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# CONTENTS

1	Introduction .....	1
2	State of the Art.....	4
2.1	Bringing the City to STS .....	4
2.2	Urban Planning in STS .....	6
2.3	Critiquing the Smart City .....	9
2.4	What's left?.....	13
3	From the Imaginary to the Constructed Subject .....	14
3.1	Co-Production of the Smart City .....	14
3.2	Socio-Technical Imaginaries.....	17
3.3	The Imagined Subject.....	20
3.4	The Search for the Smart Citizen.....	26
4	Smart City Wien as a Case Study .....	28
4.1	Research Questions.....	28
4.2	Data Collection & Material .....	30
4.2.1	Official Documents.....	31
4.2.2	Interviews.....	33
4.2.3	Observant Participation.....	34
4.3	Data Analysis.....	35
4.3.1	Situational Analysis .....	36
4.3.2	Discourse Analysis .....	38
4.4	Searching the Smart City Wien Imaginary .....	39
5	Smart City Wien and its Dimensions .....	42
5.1	Defining the Smart City Wien.....	42
5.2	Resource Preservation.....	48
5.2.1	Energy Efficiency and Renewable Energy .....	49
5.2.2	Mobility .....	50

5.2.3	Built Environment .....	51
5.2.4	Urban Infrastructure.....	52
5.2.5	Summary.....	56
5.3	Quality of Living.....	57
5.3.1	Social Inclusion .....	59
5.3.2	Health .....	62
5.3.3	Environmental City .....	64
5.3.4	Summary.....	67
5.4	Innovation.....	68
5.4.1	Research.....	72
5.4.2	Economy .....	73
5.4.3	Education.....	76
5.4.4	Summary.....	77
6	Re-Assembling the Smart Citizen.....	80
6.1	Openness for Innovation and Change.....	81
6.2	Individual Responsibility .....	82
6.3	Work Life .....	85
6.4	Social Integration.....	86
6.5	From Constructing to Shaping the Smart Citizen .....	88
7	Governance of Innovative Citizens .....	89
7.1	Public Performances .....	90
7.1.1	Information .....	91
7.1.2	Participation as Identity Building .....	93
7.1.3	The City as a Role Model.....	96
7.2	Education.....	97
7.3	Infrastructure.....	99
7.4	Another Brick in the Smart City?.....	103

8	Building Cities, Building Citizens – a Conclusion .....	105
8.1	The Co-Produced Smart City .....	105
8.2	The Competent Citizen .....	107
8.3	Guiding Collective Action .....	109
8.4	What's left to do? .....	112
9	References .....	115
10	Index of Figures .....	123
	Appendix .....	124
	Empirical Material .....	124
	Interviews.....	124
	Documents .....	124
	Original Quotes.....	124
	Chapter 5.....	124
	Chapter 7.....	126
	List of Abbreviations .....	127
	Abstract .....	129
	Zusammenfassung .....	131
	Curriculum Vitae .....	133





# 1 INTRODUCTION

*To get ourselves ready for the 21st Century, we have to redefine what “government” actually means. We ARE our government. Without us, there is nobody there. As it takes a village to raise a child, it takes people to craft a society. We know it can be done; it was done before. And with the help of new technologies it is easier than ever. So we actively set out to build truly smart cities, with smart citizens at their helms, and together become the change that we want to see. (A Manifesto for Smart Citizens, Frank Kresin)*

Imagine you live in a newly built city. You are on your way to an important meeting. On the way to your office you cross many CCTV cameras, recording every move you make. In your office, you remember that you forgot to adjust the climate control. In the morning you have seen at the control screen that your energy consumption in comparison with your neighbours is a little too high. You grab your smart phone and enter your smart home app, setting the room temperature a little bit lower. After you finished the configuration you take a seat in front of your telepresence system and join a video conference. In this city every move you make is recorded in real time and processed by central control systems. Traffic, energy consumption and (potential) offenders are recorded every minute. The city is an urban environment of sensors and cameras.

Imagine now, you are living in one of the most dangerous cities in the world. However, things have changed. Through SMS services and free Wi-Fi hotspots information is now at the fingertips of the poor. In one of the installed free access points you log into the official website to define your priorities on how the municipal budget should be spent. After you finished this task you use the newly built or heavily expanded public transport system that is now connecting large areas of the city with each other, visiting your friends. Providing infrastructure and fostering social inclusion, e.g. by providing clean water and electricity to everyone (including illegal slums), are the main elements leading to positive changes.

Both of the briefly described cities exist for real. The first city described is Songdo in South Korea (Gale International, n.d.). Songdo was built from the ground and is based on the idea of a technology-driven and centrally managed urban environment. Everything is processed by sensors and rendered more efficient by technological means. The second city is Medellín (Bintrim, n.d.), the second largest city in Columbia. Medellín focused on existing structures and improved them according to social

needs. These two projects are very different in how urban life, the needs of its citizens<sup>1</sup> and the relations between the city and its residents are imagined. And still, both of them are recognized as smart cities. If the term smart city includes these very different approaches to urban development, what then is a smart city and who are the smart citizens that are needed to realise this very different visions?

The term smarter city was originally framed by IBM and described the cooperation's approach to urban planning and development. The smarter cities approach would utilize the newest information technologies to create highly efficient urban systems, optimizing the usage of limited resources available to city administrations (see Cosgrove et al., 2011). Later, the term smart city was taken up by other technology vendors, such as Cisco. The original smart city was technological as well as discursive a product of the high-tech sector, which sought to create a new business field for their information and communication technologies (Söderström, Paasche, & Klauser, 2014). This development of the smart city as a new paradigm to urban development was taken up by urban planners, central institutions and funding schemes, not at last by the European Union (European Commission, n.d.). As a result smart cities are emerging everywhere. Alone the Indian government declared to build 100 smart cities within the next years (Ministry of Urban Development, Government of India, 2015). It seems the smart city is the future of urban planning.

This future is heavily discussed in academia in different disciplines, esp. in the field of urban studies. Yet, the smart city has been discussed so far mainly on a mere abstract level, raising questions of the definition of "the real smart city" (Hollands, 2008), the corporate visions of the smart city (Söderström et al., 2014) and the disciplining powers of the smart city (Klauser, Paasche, & Söderström, 2014; Vanolo, 2014). However, the smart city is a contingent phenomenon, depending on the actual and regional situation in which the urban is created. Although important actors in constructing the smart city, the role of municipal governments and the official urban planners is not highlighted in the recent literature very often, despite the fact that their plans and ideas regarding the development of the smart city are integral parts of defining social life and social order within the imagined smart city. To explore these imaginaries of the future city is an important building brick for understanding the construction and the inbuilt power relations within the planned urban development. This is one important element in understanding actual developments in smart urbanism.

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<sup>1</sup> I am aware that the term citizen is not unproblematic, as it excludes certain groups in society. Therefore, citizen is used in this work interchangeably with resident....

A second vector to access these developments is based on the insight, that a city is more than just buildings or streets. The city is the result of shared ideas and practices bringing the material aspects of the urban environment to life. The smart city is not just constructing an urban environment or a desirable future, but it is also constructing the habitants of the smart city: the smart citizen. This is no coincidence, as the smart city needs the smart citizen to stabilize this complex socio-technical system. In imagining the micro level of social practices, the macro structures of the urban system are brought to life. With my thesis I will search for the imagined smart citizen and shed some light to these unexplored districts of the smart city. To do so, I explored the smart city initiative of the city of Vienna. Bringing together the work on the smart city from urban studies and the field of Science and Technology Studies (STS) I search for imaginaries regarding the smart citizens within the official *Smart City Wien* strategy and discuss the instruments applied to actively turn residents into smart citizens. In the next chapter (chapter 2) I will explore the emerging field of urban STS and how it applies well-established concepts from Science and Technology Studies on urban planning and the construction of the city. In this chapter I will also explore the smart city literature, mainly taken from the field of urban studies. In chapter 3 I will discuss the theoretical background of my work. To do so, I rely on the idiom of co-production (Jasanoff, 2004) and the concept of socio-technical imaginaries (Jasanoff & Kim, 2009, 2015). In this theoretical frame, the city, which I see here as a technological artefact (see also Aibar & Bijker, 1997), and social order are co-produced, i.e. the city is an achievement of the social system and therefore incorporates and reproduces social values and knowledge. With the concept of socio-technical imaginaries these belief and values systems are described as collectively held knowledge and visions of a desirable future.

The empirical field and the methodological approaches, especially tracing the imaginaries of the smart city and the smart citizens in the official documents, are discussed in chapter 4. In this chapter I will discuss my research questions, the methods used to collect and analyse my data and a description of the empirical field. The empirical work is described in chapter 5, where I carve out the imaginaries of the smart citizen from the main documents and related it to the expert interviews. The found attributes of the smart citizen imagined in the Smart City Wien imaginary are put together and re-assembled to picture the actual imagined smart citizen in chapter 6. The governance instruments to enable the envisioned smart city are then discussed in chapter 7. In this chapter I discuss how the city of Vienna seeks to transform its residents into smart citizens and connect it back to the central concepts of theoretical background of this work. And now, we should start our search for the smart citizen, look for her/him in the different districts of the Smart City Wien and begin our ethnography of the imagined. Let's see, what we find.

## 2 STATE OF THE ART

The city as empirical field has a long tradition within the social sciences. The Chicago school was one of the first branches within sociology taking up the urban environment as the major empirical area for their studies. Based on the work of Robert E. Park (1915), the Chicago school became heavily influential in sociology and anthropology (Bulmer, 1986). This development provided the basis for a strong foundation of urban sociology and anthropology. These fields are mostly concerned with questions of how individuals interact within social systems found in an urban context. Especially urban sociology focuses on processes of social integration within the city (Flanagan, 1993). As urban sociologists argue, community building is tightly related to these questions, because the city needs other mechanisms of building integrated social groups than rural areas.

This also constitutes the starting point for the younger and interdisciplinary field of urban studies. A definition of urban studies is thereby as complicated and hard to produce as finding a definition of the city itself. The assemblage of different disciplines brings various perspectives together, each focusing on slightly different issues within urban systems. Additionally, the on-going globalisation in social processes started a discussion in the field whether the city as such is still an adequate focus for urban studies (Brenner & Schmid, 2015). However, the uniting element of urban studies is – still – the focus on diverse social issues within an urban environment and a common sense of a social responsibility and the inherent political approach of the research (Galès, Sassen, & Manchester, 2005).

A completely different approach is presented within the growing field of complexity science. In this field the city is also seen as a site of social interaction, yet the question is rather how social interactions can be described in a mathematical model for simulations than to understand processes of meaning making. Utilising network analysis and graph theory, complexity science is modelling the city as a set of relations between spaces and people and the flows of materials, information, and individuals within these networks (e.g., Batty, 2013). While this method of analysis is important and promises great insights, it neglects the questions why these flows and networks are built the way they are, how power relations are constituting these social practices, and how the infrastructural and material aspects of the urban environment are shaping these flows.

### 2.1 BRINGING THE CITY TO STS

Over the last years the city as an object of inquiry became more and more important within the field of Science and Technology Studies (STS), highlighting questions of materiality and expertise in urban

planning and development. Technology and expertise are playing an ever increasing role in urban processes and how the city is constituted. Smart cities are only the latest development in this process of emphasising the technical aspect of these socio-material systems. However, the idea of technology as a powerful source for deep and necessary urban change is not new and neither is the idea of the possibility of a technological fix for urban problems (Graham, 1997). As a consequence of the ontological shift within the social sciences and specifically in STS, the built environment became an important focus of empirical inquiry and – as a consequence – the city as empirical field. STS thereby draws from a range of established concepts to analyse the city from a new perspective, namely large technological systems (LTS), the social construction of technology (SCOT), and actor-network theory (ANT).

LTS does not focus on single technological artefacts but shifts the focus to large-scale distributed and functionally integrated socio-technical networks. The emerging technical infrastructure is not only a network of technological artefacts and engineering systems but is also integrated into different political and social contexts, from where it can emerge (see Hughes, 1993). This also implies that these large technological systems are not created without normative ideas, but that these infrastructures are always subject to governance (Coutard, 2002). Graham & Marvin (2001), also utilising LTS as an approach to urban issues, emphasise the discriminatory potential of infrastructures. In their view, the urban condition is a question of access to services and material infrastructure of the city. The infrastructural networks therefore create a spatial and social segregation of societal groups. However, the material connection of these infrastructures is only one aspect under discussion. Infrastructures like CCTV or biometric recognition software can determine access to certain areas and divide the population in premium, normal, and deviant users (Graham, 2005). This approach is criticised for its pessimistic and dystopian prospect by some scholars (Coutard, 2008; Coutard & Guy, 2007).

The ANT approach is de-centring the human actors and focuses on the relation between human and non-human actors in the construction of the urban environment (McFarlane, 2011b). This actor centred perspective also changes the perception of the city in a radical way in questioning its ontological status as fixed entity. Cities as such are a built environment where different actors and societal groups are inscribing their ideas of social order and social life into steel and concrete. Yet, this perspective is very static as it disregards the processes of appropriating these built environments. For a deeper understanding of *the city* the approach of urban assemblages (Farías & Bender, 2010) proposes to conceptualise the city as an ontological unstable entity. The city is not (only) socially constructed, but is an emergent phenomenon of enacting practices, assembling “networks of bodies, materialities, technologies, objects, natures and humans” (Farías, 2010, p. 13). A city is not just space

and design – it is a set of socio-technical processes connecting different sites. The status of the city is therefore dependent on these processes that enact and create not just a different perspective on the object, but a different reality of it (Mol, 2002). Within this newly emerging field of research, STS concepts have been introduced and are heavily discussed in urban studies (see Brenner, Madden, & Wachsmuth, 2011; Farías, 2011; McFarlane, 2011a). In a similar way Amin & Thrift (2002) argue that the city is an actual achievement of the situation. Looking at the city from a *flâneur's* perspective is an assemblage of spatial and temporal transitivity, urban rhythms, distributed symbols, and footprints. Each of these dimensions creates an image of the city in relation to the ways an observing subject is moving through the urban environment. In a similar way Latour & Hermant (2006) make the city of Paris visible. In their art project, the authors show that the definition of Paris is highly dependent on the individual perspective and that every route taken through the city creates different versions of Paris.

While these developments are important for understanding the general relation of STS and urban studies, the role of STS concepts in works on urban planning processes are important for the questions of this thesis. Urban assemblages and material aspects of the city are essential for understanding the actual practices within the urban environment. To understand the emerging Smart City Wien, which builds the main research object of this thesis, the question of the imagined and planned city is of inherent importance. Within the planned urban environment the foundations of the later realised smart city are negotiated. Plans and strategies for urban development are therefore blueprints for a social order that will be implemented. Consequently, the question how these blueprints come into being and how these plans are making imaginaries available for a deeper analysis are important questions.

## 2.2 URBAN PLANNING IN STS

In STS, one of the most influential and best known examples for looking at the built environment is the bridges of Moses. Langdon Winner (1980) retells the story of urban planner Robert Moses, who built several bridges over the roads of the Long Island parkway system in New York State between 1924 to 1940. The roads were connecting the more urban areas of Long Island with state parks and beaches. According to Winner (1980), the bridges over these streets were inherently racist by design. The bridges were too low to let public transport pass through. The buses, which were mainly used by the black population of the city, could not go under the bridges in order to reach the beach. As a consequence, the beach was reserved for the wealthy, white group. While years after the publication there was a discussion whether the bridges were really that low and even if, that the design was not

intentionally racist (Joerges, 1999), the core argument of the text prevails, at least as an urban legend (Woolgar & Cooper, 1999). Shaping/deploying infrastructural artefacts enable powerful social actors to enforce their interests and settle political issues. Artefacts do have politics (Winner, 1980).

One of the first approaches within STS to study the city as a whole came from the work utilising the framework of Social Construction of Technology (SCOT). Aibar & Bijker (1997) applied the SCOT approach to the extension plans of Barcelona in the mid-19th century. In their work, the authors identified different social groups and their “technological frames” (Aibar & Bijker, 1997, pp. 12–15) surrounding the city and the extension plans. The technological frames in this work are the different meanings and emphases resulting in a specific perspective on Barcelona and its expansion plans. By doing so, the interpretative flexibility of the city was shown, as there was no common understanding of what the city is or should be. This perspective opened up a deeper understanding of political agendas and values in urban planning and the built environment. In analysing the different frames in which the city was seen by that time it also reveals a way to see the city in the future. The technological frame – the attribution of different meanings – cannot be separated from the idea of the society and the forms of life within the urban region. The city as an artefact is therefore object of contention, incorporating the contingency of social life into the built structure of the city. In this framework urban planning can be “understood [...] as a form of technology, and the city as a kind of artifact” (Aibar & Bijker, 1997, p. 6). Negotiations between different socio-technical world-views finally shaped what we know as Barcelona today.

Orchestrating urban change needs mediators and instruments, where ideas on urban development are inscribed. In Aibar & Bijker's (1997) case the map of the city became an object of contestation, as different social groups tried to inscribe diverging political and social ideas into the extension plan. In a similar way, Söderström (1996) discusses the role of maps in urban planning. In his paper, plans are immutable mobiles (see Latour, 1986) in urban development. During the planning process maps have the role of inscriptions, making the city visible in a specific way and from a specific perspective. The ideas going into this creation process of such perspectives, however, are not just appearing in situ, but are also relating to urban developments elsewhere. Global markets, migration, and a general higher mobility enable building types and ideas on urban planning to be circulated and transported into different contexts – the prototypes became mobile, as they are traveling, and they are immutable, as they are not changing. Therefore urban plans and the built environment also always relate to an *elsewhere* (Söderstrom & Guggenheim, 2009). This open and inward perspective on representations of the city is also discussed by Ewenstein & Whyte (2009), who conceptualise maps as an epistemic as

well as a boundary object<sup>2</sup>, enabling collaboration and negotiation between different groups in urban planning. However, maps are not the only epistemic objects within urban planning as Yaneva (2005) shows. In her work, she discusses the function of physical models of buildings within architecture. In scaling the building and parts of the city down, and bringing the built environment into the architect's lab, a new form of knowing and manipulating the city is created. In several steps of scaling up and down, assembling and reassembling models, the building becomes stabilised.

