E-scooter regulation in urban spaces:

Intersecting inequalities in low-carbon mobility transitions

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Abstract

What ways are e-scooters regulated as they penetrate urban space? Which actors have decision-making power in practice, and with what implications for the interests of diverse social groups that undertake mobility in cities? In this thesis, I operationalize these questions through a case study of e-scooters in Stavanger. This entails an application of two theories: Avoid-Shift-Improve (A-S-I) and Transport Related Social Exclusion (TRSE). Through the use of these two theories, I explore intersecting inequalities in urban space by focusing on different approaches to mobility transitions, the history and concept of public space, and imaginaries of sustainable cities. The study comprises three expert interviews, document analysis including United Nations reports, mission statements, and city development plans; discourse analysis; and participant observation in the form of attending an annual mobility conference. My empirical analysis suggests that while the sustainable benefits of e-scooters are context-dependent, they are simultaneously framed as a universal sustainable mobility tool by e-scooter operators and in certain imaginaries of sustainable cities such as the Smart City, while generally disregarded in discussions about their specific role in achieving sustainable city development goals by policymakers. This disregard impacts diverse population groups in exclusionary and harmful ways. I discuss this in relation to scholarship on the viability of e-scooters and approaches to sustainable and accessible mobility, and how different groups are unequally affected by such approaches and applications within public space. Overall, this is framed in relation to intersecting inequalities that must be considered during regulation of new technological interventions like e-scooters. In this case study, gaps between actors who constitute the regulatory apparatus led to narrow outcomes, with the consequence of marginalizing the inhabitants who are directly affected by these applications.

1. Introduction

Mobility is a defining element of contemporary society. While mobilities can be crucial starting points in providing people access to economic opportunities and social networks, enabling civic life participation and the development of identities on the one hand, they also have global consequences as demonstrated by climate change and marginalized social groups (Cook & Butz, 2018, 3). The European Union is particularly interested in fostering social inclusion, preserving

the traditional European social model, while simultaneously minimizing and managing the unfavorable consequences of increased mobility such as the possibility of social and geographic polarization (Madanipour, 2010, p. 112). Such consequences form the basis for the United Nations' (UN) Sustainable Development Goals (SDGs). Adopted by the UN in 2015, the SDGs are "a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity" (United Nations Department of Economic and Social Affairs, n.d.). With 17 goals in total, the SDGs are intended to be addressed and achieved in tandem where the action towards one goal will affect the outcome of others (United Nations Department of Economic and Social Affairs, n.d*).* The largest share of greenhouse gas emissions is generated by the transportation industry, which produced over seven billion metric tons of CO_2 in 2021. In the same year, passenger cars accounted for nearly 39% (Statista, 2023). Sustainable transport is a relevant topic across multiple SDGs but it is especially pertinent to SDG 11. The aim of SDG 11 is to "make cities and human settlements inclusive, safe, resilient and sustainable" (United Nations Department of Economic and Social Affairs, n.d.). As the world's population continues to increase, thereby increasing mobility issues such as traffic congestion, noise pollution, and air pollution, urban mobility has become a decisive area of focus in sustainable transportation and city development. One possible aid in the creation of sustainable cities is shared micro-mobility services.

The term micro-mobility refers to forms of transportation that are small, weigh less than 500kg, and operate at speeds below 25 km/h on average (O'Hern & Estgfaeller, 2020, p. 2).. Designed to travel short distances, this type of transportation is operated by a single individual. Micro-mobility includes both electric powered and human-powered vehicles that do not contain internal combustion engines and do not travel over speeds of 45 km/h (O'Hern & Estgfaeller, 2020, p. 2). Shared micro-mobility services including dockless e-scooters. Dockless and docked e-bikes have become increasingly popular through recent technological development. Users have several options between modes and companies available as a result of the increasing availability and variety of micro-mobility services in major cities worldwide (Reck et al., 2021, p. 1). E-scooters in particular have been positioned as a sustainable solution to the "first mile/last mile" problem. In addition, e-scooters are positioned as a zero-carbon solution to reduce carbon emissions, vehicle congestion, and pollution associated with urban transport. Despite these claims,

policymakers have often struggled with connecting e-scooters to their sustainable development plans. This relates to the general difficulty in the development of regulation regarding the usage of shared e-scooters. Lack of regulation is an issue that affects the inhabitants of urban cities and creates issues of exclusion in public space. Therefore, there appears to be a disconnect between e-scooter operators and the policymakers of the urban cities in which e-scooters have been heavily deployed, potentially allowing for e-scooters to cause more harm (both socially and environmentally) than good.

In order to address the potential harms created by a lack of understanding of the role e-scooters currently have and should have in the future, an emphasis on understanding areas of exclusion that occur as a result are crucial in the actualization of a truly sustainable urban city. This thesis aims to explore the application and positioning of e-scooters as a sustainable form of transportation in the city of Stavanger, Norway. This problem is broken down into three research questions:

1. What is the relationship between e-scooters and sustainable urban development?
2. How are e-scooters viewed within the context of sustainable mobility transitions?
3. How are different groups affected by sustainable (mobility) transitions?

The first question is addressed through a combination of document analysis, discourse analysis, interviews and participation in a mobility conference, the last two featuring different stakeholders in Stavanger. The second question is addressed through the case study of Stavanger with a focus on mobility and mobility transitions taking place within the context of Stavanger's Smart City plan and the municipality's SDGs. The third question draws on the empirical data in relation to theories of sustainable mobility and exclusion, and situates insights within thematic scholarship on public space and sustainable imaginaries.

The thesis is organized into seven sections. Section 2 presents general background on the regulation, perceptions, and evolving authority around e-scooters. Section 3 provides the theoretical underpinnings that guide the means of addressing the research questions. These theories pertain to sustainable mobility (A-S-I) and to mobility and exclusion (TRSE). This section also includes a literature review of public space and two different conceptualizations of a

sustainable city – the 15 minute city and the Smart City – [in order to understand how conceptions of public space have changed over time and how people are affected differently in that space within different sustainability imaginaries]. Section 4 pertains to the research strategy and methods used. Section 5 includes the results and analysis of the interviews and observations conducted in relation to sustainable mobility in Stavanger. Section 6 discusses e-scooters in relation to conceptual and thematic scholarship. Section 7 concludes with reflections on sustainable mobility ambitions, the position of e-scooters within them, and potential avenues for future research.

2. Literature Review

The literature begins with a look at regulation and perceptions of e-scooters and the evolving authority surrounding them. Accordingly, this section includes three sub-sections that include general background on the regulation, perceptions, and evolving authority over e-scooters.

2.1 E-scooter regulation

The arrival of e-scooters seemingly happened overnight first in the United States then across the globe. Dockless electric scooters first made their appearance in 2017 when scooter companies like Bird and some bicycle-sharing companies such as Lime began offering scooter sharing services. Such services have been both praised and contested; hailed on the one hand as urging in "a new era of sustainable urban micro mobility" and contested on the other due to pedestrian conflicts, conflicts of public space, and concerns for their extensive battery production process (Datava et al., 2022, p. 136). In 2018, various dockless electric kick scooters began appearing in major cities, often through controversial and unsanctioned roll-outs. In 2023, five years after their introduction in major cities, e-scooter sharing services were banned from Paris after a vote where about 90% of voters supported the proposed decision to ban self-service scooters. However, in many cities, concrete decision making at the political level remains unclear or absent. The combination of ambiguous regulation and chaotic parking, as a consequence, is one reason for the littering of e-scooters on the streets rather than easing urban congestion as expected with the claims of e-scooters being a last mile mobility device (Datava et al., 2022, p.

147). Unlike bicycles, established norms are absent for the expected behavior of e-scooter riders. Similarly there was initially no parking infrastructure (Sareen et al., 2021, p. 46).

Fearnly (2020) identifies three primary reasons for the initial inability for authorities to address the effects of e-scooters in public space. The first reason relates to e-scooters operating in a regulatory blind spot between the grey areas of local and national government, commercial use and public space, and cycling and engine operated vehicles (p. 171). The second reason pertains to the global introduction that occurred rapidly and unexpectedly. The third reason relates to the fact that legislation was not flexible enough to handle this new transportation type. This is a consequence of the e-scooter operators acting first and dealing with consequences second (Fearnly, 2020, p. 171). This means, rather than asking for permission to deploy their services, conforming to the existing regulation of similar industries, e-scooter operators chose to seek forgiveness, entering the market freely and waiting for the authorities to respond (Button et al., 2020, p. 6). For these reasons, many urban regulatory authorities have taken reactionary approaches as opposed to proactive ones. In this way, many e-scooter operators benefitted from the first-mover advantage due to the unclear authority and regulation practices (Button et al., 2020, p. 6).

2.2 Perceptions of e-scooter emergence

Public responses to feelings of public space encroachment have taken the form of protests, removal, or destruction of e-scooters. Freedom of parking may be an integral part of the e-scooters appeal. However the freedom of parking without clear parking regulation causes issues on the streets leading to disruption, causing irritation or even accidents (Datava et al., 2022, p. 147). E-scooters are often positioned as solving the first-mile/last-mile problem (FM/LM), a dilemma of public transportation that relates to the distance between one's starting destination, the chosen public transportation, and the ending destination. The issue pertains to the difficulties associated with traveling to and from the transit station acknowledging that sometimes a considerable amount of walking is required. These extra steps are referred to as FM/LM. Such issues can force passengers to use personal transportation such as cars to commute the distance between public transportation stations and their final destinations or possibly forgoing public transportation altogether. The FM/LM problem, therefore, can potentially reduce the intended

benefits of public transportation such as reduced carbon emissions. Micro-mobility options such as e-scooters are thereby solutions to the FM/LM problem with their light-weight, communal design intended for travels of short distances. Similarly, e-scooters are referred to as a sustainable transportation alternative to cars.

E-scooter companies have framed e-scooters as a tool used to fight climate change claiming that they reduce traffic and pollution, improve air quality, and create a "cleaner and more hospitable world" (Bird, n.d.). However, the manufacturing of the batteries is an intensive process that requires minerals and materials that are often not recycled. The greatest climate impacts from e-scooters pertains to the materials and manufacturing (Hollingsworth et al., 2019, p. 2). The ride itself has a neutral primary carbon footprint and in comparison to dockless e-bikes and personal automobiles, dockless e-scooters yield a smaller cumulative carbon footprint (Hollingsworth et al., 2019, p. 9). Still, bicycles, buses, and personal electric micro mobility vehicles have smaller carbon footprints than dockless e-scooters (Hollingsworth et al., 2019, p. 9). Therefore propositions of e-scooters as having zero direct carbon emissions during ride trips need to be scrutinized as the kind of trips being replaced by e-scooters needs to be taken into consideration. Because the manufacturing of e-scooters is so resource intensive, if e-scooters are being used on journeys that would have been walked or cycled otherwise, they are a net loss (Kale, 2022). According to e-scooter operator Lime, one in four riders replace car trips with e-scooter trips and estimates that 40 million kilometers of car travel have been avoided across the globe by its riders (Lime, n.d.). A study by Reck et al. (2022) found that trips made with personal e-bikes and e-scooters emit less CO_2 than the transportation modes they replace, whereas shared e-bikes and e-scooters emit more CO_2 than the transport modes they replace (p. 1).

2.3 Evolving authority over e-scooters

Regulation of e-scooter use on public roads and footpaths vary depending on jurisdiction. With the first initial arrival of the new services, it is common for cities to lack an appropriate regulatory framework that ensures equitable and sustainable use of the e-scooters (James et al., 2019, p. 1). General Secretary of the Norwegian Blind Association Per Inge Bjerknes understands the voting results in Paris, banning e-scooters, as a testament to the impossibility of e-scooter parking and use regulation (Tørmoen et al., 2023). The most important point for the

association is the banning of e-scooters from the sidewalk. Swedish e-scooter company Voi has stated that it is not opposed to banning e-scooter riding on the sidewalk but stresses the need for good infrastructure, stating they understand that many of their users feel safer on the sidewalk in the absence of a good cycle path (Tørmoen et al., 2023). Such issues of accessibility and equity are simultaneously diminished by the company as a minority issue with the leader of the Voi in Norway stating that because the majority is positive towards e-scooters, there is no concern of e-scooters being banned in Norway. The relationship between the Norwegian Blind Association and e-scooter regulation in Norway, or lack thereof, is elaborated upon in Section 5.2.

3. Theory

This theory section focuses on the concept of public space, and on the 15 minute city and the Smart City as two different conceptualizations of sustainable cities. Through this underpinning, issues of accessibility and inclusion are highlighted in relation to mobility. In order to understand the role that e-scooters play in the municipality's sustainable mobility transition goals, it is important to understand the ways in which public space is conceived within different sustainability concepts and therefore how different approaches to sustainable mobility within these concepts can have exclusionary consequences for different groups of urban inhabitants.

3.1 Avoid-Shift-Improve and Transport Related Social Exclusion

With the challenges posed by climate change, cities today are scrambling to meet the goal of limiting global temperature rise to 1.5 C. Economic and social development is facilitated through transport and infrastructure development but often goes against and hinder sustainable development due to accidents, air pollution, congestion, and greenhouse gas emissions (Bakker et al., 2014). Therefore, mobility plays a large role in the emissions of carbon dioxide (CO2) with transport being responsible for 20% of global-related CO2 emissions, which are projected to increase by 16% by 2050 compared to 2015 (International Transport Fund, 2021). One reason that the task of climate change mitigation has proven challenging is due to the lack of consensus on the definition of sustainable mobility. Remme et al. (2022) define sustainable mobility as pertaining to the Avoid/Reduce-Shift/Maintain-Improve (A-S-I) approach. This includes "less travel in motorized vehicles (avoid), more fuel-efficient modes (shift), and using cleaner fuels

(improve).” When combined, these three approaches can lead to and create rapid decarbonization through policy mixes that maximize complementarity (p. 1). Through its three main objectives, the A-S-I framework addresses three ways for GHG emissions to be reduced from the transport sector through the promotion of alternative transport solutions (Dalkmann & Branningan, 2007, p. 12).

