy of the subjects are safeguarded. The BPS states that studies that take place outside the controlled environment of the laboratory must respect the privacy and psychological wellbeing of the individuals studied. Observation in public spaces without consent is only acceptable where those observed can reasonably expect to be monitored (BPS 2014: 25). Obviously, this is not the case in smart cities such as Eindhoven.

Consequently, Living Lab projects such as Stratumseind 2.0 challenges two fundamental conditions for the rule of law, namely legality and legitimacy. Municipalities and governmental organizations often conduct experiments, monitor public spaces and gather data about citizens without a specific legal basis. Researchers often conduct experiments on test subjects without their knowledge and without any form of informed consent. And it is unsure to what extent such experiments promote public goals. For example, Article 8 ECHR allows for limitation on the right to privacy if based on a law, if necessary in a democratic society (which is often unsure) and when one of the following public interests involved: 'national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others'. Especially in public-private partnerships, it is unsure to what extent companies that have access to the data gathered will have the public interest at heart (Krohn & Weyer 1994; Martin & Schinzinger 2000; Felt et al. 2007; van de Poel 2011; van de Poel 2009).

4.3 Freedom and autonomy

Finally, two principles of democracy are at stake in Living Lab experiments such as Stratumseind 2.0. First, the preconditions for democracy, namely that citizens can engage freely

and autonomously in public deliberation, debates and elections. Like the right to privacy can be seen as a precondition for developing one's personality and becoming an independent and critical citizens, the ability to act and engage with others as a critical and independent citizen can be seen as a precondition for democracy. If all would follow public opinion without discussion, democracy would be an empty concept. Second, the idea of democracy is not only that governmental action should be based on democratic law, but also that citizens should have the ultimate decision on how public spaces are designed and in which way they function.

To start with the latter point, the report of the expert group 'Science and Governance' to the European Commission stated in 2007 that there is a new regime in the field of science: collective experiments of co-creation in which society becomes a laboratory. In this type of experiments, the goal of the project is not made explicit in advance, but the goals of the research arise as the experiment progresses (Felt et al. 2007). The advice was to build a European Knowledge Society on the basis of collective experiments in which innovation was distributed among various actors in society.[70]

In practice, however, citizens cannot or have very limited influence on smart city and living lab projects, and it is increasingly difficult to appoint stakeholders or representatives thereof, in particular when whole cities or provinces are designated areas for experimentation. Consequently, while public spaces are increasingly non-neutral and dynamic, citizens have increasingly less grip on such changes. Rather, private parties and companies are assigned an important role in designing the public space, as was stressed in the previous section.

In addition, there are concerns over the protection of the individual freedom and autonomy of citizens. This concern mainly concerns the use of data in Living Labs to influence the behaviour of citizens. In Eindhoven, data are collected on the relationship between light and aggression, in order to be able to adjust the lighting in nightlife areas in such a way that the behaviour of visitors becomes less aggressive. The same applies to spraying tangerine scent in the streets, which would make citizens more relaxed. In a way, it echoes the rumour that airlines reduce the amount of oxygen in the airplane, so that people are less energetic and fall asleep more often. That way, customers are easier to handle by flight personnel. Citizens that are tacitly made more relaxed by influencing their behaviour in public spaces are also easier to handle by public authorities.

This is a form of nudging. A nudge is 'a form of choice architecture that changes people's behavior in a predictable way without forbidding other options or changing their economic motives' (Thaler & Sunstein 2008: 6). The problem of steering the subconscious is that it can undermine individual freedom, without the individual being aware of that fact or being capable or exercising any form of control over it (Hausman & Welch 2010; Wilkinson 2013). The person is steered in a certain direction on the basis of psychological mechanisms (Nys & Engelen 2016). Of course, the government has always steered behaviour of citizens, for example through public campaigns (for example, to quit smoking) or through public laws, which prohibit certain conduct (for example, to smoke in bars and restaurants). The essential difference is of course that laws and public campaigns are transparent – the citizen knows he is being influenced. In addition, because he is aware of that fact, he can ultimately make a decision, even if that means breaking the law (Hausman & Welch 2010: 130). In the case of smart cities, it will often be hidden to citizens that they are steered in their behaviour and decisions based on (their) data and corresponding social or psychological vulnerabilities. This phenomenon is already apparent in the online realm and referred to as 'hypernudging' (Lanzing 2019; Yeung 2018). Moreover, it may not even be for the sake of their interests, but rather for

[70] See also: Von Hippel 2005.

the sake of whoever is steering them, raising the even stronger moral concern of manipulation (Susser, Roessler & Nissenbaum 2018).