Söderström (1996), however, discusses also a second – outward oriented – function of seemingly objective maps and stabilised representations. A map is not just representing the city as a contingent object, but – as soon as they became immutable – travels in society, circulating the created knowledge and stabilising a specific reading of the city. As soon as a map has become a commonly accepted representation of the city, it is not just a representation anymore. From this moment on the map and the city are interchangeable as there is no difference between the two in the shared understanding of the urban environment. In discussing urban change, the role of these representations is of immense importance, as the making of these models for future buildings exerts a form of power. In this context, Bijker & Bijsterveld (2000) explored how the integration of so-called non-expert groups changed the initial construction plans of social housing in the Netherlands. The Women's Advisory Committees on Housing (VACs) had a profound impact on the plans and the construction of social housing projects. Yet, strategic movements were necessary to position them as an important social group. Inclusion or exclusion of social groups – thus making them (ir-)relevant – is a performance of power and influences the form of urban change. The city as an artefact is negotiated through these plans.

In these negotiation processes social knowledge production is a central element of negotiating the frames of meaning applied to urban sites. In his book, Lachmund (2013) discusses the conflicts and constitution of certain perspectives on wastelands in West Berlin and the resulting frames as urban nature parks. Taking up the idea of the artefact and how design stabilises social structure, Gieryn (2002) asks what role buildings have within the urban environment. Looking at the materiality and the design of buildings, they fortify social practices and social structures around them as designers are not just creating a building but also imagining its users. Relying on concepts of ANT like *black boxing*<sup>3</sup> and *obligatory passage points*<sup>4</sup>, Gieryn (2002) shows that buildings are actors themselves in

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<sup>2</sup> Boundary objects are a concept developed by Star & Griesemer (1989). A boundary object is an object that enables the cooperation of different communities, because it is adaptable to fit different contexts but is stable enough to maintain a common identity across these different contexts. Maps can be boundary objects, as they carry enough information to maintain their identity as a representation of a site, but are used in different ways across varying social contexts.

<sup>3</sup> Black boxing is a concept taken from ANT and describes the process of eliminating contingency of relations between actors (see Latour, 2005). A black box is therefore a set of relations and practices that are taken for granted and are no longer questioned by anyone. In the process of creating a software system, the internal workings, the form of the programming



creating the city. However, he also recognises that cities and urban socio-technical structures are not beyond the reach of human intervention, but are subjects to change. Interpretative flexibility is in place in urban reconfiguration processes, which means that the stability of urban environments must be explained.

This is also the starting point for Hommels (2005). In her book, she argues that the city is in constant flux and subject to change. As a result, “obduracy and stability are never permanent but rather ongoing accomplishments” (Hommels, 2005, p. 196). In three case studies she explores how STS concepts and approaches – such as SCOT, ANT, and LTS – are suitable to explain the obduracy of urban structures. In her perspective, obduracy and urban change are the result of the seamless web of material properties, institutions, shared values, and the degree of embeddedness of sites in the social structure. According to Hommels (2005), change in the urban structure is always an expression of social circumstances.

Karvonen & van Heur (2014) also recognise this idea of urban change as an inherent phenomenon of the city. However, the question is not per se what groups or technological frames are negotiating the processes of change or the obduracy of urban sites and artefacts. Instead, the city is understood as a laboratory. As such, the city is as a privileged site of knowledge production (see also Gieryn, 2006). Based on this knowledge “urban laboratories are influencing the evolution of today’s cities” (Karvonen & van Heur, 2014, p. 388).

## 2.3 CRITIQUING THE SMART CITY

The smart city as subject of research has been taken up by a small community of researchers in the last years. While most of critical work on smart cities can be found in the field of urban studies, the topic is more and more taken up by various disciplines besides STS. While the role of digital infrastructures and information and communication technologies in cities and urban planning has already been discussed some time before (see Graham & Marvin, 1996), the smart city represents a whole new dimension in the integration of ICT in the urban environment. Smart cities are often

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interface, and the included modules are open for discussion and are highly visible. However, as soon as the piece of software is delivered in a productive context these connections become stable and the inner working of the software and the assemblage of libraries, sub-routines, etc. are no longer open for discussion. The complex assemblage of these elements is hidden within a black box where the outside world is only aware of the input, the interface and the output. The inner workings of the technology are invisible.

<sup>4</sup> In a network of social relations between (non-)human actors the structure of the network is reflecting the distribution of power within the network. An obligatory passage point thereby describes a node in the network that must be included in order to be able to form a stable network. Because of this privileged position, these actors are immensely powerful as they can control access to certain parts of the social structure and mediate interactions (see Callon, 1986).

understood as mainly technological endeavours, aiming at optimising urban processes with digital means. This rather narrow perspective is accompanied by the lack of a common definition of a smart city (Albino, Berardi, & Dangelico, 2015; Angelidou, 2014).

Hollands (2008) asked rather early in the development: *Will the real smart city please stand up?* In his polemic against an entrepreneurial and technological deterministic version of the smart city he claims that the urban reality is much more complex than the cooperation's idea of urban management and that a real smart city must take social issues, such as inequalities, local needs, and structure of the city and its residents into account.<sup>5</sup> A similar critique is brought forward by Greenfield (2013). In his book, he explores the visions of big IT companies such as IBM or Cisco Systems presenting a networked city optimising each and every process. His big critique of the smart city vision presented by these companies is that cities are more complex and not every city can be built from the ground up like Songdo (Gale International LLC, n.d.) or Masdar (Masdar, n.d.) (two extremely popular examples for newly built smart cities). Additionally, the vision of these corporations includes privately owned infrastructure, which is closed for public interventions.

Söderström, Paasche & Klauser (2014) discuss the dominant discourse on smart cities and link it to a certain socio-technical imaginary or techno-utopia. The authors are discursively distinguishing two elements: First, IBM created a unitary language and translated the city and its issues into this specific discourse. In presenting its own urban theory, IBM transformed the very idea of a city into a system of systems, which are accessible and controllable through data processes. This theory can be seen as a translation device that transforms different urban phenomena into *normalised* data in order to create knowledge and solve urban issues. In defining the city and its issues this way, IBM could position itself as one of the central players in the field of smart cities. Consequently, it established a specific idea of urban management as a system engineering task. Secondly, a transformative narrative was connected to the idea of a city. In the campaign of IBM, contemporary cities are presented as sick patients with several pathologies. The challenges ahead are urbanisation, climate change, and scarce financial resources of municipalities (see also White, 2016). The utopian narrative of a smart city has been constructed by three aspects. Firstly, it is uni-vocal, as only the worldview of IBM is presented in it, while other approaches to solve urban problems are not present in the story. Secondly, the story works with before-after demonstrations. In this narrative the city had several problems before it became smart. But now, as smart technologies are utilised, these problems are a thing of the past. Thirdly, smart cities are (re-)presenting a perfectly functioning urban society, governed by code. To

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<sup>5</sup> Even in the logic of optimising economic indicators, social structure is important (see Caragliu, Bo, & Nijkamp, 2011).

enable such a vision, access to all sorts of data must be available. Otherwise this data is underused and *unsmartly* organised (Söderström et al., 2014).

In a similar way Hollands (2015) analyses dominant narratives of the smart city. The author makes two main arguments. Firstly, the smart city is an ideological concept assuming that IT can automatically improve several issues like economic growth, efficient administration and climate friendliness. This also includes that the transported idea of a smart city does not only point at certain issues, but also hides others, as they are not in the focus of the methods and therefore the overall perspective. Secondly, this perspective is a “corporate vision of smartness” (Hollands, 2015, p. 2), which means that the solutions to these problems can only be achieved by an entrepreneurial form of governance. These ideas of a smart city are – again – embedded in a certain imaginary or utopia.

Hollands (2015) as well as Söderström et al. (2014) point out that smart cities are a huge and expanding market, and therefore this corporate vision of a smart city is highly driven by ICT companies’ profit motives (see also Townsend, 2013). The combination of this profit motive and the general trend of (urban) privatisation is leading to an environment where the only option for citizens is to adopt the new conditions. In this framework, citizens are often seen as a barrier for such a smart development. Therefore, people need to be educated in order to enable this vision of a smart city. Smartness in this sense is defined as accessing and consuming technology in a certain way, but not as questioning or actively participating in urban developments.

In the vision of the IT companies, a smart city includes the heavy usage of data to analyse and optimise urban processes. Kitchin (2014) points out that establishing a sensory real-time city has several issues. Data collected by the ubiquitous sensors are not apolitical or neutral (see also Gitelmann, 2013), but they are creating a specific perspective on the world. Yet, this data is used in the vision of a panoptic city to establish a technological control and regulatory regime. This regulatory regime is, however, not a regime to discipline the residents of the city, but to make things work in reality. Klauser & Albrechtslund (2014) argue that the surveillance mechanisms in smart urban infrastructures are not just observing human actors but also the non-humans. In the case of a misalignment, when interaction between these becomes problematic, the regulatory regime changes parameters in the system to re-align them. In this perspective, the normative system is not known to the individual. From now on, the normative goal is the optimisation of the processes by dynamic interventions from the system. Yet, although the normative frame is not a reference point for regulating the residents’ behaviour anymore, these optimisation processes are installing new power dynamics of population control (F. Klauser et al., 2014; Sadowski & Pasquale, 2015).

In this context, Vanolo (2014) talks about *smartmentality*. The author refers to the concept of Governmentality (Foucault, 1991) and applies it to smart cities. In his work he points out that “‘smart cities’ inevitably also co-produces what we could call a ‘smart citizen’” (Vanolo, 2014, p. 893). This smart citizen is disciplined by technological systems in order to be made compatible to this vision of a smart urbanism (see also F. Klauser et al., 2014). The smart citizen is constructed through a combination of population measurement and a smart city discourse that conveys how a smart citizen is assumed to behave. Vanolo (2014) does not present a systematic analysis of an imagined smart citizen. However, based on this short description it is easy to imagine numerous groups that are excluded by such a vision of a smart city. In this way, a citizen of the smart city is created by the knowledge that is prevalent within the smart city population and the instruments of intervention available to the smart city governance. Gabrys (2014) focuses on the latter, arguing that a smart city is an environmental approach to governance. The practices of the residents are controlled through an adaptable and programmable environment. The focus is not on making a smart citizen through constructing a subject anymore, but by enabling or disabling certain practices that constitute a citizen. In this context, key to understand the emergence of the smart citizen is the environment or milieu a person inhabits.

The discussed literature so far assumes a smart city that highly complies with cooperate smart city visions. Wiig (2015a) argues that this discourse alone is not determining the nature of the smart city. In exploring the smart city ambitions of Philadelphia, the discursively constructed idea of the smart city clashed with the reality of Philadelphia. Policies on smart cities might create the vision of a hyperconnected (Calzada & Cobo, 2015, p. 2) and optimised urban environment, yet the existing city is often resisting these efforts of transformation. Additionally, policies are not travelling as they are, but are adapted to the local context (Crivello, 2015). The originally formulated goals are subject of discussion, when becoming implemented in a specific site and the term smart city is often attached to new meanings (Buck & While, 2015) and adapted to the local context. The label smart city is often used to disguise other agendas, such as the implementation of austerity measures (Pollio, 2016) or to fit the urban development strategy to an already established neoliberal governance logic (Wiig, 2015b). Shelton, Zook, & Wiig (2015) argue that research on smart cities must shift its focus from the discursively and idealistic formulated smart cities to the “actually existing smart city” (Shelton et al., 2015, p. 14). Therefore analysing the emerging smart cities is important to understand the how smart city concepts are travelling and are translated into local contexts (Kitchin, 2015) and what their normative nature is (Luque-Ayala & Marvin, 2015).

## 2.4 WHAT'S LEFT?

Smart cities represent a new paradigm of urban planning. Although there is no agreed-upon definition of a smart city, this term is accompanied by urban change or the construction of completely new cities. Yet, urban change is contested, as different social groups are trying to influence and shape urban development according to their interests. The battlefield of these controversies is, as we have seen, often the official plan for future urban development. Therefore these strategies of the smart city are the result of a negotiation processes and a discursive construction of the smart city formulated by the most influential groups. In the first big strand within the presented literature on smart cities, the business actor's discursive constructions are emphasised. The imaginaries and ideas from urban planes or the city administration are not taken into account. The presented deconstructions of smart city discourses also favour a macro perspective, neglecting the assumptions about a smart citizen. Yet, these strategies and plans for urban change are also strategies and plans for social change. In order to stabilise the city in the new configuration, the city needs residents that comply with these changes and adapt to the new socio-technical structure. The city and the citizens are shaping each other. Ignoring the inscribed ideas of a smart citizen within actual existing plans is therefore a blind spot of the actual smart city research.

The second big strand within the smart city literature is exactly pinpointing the function of the smart city as a disciplinary device or environment. However, the normative ideas that are distributed by the smart city are not examined in detail. The discussion on the normative and disciplining nature of the smart city resides on a theoretical level. The smart city is actively constructing smart citizens, yet the ideas how smart citizens could be governed are implicitly, if not explicitly, formulated in the dominant smart city discourse of each city. Therefore an empirical study of the actual smart city discourse is necessary to reveal the local imaginary of smart city governance. Bringing together an analysis of the dominant discourse of the smart city and the resulting instruments of actively creating the smart citizen is therefore a necessary first step to understand the social implications of any smart city.

### 3 FROM THE IMAGINARY TO THE CONSTRUCTED SUBJECT

Within STS many scholars have shown that social structures, values and norms are co-determining the production of (scientific) knowledge and its artefacts (e.g. Schiebinger, 1989; Shapin & Schaffer, 2011; Winner, 1980). Similarly, urban planning is an inherently social process and the built environment an achievement of the social system (Aibar & Bijker, 1997; Bijker & Bijsterveld, 2000). Creating a smart city can be understood as an attempt to create a value system and a specific social order embedded in steel, concrete and fibre cables. The city is society made durable.<sup>6</sup> Material manifestations in the city are the result of diverse negotiations and the balancing of different interests. In embedding certain values and visions, the planned city has certain users in mind and, as a result, creates necessarily winners and losers (see Graham & Marvin, 2001). The urban is scripted for smart citizens and at the same time constructs its residents. Therefore the question arises how ideas on social life and social order in the context of STS and urban planning can be theorised. In this chapter, I will discuss how the entanglement of techno-science and society can be understood in theoretical terms in the context of the smart city and how a collective idea of the Smart City Wien inevitably constructs a certain idea of a smart citizen.

#### 3.1 CO-PRODUCTION OF THE SMART CITY

Urban planning and scientific knowledge are not neutral or independent, but are deeply influenced by social processes. The perspective of societal processes shaping scientific knowledge, e.g. through socio-technical configurations in the laboratory (Knorr-Cetina & Mulkay, 1983; Latour, 1983), is highly important in discussing the role of science and technology within society. However, an inquiry into the bi-directional shaping of these concepts, illustrating the deep entanglement of techno-scientific knowledge and society, is needed. In her concept of co-production Jasanoff (2004) argues that science and social orderings co-produce each other. Science, technology and society are influencing each other simultaneously, as science and technology are not entities outside of society's boundaries, but are understood as societal achievements. As a result, science and society are not two distinct elements, but are describing the same phenomenon from different perspectives. Science is shaping society and society produces science. The distinction between techno-science and society in the approach of co-production is at best an analytical one. As techno-science is an achievement of the social system, their relation is necessarily a hierarchic one. There is no science without society, as there can be no living room

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<sup>6</sup> This formulation is inspired from Bruno Latour, who originally wrote: "*Technology is society made durable*" (Latour, 1990).

without a building. The theoretical approach of Jasanoff is grounded in the understanding of co-production, which states

*[...] that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it. Knowledge and its material embodiments are at one products of social work and constitutive of forms of social life; society cannot function without knowledge any more than knowledge can exist without appropriate social supports. Scientific knowledge, in particular, is not a transcendent mirror of reality. It both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions - in short, in all the building blocks of what we term the social. The same can be said even more forcefully of technology. (Jasanoff, 2004, p. 3)*

The concept of co-production is emphasising specifically the role of knowledge that is necessary for and in need of social structures. Knowledge is in a dialectic relation with social practices, which are producing knowledge, but are also based on knowledge. In the given definition, knowledge is also understood much broader than just scientific knowledge. In the framework of co-production knowledge is conceptualised as the result of “processes of sense-making through which human beings come to grips with worlds in which science and technology have become permanent fixtures” (Jasanoff, 2004, p. 38).

This perspective is rooted in a Weberian approach, where social action is the centre of our inquiry (Weber, 2008). Social action thereby is distinguished from other forms of action in two ways. First, it must be social, i.e. it must be related to another actor within society. While Weber himself might not have had this in mind, in a more recent theoretical approach this can also include non-humans (Latour, 2005). Second, Weber distinguishes action from behaviour. A social action is connected with a certain meaning and is done consciously. As a result of this definition, the meaning we give actions, situations and actors become important. The idiom of co-production is as an approach deeply rooted in the interpretative paradigm within the social sciences, which is “emphasizing dimensions of meaning, discourse and textuality” (Jasanoff, 2004, p. 4).

Scientific knowledge is emphasised in the framework of co-production, as science and technology are becoming important and defining aspects of modern societies (Jasanoff, 2004). As such, techno-scientific knowledge holds an immense power and importance and influences social structures and practices. At the same time, the produced knowledge and technology is an expression of the ways we choose to live in this world (Jasanoff, 2004). In this perspective, social norms, ideas and mechanics embedded in science and technology are becoming relevant aspects of investigation.

Jasanoff (2004) identifies four distinct lines of inquiry into the entanglement of techno-science and society. First, the framework of co-production asks the question how a techno-scientific framing

emerges and stabilises. It further asks how new phenomena are identified and how they are given meaning. A certain idea of a city must first emerge, before it can be taken up by a broader public. Consequently, the smart city must become known within a certain community that attributes meaning to it. This line of inquiry also poses the question how a concept or framing of the smart city is differentiated from others, like the resilient or the sustainable city. A second direction of research is more concerned with controversies around these framings and technologies and how they are resolved. This includes the question, how certain framings become dominant. The third line of research Jasanoff names, focuses on practices and questions how techno-scientific objects and achievements, e.g. scientific facts, are able to transcend boundaries and leave the context of their creation. The last tradition, which Jasanoff (2004) connects to the term of co-production, examines the cultural practices of techno-sciences in relation to the contexts in which they operate.