Originally developed in Germany in the early 1990s, the A-S-I approach was first officially mentioned in the 1994 report of the German parliament’s Enquete Commission. With a focus on demand side policies, the A-S-I approach offers a different way to structure policy measures in an attempt to reduce the environmental impact of transport with a focus on holistic approaches for a more sustainable transportation system design and an improvement in city life. The A-S-I framework has been used consistently by the European Environment Agency since the 2009 Transport and Environment Reporting Mechanism (TERM) report. The framework is therefore used in the production of this annual assessment of progress towards achieving the ambitions set in the European Commission’s Transport White Paper. (EEA, 2012, p. 5).

The A-S-I approach is ordered in a hierarchy starting with “avoid”, followed by “shift”, and concluding with “improve”. The “avoid/reduce” pillar refers to the necessity of improving the efficiency of the entire transport system. The dependency of motorized travel and the length of traveled journeys can be reduced through transport-oriented and compact development of cities. This relates also to transport demand management with an emphasis on the necessity of greater connection and intermixing of residential, work, and leisure districts (GIZ, 2019). Next, the “shift/maintain” pillar seeks to improve the efficiency of individual trips. This relates to a shift away from transportation modes that are more polluting and energy intensive towards more environmentally friendly modes of transportation. This specifically applies to shifting and maintaining active transport (walking and cycling) and public transport (bus, rail, etc.). Lastly, the “improve” pillar “focuses on vehicle and fuel efficiency as well as on the optimization of the operational efficiency of public transport.” This relates to the aesthetics of public transport. Similarly, the energy sources needed to function must also be improved. The introduction of renewable energy into the transportation sector needs to be a fundamental pillar of the industry (GIZ, 2019).

The organizational structure of the A-S-I approach allows for a wide and diverse range of varied policies, regulatory instruments, and best practices. Many aspects of A-S-I have been carried out in developed and developing countries, but no country has yet to formally adopt A-S-I as its transport policy framework. This can be attributed with the multifaceted objectives driving public transport policy (Bakker et al., 2014, p. 329). Bakker et al. (2014) address these shortcomings of the A-S-I framework by suggesting the addition of access as a fourth component, claiming that in order to accomplish sustainable and economic development objectives, expansion of ASI with accessibility is necessary. “If Access would be added as a fourth component, A-S-I could be restated as A-ASI to signify that improvement in access is the developmental objective that is prioritized, and that Avoid, Shift and Improve are important strategies to ensure Access will contribute to sustainable development (p. 347).” However they acknowledge that even this expansion to A-ASI would require further expansion through the application of transition theory and lifestyle changes which could possibly create the foundation for a “truly sustainable and equitable transport systems in many places”, leading to “more robust policy measures and more synergistic and integrated policies”. The transition literature may add to the ASI approach a longer-term, more political, actor-based perspective that will help policy frameworks and the longer-term focus of policy-makers' definitions of sustainability whereas the promotion of sustainable lifestyles could more clearly and appealingly address Avoid and Shift in conversations about A-ASI (Bakker et al., 2014, p. 328).

The A-S-I framework is a good starting point for addressing how the current transportation industry can be transformed to align, rather than obstruct, sustainable development ambitions. However as previously stetted, the missing component of accessibility can also be harmful when addressing issues of sustainable transportation. In this way, the TRSE framework is introduced to acknowledge and address the consequences associated with a narrow-minded approach to transport provisions. Therefore, the A-S-I framework is used in this thesis as an alternative approach to sustainable mobility transitions while the TRSE framework is used to explore the social consequences that remain to be addressed within this alternative sustainable mobility approach.

The transport-related social exclusion framework can be understood as:

> "the process by which people are prevented from participating in the economic, political and social life of the community because of reduced accessibility to opportunities, services and social networks, due in whole or in part to insufficient mobility in a society and environment built around the assumption of high mobility" (Remme et al., 2022, p. 2).

Limited transport provision has consequences of reduced access to services and activities in the labor market, financial services, education and training, health care, food shops and participation in social and cultural activities (Bjerkan and Øvstedal, 2018, p. 1179). The TRSE framework defines exclusion as relational, stemming from dynamic processes. This relational feature of the framework means that disadvantage is directly compared to the typical activities and relationships of the remaining population. Therefore, it is integral that inclusion is also a dynamic process especially during transitional periods that challenge and change norms and practices. The creation of sustainable mobility systems that are inclusive must extend beyond a focus of people at risk to exclusion within the current system to tackle the "escalating dynamic" of hypermobility (Remme et al., 2022, p. 2). The danger of hypermobility, to people and sustainable development goals, as a consequence of contemporary modes and approaches to mobility, is explored further in Section 6.2.

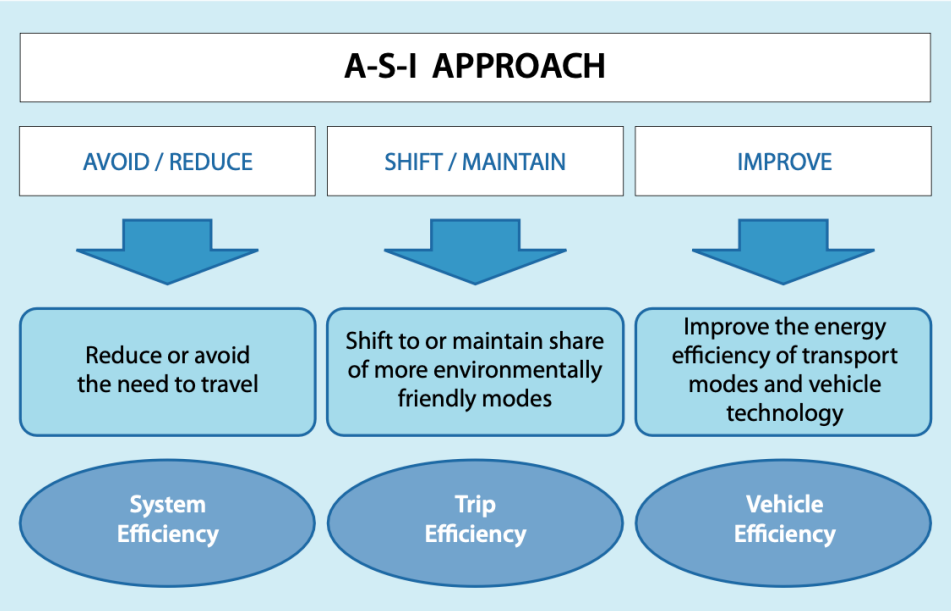

Figure 1. The A-S-I Approach. Source: GIZ (2011).

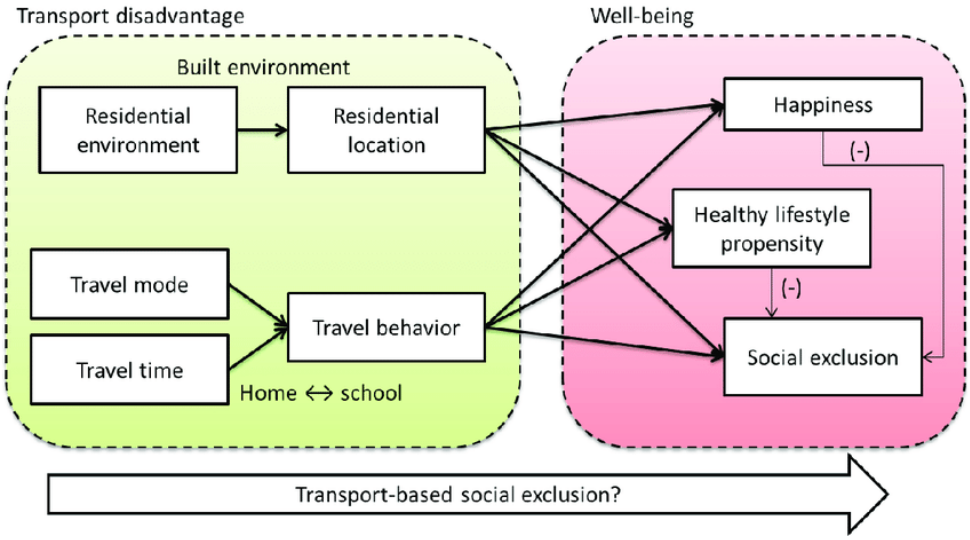

Figure 2. Conceptual framework of transport-based social exclusion. Source: Perez-Barbosa & Zhang (2017).

3.2 Public Space

Public space has been shown to provide economic, social, environmental, and human health related value. Public space can increase regional economic performance, influence a longer life, provide an area for social interaction that supports community social life, and encourage the use

of sustainable transportation (Carmona et al., 2021, p. 7). With the advent of technology, the concept of public space continues to change as technological developments change the way people interact with public space. What at first was considered distinct and separate from private space, has become relatively nuanced when it comes to defining public space. In the modern city, the convergence of functions that were found in the ancient Greek *agora,* where the central public space functioned as a place of assembly, a marketplace and a place of rituals and ceremonies, have disappeared. The public sphere transcends physical spaces and is created through a multitude of areas that may never intersect in space or time, thereby making the contemporary public sphere metaphorical (Madanipour, 2010, p. 120).

The concept of public space, its conditions and its consequences, has been debated for centuries. For Louis Wirth (1938), interactions in public space were a tolerance of differences amongst strangers. He claimed that the conditions for the urban as a way of life were dependent on the size, density, and heterogeneity of the space. Through this understanding, Georg Simmel (1971) saw a transformation from a tolerance of differences to a "blasė attitude" or a rudimentary indifference to occurrences of unfamiliarity or difference. His understanding of the modern city as a place of mature money economy is therefore congruent with Marx's definition of a capitalist economy. Thus, the blasé attitude runs parallel to Marx's use of abstraction in the form of the commodity and the concept of value (Bodnar, 2015, pp. 2091-2092). He argued that the individuals in the urban developed an organ that helped them to manage the stimulation of the city, helping individuals to handle their interactions within the urban environment (de Souza e Silva & Frith, 2012, p. 27). With the dependence on mobile technology that is now common, de Souza e Silva and Frith (2012) argue that rather than using mobile technologies as a means to withdraw from public space, as commonly argued, people instead use such technologies to achieve a similar goal as the blasé attitude (pp. 27-28).

Traditional understandings of public and private space as distinct and opposite sides of space have become blurred by the use and application of mobile technologies in public spaces, modifying the practice and definition of what it means to be visible in public. The use of personal technology devices such as "location aware devices", influences people's relationships with places as well as mobility patterns throughout cities. At the intersection of aesthetics and

politics lies visibility. Such relationships between relations of perception and relations of power, are a core aspect of media technologies, which have contributed to the modification of visibility practices through the significant increase in the use of personal technology devices and surveillance practices. Visibility, the act of "seeing and being seen", comprises instances of noticing, managing attention and regulating the importance of topics and events. The Smart city is an example of a concept that utilizes surveillance practices through technological means to track and control public spaces in an attempt to protect individuals in urban spaces (Hatuka & Toch, 2017, p. 985).

In her influential 1961 book, "The Death and Life of the Great American Cities", Jane Jacobs writes that the first attribute of three, of an equipped city street (i.e. one that can handle strangers and is itself a safety asset) is the clear demarcation between that which is public space and that which is private. Public space can be understood as something specific to cities as it is the clearest demonstration of the tension between the moral remoteness and physical proximity of city inhabitants; the urban predicament (Bodnar, 2015, p. 2091). In relation to marginal public spaces, the public spaces on the edge of the city, Madanipour (2010) refers to public space as a limited resource that is subject to extreme competition between the neighborhood stakeholders as various groups attempt to control and appropriate the space. He identifies two forms of competition in relation to the public spaces of neighborhoods: competition for use, characterized by an array of conflicting public behavior, and competition for development, indicated by a display of institutional competition over control of space (p. 117). In the realm of public space, there is constant exchange and contact among strangers where the individual observes and is observed (Hatuka & Toch, 2017, 985). This relates to the second main quality Jacobs writes is necessary of an equipped city street; the eyes of the "natural proprietors" of the street. A natural proprietor refers to both residents and strangers but more importantly to the orientation of the buildings on a street. "They cannot turn their backs or blank sides on it and leave it blind" (Jacobs, 1961, p. 35). The presence of people of different backgrounds and relationships to the city and to others around them is integral to the safety of the city but also within the very definition of public space and what it means to be within that realm.

Carmona et al. (2021) identify three key dimensions that collectively define the character of public space: the "kit of parts", the qualities, and the context for action. The "kit of parts" represents the four basic components of public space. Although the first three parts are entirely physical (buildings, landscape, and infrastructure), similar to Jacobs, the authors contend that the fourth part (uses) is the most significant in the characterization of public space because it encompasses human activity (19). The acknowledgement of the kit of parts requires the acknowledgement of the ways in which the parts are utilized together to enhance the qualities of public space that allow for human activity to continuously take place. Tangible, intangible, and desirable qualities should generally be considered holistically in order to avoid possibly undermining efforts to improve public space by focusing on one quality at the expense of another. Public activities are of particular importance in perceptions of public space where necessary activities are hardly influenced by the physical quality of public space but optional activities (i.e. socializing) can only occur if the conditions of the environment are optimal. The last dimension of public space character, the context for action, is realized by the combination of the various components of the kit of parts "to create the networks, densities, mixes, urban typologies (urban, suburban rural) and urban forms that constitute particular places" (Carmona et al., pp. 14-16).

Throughout history, the dominant view of public space has been the concept of "positive" urban space. Positive urban space refers to the (physical) "container" of public life. In contrast, negative urban space relates to spaces that are underused and unconnected to other parts of the city. Despite numerous critiques of contemporary urban space including the creation of dead space by modernism as argued by Sennett or the failure of modernist space to clearly demarcate the separation of public and private as argued by Jacobs, they share a common argument that by ignoring the social and psychological needs of a growingly diverse city, the modernist movement facilitated the "homogenization" of various spaces (Carmona et al., 2021 pp. 38-39). Hajer and Reijndorp (2002) attribute homogeneous thinking from key figures such as administrators and designers as one reason for the lack of vision in relation to the quality of public spaces. The application of design discourse is frequently and commonly used to determine the ways in which public space should be reorganized. To these authors, "Common themes include the interest in the reduction of untidiness, an emphasis on the aesthetic, and a predilection for design" (p. 8).