4.4 Conclusion

This section discussed the Living Lab project in Eindhoven, called Stratumseind 2.0, which is a public-private partnership. This case has been used to study the relationship between Living Labs on the one hand and democracy and the rule of law on the other hand. It has signalled three particular tensions. First, Living Labs can undermine the fundamental rights of citizens, such as the right to privacy and the right to data protection. These rights are not only bestowed on citizens by democratic means, they are described as preconditions for developing one's character and personality and hence for active and engaged citizenship. Second, a legal basis for conducting the experiments and gathering the data is often lacking and the requirements for conducting valid and legitimate experiments are often ignored. This may put pressure on the principles of legality and legitimacy and the core assumption of democracy that the government is only allowed to act on the basis of a law, enacted through a democratic process. Third and finally, Living Labs are used to manipulate and nudge people, through which the behaviour of citizens is tacitly influenced. This may undermine citizens' freedom and autonomy, and consequently, the preconditions for democracy.

5. Revisiting the Transformation of the Public Sphere

Section 2 described developments such as datafication and hybridization enable the 'physical' world to increasingly become an 'online' built environment that collects data and adapts based on that data. Private spheres are becoming increasingly public. Vice versa, along with developments of datafication and hybridization, the public sphere is increasingly privatised. The same development of commercialisation and privatisation witnessed with the Internet can now be detected in the actual 'physical' public sphere with the rise of smart cities. Big Data has opened up new opportunities for commodification and commercialization of public sphere and the new frontier is the development of smart cities. Smart environments allow architects to access data, monitor and nudge citizens on an unprecedented level. Yet, as described in Section 4, the legitimacy of surveillance, the nudging of citizens and the use of a (unique) public space without the consent or equal input of citizens controversial from a legal and ethical viewpoint. These features of Living Labs challenge the freedom and autonomy of citizens, which are important prerequisites for a plurality of views necessary for a flourishing democracy. As Section 3 argued, while these features may be used to advance public interests such as public health, safety or sustainability, powerful commercial actors are highly influential in shaping and promoting a certain (financially beneficial) perspective on improving the 'quality of life' and underlying conception of the good life without having participated in democratic procedures of decision-making. They undermine the rule of law that constitutes the legitimacy of democratic procedure and increasingly compromise the neutrality of the public sphere.

Although Habermas finalized his manuscript early sixties of last century, it is not difficult to identify some of his observations regarding the intermeshing of the public and private in modern day environments. A number of transformations of the public sphere can be discerned. First of all, the public sphere is datafied; reality is expressed in data. It is quantified and hence made legible and measurable. On the basis of this data, citizens and their activities are becoming increasingly visible. Secondly, the public sphere is increasingly becoming a hybrid place, in which the physical and the digital, offline and online, are increasingly intertwined. The public sphere is used as a place to monitor public life (a source of data) and as

place to experiment on the behavior of citizens through smart applications and modern technologies. Thirdly, the public sphere is no longer under the primary care of the government. Both private (commercial) parties and citizens play an increasingly big role in gathering data and imposing certain ideas of the good life. In smart cities, the public domain is governed by public-private partnerships.

These transformations however, challenge some of the features that are deemed valuable for a public sphere within a deliberative democracy. They raise several concerns. First of all, these transformations raise the concern surrounding the value of 'neutrality'. One of the core aspects of the ideal of the public domain has been that it is relatively neutral to various visions on the good life, and leaves room for minority and dissenting opinions. Smart Cities are often explicitly based on one normative approach regarding the good life. Moreover, they may also actively try to impose, through nudging, manipulation or coercion, a particular normative perspective.

Furthermore, although one of the core aspects of the public domain has been that were norms are imposed on citizens and their freedom is limited, these should have democratic legitimation. Due to developments of privatization, both citizens and especially larger tech companies are capable of imposing norms unilaterally.

Related to these companies there is the concern of harmful commodification. In Smart Cities, the public domain is not only seen as a place where parties can impose norms and ideals, it is also a place for harvesting data about individuals and their social relationships. These data can be used to develop product and services. Thus, the ideal of the public domain as a free zone for interaction and deliberation is turned into the ideal of a zone of commodification and commercialization, a domain that has maximum utility. However, the question is to what extent these market influences should be intertwined with the lives and decisions of citizens.

This point becomes even more urgent in light of the dissolution of the private. The ideal of the public domain depends on an idealized version of the private domain, both physically and metaphorically, where people are autonomous and can develop their thoughts and beliefs. Citizens should, more or less, be able to experiment, read and think without being interfered with by parties that they do not want to be part of that process. In Smart Cities and Living Labs, this ideal is increasingly undermined, both because the homes of citizens are connected to the web and included in the smart strategy, and because the private lives, as far as they take place in the public sphere, can become fully controlled and monitored.