As showed above this idiom of co-production also takes up questions of action and interaction, exploring cultural specific practices and looking at controversies and how they are resolved. There is no predefined supremacy of nature and society or science and society. In this sense, the idiom of co-production is a symmetrical approach, as it looks at cognitive commitments but also integrates material arrangements as important part of the social. In the framework of co-production the smart city can therefore be understood as a result of the entanglement of normative ideas and the knowledge produced in and about the city. The processes of forming the smart city are informed by practices actively shaping these connections. Material arrangements are holding scripts that are shaping, yet not determining, these practices (Akrich, 1992). They are part of these practices and must therefore be understood in relation to the material design of *the city*. As Jasanoff notes, social structure

*[...] is surely implicated in the stability and instability of social arrangements, but just as important are the belief systems out of which those materialities emerge and which give them value and meaning. (Jasanoff, 2015, p. 22)*

The design of these infrastructures is important and the networked structure of the city is directly connected to that design. Planning processes are anticipating these *use cases* – they are in a way practices of a second order. Therefore, these anticipating practices guided by socio-technical imaginaries and expectations are important to understand the co-evolvement of the smart city and the smart citizen. However, as Jasanoff (2004) states in the last quote, belief systems are at the bottom of the socio-material arrangements. Human actors and societal prevalent values, norms and imaginaries are in the focus of the program of co-production. The theoretical frame of co-production is more interested in "human beings and their institutions as knowing agents" (Jasanoff, 2004, p. 38). Therefore the concept of co-production is not just interested in the practices of the social system, but



also wants focus on normative assumptions and value systems guiding these practices, and how these are becoming prevalent. Knowledge here is understood as the meaning we assign to technologies and situations.

Translating these assumptions about the entanglement of knowledge and infrastructure results in the observation that the make-up of the city is not only guided by the material infrastructures. Ideas and collectively held – i.e. the social prevalent – knowledge about the individual's social context are as important as the material arrangements and the actually happening social practices, including human and non-human actors alike. In order to create the smart city, smart citizens that are moving in the smart urban environment like a “fish in water” (Bourdieu & Wacquant, 1992, p. 127) are needed.

In the perspective of co-production, urban planning in the smart city can therefore be seen as a way to represent the world. Urban development strategies and smart city initiatives are not neutral knowledge about the urban system, but represent the city as the planners want it to be. Just as Barcelona's extension plans had to be negotiated between various social groups with diverging normative ideas of social order (Aibar & Bijker, 1997) the smart city is the result of local negotiation processes. Development strategies therefore have a similar role as maps – they create a certain perspective (Söderström, 1996) on the city and act as blueprints for the materialisation of the smart urban environment. The smart city strategy represents a form of knowledge that also constitutes how we choose to live in the city. Yet, the existence of the world produced in this way is only granted, if the social group shares the inscribed ideas of urban life. The city needs a shared knowledge to create a common socio-technical world. This kind of guiding knowledge is present in the concept of socio-technical imaginaries.

## 3.2 SOCIO-TECHNICAL IMAGINARIES

The concept of socio-technical imaginaries was first used and introduced by Jasanoff and Kim (2009), comparing policies on nuclear power in the US and South Korea. In their paper, the authors define socio-technical imaginaries as

*‘collectively imagined forms of social life and social order reflected in the design and fulfilment of nation-specific scientific and/or technological projects.’ Imaginaries, in this sense, at once describe attainable futures and prescribe futures that states believe ought to be attained. (Jasanoff & Kim, 2009, p. 120)*

The concept of socio-technical imaginaries is based on earlier publications on imaginaries and their role in society – not at last on the work of Anderson (2006) and Taylor (2004). In the social sciences the concept of imaginaries is used to describe a wide variety of different phenomena, including

cognitive schemes or shared fantasies (Strauss, 2006). The definition of Jasanoff and Kim (2009) is based on imaginaries as shared cognitive schemas or collectively shared ideas of social order. Consequently, imaginaries are a collective achievement. In order to become an imaginary, these ideas and visions of social order and social life must be shared by a group of people and effectively change interactions within the social fabric without being questioned: "Imagination has become a collective, social fact" (Appadurai, 1996, p. 5). Imaginaries are shared within a collective and therefore can be understood as the basis for collective action. From a common vision, a group is "capable of moving from shared imagination to collective action" (Appadurai, 1996, p. 7 f.). This collective action is orchestrated by

*the ways people imagine their social existence, how they fit together with others, how things go on between them and their fellows, the expectations that are normally met, and the deeper notions and images that underlie these expectations. (Taylor, 2004, p. 23)*

An imaginary is responsible for creating a common understanding how social actions are fitting together and what kind of (re-)actions in social situations are expected. In this, the notion of imaginaries tries to describe one's everyday perception and intersubjective meaning-making processes within the social contexts we are part of. The social fabric, the network of interactions is made up and directed by these expectations. Social imaginaries are describing the atomic level of social order and how an individual in the collective should act. As such, the imaginary is social knowledge, which guides our practices.

In his work, Taylor (2004) distinguishes two dimensions of imaginaries, the factual and the normative. The factual dimension describes the way how the world actually is, i.e. the expectations that are normally met. This creates the daily life as we know it in a certain social context. Therefore imaginaries are factual, as they can actually be experienced in the situation. Yet, the idea of how interactions are normally played out or the idea of a normal situation always includes a normative momentum. An idea of "how things ought to go" (Taylor, 2004, p. 24) excludes other situations, as it actively constructs normality, or how social life should look like. Imaginaries in this regard are regulating social interactions within the social system. Garfinkel (1984) illustrated in his breaching experiments, what happens, if these everyday expectations of social interactions are not met. By radically breaking out of the situation, involved people were puzzled and offended and often tried to restore normality through means of social control.

Jasanoff and Kim's notion of socio-technical imaginaries also rests on the work of Marcus (1995). He was interested in the shared understandings of actors within science and technology and in "the imaginaries of scientists tied more closely to their current positionings, practices, and ambiguous

locations in which the varied kinds of science they do are possible at all” (Marcus, 1995, p. 4). As a result, the imaginaries taken up by Marcus are focused on scientific knowledge production as such and the scientific working place.

By taking up these two different strands, the concept of socio-technical imaginaries brings together the visions and ideas that are produced within the techno-scientific realm with everyday imaginaries present in the overall social system. Socio-technical imaginaries are therefore integrated in the broader framework of co-production, making the interdependencies of these two realms visible. It allows tracing the emergence of imaginaries originated in the scientific and engineering frame and how they are influenced by societal imaginaries, values and belief systems. Yet, the framework of co-production also makes it possible to explore how social order and everyday practices are related and influenced by these socio-technical imaginaries.

According to Jasanoff (2015), socio-technical imaginaries are overcoming limitations of earlier work in STS. First, socio-technical imaginaries are able to shed light on the phenomenon that socio-technical outcomes are contingent within societies. Highlighting the context sensitivity of a technology’s implementation in a general understanding of co-production avoids a social as well as a technological determinism. Second, the concept enables inquiries in temporal dimensions and relations. By constructing desirable futures, the past and the present are always also constructed in contrast to that future. Third, socio-technical imaginaries are also often imaginaries about space and how meanings or relations between spaces are established. The fourth short-coming within earlier STS work is identified in the “relationship between collective formations and individual identity” (Jasanoff, 2015, p. 23).

I take up this dimension in the next chapter with the focus on constructing identities within the city. Tracing the smart citizen through the imaginary of the Smart City Wien depends highly on the construction work of the collective that pushes this idea. Socio-technical imaginaries are providing the tools to take a deeper look at the imaginations of a smart social order. In order to create a shared understanding of how things should be, this also includes how a smart citizen should be. Social order without a common identity is hardly thinkable. The smart city creates the smart citizen not just by shared ideas of a desirable future – it must create the smart citizen as a subject in relation to the smart city. In creating the collective that holds the smart city imaginary, the smart city realises itself. Thus, the smart city imaginary is always an imaginary of the smart citizen (Vanolo, 2014).

### 3.3 THE IMAGINED SUBJECT

Socio-technical imaginaries are held by a collective – they are achievements of social groups. The entity of inquiry of the collective, which is holding and reproducing an imaginary, is not determined. However, in inquiries on collective beliefs and values systems regarding science and technology, the nation state – as powerful and regulating actor – and its policies are often the empirical fields for such studies (e.g., Hecht, 2001). The nation state as entity was also in the focus of Jasanoff's framework of co-production. One major concern of Jasanoff's book is to

*explore how knowledge-making is incorporated into practices of state-making, or of governance more broadly, and, in reverse, how practices of governance influence the making and use of knowledge. States, we may say, are made of knowledge, just as knowledge is constituted by states. (Jasanoff, 2004, p. 3)*

In this section I will explore the arguments brought forward in favour of the nation state and show that this level of abstraction is not necessarily the better choice for thinking about shared imaginaries and how these imaginaries are constructing identities. Indeed, my argument is that the very same processes observable on a nation-state level can be found on every level that is able to institutionalise normative assumptions. Processes of creating and stabilising socio-technical imaginaries can be found on a global scale (climate protection), on an EU level (as the European idea) or in a city – such as the smart city.

The term smart city is a boundary object (Star & Griesemer, 1989) that enables cooperation in and between different levels of organised social life. In the local context of Vienna the term smart city is transformed to a different concept than on the national level. Yet, the concept of a smart city is still available for different social groups and levels of society. A boundary object is stable enough in its meanings that it enables cooperation between different social (and epistemic) groups, yet it is open enough for attaching new meanings that it can be translated into new contexts. As such a boundary object enables groups and actors with different perspectives to work together, although the exact definition is different in each context. Each of these contexts is creating a slightly different smart city and a different identity of the smart citizen – creating not just connections for cooperation but also demarcation lines to guard the own understanding of the smart city. The boundary object is also a form of boundary drawing by guarding the local translation from global influences (Gieryn, 1999). Consequently, the idea of the smart city exists in various contexts and social groups, and not just on the nation state level.

Yet, what makes the state such a prominent field for empirical research regarding regulatory issues and shared knowledge, norms and belief systems? Anderson (2006) argues in his book that shared

imaginaries constitute national identities. He starts with the observation that most persons in a state are part of the national community, even though they hardly ever meet, interact or even know each other. The idea of the nation state therefore is not based on face-to-face contact but on the shared idea of this very collective, which exists in the mind of each member of this community. The nation state is the result of shared practices of imaginations. While Anderson (2006) concedes, that every large collective is based on shared imaginaries, the special quality of the nation state is the institutionalized distribution of these imaginaries through print media. Through these channels the symbols and ideas of the nation are becoming prevalent in the nation's population. The nation state is reproducing itself through public performances. As Jasanoff puts it:

*The instrumentalities, or technologies, that figure most prominently for him are those that have the power to discipline people's imaginations by making them receptive to shared conceptions of nationalism. (Jasanoff, 2004, p. 26)*

For Anderson (2006), these instruments are the mass media – here especially the print media – the educational system and administrative regulations. However, in later editions Anderson admits that in the original version of his book, he underestimated three institutions of power, which are playing an important role, or have played in the colonial history: the map, the museum and the census. Each of these items is able to tell a specific story about the national identity, about the geography, the history or the social structure. With these instruments the state performs the imaginary it needs to survive.

Taking up these instruments, Scott (1998) explores in his book, how the state makes interventions and the state's function possible. In the wake of the modern state, the problem of governing a heterogeneous population became a pressing issue. State functions, such as taxation, military service or the modern welfare state, made it necessary to make the inhabitants of a collective legible. In the context of the state this means making them measureable and therefore tangible for a central control of the government. However, measurements are always a simplification, as they mirror the interest of the legislator, which depends on the state function that should be supported by the measurement. Additionally, the complexity of social phenomena is hard to grasp with such static categorisations.

In discussing the rise of the modern state in France, Scott (1998) argues that simplifications in perceiving the population depends on a uniform and homogeneous citizenship. In creating standards of measurement also customs, language and viewpoints were unified. As a result, the regime of standards leads to a uniform community of habits. In his book Scott argues that “the abstract grid of equal citizenship would create a new reality: the French citizen” (Scott, 1998, p. 32). Developing the gaze of the modern state, governments and powerful state actors are creating the very ground on which the imaginary can develop and enable themselves to intervene with the structure of the social order. The

imaginary of the collective “guides the simplifications and standardization of human subjects so as to govern them more efficiently” (Jasanoff & Kim, 2009, p. 122).

This governance is necessary to enable the modern welfare state as it enables more aggravating forms of nation states. The state is enabled by these instruments to intervene directly. However, in establishing a collective and binding them together with the imaginary is also a form of exerting power. Imagined categories and identities may be social constructions, yet they have effects in guiding practices and therefore ordering society (Bowker, 2014). Through establishing a form of knowledge they guide our practices. These practices then again reinstate co-produced forms of knowledge, which leads to a creation of the individual. The collective identity and the state interventions are creating the subject, which is needed for the constitutions themselves. Through the process of establishing it, the socio-technical imaginary inevitably constructs and is reproduced by subjects. The co-production of scientific knowledge is creating the population in which a specific imaginary is implanted by means of power. This conception of knowledge, collective identity and social practices resembles well with the general framework of co-production. As Jasanoff states:

*The co-production framework presents more varied and dynamic ways of conceptualizing social structures and categories, stressing the interconnections between the macro and the micro, between emergence and stabilization, and between knowledge and practice. (Jasanoff, 2004, p. 4)*

This connection between knowledge, practice on the micro level and group forming and identities on the macro level are therefore also to be found in the concept of socio-technical imaginaries. As I have discussed in the last section, Taylor’s (2004) definition of imaginaries includes this knowledge of normality. In defining “how things ought to go” (Taylor, 2004, p. 24), a sense of how one should act in a given situation is included. As these imaginaries are collectively shared, they are prevalent and effective in the given community. This knowledge of the self and the group, including the relations to each other, are what socio-technical imaginaries are taking up as the shared understanding of social order (Jasanoff, 2015). A socio-technical imaginary is therefore the function, which actively shapes our daily life, and by this they are part of power regimes that are defining us.

What has been said so far is focused on the state as a central medium of these socio-technical imaginaries and the resulting identities. However, the state is neither the only community that creates a sense of belonging, nor the only entity with institutional power to push certain ideas in a population.

*In fact, all communities larger than primordial villages of face-to-face contact (and perhaps even these) are imagined. Communities are to be distinguished, not by their falsity/genuineness, but by the style in which they are imagined. (Anderson, 2006, p. 6)*

Other communities, such as social movements, are organizing themselves based on (socio-technical) imaginaries to organize their social life. I argue that even the smallest communities need a common ground on acceptable ways to interact with each other. However, the means of social control as well as the reference points to these values are different. In these, the imaginaries and the imagined communities differ. The original definition of socio-technical imaginaries did not take into account this possibility. It was emphasising the role of the state too much, neglecting other levels of community building. Also, in the first definition, institutionalisation processes of a certain vision of an attainable and desirable future were not discussed. Yet, to realize such an imaginary it must become effective within society. In order to become a dominant construction the knowledge transported within the socio-technical imaginary must be established as normalized and normalizing knowledge within society by utilize different strategies, institutions and practices. The socio-technical imaginary must be embedded in a network of power and it must be acceptable and accepted by the members of the collective – it must become prevalent within society to a certain degree.

In a new version of the definition, Jasanoff (2015) consequently points out that these collectives are not necessarily nation states, but can also exist as smaller communities. As a result she gives in the new edited volume on socio-technical imaginaries (Jasanoff & Kim, 2015) a refined definition of socio-technical imaginaries as

*collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of rooms of social life and social order attainable through, and supportive of, advances in science and technology. (Jasanoff, 2015, p. 4)*

Here, the state is no longer necessarily the level where these imaginaries reside. Opening up the definition in this regard allows tracing imaginaries within different communities, such as city administrations. Additionally, the definition accounts for the need to stabilise imaginaries in a community and to build a discursive fixity that we can relate our actions to. In this understanding, socio-technical imaginaries are a meaning giving device within society, creating a common identity (see also Felt, 2015) and a common frame for action, by establishing a specific social order.

They also differ in their means of performing and diffusion a certain imaginary. While the nation state, as Anderson (2006) shows, has various instruments to make an imaginary present in the daily discourse – especially the print media plays an important role here –, other communities might lack these ways of creating discourses and representations of these imaginaries. Yet, discourses are an important way to convey meanings and values, bundled in shared imaginaries.

*Solving problems of order frequently takes the form of producing new languages or modifying old ones so as to find worlds for novel phenomena, give accounts of experiments, persuade sceptical [sic!] audiences, link knowledges to practice or action, provide reassurances to various publics, and so forth. (Jasanoff, 2004, p. 41)*

Especially discourses shaped by official agents are providing an important perspective and a way to make the normative dimension of the smart city discourse tangible. The discourse around the smart city is also actively producing the smart citizen needed by the presented future of the socio-technical imaginary. In publicly discussing acceptable and not acceptable behaviour within the framework of the smart city the official discourse creates a climate “in which subjects perceive themselves and form their identities through processes of government which control, incite or suppress actions” (Vanolo, 2014, p. 885). Consequently, the smart citizen is not disciplined by direct interventions of the social group, the normative character of the imaginary is not enforced through external social control but by subtle instruments of governance, a form of power that Foucault (1991) called governmentality. The concept of governmentality describes thereby the instruments of the state (or any social group) for making the population visible and subject to interventions. Foucault’s (1991) classical examples are demographics and statistics. The population as such is constructed in a specific way, as – in our example – the measurement of a city’s residents is always based on a latent theory and specific interests (see Gitelmann, 2013). Yet, based on this knowledge governmentality strives to establish a common understanding of social life and cultural knowledge and mechanisms to develop and assign identities within the social group. Just as the French citizen, the smart citizen is the result of a regime of standards leading to a uniform community of habits. Every level of social life has instruments of simplifications and standardisation of humans – from stereotypes on the individual level to demographics on the macro level. Being a smart citizen is therefore an outcome of processes of governmentality within an urban community.

A way to construct the subjects and the population imagined for the smart city is participation. Participation in STS has a long tradition (for a general introduction see Sismondo, 2010, pp. 180–188) and was discussed in forms of lay expertise (Wynne, 1992), socially robust and situational knowledge (Nowotny, 2003), practical knowledge (Bijker & Bijsterveld, 2000) and in the relation of democracy and scientific expertise (see Ezrahi, 1990; Sorgner, forthcoming). In the framework of co-production, participation is especially important, as the creation of knowledge and normative claims about social life cannot be separated in this perspective any more. Through integrating different perspectives from various social groups in society, participation consequently becomes an essential element of democracy. Participation and public engagement also became an important element in urban planning over the last years (see Davies, Selin, Gano, & Pereira, 2012; Karvonen & van Heur, 2014; Rydin, 1999).



However, participation never happens without an imaginary of the public or the citizens. Staging participation formats for urban planning is based on an idea of who belongs to this public and what participants should and can do. These ideas are built into “formalized mechanisms of voicing” (Michael & Brown, 2005, p. 51). Such pre-defined formats often include only a fixed list of topics to be discussed (Felt & Fochler, 2010). While this makes the organisation of participation events easier, it also pre-defines relevant issues within urban planning. The public is constructed in relation to these topics. At the same time this makes other potentially relevant matters invisible. Similar to print media that can be used to create a set of common topics or a common knowledge about political and social issues and belongings, participation events can perform the idea of the city. The urban public and its common identity is being staged and performed in such events.