Rather than opening up for diverse urban landscaping customized to sociocultural contexts, such an approach tends to perpetrate universalizing qualities to places that take away from their unique sociocultural properties and engender a sense of impersonality.

3.3 Imaginaries of inclusive and just cities

Approaches to sustainability within a urban context are varied and it is important to understand that different approaches prioritize different facets of society and employ varying strategies.

> "Sustainability in urban development can be associated with different concepts and philosophies, such as traditional neighborhood design, smart growth, trans-oriented development, and new urbanism. All these concepts share a distinctive goal, which is the enhancement of active transportation for short trips and public transportation for longer trips. There are different factors and strategies that shape each sustainable development concept to support active transportation and public transportation including the existence of sidewalks, bike lanes, and public transportation service, along with other features such as street connectivity mixed land use (Hosseinzadeh et al., 2020, p. 1)."

This sub-section presents the 15 minute city and the Smart City as two key conceptualizations.

3.3.1 The 15 minute city

The concept of the 15-minute city focuses on accessibility rather than mobility as the main problem to be solved. The concept, known by many different names, argues that the true focus of urban planning should be that of access, proximity, and safety. The main point of departure for the 15-minute city then is first the area where an individual lives and thereby focuses on where they need to get to and how to create ease and access within neighborhoods and cities to enhance the pleasures of urban living. Speed as the focus of urban planning and development, the concept argues, is counterproductive as demonstrated by the Marchetti concept, where increased speeds lead to more spread out cities. Instead, an emphasis should be placed on reducing the need to travel and ways to create a diverse array of services within one's neighborhood to avoid the need to travel across or outside of town to fulfill one's needs (Luscher, 2023).

The concept of the 15-minute city appeared to reinstate itself in the minds of planners and politicians in the advent of the global COVID-19 pandemic as the neighborhood became the only place where essential activities could be fulfilled. In this way, the idea of the 15-minute city has been embraced with the aim of imaging a post-pandemic world and reimagining contemporary concepts of the neighborhood, whereby the daily needs and activities of most citizens can be accomplished within 15 minutes of walking or cycling (Pozoukidou, 2021, p. 3). The idea of shopping and producing locally, another aspect of the 15-minute city as it relates to reducing the need to travel outside of the neighborhood (proximity), has also become popular in the midst of the COVID-19 lockdowns, even in cities that have not adopted the 15-minute city planning model. Therefore the sourcing, producing, and consumption of local products can assist in building resilience and reducing emissions in the pursuit of environmental sustainability. (Allam et al., 2022, p. 3).

There are four key characteristics of a 15-minute city: proximity, diversity, density, and ubiquity (Luscher, 2023). In relation to physical planning, 15-minute cities are significantly based on attributes previously used as design flagships in the past, most notably accessibility, walkability, density, land use mix and design diversity. In comparison to other neighborhood centered approaches where the focus is to bring people to the activities, the 15-minute city intends to bring activities to the people (the neighborhood). This concept of proximity is a fundamental aspect of urban planning (Pozoukidou, 2021, p. 3). Whereas in the conventional urban planning concept where density is viewed solely in relation to the built environment, the 15-minute concept envisions a compact city model where people can be sustained, comfortably, by the resources available within the city (Allam et al., 2022, p. 4)."

The distribution of community facilities such as schools, health centers, and open spaces reflects more localized catchments and "their greater requirements for space". A broad range of various housing opportunities are provided by the neighborhood. Not just in the size of the living space, but also in terms of tenure and affordability. This allows for a mixed community that is more representative of society (Clarke, 2009, p. 14). In this way, diversity can be understood in two ways: (1) "mixed use of built environment in that there is a healthy mix of residential, entertainment, and commercial elements, thus maximizing available spaces as well as fostering

the proximity between services; (2) social mix in terms of multiculturality (Allan et al., 2022, p. 4).

Another important aspect of the 15-minute city is sustainability. The concept aspires for an inclusive and egalitarian approach to be applied to planning in order to achieve socially sustainable urban environments that are built through equal access, local social interaction, community participation, community stability, and a sense of safety, security, and belonging. Inclusion in this context pertains to access to quality and "affordable housing, mobility infrastructure for all ages and abilities, affordable transportation options, equal opportunities to employment and education, and the right to lead a healthy life. With the intention of being urban environments that encourage instances of resident interaction in public areas, citizen participation and "bottom-up" dynamics are vital components of the concept. Therefore, citizen engagement in all parts of the planning process is necessary (Pozoukidou, 2021, p. 4).

3.3.2 The Smart City

The agenda of the smart city can be traced back to the varied history of early 1970s urbanism. Earlier formations of the smart cities concept had various names including "cyber cities", "digital cities", "intelligent cities", "networked cities", "sentient cities", and "wired cities", among other names that overlap with other prominent and contemporary city framings such as eco-cities, safe cities, sustainable cities, resilient cities, etc. Different from these earlier concepts of "networked urbanism", the concept of smart cities can be understood as an aspiration and an amalgamation of technology products that gained global traction in the late 2000s onwards due in large part to active promotion (Kitchin et al., 2019, p. 1). Although there is no single definition of a smart city, the most common definition suggests that "the idea relies on the implicit assumption that urban infrastructures and everyday life can/should be optimized and "greened" through the technologies and innovations of global IT companies". Typically, the proposals of smart cities are collaborations between corporate technology providers and public authorities, pertaining to the application of digital technologies to control and enhance the efficiency and functionality of urban infrastructures and services (McLaren and Agyeman, 2019, p. 170). One key concept of the smart city is to improve quality of life while supporting economic development and

promoting sustainable development in cities by solving emerging problems, based on data and technology (Lewandowska et al., 2020, p. 99).

Similar to its definitions, approaches to the smart city concept are also varied and oftentimes contrasting within questions of focus and intention. These polarized conceptions can be related to two groups: those who create the technology and those who are more critical of the concept. The first group typically consists of "scientists, technologists and technocrats working in universities, companies and government" who take an apolitical, amoral approach in the name of science and objectivity in their work. Therefore there is an uncritical view of technology based on the assumption that everything (i.e. economic competitiveness and attractiveness, efficiency, participation, and sustainability) will be solved by technological applications (McLaren and Agyeman, 2019, p. 170).

On the other hand are those critics that have emerged from the social sciences (i.e. Geography, Science and Technology Studies, Sociology, and Urban Studies) and civil organizations (Kitchin et al., 2019, p. 3). These social critiques revolve around issues of equality, inclusion, and participation in smart city discourse which critics claim is dominated by the interests of corporate and institutional actors which are technology focused and optimistic (McLaren and Agyeman, 2019, p. 171). Seldom are smart city initiatives separated from broader policy goals, simply following pre-established investment patterns, sometimes perpetuating spatial splintering (Odendaal, 2021, p. 642). Critics contend that the smart city can never be devoid of biases, in neither conception, development, or promotion because of the technological solutionist approach prioritized by smart city technologies. Furthermore, they argue that the smart city "facilitates and produces instrumental, functionalist, technocratic, top-down forms of governance and government; is underpinned by an ethos of stewardship (for citizens) or civic paternalism (what is best for citizens) rather than involving active citizen participation in addressing local issues;" and often offers work around solutions, rather than critically investigating and addressing structural issues (Kitchin et al., 2019, p. 3). Questions of civil liberties, social exclusion, social discipline, and power have been brought forth by critical analysis. Similar critics argue that smart city ideology transforms the process of urban planning and development into a technical and managerial issue through depoliticization (McLaren and Agyeman, 2019, p. 171). Odendaal

(2021) argues that the concept of smart urbanism, as opposed to the smart city, is necessary to understand the multiple dimensions of the relationship between livelihoods and technology appropriation. Smart urbanism regards the ways in which the material, economic and social are applied in the continued unraveling of the smart city which is often considered its own and separate entity (p. 640).

3.4 Key Takeaways

There are many intersecting inequalities associated with e-scooters. The application of the A-S-I and TRSE frameworks introduce two ways to think about sustainable mobility and transportation. The A-S-I framework defines sustainability within the three approaches of (1) avoiding motorized vehicles, (2) shifting to more fuel efficient modes of transport and (3) improving mobility by utilizing cleaner fuels. While not an explicit component of the A-S-I framework, the organizational structure of the framework allows for the additional approach of accessibility to be added in order to create a more holistic framework capable of accomplishing sustainable development. Without accessibility as a component, the framework risks being a weak foundation for sustainable change in transportation. The TRSE framework highlights the ways in which reduced accessibility can negatively affect people's lives. This is because of the dynamic processes by which both exclusion, and thereby inclusion are contingent on. Similarly, the framework highlights the consequences of hypermobility which is further explored in Section 6. The concept of public space continues to change and be redefined in the advent of mobile technologies. The 15 minute city and the Smart City are two sustainability concepts that aim to create sustainable cities within this contemporary understanding of public space and its role and relationship to technological innovation.

4. Research Strategy & Methods

To understand the role that e-scooters currently have in sustainable development and the ways multiple forms of exclusion are produced in discussions, regulation, and development pertaining to e-scooters, this thesis used the qualitative research method of a case study to investigate the role of e-scooters in the context of Stavanger, which is a prominent example of a Smart City in Norway. In this thesis, the qualitative approach was adopted to provide insight and contextual

understanding of the role e-scooters have in public space and sustainability goals in Stavanger currently. Data was collected through interviews, a conference, and discourse analysis. Open-ended interviews were conducted in order to get a sense of the informants' understanding and experience in relation to the various regulatory, accessibility and sustainability challenges and solutions associated with e-scooters. In this way, the statements of the informants were taken primarily as subjective where semi-structured interview guides were used to ensure that although the questions asked were slightly different, they covered the same general topics. This means that questions were prepared based on prior research on the organization and the informants' roles and the interview itself included rapport with the interviewees in order to gain further understanding (Silverman, 2019, p. 177). The attendance of a conference centered on mobility was utilized in a similar way, acknowledging both the subjective and objective nature of the various approaches and understandings of sustainable mobility presented by various public and private actors. The views and approaches of various experts allowed for a deeper understanding of the systemic barriers and solutions to the sustainable mobility development for the municipality.

Three interviews were conducted, each recorded and transcribed for analysis. Two experts that were interviewed work in the mobility sector; public transportation and micro-mobility (e-scooters). The third expert was a member of the Norwegian Blind Association. They were included to get a different perspective of mobility in Stavanger. The interviews began with the identification of important actors in the mobility sector in Stavanger and requested an interview from the relevant contact person. In turn, various organizations, companies, and individual persons were suggested by the informants as potentially interesting areas to explore. These suggestions were then contacted for potential interviews. Due to time and scheduling issues, only three interviews were held. Moreover, participation at of a conference focused on mobility specifically in the city of Stavanger was used as means to attain information from many of the same actors that were originally suggested. This annual conference was simply entitled the Mobility Conference, and took place at Tou Scene in Stavanger on April 21st, 2023. The attendance of the Mobility Conference was a way for the insights gained from the interviews to be expanded upon. The conference consisted of 15 experts from public and private companies, public universities, public research organizations, and local government representatives.

The primary data collected came from two different settings: a natural social setting with analysis at the meso-social phenomena level and a semi-natural setting where individuals served as informants for their respective organizations (Blaikie & Priest, 189, p. 192). Community as it is understood from the meso-social phenomena level of natural social settings refers to fluid instances of social organization where the defining characteristics relate to either space or common interests. Within this category of community are different types of crowds and as it relates to the conference attended for data collection, the conference is a type of conventional crowd where a community is formed for a specific reason and is governed by normative rules (Blaikie & Priest, 189). In the case of the Mobility Conference, individuals who either worked in the field of mobility and transportation or simply had an interest in the topic came together to discuss the concept of mobility in the context of Stavanger's Smart City concept. The individuals interviewed acted as informants that reported on the beliefs, norms, and motives of their respective employers or organizations (Blaikie & Priest, 2009, p. 192). Additionally, they provided their own personal opinions on the same matters, sometimes differing from the generalized direction or belief of the organization as a whole.

The data collected was gathered and analyzed through inductive methods. Following the four main stages of inductive strategy as defined by Blaikie and Priest (2009), the conference and the interviews followed similar steps. First, without assumptions to their relative importance, all recorded and observed facts were regarded equally. Second, the observations and data from the interviews and conference were analyzed without a hypothesis, again applying an objective view of the relevance and importance of the data gathered. The data from the interviews was gathered first primarily because they took place before the conference was even factored in as a potential resource for data collection. Only after the analysis of both data sources were complete, were generalizations drawn inductively to draw comparisons between the facts. Drawing generalizations is stage three of the inductive strategy. The fourth and final stage is to subject the generalizations drawn to further testing (p. 103). In this way, the conference was utilized as a means to follow up the previously held interviews as there was overlap in the participating actors in the conference (i.e. one informant from Kolumbus was interviewed and a different

representative from Kolumbus was present at the conference) and due to the shared context of all organizations and individuals being in the Stavanger region.

Discourse analysis is an integral part of this research design especially as it relates to discourse concerning environmental issues. Hajer (1995) argues that the primary discourse surrounding the definition of environmental problems should be analyzed with a combination of (1) understanding the relationship between the discourse and the social practices it is produced within and (2) the content of the discourse. In other words, discourse can be understood as an array of specific "ideas, concepts and categorizations that are produced, reproduced, and transformed" within a specific framework which provides meaning to both physical and social realities (Hajer, 1995, p. 44). Therefore, discourse analysis will be applied to the case study to analyze the ways in which mobility and transportation issues are discussed in the context of sustainability.