Becoming vulnerable to manipulation by third parties that have their own interests rather than the interests of citizens at heart, is problematic from the perspective of autonomy. The idea of the public domain depends on the presumption that individuals are more or less autonomous. Autonomous citizens can meet in the public sphere to discuss, deliberate and develop new ideas and opinions. Smart Cities and Living Labs may weaken autonomy, by blurring the boundaries between public and private and by experimenting on people thus influencing their behavior or preferences.

Finally, there is the concern that public domains that are governed by powerful private parties, which may undermine the legality of these domains. In the ideal of the public domain, the government controlled this realm. Its actions were supposed not only to have democratic legitimation, but also a legal basis. Laws are published, so that citizens can take notice of the rules and prohibitions, imposed on them. In addition, laws set limits to how and to what extent the government can use its powers. In Living Labs, however, governmental actions are not based on laws. Rather, laws and legal principles are often circumvented or bypassed, with reference to the fact that the initiatives are only societal experiments.

The public and the private sphere have always been subjected to change. Moreover, the descriptions of the private and the public sphere are ideal and very much at tension with

practice. For instance, Habermas notes that already in the 20th century the public domain was increasingly privatized and depoliticized. Moreover, the private domain has always and increasingly struggled to be a place of withdrawal, separated from the public domain. Importantly, the developments that have been sketched are not new and the fact that the ideal of the public and the private domain as separate spheres is challenged is not shocking. These ideals have never existed and will never exist.

Nevertheless, normative value are attributed to these ideals in the context of the ideal of the deliberative democracy. Yet, features of Smart Cities and Living Labs conflict with the values that are associated with the ideal of the public and the private domain. This means that the developments sketched do raise an interesting question about how and if these ideals should be upheld. Does it make sense to apply these ideal features to smart environments or should a new perspective on the private and the public sphere be developed? Within the next 20 years, the meaning and function of the public sphere may have transformed structurally and dramatically under the influence of powerful private actors that provide the technological soft and hardware of Smart Cities. This is something that is already experienced today. If the values of the public sphere, essential to the model of deliberate democracy, are structurally undermined, there should be a discussion about the willingness to accept new models of democracy or new models of conceptualizing the public sphere. An aim could be to bolster the characteristics of the public sphere before private actors have absorbed it or the characteristics could be redesigned and altered. Regardless of the conclusion, what values or features the new ideal of a meaningful private and public sphere should have, should be part of a public debate between autonomous citizens.

Acknowledgments
We would like to thank the participants of the Philosophy of the City Summer Colloquium 2018 at the University of Technology Twente for their constructive comments. Furthermore, we would like to thank the anonymous referees of this contribution for their helpful remarks.

References
American Psychological Association (2010). Ethical principles of psychologists and code of conduct (with the 2010 amendments). Washington: American Psychological Association.
British Psychological Society (2014). *Code of Human Research Ethics*. Leicester: the British Psychological Society.
Beauchamp, T.L. 2011. Informed Consent: Its History, meaning, and present challenges. *Cambridge Quarterly of Healthcare Ethics* 20: 515-523.
Boyd, D., & Crawford, K. 2012. Critical questions for big data: provocations for a cultural, technological, and scholarly phenomenon. *Information, Communication, & Society*, *15*(5), 662–679.
Chesbrough, H. 2006. 'Open innovation: the new imperative for creating and profiting from technology', Boston: Harvard Business School Press
Crawford, S. 2018. Beware of Google's Intentions. *Wired*. January 2 2018. Accessed at 03/03/2018 at: https://www.wired.com/story/sidewalk-labs-toronto-google-risks/
Dingman, S. 2017. With Toronto, Alphabet looks to revolutionize city-building. *The Globe and Mail*. October 17, 2017. Accessed at 03/03/2017 at: https://www.theglobeandmail.com/report-on-business/with-toronto-alphabet-looks-to-revolutionize-city-building/article36634779/
Dunn, J. 2017. China's Silicon Valley: Meet the Chinese counterparts to 11 of the most popular US tech companies. *Business Insider*. August 5 2017. Accessed at 03/03/2018 at: http://www.businessinsider.com/china-silicon-valley-biggest-tech-companies-2017-8?international=true&r=US&IR=T#its-a-similar-story-with-xiaomi-another-electronics-