Consequently, mechanisms of voicing can serve to convey a specific imaginary in a specifically defined public, equipping participants with the possibilities to comport the individual with the expectations about the collective. Through public engagement events, the individual participant is becoming a member of a created public (Michael, 2009). The individual is entering the process of participation to become a member of the urban collective, which is holding an imaginary of what it means to be a citizen. The individual learns in these events, what “being a member of the public” (Michael, 2009, p. 620) means. Irwin (2001) speaks in this regard of technologies of communities (p. 15) that create a scientific citizen. The framework in which public engagement is staged is feeding back into the vision the group has of itself (see Michael, 1998). For Irwin (2001, p. 15) important elements in staging participation events are

- the institutional local of the event,
- how information and consultation are balanced,
- the given pre-definition of the agenda
- the degree of activity accorded to the citizens
- and significant underlying social and technical assumptions.

Kurath (forthcoming) showed that this framework can be applied to events in public engagement in planning activities. She compared public engagement activities in Zurich and Vienna and showed the differences in the staging of the cities’ residents. Each of these elements is an important building brick for constructing the citizen and conveying knowledge on local citizenship.

### 3.4 THE SEARCH FOR THE SMART CITIZEN

In my thesis I am not searching only the urban citizen but the imaginary of the smart citizen located in the Smart City Wien and how it is constructed in this initiative. To grasp the normative dimension, the power relations and processes, including the socio-technical imaginary as discourse, must be analysed to understand the emergence of a so-called smart citizen. Urban planning always includes normative ideas of the city's residents (see section 2.2). Therefore exploring the normative assumptions and ideas of urban life within the socio-technical imaginaries of the smart city is important to create the ability to question these ideas on social order.

Installing a certain imaginary in the smart city discourse and in the long run in the infrastructure of the urban environment always creates moments of belonging and not belonging (Castells, 2009; Graham & Marvin, 2001). These belongings, expressed through a shared imaginary of social life, and the resulting practices within the material and infrastructural environment calls for a form of social control. Forming or selecting the smart population means creating meaningful practices, from which the smart city emerges. But how are the practices – these include also legitimate instruments of governance – shaped through the discourse present in the social world? And how are practices made relevant or legitimate and can therefore spread in society? Living, commuting and working in a city always is based on knowledge, which describes a shared understanding of urban life and therefore guides our practices.

These socio-technical imaginaries are of course not uncontested within a society and multiple imaginaries co-exist and are constantly negotiated (Jasanoff & Kim, 2009). Yet, in the diverse smart city initiatives (see chapter Fehler! Verweisquelle konnte nicht gefunden werden.) – how different they might be – powerful actors are fixating and pushing forward their understanding of a smart city. Therefore it is crucial to have a look at official documents and initiatives, as they represent powerful allies in the process of forming the smart city and therefore defining who a smart citizen is and who not. As a result the discursive and legal fixation of the idea of the Smart City Wien creates a classification of what is smart in Vienna and which sites and people belong to that label. The Smart City Wien is a discursive fixation of legitimate practices and technologies – the Smart City Wien creates a “regime of practices” (Clarke, 2005, p. 54).

In the smart city, we find an inscription of imaginaries in more than one sense. First the imaginaries are – literally – inscribed in official documents that impact the shaping of social processes. And second, the imaginaries are getting inscribed in the technologies and infrastructures themselves – also

forming the practices that are connecting the city. Practices are therefore an intermediary – connecting sites and discourses.

In this thesis I focus on the inscription in the documents and what form of practices are anticipated in them to form the smart city. In the research on smart cities so far, there is a gap between the theorists exploring the disciplining power of the smart city *in situ* and researchers exploring the discursive construction of the smart city as a corporate narrative. Hardly any researcher asks how the vision of the smart city is connected with the idea of citizenship or belonging. The smart city constructs smart citizens (Vanolo, 2014), but it does so not only through disciplinary measures. A much stronger idea is the construction of a common vision, distributing a collective idea of the smart city within society.

To be able to explore this idea of the smart city, it is important to take the city administrations vision of the smart city serious. The administration's notion of the smart city is hardly only a copy of a commercial blueprint. Instead these ideas are getting translated into the local context, new ideas on smartness are being attached to the term smart city. In the end, the smart citizen is not a generic concept but is also translated into the local context. Taking the idea of co-production seriously therefore makes it necessary to look into the relation of smart city strategies and the knowledge that is represented in them. Socio-technical imaginaries represent this collective understanding of the smart city and its residents. Urban planning imagines a future of the city and therefore how we could attain these desirable urban futures. An important starting point is in this respect the official discourse about the smart city and how it is conveyed within society. In urban planning and urban development, participation and public engagement events can be seen as an important instrument to perform – and with that distribute – these socio-technical imaginaries. Therefore searching for the smart citizen also means searching for the official socio-technical imaginary of the Smart City Wien and the ways how it is performed.

## 4 SMART CITY WIEN AS A CASE STUDY

In the last chapters I highlighted the theoretical background of my work. The socio-technical imaginary of the Smart City Wien is the vision of the city administration. Therefore it is important to explore the official discourse on the urban development of Vienna and the desirable futures built into this vision. This narrative of a smarter Vienna builds on values and normative ideas, embedded in a network of accepted facts. The discourse is therefore a co-production of accepted urban knowledge and the future, which the city administration anticipates as worth attaining. Yet, this imaginary is only stable because various actors agreed on its importance and significance. As a result the official discourse presented in strategic documents was confronted and contrasted with the perspectives of important actors in the field of the Smart City Wien. Additionally, the stabilisation of a socio-technical imaginary needs instruments to distribute the imaginary and create a feeling of belonging.

In this chapter, the search for the smart citizens becomes empirically framed, discussing which sites I visited and which actors are important to get an understanding of Vienna's smart citizens. To achieve this empirical grounding, I am discussing in this chapter the research questions that guided my work, the empirical field and the methodological lens I used to highlight the envisioned qualities of the smart citizen.

### 4.1 RESEARCH QUESTIONS

As the title of the work indicates, the main motivation of my inquiry into the Smart City Wien is the search for the imagined citizens. This stems from the fact that a lot of literature is discussing the agendas and ideologies embedded into the smart city discourse on a very general level. The discussion is, although interesting and important, blind in two specific aspects.

First, the role of citizens in such a smart vision seems to be understudied. International actors with their vision of an urban society and the corporate perspective on smart urban development are discussed very detailed and convincingly (see Söderström et al., 2014), the role of the individual as part of the imagined collective is however not discussed at all. This is even more interesting since Vanolo (2014) clearly states that a smart city inevitably creates a corresponding smart citizen. Yet, this side of the structure - agency relationship is important to shed light on, as these visions or socio-technical imaginaries of the smart city must persuade a broader audience in order to become prevalent (see chapter 3).

The second shortcoming of the recent discussion on the evolvement of Smart Cities is the lack of studies showing how the idea of the smart city gets translated into local contexts. There is not one singular smart city imaginary, but different co-existing alterations of the originally emerged blue print.

Smart cities depend on their spatial and social context (Pizza, 2015). Resulting from these blind spots in the smart city discourse so far, there is the need to take a deeper look on “how the discursive terrain of a smart city is fashioned in local and regional context” (Kitchin, 2015, p. 4). The main research question of my inquiry into the Smart City Wien is consequently:

*How is a citizen imagined in the socio-technical imaginary of a smart city by Vienna's smart city initiative?*

In order to answer the question of how users are imagined in such a smart environment, we must know the general socio-technical imaginary that is driving the development of smart cities and to what extent the corporate perspective (see Söderström et al., 2014) on smart cities has been adopted. In this case study, a citizen is thought of as a Viennese resident in a smart city model region. In carving out the imagined citizens, the question of who is not imagined in these pictures of a smart city is implicitly posed. Yet, as we have seen in section 3.2, a socio-technical imaginary must be performed in any way to become socially prevalent. In order to become an imaginary as defined by Jasanoff & Kim (2015), they have to be held by a collective. Participation events are important resources to stage and construct the citizens (Irwin, 2001; Kurath, forthcoming). Therefore the discourse and the public performance of the Smart City Wien imaginary was an important empirical field for my work. Consequently, the follow-up research question is as follows:

*How are smart citizens represented in the official discourse of the Smart City Wien, including public available documents and public events?*

Discourses are not just constructing a certain idea of a smart city, but they are also creating a shared identity of a smart citizen. However, this identity is not uncontested and in order to establish it a lot of negotiation is needed between the different actors within the city and beyond the social structures that make up the unit we know as Vienna. Therefore, the original question was more directed on exploring how the socio-technical imaginary was negotiated by different actors and in diverging social worlds. Yet, very soon it became obvious that exploring and analysing the diverse and manifold strategic moves within the city administration and beyond, on the national as well as on EU level, would clearly exceed the scope of a master's thesis, if studied additionally to the ideological and normative assumptions of the imaginary as such. Aside from this more practical reason, the socio-

technical imaginary pushed by the city administration included - sometimes subtle, sometimes very blunt - instruments of governance. While the imaginary is a shared understanding of social order, it also includes ideas on how to control or govern the behaviour and the consciousness of the smart citizens. Therefore I decided to focus on the socio-technical imaginary in the official discourse and how the city administration's vision to establish a common understanding of the Smart City Wien looks like. Therefore the third and last question of my work is:

*What are the ideas of governance inscribed into the socio-technical imaginary of the Smart City Wien, through which the smart citizen should be realized?*

The last two questions are in this regard sub-questions of the first one. In order to understand the smart citizen imagined in the smart city initiative of the city of Vienna, the discourse is the perceivable mirror of these imaginaries. However, the way the discourse is shaped, performed and institutionalised is already part of a wider regime of governance. It frames the smart city in a certain perspective and as such tries to create necessities and normality of smart urban life. The discourse is already a practice. In the same way, the established practices are performing a specific normative idea. Practices are therefore already an integral element of the discourse. Both of them are installing a normative regime of practices and must therefore be understood to make the idea of the smart citizen tangible.

## 4.2 DATA COLLECTION & MATERIAL

In order to gain a deeper understanding of the Smart City Wien initiative and the ideas inscribed in it, different kinds of data sources have been combined. First, I started out with the idea of primarily analysing central documents published by the city of Vienna. During the starting phase of the

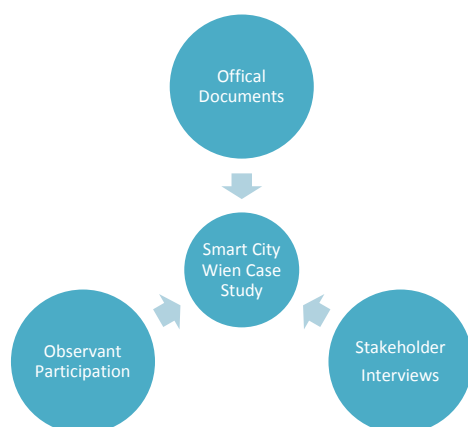


FIGURE 1 DATA COLLECTION

analysis, I created a first understanding of the initiative and the general approach of the Smart City Wien.

In the next phase of the analysis I conducted expert interviews with different stakeholders connected directly to Smart City Wien. In these interviews I asked my interview partners about the implications and implicit assumptions presented in the

documents as well as the special features of a smart city in general and the Smart City Wien in particular.

At the time of the empirical phase of the project the municipality of Vienna staged two participatory events connected to urban development and Vienna's smart city initiative. In the Smart City Wien initiative the idea of participation is presented as a central concept for urban development. It was also mentioned several times during the interviews and therefore became a very important part of the analysis. Consequently, I conducted participant observations during these events to learn more about the role of public engagement events in the construction of the smart city.

The data collection itself was structured in three phases:

- 1) Identifying central official documents
- 2) Interviews
- 3) Observant participation in events hosted by the city of Vienna and newly built city quarters

The combination of these different methods created a pool of data that made it possible to understand and reconstruct the on-going discourse around the Smart City Wien in a multi-perspective way. Discourses are not just a way of how the initiative is presented in documents but also how it is reflected in the practices rooted in these very discourses. A discourse therefore is not just the spoken or written word but is inseparably connected to practices. How exactly these practices are related to the analysed discourse and the emergence of the Smart City Wien will be discussed in a subsequent chapter, highlighting the role of participation in urban development in Vienna.

#### 4.2.1 OFFICIAL DOCUMENTS

In the first phase a document analysis of central official documents of the municipality of Vienna has been conducted. This stage of the analysis aimed at reconstructing the publicly transported imaginary of a smart city and its residents in two official and public available documents. The two documents have been selected because they represent central devices in the construction of the Smart City Wien in several respects. They are defining Vienna's strategy for urban development within the next decades in the Smart City Wien framework strategy and the Urban Development Plan 2025 (STEP 2025).<sup>7</sup> The Smart City framework strategy is important insofar as it acts as a central strategy that frames all the other urban development strategies within the next years and formulates objectives and visions until the year 2050. Therefore, it is phrased rather abstract and the objectives are not very detailed – with a few exceptions – but rather discussed on a general level. It also does not mention a

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<sup>7</sup> STEP is here an acronym for the German translation: STadtEntwicklungsPlan 2025

lot of means of how to achieve the goals formulated in the document explicitly. The idea behind this format is that the other strategies should *dock to* the Smart City Wien framework strategy and formulate the more concrete means and goals. Describing more the general idea of a city – or a smart city in that regard – also the idea of the general citizen is inscribed in this document and therefore available for analysis.

The Smart City Wien framework strategy is interesting also in another way. During the interviews and the events it was repeatedly emphasised that the document is legally binding. The document passed the local council where it was resolved as legally binding for the city of Vienna. With this move it became more than just a strategic document of the municipality but gains more the quality of a law in Vienna. Thus, the character of the document is also an agenda-setting, as it has the power to formulate common goals for the whole city administration, which is otherwise split in several smaller departments with their own perspectives on urban development. As such, it enables cooperation and demarcates the important lines to define the Smart City Wien in difference to other smart city approaches. The strategy document is in this respect a boundary object.

The Urban Development Plan 2025 was often presented as the document that translates the general strategy of the Smart City Wien framework into concrete development moves. The Urban Development Plan 2025 thereby explicitly refers to the Smart City Wien and its goals. It even presents a short definition of the Smart City Wien. Yet, the document itself is just a little less abstract than the Smart City Wien framework strategy. What makes it important for the analysis is the fact that it is very often referred to in the context of the smart city and it too frames the understanding of the Smart City Wien.

These two documents are directly connected to the municipality of the city of Vienna. Therefore – of course – the issue exists that the manifold discourses around the smart city development are not taken into consideration, but that the work at hand focuses on the one discourse by the city administration. As a consequence, the analysis cannot describe how the Smart City Wien emerges out of discourses and practices from a wide variety of actors and how the different constructions relate to each other. However, focusing on these documents also means focusing on the discourse or the perspective of a very powerful actor in the discussion (see Jasanoff, 2004). The practices that let the Smart City Wien emerge are highly influenced by these documents and the related discourse – the magistrate and the political force behind these documents are using these devices to shape the discussion. The exact discursive moves will be discussed in the subsequent chapters. Yet, making these documents a central part of the analysis makes it possible to carve out the perspective of a very important player in



defining the Smart City Wien. In doing so, the official discourse also constructs the imaginary of the smart citizen. Imaginaries of a desirable future of the city of Vienna also create an idea of how “things ought to be” (Taylor, 2004, p. 24) and therefore how one should act as a smart citizen.

#### 4.2.2 INTERVIEWS

In the second phase of the data collection interviews with six stakeholders have been conducted. The sample included stakeholders from the city of Vienna and smart city researchers with direct connections to the Smart City Wien. The interview partners were identified via the analysed documents as well as public appearances in smart city events. In the case of the two smart city researchers I contacted the Austrian Institute of Technology, as they have a research focus on smart city research. The two researchers were engaged with the Smart City Wien initiative and worked in several projects with departments of the municipality of the city of Vienna. The interviews with these researchers opened up a more technological perspective on the development of the Smart City Wien, as the other interview partners focused more on social aspects.

The Smart City Agency Vienna (TINA Vienna, n.d.) is another important stakeholder in the development of the Smart City Wien. The agency is legally located at the *TINA Vienna urban technologies + strategies* company. This company is a 100% subsidiary company of the Wien Holding GmbH, which itself is controlled by the magistrate of the city of Vienna. As a result the TINA Vienna is an economic entity that manages the smart city project of the city of Vienna and is therefore an important player in the making of the Smart City Wien.

A strong emphasis on social innovation was then brought into the picture by my interview partners at the city of Vienna. I interviewed three representatives, starting with Thomas Madreiter. Thomas Madreiter, as the city of Vienna's director of urban planning, surely is one of the most influential players in defining the strategy of the future development of the Smart City Wien. I also interviewed two public servants from Vienna's municipal department for urban development and urban planning.

In my work I am more interested in institutional imaginaries than in personal perspectives. Because of this and in order to circumvent potential problems for my interview partners, the interviews - with one exception<sup>8</sup> - have been anonymised. Gaining field access was relatively unproblematic and all of my interview partners were helpful and interested in my work. As a result of the general interest in social scientific work on the Smart City Wien and to give something back to the field, I plan a

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<sup>8</sup> The position is too exposed for a real anonymisation. Therefore I make the name of the interview partner explicit. This way I do not create an illusion of anonymity.

feedback round for the participants in this study. The exact format of this, e.g. a discussion round or a presentation, will be discussed with the interview partners.

#### 4.2.3 OBSERVANT PARTICIPATION

In Vienna, urban development is closely related to participation and public engagement events (see MA21, n.d.), and consequently also in the development of the Smart City Wien. Participation is a very important building brick in the discursive construction of the Smart City Wien and therefore the smart citizen in Vienna. After I became aware of this fact, I started to wonder how participation events are framed and set up. Therefore, I visited two official participation events in the third phase of data collection. These were connected to urban development in Vienna and the Smart City Wien initiative. Those events were of particular interest because of the specific role of participation in the Smart City Wien initiative. The first one was directly connected to the Smart City Wien, the second was on the topic of participation in urban development.

The first event was the Smart City Wien Forum on the topic of citizen participation<sup>9</sup>. The event was held in an adult education centre<sup>10</sup>. The first half of the event was set up as a sequence of stakeholder talks – most of them working for the magistrate – presenting the participation formats used so far. Only in the afternoon the event split up for two hours into different groups, discussing pre-given questions in relation to the Smart City Wien. I took part in the discussion with the title *“Creating conciseness for a smart behaviour”*, in which also representatives of the city of Vienna were present.