Following the three principles of data collection, multiple sources of evidence were used, a case study database was created, and a chain of evidence was identified. First, data triangulation was used in the analysis of academic articles, government documents, newspaper articles, interviews, and a conference. The primary search engine used was Oria and Google Scholar but the Urban Studies journal was also used through its search engine for data exploration. The keywords and pairings used in these search engines included: urban public space; public space; micromobility; smart city; e-scooters and sustainability; e-scooters and public space; e-scooters and Norway. The newspaper articles were accessed online, primarily from Norwegian news outlets to investigate the history, politics, and public perception of e-scooters in Norway. In addition to data triangulation, theory triangulation and methodological triangulation were applied. Second, the case study database was created on Notion. The Notion database contained the notes taken from the interviews and the conference as well as notes taken on the literature. The data from the document analysis was organized firstly by relevance, assigned a number between one and three; one being less relevant and three being extremely relevant. All data types, pertaining to literature but also from interviews and the conference, were color coded to highlight their relationship between and across other data. After the recorded interviews were transcribed separately, they

were transferred into the Notion database. Third, in order to maintain a chain of evidence, a map was created that outlined the stages of collection and analysis.

Different actors related to or affected by the micro-mobility sector were interviewed to assess varying positions and broad opinions about e-scooters. Such actors include representatives from Norges Blindeforbund, Nivel Regulator, and Kolumbus. Due to the varying nature of roles and businesses or organizations that informants represent, participants were asked slightly different questions based on their knowledge, experience and opinion of e-scooters. However, what each set of questions had in common for each participant was their focus on e-scooter regulation in Stavanger, sustainability, accessibility. Interviews were conducted in the month of March 2023. The concentration of interviews in one month relates to the availability of the informants but also reflects the low number of interviews held due to scheduling conflicts and time restraints. Originally a case study was planned to focus specifically on the Bussveien plan to build 50 kilometers of rapid public transport infrastructure incorporating active transport micromobility infrastructure along several nodes running through Stavanger and adjacent municipalities, but the interview was declined. The representative of the project responded by offering other unaffiliated individuals to consider speaking with instead. The three interviews were conducted in three different ways: by phone, by video, and in person. This decision was made based on the informants'and availability preference. The audio from all interviews were recorded with the informants' consent and under the terms that the recordings and transcriptions would be anonymized and not shared with anyone else. Short-hand notes were taken during the interview in addition to the full transcriptions typed from the recordings a few days after the interviews took place. All interviews were conducted in English.

The annual Mobility Conference was utilized through the means of participant observation. Participant observation is a type of observation that allows not only for passive observation but also active participation (Yin, 2017, p. 123). Participant observation was chosen because it allowed for a unique opportunity to hear multiple perspectives from various actors in the mobility sector within the North Jæren region. This conference provided the opportunity to gain more data for a broader application of discourse analysis that would not have been possible with only the three interviews obtained. Similarly, given that speakers were grouped by themes, it

may not have been possible to have gotten the same information, in the same way, through an interview with the same organizations and businesses. In this way, participant observation was the appropriate choice in order to maximize time and information.

4.1 Limitations in Scope

Despite the application of the inductive strategy and attempts to uphold the strategy's concept of "objectivity", "facts" and "truth" (Blaikie & Priest, 2009 p. 103), the criticisms regarding this strategy were also addressed in the research strategy and data analysis stages. The decision to focus on e-scooters in the city of Stavanger means that there were already preconceptions about potential individuals and communities to research on and have interviews with and potential results from these observations. However, by explicitly defining the concepts in focus (i.e. the role of e-scooters in relation to public space, accessibility, sustainability imaginaries), there is still the possibility for the findings to be replicated, a necessity of the inductive strategy. Given this modified application of the inductive strategy is used to "pursue exploratory and descriptive objectives to answer "what questions", i.e. to describe phenomena and establish regularities which need to be explained" (Blaikie & Priest, 2009, p. 104).

Some challenges associated with participant observation relate to bias and time. In relation to bias, there is a tendency of the participant-observer to adopt support for the group or organization being studied where previous support did not exist (Yin, 2017, 125). The analysis of the conference is used to depict a general understanding of Stavanger's approach to sustainable mobility. Therefore, no one organization or company is depicted more favorably than another but rather a distinction is made between how similar or different the approaches relate to one another. The challenge associated with time relates to the possibility of the participant-observer role requiring more attention than the observer role thus leaving the participant-observer with insufficient time to ask questions or take notes in the way the ideal observer might (Yin, 2017, 125).

Norwegian is my second language, which I am proficient but not fluent in. This means that I was able to follow the conference confidently with my listening abilities and I was able to take notes also in Norwegian. Despite my proficiency, being present and actively taking notes while

listening to the speakers took a lot of energy for me. Because of this, my notes in the final section of the conference were less succinct than the notes taken at the beginning. There was not an opportunity for questions from the audience. I did not prepare or ask any questions after the conference simply because of exhaustion. Additional limitations to the use of a conference as a participant-observer relate to the semi-public nature of the gathering. The speakers present, generally speaking on behalf of either a municipality, a business, or an organization, presented themselves in a way that may differ from a personal, one-on-one interview. This means that the way they spoke and presented the information might not be as reflective of their true opinions or full understanding of the topics due to the semi-public, semi-formal nature of the conference. The conference was conducted in Norwegian and the short-hand notes taken were also written in Norwegian. Pictures were taken of the presentation slides to be referred to during subsequent data analysis as a simple form of triangulation and quality-control.

5. Results and Analysis

5.1.1 Background

These rules apply to all small electric motor vehicles, but e-bikes and regular bikes are not considered small electric motor vehicles. However, e-scooter riders follow the same rules, on the same terms, as cyclists. Section 3 of the Road Traffic Act states:

> "any person shall travel showing consideration, and being alert and cautious so that no damage or risk is caused, and so that other traffic is not unnecessarily obstructed or inconvenienced. Road users shall show consideration for those who live or spend time along the road."

Table 1 shows the rules applicable to e-scooter use in Stavanger in 2023, notably classifying them as small elector motor vehicles.

The rules and regulations that apply to areas for riding and parking e-scooters are vague. The only definitive rule is that vehicle riders who use pedestrian and cycle paths must keep to the right. On the State Highway Authority's website under traffic rules for electric scooters, riders

are asked to show consideration when parking. Parking is permitted on pedestrian and cycle paths, on the pavement and general pedestrian zones so long as the scooter does not obstruct others. “You must park so that it does not obstruct people with special needs, such as wheelchair users and people with impaired vision” (Statens Vegvesen, n.d.). Riders may be fined NOK 900 for parking an e-scooter in a way deemed obstructive or inconvenient or in demarcated no-parking areas. The website explicitly states: “You can basically ride anywhere as long as you ride in the direction of traffic and follow the signs”. Riders are allowed to cross pedestrian paths but while on a small electric motor vehicle, they are not considered pedestrians. Therefore, drivers are not obligated to give way to them. Riders may be issued an “on-the-spot” fine for violating the traffic rules. A serious violation may constitute a police report. Fines do not necessarily constitute a police report but both are applied in relation to behavior that is considered particularly dangerous. The definition of dangerous behavior is undefined and it is unclear who exactly gives out these fines.

The rules that currently apply to e-scooters are (Translated table from Stavanger Aftenblad):
- users must be at least 12 years old - Children under 15 years old are required to use a helmet - 0.2 alcohol limit - E-scooters are now classified as a small electric motor vehicle, no longer a bike, and this means there are stronger traffic rules than for cyclists - Penalties and fines for driving under the influence - Additional passengers not allowed - NOK 3000 fine for driving with two people on one scooter

Table 1. Current rules applied to e-scooters. Source: Stavanger Aftenblad (2023).

The three e-scooter suppliers present in Stavanager are Ryde, Tier, and Voi. An agreement with the municipality allows each operator to have up to 250 e-scooters deployed in the city. In Stavanger, Ryde has changed out “old” scooters for newer, more robust ones deemed to be safer for both passengers and pedestrians. Stavanger was the first city to receive the newest electric scooters due to the relatively stable or consistent weather year round also due to the cities need for e scooters according to Ryde. These new scooters, which include blinkers, sound to indicate

blinkers are on, and a third of which include a helmet. Additionally, and the security measure that stands out the most is the audition of two sensors which can identify if more than one person is on the same scooter. The sensors have not been activated yet in Stavanger. According to Voi, which has tested the sensors in its own model for a year in Stavanger, the problem of tandem driving is declining. Voi plans to give users a warning for carrying more than one passenger on a scooter at a time but if a user is a repeat offender, they risk being banned from the app for a set period of time.

5.1 Case Background

According to the 2022 Sustainable Development Report, Norway is either on track or maintaining four main indicators of SDG 11, which aims to make cities and other places inhabitated by humans more sustainable, inclusive, safe, and resilient. These indicators include, the proportion of urban population living in slums; annual mean concentration of particulate matter of less than 2.5 microns in diameter (PM2.5); access to improved water source, piped; satisfaction with public transport; and population with rent overburden (*United Nations Departmen of Economic and Social Affairs, n,d.)*

The SDGs were adopted by Norway in September 2015. The Ministry of Local Government and Modernization is in charge of SDG 11. The Ministry of Finance is responsible for coordinating SDG reporting of all the ministries in the annual budget. Each ministry is responsible for its own goal(s) and budget reporting while the Ministry of Finance synthesizes all reports in the budget chapter (Norden, 2017). The engagement of civil society is viewed as a vital aspect by Norway in achieving the 2030 climate goals. Inclusive, participatory, and representative decision-making are regarded as integral components for a well-functioning society. To ensure the national ownership required for impactful and transparent follow-up of the goals, participation is fundamental. The dissemination of knowledge around the SDGs has been a focus for the Ministry with a recommendation by the Ministry of Education to include them as part of school curriculum (UNDESA, 2016).

In Stavanger, a Smart city is defined as a city based on the needs of the citizens and the application of new technology to make the city a more enjoyable place to live and work

(Stavanger Kommune, 2016). The roadmap for the Smart City Stavanger was adopted by the Stavanger City Council on 12 December 2016. The roadmap is a result of the involvement of both the private and public sectors which is emphasized as a crucial component for smart city development. The equal collaboration between industry and commerce, the public and academic is an important aspect of the Smart City Stavanger with the collaboration expected to assist in solving key societal challenges in a way that is both sustainable and efficient. Figure 3 illustrates the Smart City concept as it is applied in Stavanger. Positive effects for commercial and industrial developments are expected as a result. Global challenges such as increasing urbanization, unsatisfactory infrastructure and inefficient mobility, and environmental problems in addition to local and regional challenges in the city, are among a few of the reasons listed for the need for smart city solutions. A smart city project must therefore always include technology, cooperation, and citizen involvement (Stavanger Kommune, 2016).

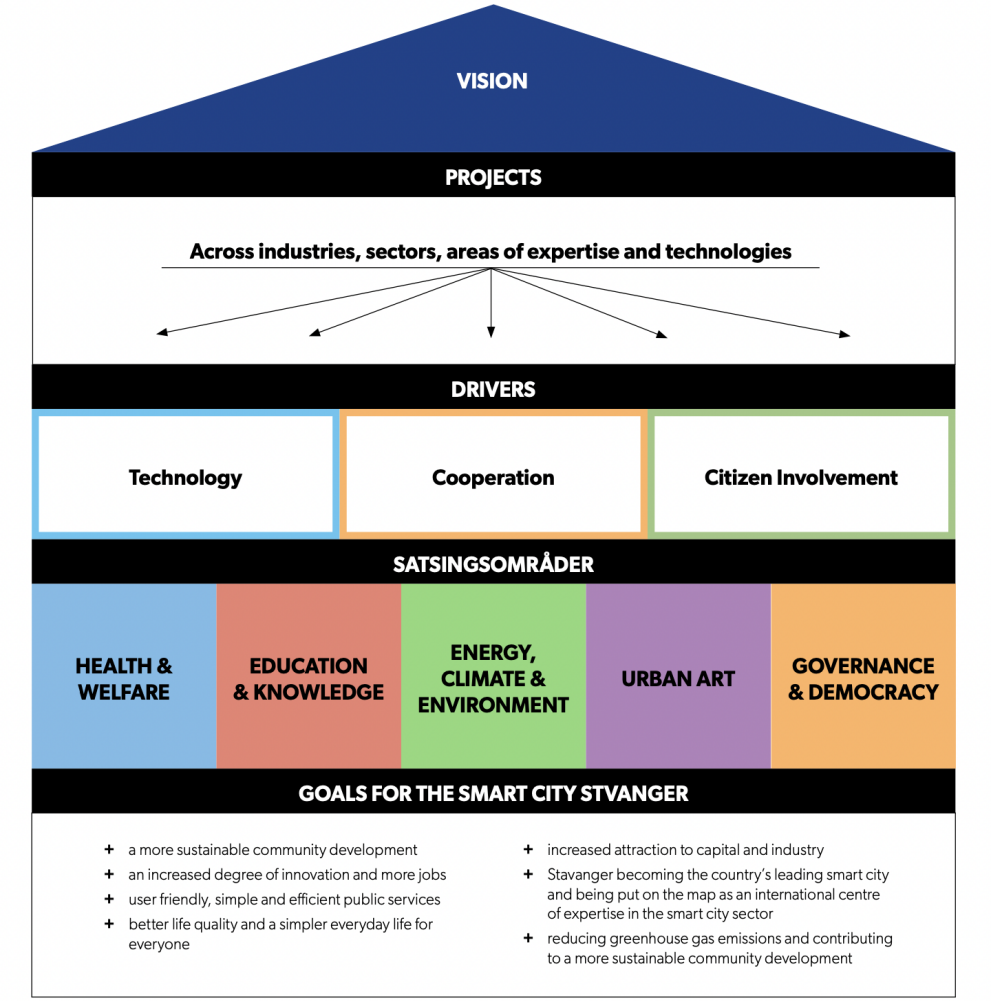

Figure 3. Illustration of the Smart City Stavanger. Source: (Stavanger City Council, 2016) .

There are five priority areas for the project: health and welfare; education and knowledge; energy, climate and environment; urban art; and governance and democracy. A recurring emphasis is placed on the strengthening of Stavanger's position as an energy capital. This paper will focus specifically on the area of energy, climate and environment. In "The Roadmap for the Smart City Stavanger", the focus of this area is explained as:

> "Stavanger wants, with its position as an energy capital in Europe, to take an active role in solving the planet's energy, climate and environmental challenges. Through technological solutions, we want to reduce the local greenhouse gas emissions, make it easier for our citizens to make climate-friendly choices and adopt more environmentally friendly alternatives for transportation" (Stavanger City Council, 2016).