manufacturer-that-produces-various-high-quality-smartphones-and-has-gained-a-decent-following-3
Felt, U., Wynee, B., Callon, M., Gonçalves, M.E., Jasanoff, S., Jepsen, M., Joly, P.-B., Konopasek, Z., May, S., Neubauer, C., Rip, A., Siune, K., Stirling, A., & Tallacchini, M. 2007. *Taking European Knowledge Society Seriously.* Brussels: Directorate General for Research, Science, Economy and Society.
Haans, A. & de Kort, Y.A.W. 2014. Reducing social aggression with dynamic lighting: the De-escalate project in Eindhoven. *Justitiele Verkenningen* 40, 4: 54-64.
Habermas, J. 1991 [1962] *Structural Transformations of the Public Sphere: An Inquiry into a Category of Bourgeois Society.* MIT Press: Cambridge
Habermas, J. 1989 [1962] *Structural Transformations of the Public Sphere: An Inquiry into a Category of Bourgeois Society*. Polity Press: Cambridge
Habermas, J. 1996 [1992] *Between Facts and Norms. Contributions to a Discourse Theory of Law and Democracy.* MIT Press: Cambridge
Hansson, S.O. 2003. Ethical Criteria of Risk Assessment. *Erkenntnis* 59: 291-309
Hausman, D.M.& Welch, B. 2010. Debate: To Nudge or Not to Nudge. Journal of Political Philosophy 18 (1): 123-136
Von Hippel, E. 2005. *Democratizing Innovation*. Cambridge MA.: MIT Press.
Krohn, W. & Weyer, J. 1994. Society as a Laboratory: the social risks of experimental research. *Science and Public Policy* 21(3), 173-183.
Lanzing, M. 2019. Strongly Recommended: Revisiting Decisional Privacy to Judge Hypernudging in Self-Tracking Technologies. *Philosophy & Technology*. (32:3) Pp. 549–568. https://doi.org/10.1007/s13347-018-0316-4
Nickel, P. (N.D.) Consent and uncertainty in biobanking and biomedical data. Manuscript Unpublished.
Martin, M.W. & Schinzinger, R. 2000. *Ethics in Engineering*, 2nd Ed. New York: McGraw Hill.
MacKinnon, C.A. 1989. *Toward a feminist theory of the state*. Cambridge, MA: Harvard University Press.
Mayer-Schönberger, V.&K. Cukier. 2013. *Big Data: A Revolution That Will Transform How We Live, Work and Think*. London: John Murray Publishers.
Nys, T. & Engelen, B. 2016. Judging Nudging: Answering the Manipulation Objection. *Political Studies*. Pp.1-16.
van de Poel, I. 2009. The Introduction of Nanotechnology as a Societal Experiment. In S. Arnaldi, A. Lorenzet & F. Russo, eds. *Technoscience in progress: managing the uncertainty of nanotechnology*. Amsterdam: IOS Press, pp. 129-142.
van de Poel, I. 2011. Nuclear Energy as a Social Experiment. *Ethics, Policy & Environment* 14: 285-290.
van der Sloot, B. 2015. 'Privacy as Personality Right: Why the ECtHR's Focus on Ulterior Interests Might Prove Indispensable in the Age of "Big Data" ' *Utrecht Journal of International and European Law* 31(80)
Pateman, C. 1989. *The Disorder of Women: Democracy, Feminism, and Political Theory,* Stanford, CA: Stanford University Press.
Pols, A. 2016. May Stakeholders be Involved in Design Without Informed Consent? The Case of Hidden Design. *Science and Engineering Ethics* p.1-20
Roessler, B. 2015. Should personal data be a tradable good? On the moral limits of markets in privacy. In: *Social Dimensions of Privacy* (Roessler, B & Mokrosinksa, D. eds). Cambridge: Cambridge University Press. Pp. 141-161
Satz, D. 2010. *Why some things should not be for sale. Oxford* University Press: Oxford

Sauter, M. 2018. Google's Guinea-Pig City: Will Toronto turn its residents into Alphabet's experiment? The answer has implications for cities everywhere. *The Atlantic*. Februari 13 2018. Accessed at 14/02/2018 at: https://www.theatlantic.com/technology/archive/2018/02/googles-guinea-pig-city/552932/
Susser, Daniel and Roessler, Beate and Nissenbaum, Helen F. 2018. Online Manipulation: Hidden Influences in a Digital World (December 23, 2018). Available at *SSRN*: https://ssrn.com/abstract=3306006
Thaler, R. & Sunstein, C. 2008. *Nudge.* New Haven: Yale University Press
Thaler, R. & Sunstein, C. 2003. Libertarian Paternalism is not an oxymoron. *American Economic Review* 93, 2003 pp. 175-179.
Townsend, A.M. 2013. *Smart Cities: Big Data, Civic Hackers, and the Quest for A New Utopia*. New York: W.W. Norton
Vaidhyanathan, S. 2011. *The Googlization of Everything (And Why We Should Worry)*, Berkeley, CA, University of California Press
Wilkinson, T.M. 2013. Nudging and Manipulation. *Political Studies* 61 (2): 341-355
Zuboff (2015) Big other: surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology* 30, 75–89.