The second event I visited was the *Zukunftskongress: Partizipation\_Direkt\_Demokratisch*<sup>11</sup>. It was, as the name suggests, a congress of different stakeholders discussing the questions of the integration of participation in urban development, the role of participation in urban planning and how participation relates to representative democracy. The whole event was thought as a participation format, as the goal of the congress was to gain knowledge from the community and the citizens to formulate an agenda on urban participation and development for the next years. However, most workshops have been panel discussions with the same stakeholders as in the first event.

These events are valuable resources for the analysis in two dimensions. First, the very setup of these events sheds light to the city administration's implicit understanding of participation. This does not necessarily mean that it reflects the municipality's explicit understanding of the term participation,

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<sup>9</sup> Translation: BürgerInnenpartizipation

<sup>10</sup> In Austria, it is called a “Volkshochschule”, translated word by word as People's Higher School.

<sup>11</sup> Translation: future congress: participation\_direct\_democratic

but the practices of setting up and doing such an event show how participation gets translated into these contexts. Second, during these events a lot more was talked about participation than implementation. Thus, also the explicit understanding of the magistrate what participation is or should be can be learned by visiting these events. This opens up the possibility to compare the two aspects of urban participation in Vienna and to set them in relation to the Smart City Wien strategies.

In addition to participation events I also visited the first materialisations of the Smart City Wien, namely the Seestadt Aspern. The Seestadt Aspern is a newly built city quarter of the city of Vienna and represents an urban laboratory for the Smart City Wien initiative. In this laboratory, new technologies such as smart grid networks, new forms of social life – e.g. sharing initiatives – and novel ways of assembling streets and buildings – e.g. the dense city – are tested. This new city quarter can also be understood as performing the smart city for the rest of Vienna. In installing the imagined technologies and social orders in the new quarter of Vienna, it becomes a show case for further projects. Therefore, I went there one time alone and a second time with a guided tour. During the tour through the Seestadt Aspern, the Smart City Wien was performed even stronger. Of course, the ideas and implementations cannot be translated one-by-one to the rest of the city. However, the Seestadt still is the materialised vision of the Smart City Wien and as such a valuable option to explore the Smart City Wien.

### 4.3 DATA ANALYSIS

The goal of the analysis was not to generate a theory, as e.g. traditional Grounded Theory (Corbin & Strauss, 2014) would suggest, but to integrate and come up with sensitising concepts (Blumer, 1954). The difference is that the emphasis on theorising rather than on theory is more compatible to the idea of situations: An abstract and generalised description of a smart city as a socio-technical configuration was not in the focus of this work, but to understand the situation as the structured and structuring phenomenon that it is. Social interaction and social situations are emergent and fluid. Therefore “it makes no sense to write a grand theory of something that is always changing” (Denzin, 1992, p. 93). Taking that fluidity of social phenomena into account, it becomes clear that absolute and definitive concepts are not able to grasp this change (Blumer, 1986). If we would make these concepts absolute, it would neglect social change and promote a deeply deterministic view of the human nature. Fostering this absolute understanding of the social would render invisible the possibility that it could otherwise be.

In order to make sense of the collected data, I relied heavily on the methodological approach of Situational Analysis (Clarke, 2005). The utilised instruments of this approach and the role of discourses in the analysis will be explored in the following section.

#### 4.3.1 SITUATIONAL ANALYSIS

Clarke (2005) presents the method of Situational Analysis as an attempt to push traditional Grounded Theory in a post-modern direction. As Grounded Theory is deeply rooted in the tradition of pragmatism, it normally deals with social processes as such and understands the surrounding actants and discourses as the context of this process. In a Situational Analysis not a single process is in the centre of attention but the situation as such, where many processes and negotiations of meanings are present. The situation is not just the context of the process but the situation is defined by different processes involving manifold actants. The process and the situation are becoming co-constitutive, where the situation(s) can only be understood by the multiplicity of the processes and actors, whereas the process also gets defined by the situation. Therefore, the aim of this method is not just to look at a social process in the first place, but to identify the actors – human and non-human alike – present in the situation, the discourses and discursive construction as well as symbolic, spatial and temporal elements in the situation and how they relate to each other. Within this assemblage of different actants the social processes at play can be understood in their different appearances.

To make these manifold relations and the emerging situation(s) and processes visible, Clarke (2005) proposes to utilise different forms of maps. Maps are not new per se, as traditional Grounded Theory also works – implicitly – with maps in visualising the different relations of categories and concepts. However, in Situational Analysis, Clarke (2005) presents different forms of maps to show different relations. Situational Maps are the natural starting point in a Situation Analysis. In this stage of the analysis the researcher tries to identify human and non-human actors represented in his/her material. In contrast to Grounded Theory, where one would look for verbs as a description/abstraction (see Charmaz, 2014), the concepts are mostly nouns, as they should represent the found actors. In my project I oriented my analysis on the suggested scheme by Clarke (2005) with pre-defined categories of actors (Clarke, 2005, p. 90).

The actors found in the situation are then sorted in the respective categories to get an overview which actors are defining the situation. This mapping of actors in the field is an important step to identify potential interview partners and to get a first idea of the issues and topics relevant to the smart city discourse. In a next step, the analysis poses the question how these actors are relating to each other, shedding a first light on the possible processes in the situation and how the actors interact in these

processes. These relations are visualised in relational situational maps. Those maps relate the most to Grounded Theory, as the relation between different concepts is questioned. One outcome of such a map is the refined idea which processes and relations can be identified within our material and which one we would like to follow. During the analysis manifold relations will be seen and theorised, but not each one fits the research questions. In addition it prepares the analysis for the next step: identifying different social worlds and arenas in the inquired situation.



FIGURE 2 PREDEFINED CATEGORIES OF ACTORS IN SITUATIONAL ANALYSIS

By analysing social worlds, the focus from analysing the individual in a (social) process shifts to studying interactions. The analysis of social worlds understands the making of meaning as a product of social groups. A social process is always played out in a specific social context that is formed and defined by different groups. Following the premises of Symbolic Interactionism, meaning is always the product of social interactions – therefore studying the actions of an individual would create analytical blind spots. Analysing the presented social worlds is important insofar, as these social worlds are shaped by discourses (Clarke, 2005, p. 46) – which then shape themselves the processes that make up the ontological status of the smart city. In a post-modern understanding, and given the Actor-Network-Theory-based theoretical background of this study, the social group is not just defined by human actors but by all kinds of actants that are defining the situation (Latour, 1993b). Meaning is therefore the result of this complex interplay. Social world maps help to identify the different constructed social worlds and which actor relates to which social world. The main question at this stage is:

*What are the patterns of collective commitment and what are the salient social worlds operating here? (Clarke, 2005, p. 110)*

Concepts to inquire could be shared ideologies, particular sites, shared identities, movements, and so on. At this point it is important to acknowledge that actors can be part of more than one social world. In combination with relational maps the interesting part is how social worlds overlap (if they do) and how the relations look like between actors within a social world, but also between different social worlds (if there are any). In a way you could use the social world map as an overlay for the relational map to visualise these features of the situation.

One problem I encountered in my work is that the analysis of the Smart City Wien initiative only presents the social world of the municipality of the city of Vienna. As a result, this study is not able to show the interplay between the different constructions of the Smart City Wien. However, as discussed before, this social world/discourse is a rather powerful one as it is the social world of the central institution that is responsible for pushing a certain vision of the Smart City Wien. To counteract this one-sidedness, I did not just talk to public servants but also to scientists at the Austrian Institute of Technology to open up at least a second, yet heavily related, perspective/social world in the arena of the Smart City Wien.

#### 4.3.2 DISCOURSE ANALYSIS

Integrating discourse and the construction of reality through discourse into the analysis is an important feature of Situational Analysis, as the relation of the prior identified elements creates certain social worlds, representing a specific perspective of the world.<sup>12</sup> Clarke (2005) emphasises the multiplicity of a situation. Different perspectives, social worlds and arenas interacting with each other are constructing the picture the researcher is finding in his/her inquiry of the situation. These relationships do not just constitute the social world but are also stabilised by the discourses in this very social world.

A discourse can be seen as the production and reproduction of meaning in an interactive process. This resembles the idea of Symbolic Interactionism (Blumer, 1986). With discourses we create the (social) world upon which we will act, but we also assure ourselves that our interpretation of the world is in accordance with our social group. Following Foucault, a discourse also constructs distinctive forms of knowledge that “constitutes sets of practices, distinctive disciplinary formations through which power/knowledge (power as knowledge/knowledge as power) operates” (Clarke, 2005, p. 149).

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<sup>12</sup> Of course, taking the ontological shift serious, we must be aware that these are not just perspectives but created realities. The discourses are shaping the practices that guide the alliance of different actors, creating identities and meanings in the actor-network.

In the analysis at hand a discourse has two important functions. First, the discourse creates identities – not just of human actors but also of the non-human actors. The Smart City Wien as an identity is a result of that very discourse that consequently also produced a shared identity of the smart citizens. The ways in which one can talk about the smart city is defined by these points of reference. Yet, as the relation of different human and non-human actors is also creating the Smart City Wien, the discourse is influencing the possible and not-possible relations of these actors. Which relations are imaginable and which ones are not? This question is even more important as the status of the analysed documents can be compared to a law – at least the Smart City Wien framework strategy is legally binding for the city of Vienna.<sup>13</sup>

This leads us to the second important feature of the discourse: Discourses are not just spoken words. Discourses are also part of discourse practices. This means that a discourse leads to actions and vice versa. Through producing a specific knowledge about the smart city, the subject of the smart citizen is created as well. In focusing on certain features of a smart city, other possible discourses are made invisible. The knowledge about the smart city is also knowledge about the smart citizens. This knowledge then creates identities (see section 3.3) and naturalises a certain understanding of *smart practices*. Talking smart city becomes doing smart city.

In Situational Analysis discursive constructions are seen as actors by itself, relating to other actors and/or constructions. This makes it possible to include these mechanisms of doing the smart city in the analysis and to create an understanding of how the produced knowledge about the smart city influences practices that are then again constructing the ontological status of the smart city. Because of this relation the discourses are important to include in the discussion as they are securing and stabilising a specific vision of the smart city.

## 4.4 SEARCHING THE SMART CITY WIEN IMAGINARY

Doing research is always a messy business and the only thing the reader sees from this process is the polished, reworked and reassembled final product in form of an article or, in this case, a master thesis. However, creating this polished product, finding the results, is an essential part of the research process. Doing research always starts with making a mess. In this particular case the mess started with the search for relevant documents and stakeholders. Exploring the Smart City Wien therefore meant opening the discursive and performed – and performative – black box of this work's research object. In

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<sup>13</sup> This is an important distinction. The document is – of course – not legally binding for the citizens but for the city administration. That will – naturally – influence the practices of this organisation.

the beginning I collected many different articles of and about the Smart City Wien initiative and started to create a first situational map. Eventually, I found the Smart City Wien issue of the *Perspektiven* magazine. This magazine is published by the city of Vienna and can be seen as a channel to transport the city administration's perspectives and visions on different matters. Although I decided after some time to neglect the document as a primary source for analysis it directed me to other important documents and stakeholders. Based on the found articles and the *Perspektiven* issue on the Smart City Wien, I created a situational map, as discussed in section 4.3.1. An early version of this map can be seen in Figure 3.

As already described, this thesis describes the imaginary that can be found in the official strategy document. As a result I focused on the social world of the city administration and the important actors in this arena. *The Smart City Wien framework strategy* therefore soon became the centre of the analysis. Utilising discourse analysis, I carved out the imaginary of the smart citizen and the imagined governance instruments. However, the document is only one actant within the discourse. In order to understand the discourse, the findings and the knowledge I created so far were then discussed with important stakeholders in the social arena of the Smart City Wien initiative. The interviews, anonymised and transcribed, were then analysed to empirically ground my findings within a wider context. The documents as well as the interviews were all analysed with the software Atlas.ti.

Since performing the smart city imaginary is important to stabilise it as a collective idea, I visited several sites where the Smart City Wien was presented and performed (see 4.2.3). During the observation I took field-notes and compared them with my findings so far. In case of the participatory events I was looking into the staging of the format, how interaction and voicing of concerns was orchestrated. Visiting the Seestadt Aspern served a different purpose. Here, the vision of the Smart City Wien can be – partly – experienced. During this trip I took pictures and also created field-notes to capture the material performance of the Smart City Wien.

As I said in the beginning of this section, research always means making a mess. In the process of writing this thesis I switched constantly between analysing my data and writing a chapter. As such this thesis can and should be understood as another black-box, hiding a multitude of different maps, pictures, transcripts, field-notes and memos. In bringing these together I present my interpretation of the Smart City Wien.



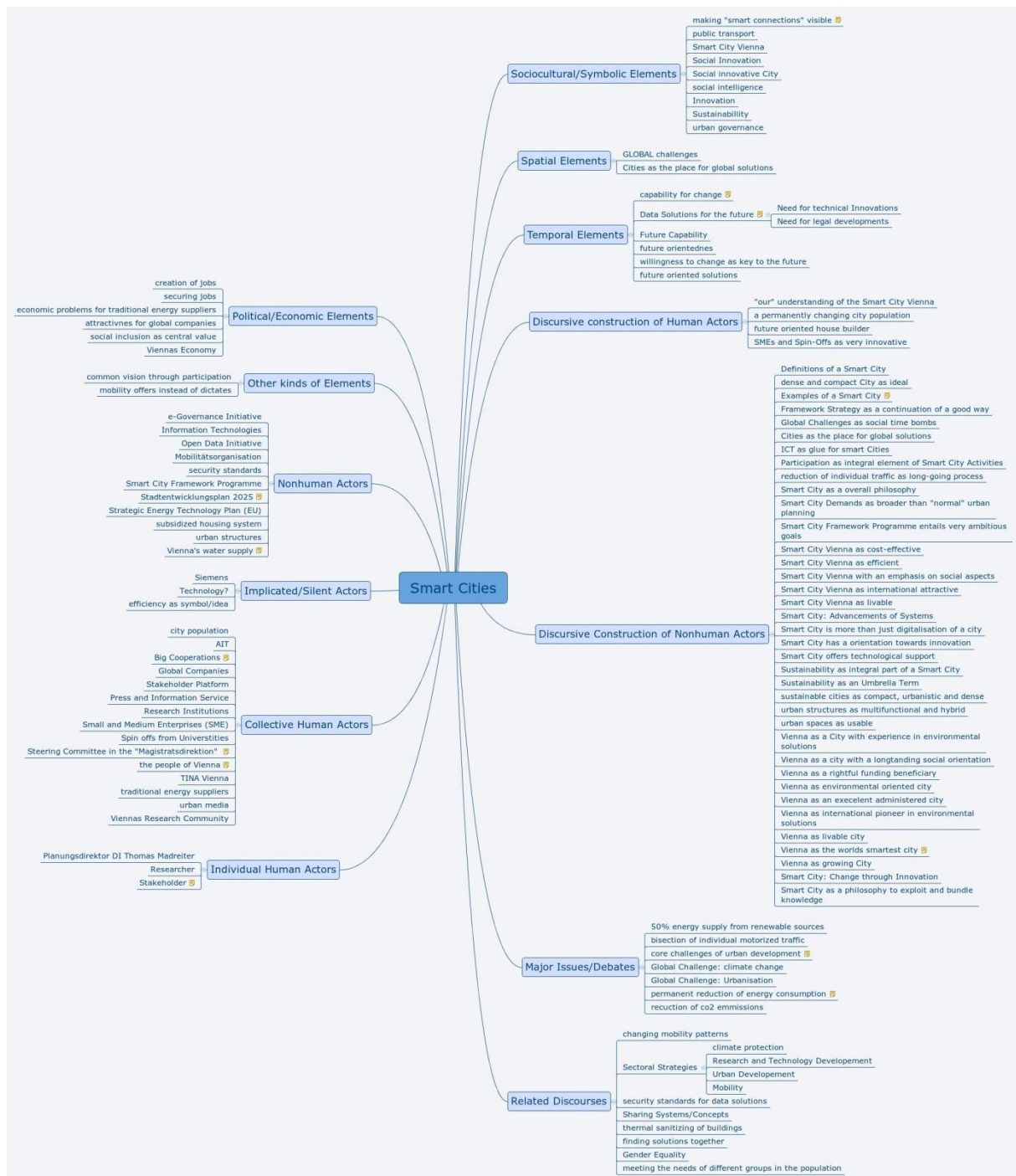


FIGURE 3 EARLY SITUATIONAL MAP

## 5 SMART CITY WIEN AND ITS DIMENSIONS

In this chapter I will discuss the Smart City Wien initiative and its three dimensions as defined in the Smart City Wien framework strategy: resource preservation, quality of living, and innovation. Within the Smart City Wien each of these three dimensions has a specific function and meaning, and each of them adds a certain perspective on the smart citizen. As described in chapter Fehler! Verweisquelle konnte nicht gefunden werden., the Smart City Wien framework strategy is in the centre of my analysis. The discursive constructions found in this document are embedded in a wider stakeholder context. As such, the format of this chapter follows the structure of the Smart City Wien framework, carving out the normative ideas and the imaginaries of a smart citizen from each of these perspectives.

Since there is no clear definition of the smart city as such, every city can and must subsume its own interpretations under this term. In the first section of this chapter, I will thus discuss the general approach to smart urbanism and how it relates to other already well-known concepts like that of the sustainable city. The second section thematises the dimensions of resource preservation and how the Smart City Wien is positioned against the challenges of urbanisation and climate change. Section 5.3 explores what the Smart City Wien constructs as a liveable life and how the level of quality of living in Vienna can be sustained, while facing the before discussed challenges. The dimension of quality of living presents the ideas about a smart citizen very explicitly. The last section explores the role of an innovative citizen and innovation in general within the Smart City Wien.

### 5.1 DEFINING THE SMART CITY WIEN

In order to understand the mechanics and processes of the Smart City and how it constructs the smart citizen, a closer look at the local idea of the Smart City Wien is necessary. While the three main dimensions of the Smart City Wien, resource preservation, innovation, and quality of living, will be explored later in this chapter, the general idea of smart urbanism found in the framework strategy needs to be discussed. In this document, the city of Vienna states:

*Any city that utilises the smart city concept as a metaphor for processes of change defines it in its very own way. While some cities focus above all on the implementation of technological possibilities, others aim mainly at the reduction of emission levels. Conversely, Vienna continues its chosen and successful road by following several objectives concomitantly and favours social inclusion even more than in the past. (Framework Strategy, p. 15)*

In its current form, the Smart City Wien is possible because of the lack of a hard definition of a smart city as such. Consequently, the definition of the initiative in Vienna could differ in central aspects to other ideas of a smart city and still be a smart city in the international discourse. The general smart

city is presented as a metaphor that has to be adapted to the local context and needs. This rhetoric move keeps the smart city very open for own ideas and interpretations. A metaphor is not a definition and, as a result, must be adapted to one's own understanding. Additionally, in the interviews conducted for this thesis, there was a strong boundary drawing between the Smart City Wien and other smart cities, culminating in the declaration of a different smart city theory in Vienna.