The main approach in this area relates to the development and application of technological solutions in order to provide real time contributions to the SDG objectives. According to the municipality, Important avenues worth focusing on, in the application of mobility, include the development and application of new technology solutions that reduce local greenhouse gas emissions, make climate-friendly choices in the daily lives of citizens easy; enable the rapid application of new and eco-friendly technologies in the transportation sector; and promote the active exploration of the possibilities surrounding the adoption of new driverless transport systems.

Project ideas are defined by the Stavanger City Council (2016, p. 35) as "an expression of the creativity and willingness to create from which the Smart City Stavanger project as a whole has benefited - with constructive contributions from a wide range of environments." As defined by the Stavanger City Council, projects under the climate and energy section that relate to or can be applied to mobility and transportation are: the establishment of a coordinated regional plan for public charging; the establishment of a pilot project based on automated vehicles carrying people and goods in connection with the Bussveien project; the use of sensor technology for monitoring transportation issues such as traffic and parking as a service to reduce car traffic; the introduction of shared mobility services (electric cars and bicycles) that help reduce car traffic; the

establishment of regional and urban development projects as smart city project where issues are solved by the advent of smart technology; the initiation seamless transport solutions for Stavanger and neighboring municipalities with the use of technology to achieve efficiency and environmental benefits; and the development of solutions for “better public transport coverage outside the main routes for public transport (“last mile”)” (Stavanger City Council, 2016 p.35).

Two projects taking place in relation to Stavanger’s climate and energy goals are the mobility hub and Bussveien. The first mobility hub in Stavanger is located at the square in Hillevåg. Stavanger Kommune defines a mobility hub as “a place where you can find various modes of transport, parking spaces and public transport services to suit your journey” (Stavanger Kommune, 2016). Services at the mobility hub include, but are not limited to, city bikes, electric scooters, extra bike parking spaces, nearby bus stop, parcel machine, and takeaway options. The project is based on the challenges associated with transferring during travel. For example, it is common for travelers to have to move from one place to another in order to switch and transfer between transportation types (i.e a train to a bus), an oftentimes, time-consuming process. The mobility hub in Hillevåg serves to develop and test the ways in which the use of public transport can be made easier with the hope of replicating the success of the project in other places. Various services and functions are prototyped and repeatedly tested in real-life situations over an extended period of time.

Bussveien is a planned transport project of 50 kilometers that serves as the Nord-Jæren’s most important response to Norway’s zero emissions goal. Once completed, Bussveien will be Norway's first “full-fledged” bus system. The route runs from Sola through Sandnes, Stavanger and Randaberg. Bussveien is a part of the Urban Environment Package (Bymiljøpakken) which allocates over 30 billion kroner (2.6 million Euros) to various projects and measures towards 2023. The package is financed by tolls and state funds in addition to the contribution of approximately 1.5 billion Kroner in VAT refunds from the Rogaland County Council. Therefore, bussvein is one of many projects focused on lowering climate emissions, reducing car traffic, and traffic noise for the inhabitants in Nord-Jæren. The project prioritizes public transport (buses), cycling and walking, before cars. In this way, 70% of the lanes will be allocated for buses only. Cycling and walking paths will also be built alongside the bus lanes to further discourage the use

of personal cars. The project places a big emphasis on precision, frequency, and pleasure and thereby also aesthetics (Rogaland Fylkeskommune, 2020).

5.2 Case Study Findings and Analysis

The Mobility Conference took place on 21 April 2023 at Tou Scene in Stavanger. Described as "the region's most important mobility conference", The arrangement gathered researchers, academics, politicians, and public and private sector workers to discuss mobility. With an emphasis on transport, urban development, and mobility issues, the conference sought to address ways in which good mobility and sustainable urban development can be created as well as ways in which mobility can contribute to the work in reaching the country's zero-growth emission goals. Attendees were encouraged to think of mobility beyond buses and physical means of transport. A large emphasis was placed on quality. There was a focus by multiple participants to shift the focus of mobility towards collaboration and the utilization of current infrastructure. In this way, during a presentation titled "More mobility for less money", one way for the municipality to maximize its investment in mobility infrastructure, is to support and build the structure for the cheapest transportation types: cycling and walking. In a similar section titled "New solutions meet old models", the Administrative director of the Institute of Transport Economics Bjørne Grimsrud problematized the hindrance of progress within limited or conflicting understanding of what national agreements and goals are intended to do. He argued that is important to understand that urban growth agreements such as the the National Transport Plan (NTP) are a collection of measures on what we should be doing, therefore today's NTP is not a plan on how to achieve our goals, but rather an example of how we can plan to reach our climate goals.

One participant specifically called for a shift in thinking, from mobility to accessibility. A shift from mobility based planning to accessibility based planning means there is a focus on the destinations that can be reached during travel rather than the amount of area or distance that can be covered. When the means is mobility, the goal becomes accessibility. This requires an acknowledgement of the ways land use and transport affect each other.

One of the participants in this conference was Kolumbus, a company that was also interviewed for this thesis. During the conference, the Administrative director Edith Nøkling represented the company and presented the current projects Kolumbus was focused on. With a budget of approximately 2.2 billion kroner, Kolumbus is the main Public Transport Authority (PTA) in Rogaland County. On a yearly basis, Kolumbus has documented 27.5 million bus trips, 580,000 e-bicycle trips, and 540,000 boat trips. A large emphasis was placed by Nøkling on Kolumbus' efforts to electrify transport as much as possible. This is reminiscent of the emphasis of new technological development in the Stavanger Smart City concept. Autonomous buses were positioned as a high priority solution for the company; one that is fast approaching. The leader of the transport committee of Rogaland County claimed that the development of such new technology would allow for less money to be spent on transportation. A concept that was shared, called bydeling, was a proposed project aimed to encourage mixed transportation use by creating an area where different modes of transportation are offered within the same area (i.e. bus tops, car charging stations, and e-bike docking stations. This concept is reminiscent of the mobility hub located in Hillevåg as both focus on facilitating mixed transportation modes and encouraging the use of public transportation. There was no representative to talk about the mobility hub specifically and it was never mentioned by name during the entirety of the conference.

One striking observation during the Mobility Conference was the omission of electric scooters from the discussion. In addition to the absence of any e-scooter operator, representative, or regulator, only one person mentioned the term "micro mobility" and another person mentioned an operator by name to speak on a collaboration taking place between their business and the operator (Voi) in Oslo. In this way it becomes evident that the municipality of Stavanger does not view micro mobility as a tool that can assist in its climate goals related to mobility and that electric bikes are not considered as a micro mobility tool. This relates to the ways in which the two types of transportation are framed.

In the presentation "Public transport at a crossroads" from Asplan Viak, five points were summarized as the main transition aspects that should be applied to future approaches to public transportation: (1) Increased resistance to crowding, (2) increased use of home offices, (3) more

flexible users, (4) new forms of mobility, and (5) increased competition for [state] money. These points could potentially be realized with the application of e-scooters especially as it relates to preventing overcrowding on public transportation, diversifying transportation types among users, and utilizing the presence of this relatively new form of mobility. However, it became clear from the absence of e-scooters as a topic of discussion within mobility transitions that many sectors of the industry and the municipality do not view e-scooters as a legitimate mobility tool.

There is a lot of emphasis on Stavanger being Norway's "technology capital" as not only stated in the introductory remarks of the conference but also in various presentations. This makes sense given that technological innovation is one of the most crucial components of Stavanger's Smart City concept, but what is missing from the Smart City concept and therefore perceptions and understandings of sustainable mobility, is an acknowledgement of the consequences associated with such technological innovation. In the case of shared mobility, the exclusion of e-scooters from mobility conversations creates unintended barriers within climate goals. Additionally, it further marginalizes vulnerable groups by leaving issues associated with current e-scooter practices and regulation unaddressed.

The ambiguity of the safety rules and regulations regarding e-scooters on the The State Highways Authority (Statens Vegvesen) website further complicates the understanding of e-scooters' true role in society or problematizes what the role of e-scooters should be.

Kolumbus is a limited liability company (LLC) organized in a three tier model. Rogaland county municipality owns and grants the company money. Kolumbus is thereby a Public Transport Authority (PTA). A PTA is defined as "authorities that either contract out the provision of bus route operations to other companies (PTO) or carry out the route themselves." A PTO or Public Transport Operator is contracted by the PTA and is the operator of vehicle fleets (i.e. buses). Kolumbus is responsible for managing the bus and boat routes within the strategy and budget defined by the municipality as well as the sale of transportation tickets and customer service. Neither the municipality nor Kolumbus own the buses and boats that carry passengers. The operators are various bus and boat companies who travel various routes contracted by Kolumbus.

Currently, Kolumbus dispatches a total of 450 buses, ten speedboats, and three ferries (Kolumbus, n.d.).

On 13. June 2017, Rogaland community council decided to rebrand Kolumbus as a mobility supplier, moving towards the inclusion of even more transportation types into the service. This means that in addition to having the responsibility of the bus and boat traffic in Rogaland, the company works to make sure that trains, bicycles, sidewalks, and car sharing options work seamlessly with the buses and boats in order to make it easier for people to travel without the use of their own cars. With the creation of the New Mobility department in February 2023, Kolumbus has signaled a greater focus on its role in reaching Norway's climate ambitions. The department is focused on shared mobility options such as electric city bikes and carsharing. One of their main projects is Hjem Jobb Hjem (Home Work Home), a business to business solution that subsidizes electric bike use for the employees of participating companies in North-Jæren. The Home Work Home emphasizes the necessity of collaboration in order to develop an attractive mobility infrastructure. The mobility scheme is a collaboration between Rogaland county municipality, Stavanger, Sola and Randaberg municipality, Bysykkelen (the city bike), Kolumbus, the State Highway Authority and the Norwegian Railways Directorate. The main purpose of the scheme is to reduce personal car use among the employees of the companies in North-Jæren as a means of contributing to the government's zero growth target.

According to a top leader of the mobility department, a big question that the department is continuously reassessing is what different incentives, campaigns, or discounts can be used to encourage the use of public transport services? For them, the answer is to work directly with the public to change the public's behavior. This is a key aspect and strategy of the Home Work Home scheme. This was the same sentiment behind the rebranding of Kolumbus in 2017 and can be seen in the interface of the Kolumbus app. The app allows users to see live bus times for their chosen destination and to filter the visibility of shared cars, city bikes, and even electric scooters. This allows users to choose their preferred method of transportation and switch between them. As it pertains to electric scooters, they are integrated in a way that the informant refers to as "level one integration". This means that users are given an overview of where the scooters are

but in order to book them, users are switched out of the app and into the given operator's app. The same applies to car-sharing (Kolumbus informant, personal communication, March 7, 2023).

When asked about the best ways to incentivize the use of public transportation, they emphasized the need to create a "seamless" app. "The role should be to facilitate use. [We] are focused on making the trip as seamless and convenient as possible in both the physical and digital world." The demand for more personalized transport services has generated a shift towards user-based mobility solutions. This is a key aspect of Mobility as a service (MaaS), a type of service that conceptualizes the integration of public transportation with other mobility types. In this way, there are some similarities in the technological approach of Kolumbus, its app and MaaS. Both concepts share the core idea of providing digital services that make it easier for travelers to plan, book, and pay for the offered mobility services, with the intention of decreasing car dependency. However, the informant doesn't believe this is the direction Kolumbus should take. For them, a seamless digital infrastructure requires a move away from MaaS, and towards the direction of Mobility on Demand (MOD).

MOD can be defined as "a new concept based on the principle that transportation is a commodity where modes have economic values that are distinguishable in terms of cost, journey time, wait time, number of connections, convenience, and other attributes." Where the primary focus of MaaS pertains to passenger mobility aggregation and subscription services, MOD focuses on "the commodification of passenger mobility and goods delivery and transportation systems management" (Shaheen et al., 2017, p. 25).

The ways in which MOD could be applied to the configuration of the Kolumbus app remain unclear but the informant acknowledged that one of the biggest issues in creating a seamless solution is defining the best business models for different forms of transportation (Kolumbus interview). Despite the advent of the mobility hub, the mixing of various modes of transportation, in practice, proves to be more of a challenge than the informant would hope. Travelers on buses are required to buy an additional ticket (21 NOK) for their bikes in order to bring them on board. A bicycle ticket on a train can cost up to an additional 235 NOK. Additionally, trains require that personal e-scooters be collapsed before boarding otherwise users

could be faced with a fine of up to 1150 NOK. The informant acknowledged that the current system was not particularly inclusive of multi-modal transport stating that “there is a hassle with bringing your bike or scooter on public transport. There is less incentive to use public transport in these cases because you should be able to choose your (various) modes of transport but there is a feeling of not being welcomed or included when you need to bring your personal transport on board. Kolumbus could be more flexible and cleverer in this way which would create a more seamless application model.”

Nivel Regulator is a company that assists cities in the regulation of micro mobility tools. Through the use of digital regulation tools, the company aims to make cities cleaner, safer, and more accessible. Currently the company has two main products on the market: the digital regulator tool and the parking report tool. The digital regulator tool analyzes the position of the vehicles, in real time (Nivel.no). This tool is aimed specifically towards city administrations whereas there are two versions of the parking report tool (one for the public and one for regulatory authorities) which is a mobile app. These regulation tools revolve around three main components for dynamic, digital regulation of e-scooters: mandatory data sharing, digitally communicated policies, and compliance.

One interview was conducted with a top-ranking employee. When asked about formal regulation, the interviewee noted that one reason for a lack of formal regulation could be attributed to the more recent collaboration efforts between the city of Stavanger and the three main operators. Because this collaboration seems to be working, they suggest that the city of Stavanger doesn't have a big reason to get regulation in place. Current regulation comes as a direct result of the collaboration between Nivel and the e-scooter operators. This regulation relates to capping numbers of scooters in allocated zones where numbers can be adjusted accordingly. “The same principles for capping cars in the city should be applied to scooters where the number is related to (scooter) parking spots and not the scooters themselves. The problem increases with capping numbers because operators will overcrowd the scooters in the city center creating more parking problems.”