*Because, when people tell me that there are so-called smart cities in South Korea or Japan, where the smart thing is the construction of a gated community, quasi a virtual fence, I have to say, this is interesting but has absolutely nothing to do with our smart city theory, yes. (Madreiter, 142-146)*

The quote from Thomas Madreiter, Director of Urban Planning of the city administration in Vienna, shows a clear distinction between other cities' initiatives and the idea of the Smart City Wien. He even proclaims an own smart city theory. In the framework strategy this specific understanding of the smart city, which also includes a subtle form of boundary drawing, is presented. The Smart City Wien is here defined as a "metaphor for processes of change" (Framework Strategy, p. 15). This change is a central element of the understanding and construction of Vienna as a smart city. The only stable idea about the smart city in this perspective is the focus on (socio-technical) change. As a consequence, this change and innovation must be fostered and governed in a specific way, as the following quote from an interview shows:

*And the connotation of the sustainable city is more on: let's see, to keep it as it is, respectively balance it, yes. A smart city in Vienna's understanding has a much stronger dynamic development perspective, yes. [...]. Instead, we try to stimulate real innovations. (Madreiter, 166-177)*

In this quote the smart city is contrasted to the idea of the sustainable city. While the latter is focusing more on stability, the Smart City Wien focuses on development and innovation. Again we see this distinct understanding of the Smart City Wien as different to other urban development ideas – this time the sustainable city. This is also made very clear in the formulation of the smart city in Vienna's understanding. At the same time, innovation is not something that is simply made, but that must be fostered. The Smart City Wien inherently needs innovation, but the city administration seems to have the understanding that it is not them who can innovate alone. Instead, a stimulating environment for innovation is needed. However, in the framework strategy, innovation is a rather open term that subsumes many different ideas on change. What counts as an innovation or what kind of change is realised is open to negotiation. As we will see later, the stimulation of innovations also comes with a selection of innovation, as the general innovative climate is part of a broader governance approach. Process-oriented understanding of a smart city in Vienna differs tremendously from other

perspectives on that matter. This notion of the smart city was emphasised by most interviewed stakeholders.

*What is smart on a smart city? In my opinion a smart city is somehow concerned about sustainable urban development. Even if this guiding principle so to say, was a guiding principle before, a previous guiding principle. I think, from a planner's perspective, the innovation of the smart city approach is probably more on the, how to say, on the process level and is [...] another way of doing things that have been tried so far. (AIT, 126-132)*

This emphasis on the processual level and the idea of constant change describes the tensions and relations between the sustainable and smart city. Smart city means change, not stability. The sustainable city can – in principle – be achieved while the smart city with its focus on constant change and processes is a constant achievement. Therefore it has no end state and is never finished, but presents a very specific way of thinking and living.

A second important element in the local translation of the smart city concept is the active boundary drawing to other, more technology-driven smart city initiatives like Songdo (Gale International, n.d.) or Madar (Masdar, n.d.). While *the others* are presented as focused on one goal, Vienna is pursuing several objectives. Following the argumentation of the framework strategy, the Smart City Wien clearly must be distinguished from other more technocratic or instrumental approaches to urban development. Interestingly, this multi-objective approach is presented as a continuous strategy that has been in place all along. Starting from this observation, innovation is not just located in the goals of the Smart City Wien, but should primarily be seen in the processes to achieve these goals.

*And from the beginning we had a very broad perspective, a very broad approach to the topic smart city. For me for example it was already clear, we want to implement the energy policy and energy goals. Nevertheless, a smart city was never purely focused on energy topics, as this was the case for some cities. This is changing more and more. And I am convinced that these, so we always have been saying, we absolutely want these socio-economic aspects included, the social aspects, environment, quality of life and so on. (MA 18, 121-128)*

Vienna's theory of the smart city is presented with a strong emphasis on social dimensions and social processes that are also mentioned in the framework strategy and in the interviews several times. The social dimensions of the Smart City Wien are presented as a unique selling proposition, including ideas on the environment or quality of living. The importance of these aspects is even that important that the city administration made them one of the defining dimensions of the Smart City Wien. Because of this openness, it is possible to relate pre-existing ideas and approaches on urban development to the Smart City Wien. Successful developments of the past are now brought together under the new paradigm of smart urbanism.

*Vienna enjoys a very good starting point for becoming a smart city. The Austrian capital differs from most other metropolises through its good performance in so many areas: housing, public transport and other infrastructure services (e.g. waste separation, Spring Water Mains), education and universities as well as vast urban green spaces. All this contributes towards high quality of living. (Framework Strategy, p. 25)*

In this quote a new boundary is drawn between Vienna and other smart cities. While before, the general idea of the Smart City Wien was positioned against other initiatives or a rather static idea of the sustainable city, the potential of Vienna to become a smart city is discussed and contrasted to not so well performing cities. Vienna has a good starting point for becoming a smart city, the quote states. But this alone seems to be not enough to establish the Smart City Wien. To the contrary, Vienna is different to other cities in its possibility to become a smart city. Whereas other cities must put a lot of effort to become a smart city, Vienna seems to do quite well in that respect. Performance is here defined mostly by aspects relevant for quality of living, a dimension of the Smart City Wien. The focus on this dimension in order to draw a difference between the other cities and Vienna is important in the general construction of the Smart City Wien, as we will see later.

The boundary drawing of the Smart City Wien to any other smart city is not an end in itself but serves a distinct purpose. Through defining the Smart City Wien as an entity of its own, the authority of interpretation clearly is located within the city administration, protecting the idea of the smart city from outside influences.

*There are national initiatives on smart cities as well. [...] So, smart city is unbelievably sexy and there is actually steaming a lot from the ground, but we are above such things, because we never talk of smart city per se, instead we always talk about Smart City Wien, because we defined it, what it means. Because for us it is a branding. (TINA Vienna, 287-291)*

As a result of this approach the above mentioned necessity to integrate existing efforts in urban planning is made easier. In general, the city of Vienna promotes the notion that Vienna always has been smart. As a result, the Smart City Wien framework strategy is constructed as a continuation of the urban development processes done so far. In addition, the framework strategy integrates the smart but dispersed urban development projects in a common framework. This way the Smart City Wien comes to live by integrating the already existing urban development processes. Deriving from the necessity of finding an own definition, the Smart City Wien framework strategy provides a common understanding of the Smart City Wien. The Smart City Wien differs from that as it integrates other dimensions realising a broader understanding of urban development.

*Smart City Wien combines the three essential and interlinked basic elements of resources (resource preservation), quality of living and innovation. In this way, it builds on typical strengths of Vienna and includes externally imposed binding goals. (Framework Strategy, p. 30)*

In general, the Smart City Wien rests on three thematic pillars visualised as the coloured lines in its logo. A smart city needs to opt for resource preservations (red), ensure quality of living (yellow), and foster innovation in all fields (blue). In each of these pillars specific goals of the Smart City Wien are defined. The three thematic fields are distinct fields of action but they are inherently interlinked at the same time (TINA Vienna, 113-119). This interlink character of the three dimensions is also present in the whole framework strategy, as a)



FIGURE 4 SMART CITY WIEN  
LOGO

each of the dimensions seems to influence the others and b) smart projects should include all different perspectives. Although these three dimensions are heavily interlinked, understanding the specific relation of them is important, as each dimension has its own role in construction the narrative of the Smart City Wien. The importance of the social dimension is shown in the following quote from the interview at TINA Vienna:

*I build a new city quarter with zero emissions and zero energy and so on. Great. But it also must be socially acceptable and participation and social inclusion must be part of it, so that I built something that the people want and accept. (TINA Vienna, 113-123)*

This understanding of smart urban development shows that meeting one goal alone is not enough. In this short paragraph, all three dimensions are – implicitly or explicitly – present. Building a new city quarter including technologies to realise zero emissions is implicitly pointing at (technological) innovation. The resource preservation idea is guiding this innovation as an objective. Yet, social dimensions must be considered as well with social inclusion and participation. Especially social inclusion and participation are seen as important. These two topics are also elements of the quality of living dimension, which has a very specific function in the Smart City Wien.

What is striking in the conception of these three pillars of the Smart City Wien is its resemblance with the three different dimensions of sustainability. Resource preservation would be a smart city translation of ecological sustainability, quality of living could be derived from social sustainability, and the focus on innovation – as stated in the last quote that includes economic elements – is similar to economic sustainability. It seems that the goals of the Smart City Wien are not radical or new, but derived from earlier approaches to urban planning, especially from the notion of the sustainable city (Madreiter, 154-157). The similarity of the two approaches can be explained by the developing

discourse in urban planning. The three pillars of sustainability are translated into an urban innovation paradigm.

While the smart city emphasises different qualities, namely the dynamic and process-oriented approach, it is still a successor of the concept of the sustainable city. This similarity can also be seen from the formulation that these three elements are essential to the smart city. But what follows from that? Only if all three dimensions are realised in the urban environment, it becomes a smart city. This idea has far-reaching consequences for planning routines but also for the idea of citizenship, because a smart citizen must therefore fulfil many demands.

At the same time the ideas of the sustainable city are very important to understand the formation of the Smart City Wien. While the smart city is not explicitly related to sustainable urbanism in the documents, the relation between the two concepts becomes clear in several statements, like one from the Urban Development Plan 2025 where the central objective of urban development in Vienna is described as:

*growth and development dynamics are to lead to a new start that will prove of benefit for the city as a whole. Vienna is to remain a liveable city, where people like to stay, work, study and communicate. The quality that renders Vienna so attractive is to be experienced by all – old and young, long-time residents and newcomers as well as visitors. For the strategic orientation of Vienna, this objective means that the different dimensions of sustainable development are pursued with equal intensity: competitiveness and entrepreneurial spirit as well as affordability, social justice, integration and resource-efficient climate and environmental protection policies. (STEP 2025, p. 20)*

This statement clearly positions quality of living as the main objective for urban development. While the three dimensions of a sustainable city are equally important, they are presented in a general framework of providing the highest quality of living. In the interviews, this dimension was also highly emphasised.

*Safety, this all comes with life quality and this is, in my opinion, the key premise. Look, I don't want the most technological city, I also don't want the city that is powered by 100% from renewable energies as fastest, no, I want the most liveable city, which is socially acceptable. (TINA Vienna, 677-680)*

In this statement, quality of living is also understood as a socially acceptable city. Quality of living is therefore a city without controversies or it resembles a compromise. Both possibilities are interesting as the idea of the Smart City Wien creates shifts within social structure, producing winners and losers. At the same time, change within the city is always a change in power relations. Additionally, growth and development dynamics are seen as a mean to provide the city with the sought after quality of life. In this quote the processual level and socio-technical change are also emphasised. Growth and

development alone are not what the city needs, but the (verbal) focus is on development *dynamics*. Additionally, the idea of this interlinked character is represented in the idea that none of them should be in favour over the others, i.e. all three perspectives should be present in urban planning.

*It is the first big task of the present Smart City framework strategy of the City of Vienna to highlight ways and means in which Vienna can contribute to the attainment of the major European climate and energy objectives (for 2020, 2030 and 2050). [...] However, the responsibility for future generations above all motivates us to continue our pursuit of ambitious goals in the context of the EU energy and climate objectives for the period until 2050. (Framework Strategy, p. 12)*

As we can see from the last quote, not all goals are developed in the context of Vienna. Instead, ideas and objectives from other levels are also integrated into the strategy, especially the climate goals of the European Union. This quote positions the pillar of resource preservation as the first and foremost aim of the smart city strategy. However, it is explicitly linked to the idea of quality of living, as preservation is necessary to keep the high standards for future generations. These two moves construct resource preservation as an inherently Viennese aim, generating legitimisation for these issues.

Each of the three dimensions in the construction of the Smart City Wien has a specific function. Resource preservation outlines the challenges ahead. In order to keep the level of quality of living, these challenges must be solved by innovation, i.e. new ways of living and new technologies. Each of these dimensions demands different qualities from the residents of a smart city. Therefore the following sections discuss the different perspectives on the smart citizen from the specific dimensions.

## 5.2 RESOURCE PRESERVATION

Two of the core challenges Vienna is facing and which the smart city should solve are the phenomena of urbanisation and climate change. The dimension of resource preservation is taking up these issues more than the other two, i.e. quality of living and innovation. Urbanisation and climate change are directly addressed and ways to solve these problems are actively formulated.

*The combustion of fossil fuels in cities and their surroundings causes approx. 70 to 75% of worldwide CO<sub>2</sub> emissions. In developing and emerging countries as well as in highly developed industrial nations, migration towards the cities continues unabated. Cities thus play a key role for the energy turnaround and must undertake intensified efforts to attain ambitious goals. (Framework Strategy, p. 43)*

What we see in this quote is an interesting collective idea of the cities. In this quote, the Smart City Wien or Vienna as such are not mentioned, but cities as generic plural. As a result, the construction of cities as the hotspots of global warming is not directed to Vienna or its residents. The cities as a collective must act and formulate ambitious goals. Through this collective idea, which catches all



urban spaces under one term, allows two things. First, neither the residents nor Vienna as such are responsible for that argued issues. The picture of Vienna as the world's most liveable city is being kept intact, while the narrative of urgency and the need to act is established at the same time.<sup>14</sup> In addition to this collective problematisation, cities are also presented as the solution to these issues, as "it is an advantage of cities that condensed settlement types tend to trigger lower energy requirements for mobility and space heating" (Framework Strategy, p. 43).

In the framework strategy, resource preservation is primarily measured by emitted CO<sub>2</sub>. The overall goal of this dimension is the reduction of CO<sub>2</sub> emissions by 80% until the year 2050. The strategy follows an UN recommendation that was taken up by the European Union (Framework Strategy, p. 43). An intermediary step is the reduction of the CO<sub>2</sub> emissions by 35% until the year 2030 (Framework Strategy, p. 47). This reduction in greenhouse gases should be accomplished by increasing urban density. This idea connects to a theoretical discourse within the urban planning community, where urban density is directly correlated with lower energy consumption per person (Burton, Jenks, & Williams, 2003; Jones & Kammen, 2014). The Smart City Wien discourse constantly refers to the idea of the dense city, which is one of the major topics when it comes to concrete means to achieve an integrated city. As one of my Interviewees told me:

*Because the resource efficient city, and now we can tell each other about smart city and gadgets and technology what we want, is in the end of the day the dense city, so the compact city. (Madreiter, 463-465)*

The density of cities is presented as *the* key feature of cities where energy demand can be reduced and consequently resource preservation can be achieved. The idea of the dense city is inevitably interlinked with a specific idea of mobility in the city, and its general structure and is one of the dominating topics of the dimension of resource preservation. Aside from this latent sub-dimension, the thematic pillar of resource preservation is further divided into four sub-fields, energy efficiency, mobility, buildings, and infrastructure.

### 5.2.1 ENERGY EFFICIENCY AND RENEWABLE ENERGY

Energy efficiency and renewable energy sources are the first of four sub-fields of the thematic pillar on resource preservations. The framework strategy formulates the goal to drop the energy consumption by 40% till 2050 while over 50% of the supplied energy should originate from renewable energies (Framework Strategy, p. 47). As means to achieve these goals Vienna's energy system should develop further towards renewable energy sources.

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<sup>14</sup> This is meant analytically. With this I do not want to express that these actions are not necessary.

*The main emphasis regarding the further development of Vienna's energy system is on the intense use of local renewable sources and waste heat for both heat and electricity generation. The tapping and development of renewable energy sources (e.g. deep geothermics) for the district heating system and the considerable potentials of near-surface geothermics (depths of up to 300 metres) and solar energy are of great importance for the attainment of the above targets. (Framework Strategy, p. 47)*

Resource preservation and energy efficiency are one of the main goals of the Smart City Wien. Yet, the emphasis on renewable energies is quite strong, while resource efficiency is discussed in this dimension only briefly. However, since not all energy demand can be met by renewable energies, energy efficiency comes back into the picture in other sections and dimensions of the strategy. Rather a general understanding of possible levers than clear applications is given. The smart city is defined as a set of goals again, whereas the actual means to achieve them are not (fully) developed:

*By the same token, even stricter energy-saving measures are assumed for the period from 2030 to 2050. These should be supported – possibly in the wake of price hikes for fossil energy sources – both by intensified market penetration of energy-efficient technologies and more energy-conscious behaviour on the part of consumers. (Framework Strategy, p. 46)*

Renewable energy production is presented by providing examples of possible technologies, while energy efficiency is discussed on a very general level. Essential to energy efficiency is what the discourse around the Smart City Wien defines as social innovation. In this short passage above, the central idea of the Smart City Wien is articulated. Social innovation and technological innovation together are necessary to achieve the goals of the smart city. On one hand the technologies within the city must have a higher degree of energy efficiency, on the other hand energy-conscious behaviour is needed to realise the smart city. This implies that the behaviour of Vienna's citizens so far was not energy-conscious enough and that a change in behaviour is necessary. In the given formulation, the reference to the market is interesting: It does not just need energy efficient technologies, but the consumers must embrace these technologies by themselves. As a result, the technological innovation also refers to social innovation. These two demands voiced in this sub-dimension are qualities of the smart citizen that need to be discussed.

## 5.2.2 MOBILITY

The second sub-field of resource preservation is resource-conserving mobility. This includes the reduction of mobility demands, especially the motorised individual traffic (MIT), i.e. cars, and a shift from fossil fuelled vehicles to e-mobility. The set goal is to reduce the motorised individual traffic to 20% by 2025, 15% by 2030, and considerably less than 15% by 2050 (Framework Strategy, p. 49). The share of e-mobility in the discussed time frames is not quantified.

*If the mode share of motorised individual traffic remained unaltered, the population growth would also lead to a rising number of car trips by 2025, resulting in its turn in increasing energy demand and pollutant emissions due to traffic as well as in the intensified use of already scarce urban space. This does not tally with the objective of high quality of living for all urban dwellers. Short distances can be easily covered by bike or on foot. (Framework Strategy, p. 48)*

In this quote, the idea of the urban mobility system is linked to two concepts. First, the mobility system is directly connected with the challenge of urbanisation. The growing city is inevitably leading to an increased energy demand, more pollution, and an over-usage of urban space. This is the threatening picture that is drawn in the framework strategy. As a result of this challenge, the decrease of motorised individual traffic and a shift in mobility behaviour towards biking and walking is necessary. This refers to the idea of the dense city again. To make this shift in mobility possible, the city needs a change in the overall urban structure, which must be decentralised or polycentric to meet the requirement of short distances. In this logic, urbanisation primarily needs a change in behaviour and the built structure of the city.

Consequently, this sub-dimension presents an inherent idea of change in social behaviour that is far more important than the technological component. Switching to walking, cycling, and public transportation is far more emphasised than e-mobility, which is mentioned only briefly (Framework Strategy, p. 49). As a consequence, e-mobility is a supplement to the overall social innovation approach.

### 5.2.3 BUILT ENVIRONMENT

The third sub-field discusses the built environment and primarily tackles the energy efficiency of buildings within the city. Interestingly, the built environment dimension is not related to a dense city structure, but refers to the individual building and the ways to make it more energy efficient. The main objective of this sub-dimension is the reduction of energy usage in buildings for heating, cooling, and providing warm water by 1% per person and year (Framework Strategy, p. 53). Differently to the other formulated goals this one is not formulated in relation to the deadlines of 2020, 2030 and 2050, but describes a continuous reduction. Although passive housing and low energy housing is a complex assemblage of technologies, the document only talks about standards.

*For this reason, energy standards, above all with a view to neighbourhoods and urban quarters in combination with new energy supply systems, must be redefined; likewise, the thematic complex covering buildings, energy and energy systems must be jointly discussed. (Framework Strategy, p. 52)*

In this context, energy standards aim at the energy efficiency of buildings. While the general reduction of energy usage is described in general, the specific standards described in the framework strategy

limit the allowed amount of energy heat or cool a building<sup>15</sup> and the hot water preparation. Which technologies are necessary to meet the formulated goals and standards as such is left open. Yet, the house owners are seen as important factors in the process of energy reduction – as obstacles to the process of sanitising.

*This requires frame conditions that go beyond mere subsidisation, as the experience of recent years has shown that the latter tool does not generate a leverage effect strong enough to permit the attainment of ambitious rehabilitation goals. In the future, rehabilitation rates and qualities will have to be additionally boosted by means of other instruments, e.g. of a regulatory or fiscal policy type. (Framework Strategy, p. 53)*

The frame conditions, e.g. funding for sanitising buildings, could not generate enough leverage – or at least for the ambitious goals of the smart city. Of course, the old structure of the city needs a change in order to fit the new ideas of the smart city and to be able to meet the goals formulated within the framework strategy. However, changing the structure is not just a change in the built environment – even if we are discussing this specific point here right now – but also needs corresponding changes in the social system. In the above quote, the social conditions of the current city are described as an issue or an obstacle for this transformation process. Obviously, not enough people adopted the idea of sanitising their buildings as a necessity. Again, the issue is discussed here relates to the diffusion of technology and the adoption of ideas within the collective.

Change in a social system – and this includes the integration of technologies, innovations, and artefacts – must overcome a certain inertia of its actors and structure. The presented narrative of the smart and bright future is obviously not enough to motivate certain population groups. As a result, regulatory mechanisms and new incentive structures must be introduced to activate the needed change. Again, the technological innovation is deeply related to social innovation within the city.

#### 5.2.4 URBAN INFRASTRUCTURE

The fourth and last dimension of the resource pillar thematises the urban infrastructure and information and communication technologies (ICT). In this context, Vienna is presented as a city with an outstanding infrastructure that needs to be maintained and safeguarded. It is interesting though that the aspect of infrastructure is placed in the resource preservation dimension for two reasons. First, all goals but one are directed at the ICT part of the smart city infrastructure. Second, the ICT aspects are directed more towards innovation and economy than at the preservation of resources.

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<sup>15</sup> To make the results comparable the needed energy to raise the temperature within the building to a fixed value is measured.

*Vienna is a city that functions excellently with regard to basic infrastructure facilities such as water supply, wastewater disposal, i.e. sewerage and rainwater management, as well as waste recycling and management. (Framework Strategy, p. 53)*

The framework strategy introduces a subtle classification of basic infrastructure, such as water supply and waste management, and ICT as the new infrastructure of the smart city. At this point the central position of IT applications and digital infrastructures in the smart city becomes more obvious. Information and communication technologies have a specific function within the Smart City Wien.

*Information and communication technology is a central driver of innovation and a special asset of Vienna. The city assigns high priority to this sector – from science to business and public services – under the Smart City Wien framework strategy. This pertains to both the generic and infrastructure character of ICT and the role of ICT in shaping many services in an innovative fashion. Here, the most important task lies in the fact that the city views itself as an advanced client, provider and enabler of digital services. (Framework Strategy, p. 54)*

As presented above, ICT is a central element in enabling innovation. It is important to note that ICT is granted a generic character. That means it is seen as a tool that can be adapted to most situations and create a suitable solution. In describing something as a general tool, it is made the Swiss army knife of innovation. This classification as central driver of innovation is especially important in the context of the smart city, where innovation is the main defining element. Although the Smart City Wien is explicitly *not* a technocratic endeavour in its conception and communication, ICT becomes a major element of urban development – not as a direct mapping, where ICT automatically is identified as smart, but through a more subtle process. If ICT is the main driver of innovation – social as technological alike – then ICT becomes the main driver of the smart city.

The city, here in the meaning of the different enterprises and departments of the city administration, has the role of a provider and enabler of digital services, i.e. providing the infrastructure for digital services and their realisation. At the same time the city administration sees itself in the role of utilising this infrastructure, as it will develop own applications and use the digital ecosystem of the smart city to profit from the smart city infrastructure. The notion of an advanced client is interesting here, as the city administration sees itself as a knowledgeable player and user in the field of digital services. However, since ICT is discussed in the infrastructure section, the emphasis is clearly on the enabling characteristic of the so-called generic characteristic of ICT. This centrality of information technology in the Smart City Wien can be seen in the formulations for ICT as generic infrastructure, and how it is imagined to work in the Smart City Wien:

*Communication infrastructure facilities should be viewed as the “neural pathways” of Vienna as a smart city. The new challenges such as big data initiatives – as well as users – need strong on-site infrastructure. Investments in latest-generation glass fibre and radio networks support the economy, users and the public sector. (Framework Strategy, p. 55)*

The communication structure of the Smart City Wien is important to make many innovations possible. The role of ICT as enabler of innovation in the economy and the public sector is reinforced in this quote. The formulation of communication infrastructures as neural pathways reflects the importance of the technological side in the smart city. A similar formulation was used by one of my interview partners:

*ICT is for us the city's nervous city. Increasing efficiency is partly only possible with ICT. Because electrical systems, or infrastructural, there have to be sensors of some sort or a computer and operate it, because the human does not have the reaction. This means increasing efficiency is only possible with ICT, so, but it is not central. ICT where it really makes sense. (TINA Vienna, 163-167)*

In the above quote there seems to be a contradiction. ICT is not a central element of the Smart City Wien and only applied in specific situations. Yet, an increase in efficiency is only possible through the usage of ICT. Yet, if we take the analogy of the neural pathways or the nervous system seriously, ICT represents the central organ of the smart city. The data processing network connects different parts of the urban environment with each other and creates the city as such. Yet, the technological side adds something that cannot be achieved by social innovation alone. With the introduction of ICT, the efficiency of the smart city can be improved. Out of a sudden, it makes absolute sense why the digital infrastructure – although it is oriented towards innovation – is placed in the resource preservation dimension. The main resource in the smart city is data that must be utilised to improve the other sectors. At the same time technology is placed as a central element, while not falling for technological determinism.

As a second thematic area, the ICT infrastructure is seen as a mean to establish innovative solutions within the smart city. In this context, ICT is not so much a generic infrastructure but a specific mean to foster innovative solutions in diverse areas. Although the document makes a difference between ICT as an infrastructure, and ICT as enabler of innovative solutions, it could be understood as a service infrastructure, as the innovative solutions should be built upon the digital public services of the city.

*The systematic expansion of digital public services taps economic possibilities. This is true of apps developed by individuals as well as of business opportunities for small and big companies, e.g. in the context of innovative pilot projects and applications. In this, ICT should be understood quite broadly as ranging from communication ventures to applications in areas such as health, energy supply or education. Pilot projects are to change processes in exemplary fashion and at the same time help to access efficiency potentials in combination with staff skills. Concurrently, new services are emerging, as are new forms of presenting the city in texts and visuals. (Framework Strategy, p. 55)*

In the end the vision here is to create a service ecosystem that fosters new applications in the ICT sector. In the first sentence of the above quote, the city administration understands the provision of

public services as this ecosystem, in which innovations and services should emerge. By providing the digital service ecosystem, it can – to a certain extent – influence the developments within this service biotope. Again, this resonates with the idea of the goal-driven approach of the smart city. The goals are fixed, the innovation must be governed.

So, for us technology, ICT is an unbelievable important element. But we know, ICT is something that runs in the background and is a means to an end, but in front must be the higher goal, somehow an improvement of, as already said, resource efficiency, quality of life or social acceptability. (*TINA Vienna, 175-184*)

The emerging services are not self-sufficient but should serve the goals and aims of the smart city. The service infrastructure, e.g. the open data initiative, should therefore be seen as means to predetermining the possible innovations to a certain degree but also foster the development of a huge range of applications. This is reflected in the very specific goal of developing “the next 100 apps in three years” (Framework Strategy, p. 55).

The ICT infrastructure enables innovation, but is also subject of governance. Predetermining the possible innovations also already creates the formulated social acceptability. Forms of social acceptability are anticipated in the formation of the ICT service ecosystem. Additionally, if ICT is the main driver of efficiency, then managing the usage of this infrastructure is highly important within the smart city. The formulation of the pilot projects describes a similar situation. The pilot projects are not just proof-of-concepts, but change processes in an exemplary fashion. These pilot projects function as blue prints for later developments in making clear how and in what way processes should be changed. I do not want to suggest a completely deterministic function of these here, but I think it can be assumed that a certain direction will be suggested by these pilot projects. As such, the name pilot project is really apt, as a pilot controls the airplane mostly during the start and the landing – and in cases of emergency.

Last but not least, the IT infrastructure acts as interface between city administration and the citizens. Open government and e-participation are two main areas in this sub-dimension. In the context of e-participation, the example of the digital agenda of Vienna and the participatory approach the city of Vienna took – to integrate citizens’ ideas and opinions on this – is repeatedly brought forward.

*Vienna is committed to the open government principle and the related concepts of participation and transparency, but also to data security. The further development of high-quality e-government services of the City of Vienna is on the way. This concerns important issues such as the Virtual Office or the open government data catalogue, which is currently meeting with great interest on an international scale as well. In this way, innovative applications can be created for the benefit of citizens in such areas as energy, health, culture, environment, transport or housing, thus enhancing the intensity of use by both inhabitants and business. (Framework Strategy, p. 54)*

The document does not clarify what the open government principle entails. However, the goal is to become the most advanced European city regarding open government. Based on the digital infrastructure, communication with the city administration will be possible to a larger extent than it is now. Providing open data about the city is an important element within the open government initiative that is already on its way.<sup>16</sup> Yet, the formulation again shows the idea of the innovation biotope, where the provision of these data sets leads to the creation of many new applications.

Although participation is mentioned in this quote, it is not really discussed in the resource preservation dimension. This particular element of the smart city is described in the subsequent sections, where I will discuss how the idea of the smart city is made robust and how the governance of innovation is understood – both topics are related to the idea of participation in the smart city.

### 5.2.5 SUMMARY

The dimension of resource preservation presents two distinct challenges that lie ahead for the Smart City Wien. First, the smart city needs to be able to manage the growth of Vienna. Urbanisation and the management of migration to the city have the potential to create or intensify tensions within the city and create stress for the mobility system. Second, climate change and the need to reduce greenhouse gas emissions is a further big issue that must be tackled by the smart city. Reducing the environmental impact of Vienna is one of the most pressing issues in contemporary urban planning. As we have seen, the smart city idea is strongly connected to the concept of the sustainable city, but takes another approach to tackle issues in sustainability. In this dimension, CO<sub>2</sub> reduction is one of the main goals. Energy efficiency, changes of the mobility system, etc. are only intermediary goals to realise them.

Energy efficient technologies and the shift to renewable energies play an important role in realising the formulated goals of the resource preservation dimension. Sanitising buildings, introducing energy efficient devices or e-mobility are exemplary technologies discussed. However, these technologies are always accompanied by imaginaries of social innovation or changed behaviour.

The imagined needed social change creates a specific imaginary of the smart citizen presented in the context of this dimension. In order to achieve the formulated goals, the residents of the Smart City Wien should change central elements of daily life. First, the smart citizen is very conscious about his/her energy usage. As a result, the individual tries to reduce the personal energy consumption by changing behaviour. Part of this energy-conscious behaviour is the increased usage of energy efficient

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<sup>16</sup> For example, the City of Vienna is providing data on various areas of urban life (Vienna City Administration, n.d.-a).



technologies. What has been formulated as market penetration is – in more sociological terms – the diffusion of innovation within society (Rogers, 2003). This diffusion is not just the result of the better technology, but also an expression of social circumstances and value and belief systems. Fostering the diffusion of innovation – this also includes sanitising old buildings – is therefore directly connected to a changed value system and practices. In a similar but less drastic way the shift towards renewable energy is the expression of a common imaginary. Enabling a shift within the power supply system is necessarily built on the common acceptance of these technologies. A shift toward renewable energy production is not self-evident. The last demand formulated in this dimension is a changed mobility behaviour of the smart citizens. Switching from motorised means of transportation to public transport, biking, or walking is a central demand formulated in the mobility section. Again, realising such a mobility system is not based on technological innovation – neither cycling nor walking are new inventions – but on a change in social practices.

The city administration seems to be well aware that technological change must always be accompanied by social change. As a consequence, the city of Vienna searches for ways to foster the needed change in social practices. In this dimension first ideas of infrastructural means of governance are presented. A re-occurring theme in the interviews and the document is urban density or the dense built environment. As already discussed, this idea connects to a discourse in urban planning. The dense city enables the shift to walking or biking as the distances to central sites needed in daily life are short. At the same time the dense city favours these forms of mobility. The second important emerging theme is ICT as a central driver of innovation in the Smart City Wien. ICT is imagined as an enabler of change and – consequently – distinguished from basic infrastructure. As a result, information and communication technologies are the main element of fostering and governing this change. Social innovation governance is accomplished through the governance of infrastructure.

### 5.3 QUALITY OF LIVING

In this section I will discuss the dimension of quality of living within the framework strategy and how a specific idea of smart social life is constructed. As we have seen in the definition of the Smart City Wien, quality of living is presented as the main objective of the smart city initiative. Yet, quality of living is not only the main goal but also the main legitimisation of the Smart City Wien. As a result the other dimensions and objectives are not an end in themselves but should support the attainment of this social imaginary, or at least not hinder its realisation. Since the idea of liveability is that important, it is necessary to take a closer look at the definition of quality of living in the context of the framework strategy. According to the document, quality of living

*is a multidimensional phenomenon and the sum total of numerous influencing variables. In addition to socioeconomic parameters and material living conditions, further key dimensions serve to define it: thus the individual's life satisfaction interacts with his or her career and educational attainments, with the quality of the environment and nature, with safety and security, with social participation, leisure quality and culture as well as with openness and diversity of gender roles; finally, physical, psychological and social health, too, is important. (Framework Strategy, p. 71)*

Here, the framework strategy gives us a very comprehensive definition of quality of living. While quality of living is linked to three dimensions of health, it also is linked to a very specific mind-set expressed in the topics education and career, environment and nature, as well as diversity of gendered roles. This collection of topics and ideas already pre-assumes a very specific imaginary of the smart citizen as an engaged, culturally and politically interested and tolerant – especially regarding gender roles – individual. Additionally, leisure quality and culture are very subjective matters that integrate diverse ideas and milieu-specific values and norms. As a result of this diversity, these concepts are hard to operationalise or to make them tangible. This also raises the question, who is addressed by this idea of quality of living and in which context did this idea emerge? The city of Vienna strives to

*maintain[...] its quality of living at the current superlative level and continues to focus on social inclusion in its policy design: as a result, Vienna in 2050 is the city with the highest quality of living and life satisfaction in Europe. (Framework Strategy, p. 71)*

In this and the previous quote, quality of living is directly connected with the individual life satisfaction. Consequently, quality of living is conceptualised as a highly subjective matter, as everybody has different expectations of urban life. However, the Smart City Wien defines the fields that have direct influence on this individual life satisfaction in a way as if it were true for every citizen. In this relation, a normative idea of urban life is expressed, which also corresponds with the main premises of the sustainable city.

*Formally, we still live in the world of the Charta of Athens, which means: aerated city and somehow large green areas and free areas and low density, yes, but with that we create something that the people, in truth, do not experience as attractive. Nominal it is pleasant, like the sun is shining through the window the whole day, but actually, why am I in the city per se? Because I want intensity, because I want exchange. If I don't want that I am better off in Litschau, yes. (Madreiter, 446-452)*

Quality of living or individual life satisfaction is not just linked with the thematic areas outlined above, but also with a more general approach to urbanity. The dense city, which is an important approach to the sustainability of the Smart City Wien, is here connected to the individual's life satisfaction and a general quality of living. In this context, density is not just a means to a sustainable city but a general life style. The dense city corresponds with a dense and intensive life within the city. Additionally, the city of Vienna is certainly very proud of its ranking as the most liveable city in the

world (Mercer, 2016). This provides – again – a good starting point of connecting prior efforts to the coming smart city transformation. In the framework strategy, Vienna is not just presented as a liveable city but as a metropolis, which has achieved a *superlative* level of liveability. While this is a good message to start from, it also yields some (logical) consequences. If we live the superlative right now, it can only degrade from there. The basic message is: to keep our current level in the wake of diverse challenges, we must do even better than before – otherwise we will have to adopt lower living standards. The shortly drawn picture of quality of living is described in three distinct sub-dimensions of this pillar of the Smart City Wien: social inclusion, health, and environment.

### 5.3.1 SOCIAL INCLUSION

Social inclusion is the first sub-field of the quality of living dimension. This topic primarily tackles issues regarding migration, affordability of living, and gender equality. Social inclusion in the perspective of the Smart City Wien is defined in the following:

*Social inclusion stands for an open society and solidarity, good neighbourly relations, mutual respect and acceptance. Social pluralism and diversity are viewed as an opportunity. (Framework Strategy, p. 72)*

Again we find a very specific idea of social relations inscribed into the idea of the smart city. A need for plurality or diversity is articulated, yet it is not framed as something the smart city needs, but as a matter of fact. Social plurality and diversity are viewed as an opportunity. In contrast to other aims of the Smart City Wien, there is no projection into the future. However, this idea of a high level of social integration is directly linked to the idea of resource preservation.