Both representatives from Kolumbus and Nivel Regulator share the sentiment that the municipality needs to play a larger role in the integration of e-scooters into the region's mobility plans. Unlike other Norwegian cities, Stavanger does not have any formal regulation in place in regards to e-scooters. This means that the municipality does not have the authority to enforce any regulations. Both companies attribute this lack of structure to limited understanding of the roles each actor should play (i.e. Kolumbus, the municipality, the operators). Nivel also attributes the lack of culture around e-scooters to the lack of regulation. Compared with Bergen, Norway's second largest city where there are strict rules around the use of e-scooters, Stavanger has proven to be the city in which people are most annoyed by e-scooters (Nivel, 2023). The informant from Nivel classifies the collaboration of the municipality and Kolumbus with e-scooter operators as vital for incentivizing e-scooter use. "The municipality and Kolumbus need to view e-scooters as a way to contribute to the zero-growth target; to see [e-scooters] as a part of the solution."

When asked about how they saw the relationship between Kolumbus and Nivel evolving in the future, both companies appear open to collaboration and see the necessity for it. The informant from Kolumbus stated that the company is willing to collaborate with e-scooter operators and that the municipality has also encouraged Kolumbus to do so. However, when asked about specific plans such as the next phase of integrating e-scooters into the Kolumbus app, they stated that there were currently no plans to do so. Similarly, the informant from Nivel was also hesitant to the addition of e-scooters further into the Kolumbus business model, thereby sharing similar sentiments of moving away from MaaS. "Micro mobility operators do micro mobility better than a PTA simply because a PTA is not an operator. A PTA acts as an operator but [the service] could be offered more efficiently through an [e-scooter] operator." The Nivel informant mentioned that a project in Haugesund, a municipality of Rogaland without shared e-scooter services and limited bus routes, was proposed by Nivel as a way for the two companies to investigate the viability of subsidies and potential incentives for both the users and operators. In this way, Nivel sees a benefit in Kolumbus´ Home Work Home scheme and the application of a similar scheme that includes e-scooter providers. For example, subsidizing operators per parking area rather than parking stations or subsidizing operators zone by zone where a given amount of money is allocated for a given number of scooters. Despite emphasis on both sides about the

necessity of collaboration and the aforementioned proposed project, collaboration between the two companies has yet to take place.

In order to understand how e-scooters affect marginalized groups of people, an interview was conducted with a member from the Norwegian Association of the Blind and Partially Sighted (NABP). The NABP was founded in 1900 and is Norway's oldest disabled people's organization. With 320 employees and 8,300 members, the main objective of the association is for disabled people to gain equal opportunities and status in society. Specifically, the interviewee emphasized the association's work in getting blind and visually impaired persons active in society and the community which is greatly dependent on creating accessible transportation. The organization is managed by the members – who all have challenges with their vision – through the county team, the national board, and its national member base.

The lack of regulation over e-scooters being driven on the sidewalk poses a major problem to visually impaired persons as the presence of any micro-mobility device could create an unsafe environment. E-scooters are relatively quiet and in combination with the high speeds reaching (48 km/h), visually impaired people can feel discouraged from walking outside. This is also an issue with bicycles being ridden on the sidewalk. Before the introduction of scooters to Stavanger, the interviewee used to limit the use of his white cane primarily to particularly sunny days, enjoying the ability to navigate the city without. But after a particularly frightening incident, they now use a white cane everyday not only for him, but for others as a signal for others: although they can see him, he cannot see them.

"Even with a cane, navigation around improperly parked scooters is difficult. It is difficult to detect them and it is easy to fall down and get hurt by them." The relationship between blind and visually impaired people and e-scooters, in Stavanger, can be understood in relation to geographical and fear-based exclusion. The generally hilly nature of the city can pose additional stress to disabled individuals with not only the omnipresent issue of visibility but also the physical demands from the surrounding environment. When asked about what kind of regulation he would like to see applied to e-scooters, the interviewee emphasized the necessity of parking regulation as the unorganized parking of the scooters adds to the already difficult physical

challenges of navigating the city. E-scooters have been a major topic of discussion in the association with the most important point being the complete ban of e-scooters from the sidewalk. He acknowledged that the time restriction on e-scooter usage helps but urges that more needs to be done.

There are aids that help blind and visually impaired people travel around the city with less stress. One of these aids is the use of speakers at public transportation stops and onboard the buses and trains. The interviewee said that these assistance buttons, that verbally provide the scheduled times for the upcoming buses and trains, are very helpful and make the journey a little less hectic. However, he finds that getting to and from the bus and train stations is a bit difficult because of sidewalk congestion, such as poorly parked scooters. Blind and visually impaired people receive between 6,000-10,000 NOK twice a year in taxi subsidies. Unfortunately this system is also not without issues. The interviewee points out that taxis are expensive and this amount of money could never cover the frequency of travel needed in day to day life. Additionally, he commented on how difficult it is to actually locate the taxis sometimes, for example at the Stavanger train station. However, when the solution to the problem of accessible transportation is passenger cars, the issue remains unsolved. Disability is one factor that is heavily associated with mobility-related exclusion. When asked about the effect of the subsidy, the informant pointed out that they still feel alienated and excluded from society. “We want to travel around with other people, it's more interesting to see other people ".

6. Discussion

Despite framing e-scooters as sustainable technology, their role in the context of sustainability initiatives remains yet to be defined. Three types of exclusion surround e-scooters, making it difficult to understand what their role is in conversations of sustainability, what they should be, and for whom these decisions are made and how different people are affected by the presence of this technology. These exclusions relate to: the exclusion of e-scooters from SDGs; the exclusion of the general public from smart city decision and implementation; and the exclusion of vulnerable groups, specifically disabled people, from public space as a general consequence of lax e-scooter policy and regulation.

6.1 Exclusion of e-scooters from SDGs

Although the approach to regulating and the opinions surrounding e-scooters appear to differ between contexts, all e-scooter providers share a common positioning of the devices as a "green solution for mobility" (Moreau et al., 2020, 2). However, such claims remain to be supported by the literature. A lack of research investigating the relationship between e-scooter trips and the characteristic of sustainable urban development hinders understanding of the potential e-scooters could have in relation to sustainable development (Hosseinzadeh et al., 2021, 1). After conducting a Life Cycle Assessment of e-scooters, Hollingsworth et al. (2019) found that while e-scooters could be a constructive solution to urban congestion and the last mile problem, the reduction of environmental impacts from the transportation system are not necessarily guaranteed. They found that the use of shared e-scooters caused more CO2 than the use of the transportation modes e-scooters displaced (p. 9). The study concludes that for e-scooters to be a sustainable mobility solution in their current use case, dockless e-scooters require a lifespan of no less than 9.5 months, 284 days (Moreau et al., 2020, p. 15).

Before the banning of e-scooters in Paris, a study found that through the quantification of the environmental impacts associated with shared e-scooters, the introduction of dockless e-scooters in Paris increased the emissions of greenhouse gasses by 12,000 tons per year. This is a result of travelers shifting away from public transport buses that operate using renewable energy to e-scooters that do not use renewable energy (Abduljabbar et al., 2021, p. 10). This is an example of a negative net impact associated with e-scooters. Negative net impacts occur as a result of the benefits of e-scooters (i.e. FM/LM solution) being overshadowed by the more harmful aspects (i.e. the extensive battery manufacturing process). One of the biggest, if not the main, proponent of e-scooter usage is the application of the devices to address the FM/LM problem. Upon further investigation, the main issue relates firstly to speed which is not inherently a problem of sustainability and such a focus may, according to such concepts at the 15 minute city, actually hinder sustainable development.

Micro-mobility services can fill in the gaps created by public transportation in limited service areas and areas that are difficult to access with private vehicles such as narrow roads and streets in inner city areas. The use of small to medium vehicles for FM/LM connectivity benefits users

in accessing services and economic opportunities in less time than the use of private vehicles, public transportation, or walking. Case studies have shown that public transport becomes more accessible where micro-mobility is viewed as a more attractive option than long walks to access public transport (Abduljabbar et al., 2021, p. 9). However as shown in the case of Paris, positioning mobility as a matter of speed, thereby shifting travel away from more environmentally friendly travel options, has negative consequences.

The final takeaway from the life cycle assessment conducted by Moreau et al. (2020) emphasizes the importance of e-scooters in knowing what kind of trips e-scooters are replacing. There will always be negative environmental impacts when e-scooter users replace walking and (non-electric) biking trips whereas those who use e-scooter to replace car trips, will have reduced emission impacts (Moreau et al., 2020, p. 15).

The application and positioning of technology within the concept of the sustainable city has become increasingly common, especially in the advent of the Sustainable Development Goals. "There is no longer a question of whether cities are important for sustainable development, but rather why and how the urban condition affects our common future" (Angelo & Wachsmuth, 2020, p. 2203). However, despite the current ubiquity of contemporary discourse, the relationship between cities and sustainability can at times appear to be contradictory. Many different countries have begun to adopt varying sustainability strategies in order to meet these goals where technology functions as an integral component in achieving sustainable development (Angelo & Wachsmuth, 2020, p. 2203). Understanding of contemporary society requires an acknowledgement of two contradictory views of technology and its significance. The two views relate to "the unlimited freedom of speed and acceleration" versus "the vision of slowing down…in which natural, individual, sociocultural and technical modes of moving can mutually interact" (Bergmann, 2009, p. 15). Bergmann (2009) centers these two contradictory views on the question of whether emphasis on "the beauty of speed" or "the discovery of slowness" will allow for a life of flourishing amongst all inhabitants (Bergmann, 2009, p. 15). This divide can be applied to the various sustainable development approaches seen in modern society. Different sustainability imaginaries have different positioning of the role that new technology should play in creating green cities. The ways in which technological applications are

applied to transportation and mobility issues showcases that many sustainability imaginaries place emphasis on speed, equating "the beauty of speed" as an aspiration intrinsic to sustainable development. However, such an approach to sustainable development, where increased technological development is created with speed as the goal, may hinder other areas of progress in sustainability ambitions.

6.2 Exclusion of the general public from smart city decisions

The Smart City is one example of an urban planning imaginary or concept that has been positioned as a sustainable city model. Information and Communication Technologies (ICT) are an essential part of the smart city concept especially in regards to transportation infrastructure (Hosseinzadeh, 2020, p. 1). Meaningful access to personalized networks in complex urban situations becomes possible through the technological means provided by ICTs (Graham & Marvin, 2001, p. 243). E-scooters are reliant on GPS technology and smartphones, clearly supporting its significance into the paradigm of the smart city. Similar to the overnight deployment and continued presence of e-scooters across the world, the benefits of the Smart City concept vary by context. The decisions to implement the concept, like the decision to allow e-scooters within urban spaces, two aspects of technological innovation positioned as sustainable solutions, appear to be devoid of public participation. Existing power relations are perpetuated by the very nature of Smart City clusters, where principles such as sustainability, democracy, and participation are simultaneously given new meaning that resonate with urban inhabitants but also, continue to be expressed from "positions of power and through dominant forms of urban knowledge creation (Jirón et al., 2021, p. 616).

In this way, the people affected by the interventions of the Smart City such as communities and public servants, and the other forms of knowledge they hold, are disregarded. In a case study focused on the implementation of the Smart City concept in Chile, Jirón et al. (2021) identifies four main principles or fictions guiding Smart City interventions: *democratization*, *citizen appropriation*, *technological and social innovation*, and *local and territorialized intervention*. In turn these principles create a placebo effect where global narratives are reproduced at a local level. The positioning of e-scooters as a sustainable technology solution to issues of

transportation and mobility in Stavanger can be understood similarly through the four guiding fictions. E-scooters were seemingly dropped overnight making it impossible for both inhabitants and officials to engage in discussion on how the presence of e-scooters might affect public space (*democratization fiction*). In other Norwegian cities, the public has been engaged in the debate over e-scooters to an apparently greater extent than the inhabitants of Stavanger. The narrative of e-scooters being a sustainable transportation device is concentrated within the e-scooter companies and their respective websites with the adoption of the SGDs (Ryde; Tier) and claims to be climate positive by 2030 and fully circular with zero waste by 2025 (Voi). Based on the data collected and analyzed, this does not reflect the understanding of the municipality.

Through the Smart City concept, the municipality aims not only to address the SDGs but also to position itself as Norway´s "technology capital". Therefore, the inhabitants of Stavanger are affected by the municipality´s application of the Smart City concept which is in turn a result or consequence of various globalization processes which have their own consequences. This is exemplified by Graham and Marvin´s (2001) understanding of urban life in contemporary society:

"Contemporary urban life is revealed as a ceaseless and mobile interplay between many different scales, from the body to the globe. Such mobile interactions across distances and between scales, mediated by telecommunications, transport, energy […] are the driving connective forces of much-debated processes of globalization. In this perspective, cities and urban regions become, in a sense, staging posts in the perpetual flux of infrastructurally mediated flow, movement and exchange (p. 8)."

In other words, contemporary urban life is a complex and multifaceted phenomenon which is constantly structured and restructured through factors both within and outside of the city. In the case of Stavanger, urban life is being restructured through the Smart City concept which affects the ways in which mobility takes place. Such complexities require the involvement of the municipality's citizens to properly understand and mediate the city´s needs while simultaneously achieving sustainable development goals.

In contemporary society, the characterization of modernization is defined not only by characteristics of mobility technologies for goods, people, money, and ideologies but also acceleration. Acceleration has become the defining element for modernization where the process of acceleration has altered the space-time regime of modernity. “Rosa differentiates between three modes of acceleration: (1) technological based acceleration, (2) the acceleration of social interactions; and (3) the individual and cultural acceleration of the tempo of life.” By the power of development, all three modes are interconnected in modernity. However, they are eroded by late modernity and oftentimes are turned into development barriers (Bergmann & Sager, 2009, 16). The connection between acceleration and technical modes of mobility simultaneously shrinks the “space-distance” and widens space in such a way that challenges sense of belonging and sense of place (Bergmann & Sager, 2009, p. 17).

6.3 Exclusion of vulnerable groups from public space

Contemporary approaches to society and urban planning are challenged by utopian ideas. Utopian mobility ideas have revolved around the possibilities inherent in mobility including the exploration of new vehicle types, new transportation arrangements or the consequences of mass vehicle use that has yet to be utilized. Despite an absence of urban transport/urban mobility utopias, distinguishing between the meaning of mobility behind the thoughts of the Swiss-French architect Le Corbusier and the Dutch artist Constant provide important understandings for the role of mobility for the city and society within urban life (Nikolaeva & Nello-Deakin, 2020, p. 312).

The fundamental difference between their views on mobility are that Le Corbusier viewed mobility as a matter of efficiency, a necessity, whereas Constant placed value in mobility as “a meaningful social activity and enjoyable way of exploring the world” (Nikolaeva & Nello-Deakin, 2020, p. 312). In other words, these two approaches to mobility can be understood as having either an emphasis on speed (Le Corbusier) or play (Constant). These contrasting ideas are reproduced in different sustainability imaginaries. The 15 minute city encourages diversity and mixed-use planning as an integral aspect of achieving socially sustainable communities. Le Corbusier’s emphasis on ordered mobility and his disregard for mobility spaces as anything more than functional infrastructure necessary for good coordination of the city, has been translated into

urban design in many cities across the world where city planning has placed emphasis on cars (Nikolaeva & Nello-Deakin, 2020, p. 313). In turn, this reflects the contemporary notion that the ideal city is one designed for speed.

While the arrival of cars has contributed to significant improvements in cities such as operations, performance and service delivery, such benefits are overshadowed by the extraordinary increase in use and population density (Allam et al., 2022, p. 8). The 15 minute city concept on the other hand places an emphasis on such aspects as density and diversity where a focus is placed on the ability for urban inhabitants to be comfortably sustained by the resources available locally. In this sense, the 15 minute city concept rejects the traditional urban planning view of density in relation to built environment quotas. Rather, "access by proximity" is a necessary aspect of healthy cities which are in turn characterized by such attributes as transit villages and walkable centers (Allam et al., 2022, p. 4). One of the most important characteristics of this concept is the value placed in areas available for socializing. This is in line with Constant's view of mobility as an intrinsic value in its own right because of the social and sensory experience it provides. Therefore, Contant's understanding of urban living is applied within the 15 minute city concept where "mobile engagement with people and places in a permanently shifting urbanscape" is recognized as an important aspect of socially sustainable urban spaces. The application of Contantian ideals is also seen in Jane Jacobs' vision of a mixed-use genial city of spontaneous encounters (Nikolaeva & Nello-Deakin, 2020, pp. 314). Similar to Constant's imagination of an urban city of play, the 15 minute city is made possible by technological progress and automation. However, neither concepts position technological efficiency at the center of urban life in the ways reflected by Le Corbusier and the Smart City.

Mobility encompasses not only the physical movement of objects and bodies through space, but also "the social practices that emerge around it and the many kinds of representations that sediment it in culture" (Wallius et al., 2021, p. 85). These various aspects are interconnected and evolve parallelly, consequently affecting socio-cultural relations within all anthropic environments, creating the multifaceted phenomenon of mobility. Contemporary understandings to mobility and mobility transformations, however, are shown to be increasingly individual and dematerialized due to the privatization, digitalization, and mobilization of transport. These

technological adaptations make it possible for playfulness to occur with society, specifically urban cities (Wallius et al., 2021, p. 85).

Although mobility within a Contantian ideal is deemed intrinsically valuable, the playfulness that can occur as a result is not an intrinsic aspect of transportation devices. Instead, Wallius et al. (2021) define playfulness as something that emerges from the use of transportation devices and from the socio-cultural values (valorizations) assigned to them. They argue that the role of playfulness is vital in "sustaining, providing, and encouraging mobility in the city, and mobility as a site of play" (Wallius et al., 2021, p. 86). Therefore, they attribute the rapid spread of e-scooters to several types of valorizations as depicted by various e-scooter operators.

Practical valorizations relate to the freedom of movement that comes with the ability of picking up and dismissing a ride at any place. By anchoring e-scooters within the Smart City concept, shared e-scooters are valorized as a convenient, easy, and minimalist mode of transportation. Utopian valorization of e-scooters is highlighted in the company names (e.g. "Bird" and "Wind") which also suggest a notion of freedom and speak to a specific demographic which in turn associates e-scooters with blithe enjoyment and spontaneity. Critical valorizations relate to the socio-economic conditions of the companies that influence the perceived, conceived and loved spaces of the city as opposed to the political awareness of their users. This means that e-scooter operators have a stronger influence on users´ understandings of e-scooters, through various marketing strategies that position the service as eco-friendly, despite the uncertainty that remains in such blanket statements. Lastly, ludic valorization of e-scooters, as the authors state:

> "[…] often develop from bottom-up perspectives and can be inferred from their actual uses. The feeling of novelty and freedom offered by e-scooters appears to appeal to a primarily playful means of mobility, which is suited for experiencing the urban environment from a new perspective. These valorizations, while sometimes promoted by the companies themselves, can often go against the discourse that they wish to convey and promote an unsafe use of the devices." (Wallius et al., 2021, p. 93).

Such green narratives around e-scooters cannot therefore be applied synonymously but rather as a proponent of technology led urban development that should be expected to come with its own

environmental concerns (Angelo & Wachsmuth, 2020, p. 2213). These environmental concerns relate to the intensive battery production process and the lack of recycling options available for both batteries and the e-scooters themselves. To quote Wallius et al. (2021, p. 93), "Ludic valorizations can often create tensions between other valorizations and the practical issues raised by their use ".

In this sense, the absence of regulation and road etiquette situates the devices as playful which responds to local conditions such as weaving through pedestrians, racing playfully amongst friends or experiencing the local urban environment from a new perspective by utilizing existing infrastructure in unconventional ways (Wallius et al., 2021,p. 93). Representation from e-scooter operators and the lack thereof from policymakers generate the idea that e-scooters are not "real vehicles" or in the case of sustainable mobility transitions, not legitimate options in the sustainability agenda thereby othering e-scooters, potentially negating the sustainability potential promised by operators, through their exclusion from policy and agenda settings.

The risks of e-scooters are not evenly distributed. While for some they are acceptable, for others they can be considered a threat to both the safety of others and other forms of mobility. The implementation of new mobility devices such as e-scooters requires an exploration of the effects and consequences that are produced with change where questions of who has the right to make space and for whom the space is made need to be explored (Datava et al., 2022, p. 141). This issue relates not only to matters of public vs. private space, but the spatial concept of commons which are neither private or public but rather co-used spaces where ownership, either material or immaterial, is constructed and reproduced through use (Datava et al., 2022, p. 141). The digitalization of mobility blurs the lines between that which is material and immaterial and has its own effect on the concept of space. People's perceptions of public space become individualized due in part to the use of location based applications and location-aware technologies (Hatuka & Toch, 2016, p. 2203). E-scooters can therefore be understood as a way in which people distance themselves from the public through the use of mobile technology.

The experience or act of using e-scooters may be an individual experience, but their use and presence has consequences that affect others. One individual´s right to express their freedom of

mobility has the potential to reduce the same right of another individual. Additionally, it has the potential to simultaneously reduce public space through appropriation by the private sector. Therefore, the relationship between motility (i.e., the individual or collective understanding of mobility possibilities) and public space accessibility can be understood as dynamic tensions consisting of conflict and power imbalances (Sheller, 2009, p. 33). Madanipour (2010) shares the sentiment by identifying the most serious issue with public space use as those individuals or groups who use it most often, often excluding others from it because they are perceived as trying to take over the area (p. 117).The ability to freely pick up or drop off e-scooters anywhere is one their most attractive characteristics. However, the ebb and flow and unpredictability of e-scooters has proven to be a major barrier for public space infrastructures (Datava et al., 2022, p. 143).

Therefore, mobility within (accessible) public space only exists through the cognitive and physical appropriation of that space to exercise individual or collective personal, sovereignal, or civic freedoms. The sovereignal freedom of mobility not only applies to the act of being mobile, but the act of being able to shape public space by increasing one´s own motility; thereby decreasing the motility of others. Public space is thereby susceptible to becoming exclusionary to some groups or individuals (Sheller, 2009, p. 33). This relates closely to the subjectiveness of the perceptions surrounding e-scooter parking impediments. Perception of what one individual considers an obstruction of public space could vary simply due to their relationship to the device.

A study conducted by James et al. (2019) on e-scooter parking and general perceptions showed large differences between those who had used dockless e-scooters and those who had not on questions of comfort and perceived safety (p. 9). Someone who has used the devices previously or has the physical capability to move scooters out of the way if needed may not pay attention to how often they need to do so whereas those who have more trouble handling the devices may notice their obstruction more in the same number of instances (James et al., 2019, p. 10). What is less attended to in this contribution, however, is the inclusion of disabled persons from the sample group. Social exclusion is a multidimensional process that requires multidimensional responses. This includes the surveying of public spaces (Madanipour, 2010, p. 129). Many groups are excluded from the use of e-scooters including but not limited to those who are less-able-bodied and older (Datava et al., 2022, p. 142).

Through the application of the TRSE framework, the presence of e-scooters in public urban space can be understood as creating relational exclusion. It is not a question of banning e-scooters because they are not accessible for such groups as the visually impaired and such a conclusion oversimplifies the issue at hand. Rather, the presence of e-scooters is a matter of creating and maintaining an inclusive public space that allows those who cannot or do not wish to use e-scooters to exist in that space safely. Public spaces become battlegrounds when there is competition for the limited available resources. Some vulnerable groups can feel intimidated by those who dominate public spaces, perpetuating a lack of safety and withdrawal from public areas and thereby a withdrawal from engaging with others. The neighborhood's social divisions are reflected in the tensions that can be witnessed in the public space, which becomes a display of incompatibility between these groups. Some supporting mechanisms are required and without them, these groups may find it challenging to coexist within the constraints of available resources and prevailing conditions. Because most members of such groups are preoccupied with solving some of the most basic issues in life, their capacity to deal with others becomes limited (Madanipour, 2010, p. 114).

Theoretically, if the A-S-I framework was used in Stavanger where e-scooters were framed as a sustainable mobility mode worth shifting towards, not only is clearer policy and regulation required, but also an understanding of the city´s needs and the consequences associated with e-scooters. The framing of e-scooters as a FM/LM solution continues to perpetuate hypermobility, the same ailment of contemporary approaches to mobility that have created the very issues that sustainability goals aim to address. Therefore, broadened technology access does not solve the issues of spatial constraints. What is offered by new technology is access to networked spaces but the technology itself is not enough to access those spaces. To address those places that remain isolated and under-serviced in the smart city, there needs to be consideration for how smart technologies can be understood and work together with other utilities inherent in smart urbanism (Odendaal, 2021, p. 643).

7. Conclusion

The aim of this thesis was to investigate the role of e-scooters within the sustainable mobility transition taking place in Stavanger's Smart City. The main research question was: *What is the relationship between e-scooters and sustainable urban development?* The results and analysis were obtained through expert interviews and the attendance of Stavanger's annual Mobility Conference. The discussion identified three forms of exclusion that occur within conversations of sustainability: (1) the exclusion of e-scooter from SDGs; (2) the exclusion of the public from sustainability concept implementation and decisions; and (3) the exclusion of vulnerable groups from public space within these imaginaries.

The thesis concludes that the municipality does not view e-scooters as a legitimate mobility tool that can be used in its sustainable mobility transition ambitions. This conclusion was drawn from the expert interviews and the attendance of the mobility conference which showed that despite suggestions of further collaboration between the municipality, the PTA Kolumbus, and e-scooter operators, little has been shown to demonstrate these goals and the municipality nearly completely disregards their existence as a mobility tool. Vulnerable groups such as the blind and visually impaired are affected by the disregard of e-scooters from conversations of mobility as the lack of regulation contributes to feelings of exclusion and unsafety in public space.

The main finding is that applications of technology under the guise of sustainable development have unintended consequences that also need to be addressed. The sustainability in sustainable technological development is negated when technology is implemented without an understanding of context and needs of the people who live within the area. Therefore, e-scooters are not inherently sustainable just because they are battery-powered, generating zero emissions upon use. There is the possibility for there to be a net loss associated with the deployment of e-scooters in the municipality if cycling and walking trips are being replaced rather than cars. Future research is needed to determine if e-scooters are actually contributing towards the municipality's SDGs or whether they are actively working against these ambitions and targets.

Within the context of the Smart City, the emphasis on sustainable technological development simultaneously reproduces the unsustainable ideation of hypermobility. The positioning of e-

scooters as a solution to the FM/LM problem also negates the positioning of e-scooters as a sustainable transportation mode. Further investigation on the literature of e-scooters reveals that the FM/LM problem is an issue of speed where e-scooters have the ability to get people places faster than public transportation, cycling or walking. As demonstrated by the 15 minute city concept, an emphasis on speed is harmful to true sustainable mobility that is not only accessible and environmentally friendly, but also inclusive.

Based on this conclusion, future research is required to determine whether e-scooters are supporting or hindering the municipality´s sustainable mobility transition. Similarly in determining the role that e-scooters have within the SDGs, future research on the consequences of e-scooter deployment as well as their exclusion within Stavanger´s Smart City concept need to address. Ambiguity and uncertainty surrounding the rules and regulation of e-scooters not only hindering sustainable developments but also negatively affects vulnerable groups in society. Additionally, the vehicles are unintentionally "gamified" which is not inherently a negative thing but the danger felt by other people in the same space overshadows any fun or thrill obtained from use. Inequalities within Stavanger's Smart City intersect between the application of the Smart City concept, technological development, and public space access. These inequalities relate to the exclusion of the public from decision making surrounding sustainability approaches and concerns of public space.

The exclusion that occurs with transportation implementation or intervention requires a larger role within the municipality´s sustainable mobility agenda. This could be potentially addressed through the application of the A-S-I and TRSE frameworks. Combining the two frameworks requires a greater understanding of the sustainable technological development taking place in the mobility sector as well as the social impacts that occur as a result. The exploration of transport related social exclusion is especially important to highlight the exclusions created by hypermobility within the current transportation industry.

Mobility is an essential aspect of the human condition. The complexity of what it means to be in motion relates to the necessity to closely relate "the ecological, technological, and sociocultural dimensions and disciplines with the humanities and their capacity to interpret how perceptions,

feelings, ideas and visions are affected by modes of mobility and how they themselves influence the construction and use of them" (Bergmann & Sager, 2009, p. 17). Therefore, discussions about mobilities in transit must be interdisciplinary and holistic. In this sense, I argue that the municipality has a duty to understand the needs of its citizens first and foremost, employing any technological developments thereafter. This does not appear to be possible within the current Smart City concept in Stavanger as the prioritization of technological innovation and the rate at which it should occur (fast), overshadow any acknowledgement of not only the impacts associated with such decisions but also whether such applications as e-scooters or autonomous buses are even wanted. To quote Bakker et al. (2014): "Radical systemic changes, needed to transform transport systems and their impact on people, cities and the environment, are rare as they are very complex and generally raise considerable resistance, have longer pay-back times and fewer tangible direct economic benefits" (p. 340),

In May 2023, the municipality announced that from 1 July, public transportation would be free, effectively making Stavanger the first city in Norway to subsidize such services. Due to the announcement of this news coming at the end of the writing period, I did not get a chance to investigate what this could mean for the existence of e-scooters in Stavanger. However, this news reinforces my understanding that Stavanger is especially concerned with being a leader within sustainability transitions; a concern that prioritizes being first in the nation, but not necessarily the best to the people directly affected by such decisions. This again relates to the danger of acceleration.

Acceleration is linked to the flow of ideas, values, and cultural practices. Where modernity had once produced the fear of exclusion in a spatial sense, acceleration now induces the fear of being taken down and being outdistanced in both time and speed. Social systems of planning and democracy are threatened by hypermobility. As the technical and social processes become increasingly more insensitive, they are consequently destructive of ecological processes. Biological life cycles and development and the speed at which they occur run counter to the principle of constant acceleration. The unsustainable nature of contemporary modes of transport have been made evident by global climate change; particularly current energy consumption (Bergmann & Sager, 2009, p. 17). The unsustainable practices that the municipality seeks to

avoid and shift away from continue to be reproduced within its current framing of sustainability. Rather than racing to hold the title of “first in the nation” or “The technology capital of Norway”, I hold the municipality needs to invest more time and money into developing strong and resilient communities, engaging more closely with the most vulnerable groups who are being adversely affected by the technological and acceleration centered Smart City.

Bibliography

Abduljabbar, R. L., Liyanage, S., & Dia, H. (2021). The role of micro-mobility in shaping sustainable cities: A systematic literature review. *Transportation Research Part D-transport and Environment*, *92*, 102734. https://doi.org/10.1016/j.trd.2021.102734

Allam, Z., Bibri, S. E., Chabaud, D., & Moreno, C. S. (2022). The Theoretical, Practical, and Technological Foundations of the 15-Minute City Model: Proximity and Its Environmental, Social and Economic Benefits for Sustainability. *Energies*, *15*(16), 6042. https://doi.org/10.3390/en15166042

Angelo, H., & Wachsmuth, D. (2020). Why does everyone think cities can save the planet? *Urban Studies*, *57*(11), 2201–2221. https://doi.org/10.1177/0042098020919081

Bakker, S., Zuidgeest, M., De Coninck, H., & Huizenga, C. (2014). Transport, Development and Climate Change Mitigation: Towards an Integrated Approach. *Transport Reviews*, *34*(3), 335–355. https://doi.org/10.1080/01441647.2014.903531

Bergmann, S. (2008). The Beauty of Speed or the Discovery of Slowness – Why Do We Need to Rethink Mobility? T. Sager & S. Bergmann (Ed.), *The Ethics of Mobilities: Rethinking Place, Exclusion, Freedom and Environment* (pp. 15-24). Ashgate.

Bird (n.d.). Sustainability. *Bird.* https://www.bird.co/sustainability/

Blaikie, N. (2009). *Designing Social Research: The Logic of Anticipation*. Polity.

Bodnár, J. (2015). Reclaiming public space. *Urban Studies*, *52*(12), 2090–2104. https://doi.org/10.1177/0042098015583626

Button, K., Frye, H., & Reaves, D. C. (2020). Economic regulation and E-scooter networks in the USA. *Research in Transportation Economics*, *84*, 100973. https://doi.org/10.1016/j.retrec.2020.100973

Carmona, M., De Magalhães, C., & Hammond, L. (2021). Public Space: The Management Dimension. In *Routledge eBooks* (pp. 264–271). https://doi.org/10.4324/9781351202558-38

Cook, N., & Butz, D. (2018). *Mobilities, Mobility Justice and Social Justice*. Routledge.

City of Stavanger. (n.d.). Mobility Hub. https://www.stavanger.kommune.no/en/samfunnsutvikling/stavanger-smart-city/smart-city-projects/mobility-point/#services-at-the-mobility-hub

Dalkmann, H., & Brannigan, C. (2007). *Transport and climate change. Sustainable transport: A sourcebook for policy-makers in developing cities, Module 5e.* GTZ. www.sutp.org

Datava, Z., Skjølsvold, T. M., & Korsnes, M. (2022). Littering the City or Freedom of Mobility? The Case of Electric Scooters. In *Springer eBooks* (pp. 135–152). https://doi.org/10.1007/978-3-031-16708-9_8

Department of Economic and Social Affairs. (n.d.). The 17 Goals. UN. https://sdgs.un.org/goals

Department of Economic and Social Affairs. (n.d.). Goal 11. UN. https://sdgs.un.org/goals/goal11

De Souza E Silva, A., & Frith, J. (2012). Mobile Interfaces in Public Spaces. In *Routledge eBooks*. https://doi.org/10.4324/9780203123966

EEA. (2012). The contribution of transport to air quality: TERM 2012: Transport indicators tracking progress towards environmental targets in Europe (EEA Report No 10/2012). https://www.eea.europa.eu/publications/transport-and-air-quality-term-2012

Fearnley, N. (2020). Micromobility – Regulatory Challenges and Opportunities. A. Paulsson, C. H. Sørensen (Ed.), *Shaping Smart Mobility Futures* (pp. 169 – 186). Emerald Publishing Limited.

Global transport CO2 emissions breakdown 2021 | Statista. (2023, April 14). Statista. https://www.statista.com/statistics/1185535/transport-carbon-dioxide-emissions-breakdown/#:~:text=The%20global%20transportation%20sector%20is,percent%20of%20global%20transportation%20emissions.

Graham, S., & Marvin, S. (2001). *Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition*. Psychology Press.

Hajer, M., & Reijndorp, A. (2002). *In search of new public domain : analysis and strategy*. https://lib.ugent.be/en/catalog/rug01:001652342

Hatuka, T., & Toch, E. (2016). The emergence of portable private-personal territory: Smartphones, social conduct and public spaces. *Urban Studies*, *53*(10), 2192–2208. https://doi.org/10.1177/0042098014524608

Hatuka, T., & Toch, E. (2017). Being visible in public space: The normalisation of asymmetrical visibility. *Urban Studies*, *54*(4), 984–998. https://doi.org/10.1177/0042098015624384

Hosseinzadeh, A., Algomaiah, M., Kluger, R., & Li, Z. (2021). E-scooters and sustainability: Investigating the relationship between the density of E-scooter trips and characteristics of sustainable urban development. *Sustainable Cities and Society*, *66*, 102624. https://doi.org/10.1016/j.scs.2020.102624

International Transport Fund. (2022, July 5). *Transport Climate Action Directory*. ITF. https://www.itf-oecd.org/tcad

James, O. T., Swiderski, J. I., Hicks, J., Teoman, D., & Buehler, R. (2019). Pedestrians and E-Scooters: An Initial Look at E-Scooter Parking and Perceptions by Riders and Non-Riders. *Sustainability*, *11*(20), 5591. https://doi.org/10.3390/su11205591

Jirón, P., Imilán, W. A., Lange, C., & Mansilla, P. (2021). Placebo urban inventions: Observing Smart City narratives in Santiago de Chile. *Urban Studies*, *58*(3), 601–620. https://doi.org/10.1177/0042098020943426

Kale, S. (2022, April 27). 'I know they're exciting – but calm down!' Britain's love-hate affair with the e-scooter. *The Guardian*. https://www.theguardian.com/uk-news/2022/apr/27/i-know-theyre-exciting-but-calm-down-britains-love-hate-affair-with-the-e-scooter

Kemmer, L., Sgibnev, W., Weicker, T., & Woods, M. (2022). Spaces of exposure: Re-thinking "publicness" through public transport. *Cultural Geographies*, *29*(2), 285–299. https://doi.org/10.1177/14744740211068097

Lewandowska, A. M., Chodkowska-Miszczuk, J., Rogatka, K., & Starczewski, T. (2020). Smart Energy in a Smart City: Utopia or Reality? Evidence from Poland. *Energies*, *13*(21), 5795. https://doi.org/10.3390/en13215795

Luscher, D. (2023). Introducing the 15-Minute City Project — 15-Minute City. *15-Minute City*. https://www.15minutecity.com/blog/hello

Madanipour, A. (2010). Whose Public Space? : International Case Studies in Urban Design and Development. In *Newcastle University eBooks*. http://ci.nii.ac.jp/ncid/BB0274680X

Michael. (2021, May 17). *Worldwide transport activity to double, emissions to rise further*. ITF. https://www.itf-oecd.org/worldwide-transport-activity-double-emissions-rise-further

Nikolaeva, A., Adey, P., Cresswell, T., Lee, J. J., Novoa, A., & Temenos, C. (2019). Commoning mobility: Towards a new politics of mobility transitions. *Transactions of the Institute of British Geographers*, *44*(2), 346–360. https://doi.org/10.1111/tran.12287

Nikolaeva, A., & Nello-Deakin, S. (2020). Exploring velotopian urban imaginaries: where Le Corbusier meets Constant? *Mobilities*, *15*(3), 309–324. https://doi.org/10.1080/17450101.2019.1694300

Odendaal, N. (2021). Everyday urbanisms and the importance of place: Exploring the elements of the emancipatory smart city. *Urban Studies*, *58*(3), 639–654. https://doi.org/10.1177/0042098020970970

O'Hern, S., & Estgfaeller, N. (2020). A Scientometric Review of Powered Micromobility. *Sustainability*, *12*(22), 9505. https://doi.org/10.3390/su12229505

Pozoukidou, G., & Chatziyiannaki, Z. (2021). 15-Minute City: Decomposing the New Urban Planning Eutopia. *Sustainability*, *13*(2), 928. https://doi.org/10.3390/su13020928

Reck, D., Menendez, M., Guidon, S., & Axhausen, K. W. (2021). Explaining shared micromobility usage, competition and mode choice by modelling empirical data from Zurich, Switzerland. *Transportation Research Part C-emerging Technologies*, *124*, 102947. https://doi.org/10.1016/j.trc.2020.102947

Remme, D., Sareen, S., & Haarstad, H. (2022). Who benefits from sustainable mobility transitions? Social inclusion, populist resistance and elite capture in Bergen, Norway. *Journal of Transport Geography*, *105*, 103475. https://doi.org/10.1016/j.jtrangeo.2022.103475

Rogaland Fylkeskommune (2020). *En del av Bymiljøpakken*. https://www.rogfk.no/vare-tjenester/vei-og-kollektivtransport/bussveien/hva-er-bussveien/byene-vare/

Ryde. Sustainability. (n.d.). *Ryde*. https://www.ryde-technology.com/sustainability

Sareen, S., Remme, D., & Haarstad, H. (2021). E-scooter regulation: The micro-politics of market-making for micro-mobility in Bergen. *Environmental Innovation and Societal Transitions*, *40*, 461–473. https://doi.org/10.1016/j.eist.2021.10.009

Shaheen, S. (2017, September 10). *Mobility on Demand Operational Concept Report*. https://rosap.ntl.bts.gov/view/dot/34258

Sheller, M. (2008). Mobility, Freedom and Public Space. T. Sager & S. Bergmann (Ed.), *The Ethics of Mobilities: Rethinking Place, Exclusion, Freedom and Environment* (pp. 25-32). Ashgate.

Silverman, D. (2019). *Interpreting Qualitative Data*. SAGE.

Statens Vegvesen. (2022, August 4). Traffic rules for electric scooters. *Statens Vegvesen*. https://www.vegvesen.no/en/traffic-information/traffic-safety/safety-and-electric-scooters/traffic-rules/

Stavanger Aftenblad. (2023, March 1). Nye elsparkesykler skal varsle om ulovlig kjøring. *Stavanger Aftenblad.* https://www.aftenbladet.no/lokalt/i/3EPwzX/nye-elsparkesykler-skal-varsle-om-ulovlig-kjoering

Stavanger City Council. (2016, December 12). Roadmap for the Smart City Stavanger. *Stavanger Kommune*. https://www.stavanger.kommune.no/siteassets/samfunnsutvikling/planer/engelske-planer/roadmap-smart-city-stavanger-2016.pdf

Tier. (2023, February 15). *Sustainability at TIER: How TIER Lowers the Impact of Mobility*. TIER. https://www.tier.app/en/sustainability

Tørmoen, A., Rise, M., & Hodne, A. M. (2023, April 4). *Tror ikke på forbud i Norge: – Vi har kommet lenger her*. TV 2. https://www.tv2.no/nyheter/innenriks/tror-ikke-pa-forbud-i-norge-vi-har-

kommet-lenger-her/15636140/?fbclid=IwAR3jJszVY3gFQa0cXXMunxM-cIIotHMNTkGEc9WHSGUlzOVNHPrn5JV05Nk

UNDP. *Sustainable Development Goals: United Nations Development Programme*. (n.d.). UNDP. https://www.undp.org/sustainable-development-goals

Wallius, E., Thibault, M., Apperley, T., & Hamari, J. (2021). Gamifying the city: E-scooters and the critical tensions of playful urban mobility. *Mobilities*, *17*(1), 85–101. https://doi.org/10.1080/17450101.2021.1985382

Yin, R. K. (2017). *Case Study Research and Applications: Design and Methods*. SAGE Publications.

Voi (n.d.). Our vision: Cities made for living, free from noise and pollution. Voi. https://www.voi.com/15-minute-city