*Now you can say: how is that related to resource efficiency? Of course it is related with resource efficiency, now I am opening up a meta level, because if life together works, yes. So, if I am not obliged to change my living environment with each change in my social status, yes, if I am not forced to leave my residential environment each weekend, because I feel unease there, of course this is resource efficient, yes. And that is what I mean with the social component, yes. (Madreiter, 433-439)*

While social inclusion and, more generally, quality of living are presented as the main objective of the Smart City Wien, they are also related to the idea of resource preservation. Socially integrated communities are creating less mobility costs and are therefore better for the environment. This again helps to achieve the goals discussed in the resource preservation dimension. As a result, this function of the smart city is also not an end in itself but serves the realisation of the imaginary. Social inclusion is indirectly made a pre-condition for the quality of living in general. By relating social inclusion to resource preservation, this specific political stance towards society reflects the political ideas of

Vienna's current government.<sup>17</sup> This is also reflected in a paragraph directly aiming at migration to Vienna/Austria:

*In this, all residents of the city are united by a common language. Social and political participation of all population groups – in particular of migrants – is promoted, as are learning German and plurilingualism. Recognition and nostrification mechanisms for qualifications obtained abroad by newcomers to Vienna should be optimised. The high level of cultural events and access to these for all citizens constitute another, equally important aspect. Special attention is paid to the potentials of youngsters from families with a migration background. (Framework Strategy, p. 72)*

While barrier-free design is mentioned in a footnote, this paragraph clearly aims at the integration of migrants. Social inclusion is directly connected to language and education. Again, the formulation describes the actual state rather than a goal in the future. Vienna's population has a common language – that is German – and already pays attention to the education of migrants. The nostrification procedures should also be optimised instead of *just* being improved. This can be interpreted as a formulation that safeguards the actual status as already pretty well. It is important to note here that I am not referring to the actual status of Vienna. Instead, the language in this dimension changed to make it seem as if it is already the state of affairs. The objectives or imaginaries of this dimension of the Smart City Wien are not formulated in relation to specific points in time, i.e. 2020, 2030 and 2050, nor do they envision a continuous transformation. Even the formulations that would suggest a projection into the future, e.g. *nostrification should be optimised*, are not formulated within a specific perspective in time. This makes it different from the other dimensions, which are presenting clear goals with particular dates or perspectives in time. Quality of living, as it is already at its superlative level, cannot be achieved at a certain point in time, but must be a constant achievement by safeguarding it.

Economic inclusion is also an important element of the social inclusion sub-dimension. This primarily includes affordable and attractive housing as well as an adequate remuneration. Interesting in this sub-dimension is an idea of attractive housing.

*With regard to affordability, special emphasis is placed on housing and housing costs. Particular attention should be paid above all to persons at risk of poverty or persons unable to pay energy bills due to straitened circumstances. Moreover, the housing environment, e.g. attractive public spaces, shopping and service provision "around the corner", access to cultural and educational facilities and easy accessibility, should be given priority here. (Framework Strategy, p. 72)*

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<sup>17</sup> Currently, a coalition of the social democrats and the green party is holding the majority and the two parties are forming the city government.

In this paragraph, not just the affordability of housing is discussed, but it is also set in relation to an idea of urban environment. The flat alone is not sufficient, but is seen in its context of the surrounding. Interestingly, the idea of the polycentric and dense city comes back into the picture, as the surrounding of the flat should integrate diverse opportunities *around the corner*. There is also a certain tension between the idea of an attractive living environment and affordable housing.

*I think there are still many challenges, how smart goals, which are accompanied by really high standards [...]. Because subsidised housing has financial limits. And I think this will be a big challenge for Vienna, how these so to say, these standards can be ensured, and at the same subsidised housing is made possible. (MA 18, 761-767)*

While the framework strategy proclaims both goals as important, the city administration is well aware that these two goals are hard to combine. Smart goals in respect of housing are here defined as low energy consumption, as we have seen in the resource preservation dimension, but also include the direct surroundings of the flat or house. While social integration is presented as important for resource preservation, the focus on high-quality living environments could also foster social disintegration processes. In this respect, the city administration is well aware that regulation is necessary.

*Gründerzeit buildings are particularly attractive for private real-estate investments. While this on the one hand engenders positive development dynamics, it may on the other hand – if not duly counteracted – entail massive rent hikes and lead to the crowding-out of lower-income groups, with undesirable consequences for neighbourhood development. Socially acceptable and comprehensive quarter development thus calls for efficient public regulation. (STEP 2025, p. 41)*

In the above quote, the development of the city by parties outside of the city administration is envisioned as positive, the developments are acknowledged as potentially disintegrating. With this awareness, the city administration strives to introduce efficient public regulations. The development in the city, which can lead to potentially higher quality of living and lower degree of social integration, must be directed. The regulation is therefore a guidance of dynamic development processes. The governance of urban change is clearly directed towards the objective of quality of living.

The last topic of the inclusion sub-dimensions is gender equality. “Vienna belongs equally to both women and men” (Framework Strategy, p. 73) is the key message of this goal. The framework strategy states:

*To ensure that all residents of the city will be able to realise their life plans, the equitable participation of women and men in social and political decision-making processes is a declared key goal of the Smart City Wien framework strategy. The know-how and experience of both sexes are needed to safeguard a truly humane city. (Framework Strategy, p. 73)*

As formulated in this passage, gender diversity is needed to achieve a humane city. Social inclusion and equality are instruments to ensure that everybody is “able to realise their life plans” (Framework Strategy, p. 73). As such, gender equality is not a value in itself but has an instrumental character to achieve a higher quality of living. This formulation points at the discussed openness towards gender roles but also at a potential tension or conflict. While the imaginary of the smart citizen might include such openness, this value must be established in the population of Vienna to become a part of the lived smart city. Relating the idea of gender equality to another value can therefore be seen as a strategy to establish it within a shared vision.

### 5.3.2 HEALTH

The second sub-dimension of quality of living is health. Health is seen as one of the most important factors of quality of life, but one that is linked to other goals of the Smart City Wien.

*Health-promoting conditions of life must be further strengthened, e.g. sustainable safeguarding of high-quality natural resources (air, water and soil) or healthy nutrition with high-quality foodstuffs. Preventive measures must be rendered as effective as possible. This calls for the fostering of the health literacy of all population groups to prevent diseases and disorders triggered by health-impairing lifestyles. (Framework Strategy, p. 74)*

This idea of health emphasises the prevention of health issues, splitting it in two further sub-dimensions. First, the environment of a person should foster a healthy life. This includes healthy food, but also fresh air and clean water. As a result, health is linked to environmental issues, which are discussed as a distinct part of quality of living. This environmental dimension then again is directly connected to the idea of resource preservation.

Second, health is based on a certain life style. A healthy lifestyle is the key for preventing diseases and disorders. A way to enable such healthy lifestyles is, according to the framework strategy, the promotion of health literacy, which should prevent health-impairing lifestyles. Through the distribution of knowledge, health-related routines and practise of smart citizens should change – in other words: health is also based on a change in behaviour or social innovation. This behavioural change has – according to that logic – to be promoted. In this formulation we see the idea of personal responsibility again. The city administration is enabling such life choices, but the active part is located in the individual.

*Physical exercise in daily life, e.g. walking or cycling, must be rendered attractive by corresponding design in an everyday context and requires promotion to stimulate interest. (Framework Strategy, p. 74)*

Aside of the active promotion, the environment is not just seen as important because of its inherent health-promoting qualities such as clean water, but should also foster a certain style of behaviour. Rendering physical activity as attractive by *design choices* corresponds with the ideas of a changed mobility system and the dense city. In this, the social innovation of changed practices is closely related to the materiality of the environment (as infrastructure) and a specific mind-set, which is called health literacy in this context. The role of the city administration is partly to promote this mind-set within the city population. This way, the city enables a health-preserving lifestyle for its citizens. The quality of life is the justification for these transformations and the *glue* that holds the smart city together at the same time. Yet, not just health-promoting means are included in the framework strategy, but also care and medical treatment. The overall goals is

*safeguarding of medical care at the highest level due to demand-oriented and efficient supply structures and processes (best point of service) for all citizens as well as reduction and shortening of hospital stays. (Framework Strategy, p. 75)*

Again, we see the idea of keeping the momentary state and protecting it from future challenges. Medical care needs safeguarding instead of development. The way to ensure the actual high level is efficiency, e.g. by shortening hospital stays. This is also expressed in the subsequent paragraph, where we find an idea how to introduce this efficiency:

*Efficiency and strategic focuses in medical care are necessary contributions to enable long-term security of service delivery according to the principles of solidarity. The Vienna 2030 Hospitals Concept pursues the goal of concentrating medical services to improve their quality and ensure optimum use of existing resources in order to prepare Vienna's hospital system for future financial and quality-related challenges. (Framework Strategy, p. 75)*

In contrast to the idea of personal responsibility, the principle of solidarity is introduced. However, solidarity is mentioned only in very specific fields in the framework strategy. Health services as a thematic field is one of them. At the same time it is linked with the idea of efficiency and it is contrasted with emerging challenges, which are threatening these health services. In this very specific topic of the Smart City Wien we find the narrative of the smart city in general again. Preserving the current very good level of services and living quality needs change and a boost in efficiency. The value of solidarity is used as it needs no more justification, i.e. it is a terminal value. Instead, it serves as justification for changes aiming at efficiency. The idea of solidarity is threatened by future developments, therefore efficiency and optimal use of the resources must be introduced. The idea of optimisation of every aspect in the city is also a re-occurring theme that is also introduced into everyday life aspects.

*“Work/life balance” is a concept that assigns greater importance to time and leisure activities when assessing quality of living. As a smart city, Vienna contributes to optimising the everyday life of its residents and fosters innovative solutions to promote flexibility of site and control over time, i.e. quick and efficient processes on the one hand and deceleration on the other hand. (Framework Strategy, p. 75)*

In this idea we find the connection of optimisation and its realisation through innovation again. However, in this case even the private life needs to be optimised, without defining the meaning of optimum. Yet, this is an important aspect of every optimisation function (or heuristic). What is an optimal life? And how can this be *normalised* to align the different ideas of a good life?

In the last quote, this quality of life is connected with flexibility in space and control over time. Optimisation is connected to the idea of saving time – introducing a logic of optimisation into the realm of the private life. The smart city always comes back to the question of efficiency and social innovations to foster productivity. However, the social innovation described in this quote is not directly addressed but constructed more subtly. Whereas work-life balance could also be achieved through standardised working hours, the novelty in this approach is the function of innovation to enable flexibility in space and time. The social innovation creates the responsibility for the individual to take control over the daily routines and practices. Collective working hours or working routines are neglected in favour of an individualised employee.

### 5.3.3 ENVIRONMENTAL CITY

The third and last topic of quality of living discusses Vienna as an environmental city. While the question arises why this is not included in the dimension of resource preservation, the framework strategy states that it “is a key contribution to quality of living and life satisfaction” (p. 76). This follows the overall logic of the framework strategy, where resource preservation is one of the major foundations that quality of life is based on. In the logic of the this dimension this becomes even more true, because

*air pollutant and noise emissions negatively impact human health and quality of living and cause huge economic costs, which must be minimised by forward-thinking planning as well as by early avoidance and protection measures. The City of Vienna realised its responsibility already at an early date and thus has developed comprehensive measures that are reflected in the measured values, which are largely gratifying. (Framework Strategy, p. 77)*

Air and noise pollution are discussed as major issues regarding the environment. These issues are hugely influencing our quality of living in a negative way and must be tackled. This is actually one aspect that can be measured and obviously the city administration does so. Interestingly, though, the framework strategy does not formulate the mandatory ambitious goals that are quantifiable in this respect, but formulates the aim rather vaguely. Additionally, it also does not specify them anywhere



else in the document. Yet, the impression that such a measurement is actively pursued is supported by the reminder that the measured values are largely gratifying and comply with the EU norms (Framework Strategy, p. 77). Again, Vienna is presented as a city that is already doing pretty well. Certainly the city administration tells us what is in the responsibility of the city. In an instant the individual is not responsible for the effective measures. This responsibility is rather important in the construction, as the two described issues are directly linked to a topic also tackled in the resource preservation dimension: traffic.

*Traffic in Vienna is the main causal agent of noise and air pollutants. Smart urban development should create the spatial planning and structural preconditions to motivate the population to switch voluntarily to eco- and climate-friendly mobility types. (Framework Strategy, p. 77)*

In this quote, the responsibility of the city administration is specified. The city is responsible for the provision of structural preconditions to motivate the smart citizens and enable a shift in their behaviour. The responsibility of the city administration is to enable the responsibility of the individual. In this argumentation, traffic is not just the cause of noise and air pollution, but is made an actor in itself that stands against the ideas of smart urban development. Of course, traffic is understood as motorised individual traffic here, where public transport, cycling, and walking are associated with the term mobility and eco- and climate-friendliness – an inherent smart approach.

Switching to public transportation is described as voluntary, which refers to the idea of a smart mindset of the citizens. However, this voluntary switch is fostered and orchestrated by diverse elements of the smart city. The spatial and structural preconditions form external constraints to render these types of mobility more attractive – the urban environment's structure is therefore a mean of governance. As this is a re-occurring theme, it is interesting that these ideas are now explicitly linked to quality of living and social innovation. Again, we see the basic idea or theme of the smart city Wien. Quality of living as described in the framework strategy is the ultimate goal and inherently linked to ideas of eco-friendliness and efficiency. Yet, to keep our high standards, innovation in form of changed behaviour – supported by technology – is a necessity.

Another interesting docking element in the environment sub-dimension is closely connected to Austria's self-understanding: ecological production and consumption of food – especially the avoidance of GMOs.

*A notable part of Vienna's green spaces is used for agriculture: horticulture, viticulture and field crops. This is unique for a metropolis of this size. The municipal administration and the city government have for many years been promoting environmentally friendly, ecologically oriented methods of organic and genetically unmodified production. (Framework Strategy, p. 78)*

In this passage, the city of Vienna actively takes a stand on organic and non-GMO production. This normative stance connects to a more general socio-technical imaginary. The resistance to a certain technology – here genetically modified organisms in agriculture – is able to create a collective identity, a *we-feeling*. The socio-technical imaginary of Austria as a country without genetically modified organisms (GMOs) emerged and stabilised in various practices and institutions (Felt, 2015). While this connects very well with the picture Austrians have of themselves, this quote creates the impression as if this is an achievement of Vienna.

As an exemplary service the framework strategy names the Vienna EcoBusinessPlan, which is a programme to help Viennese enterprises to implement environment-friendly and sustainable measures. The impact of this programme on the environment is presented in analogies, to make the success tangible.

*waste production was curbed by 123,570 tonnes, which equals 1.53 times the capacity of Vienna's Ernst Happel Stadium; moreover, 1.04 TWh of energy was saved, corresponding to the annual consumption of 208,000 Viennese households; the emission of carbon dioxide was curbed by 305,000 tonnes, which can be equated with the volume of 51,300 hot-air balloons; 93.4 million transportation kilometres were likewise rendered unnecessary, corresponding to 2,330 trips around the equator. Furthermore, drinking water consumption was reduced by 2.573,500 cubic metres, equal to the volume of 830 Olympic-sized swimming pools. (Framework Strategy, p. 79)*

In order to make the efficiency of an environment-friendly economy visible, a lot of culturally significant metaphors are utilised. The figures alone are not convincing, but the hot-air balloons, the popular sports stadium, and trips around the equator are tangible. These metaphors connect the effect of environment-conscious behaviour to the resource preservation dimension and reinforce the idea that resource preservation is highly dependent on social practices and values. Resource preservation and quality of living are linked even tighter together. Additionally, this service is an example of governing social and technological innovations through services provided by the city administration. In creating such a service, the city of Vienna was able to introduce certain eco-friendly innovations, social and technological as well, into a wide variety of enterprises within the city borders. Through the service infrastructure, the city is promoting actual ways of enabling the smart city objectives. While this change needs a certain mind-set, it also needs an ecosystem that supports these changes.

#### 5.3.4 SUMMARY

If we are ever to find an imaginary of the smart citizen, quality of living offers an important perspective on the construction of the Smart City Wien's residents. The ideas, values, and norms in regard of what quality of living should mean for the smart citizen are a main element in defining the imagined population of a Smart City Wien. In the overall narrative of this dimension, quality of living is possible at its highest level at the moment. Yet, to safeguard this level of liveability, the smart city needs very specific qualities of its residents, also in relation to social life. The narrative is very similar to the story told in the resource preservation dimension. However, it aims at different areas of daily life and social behaviour – on social inclusion and individual responsibility.

The smart citizen is a very social creature. S/he is engaged, culturally and politically interested, and prefers an intense lifestyle. Daily life is characterised by manifold interactions with the direct social environment. Thereby the smart citizen is open-minded for diverse life-choices. Gender and ethnicity are no important categories to shape social interactions. Of course, these social interactions are possible, as all smart citizens speak German. The dense network of social interactions is a mirror of the high degree of social integration. In a smart city, no one is left alone. This high degree of social integration is accompanied by a high degree of individual responsibility. The smart citizen prefers eco-friendly modes of transportation, like public transport, walking, or cycling. This is a characteristic we already encountered in the resource preservation dimension. It also connects to an individual responsibility for one's health. Smart citizens are health literates, eat healthy and physical exercise is part of their daily life. As a result, their health as well as their leisure time is at an optimal level. This is supported by the general flexibility of smart citizens. Spatial and temporal dimensions of work-life balance are perfectly managed by smart individuals.

In the perspective on smart citizens presented in this dimension of the Smart City Wien, technology is playing a minor role. Instead, the emphasis is on social processes and how these enable the construction vision of the smart city and the life in it. This starts with a very distinct perspective on urban life. Urbanity is intensity and dense structures, social structures as well as the built environment. People come to the city to experience this intense interaction. This idea of urban life is not brought into the picture accidentally, as it directly connects with one of the main idea of smart sustainability. The dense city, already present in the resource preservation dimension, is brought back into the picture. The dense city is not just important to reduce energy consumption and CO<sub>2</sub> emissions, but also mirrors the urban life style in the smart city. At the same time, social inclusion, a dense social network, contributes to the resource objectives, as it reduces the movement within the city and enables a sustainable life style. Here we have a construction that legitimises the dense city

and an integrative social agenda of the city government. However, this question also introduces questions of responsibility and agency. While the old approach of the city of Vienna was a more paternalistic one, the framework strategy aims towards a shift to governance. Changes in the Smart City Wien are not located only in the mayor's house, but are a responsibility of all smart citizens. Values like individuality, flexibility, and personal motivation for behavioural changes are emphasised and promoted. In this regard, the Smart City Wien rests on individual responsibility of each citizen to realise and safeguard the high quality of living Vienna offers at the moment.

The role of the city administration is the provision of a general frame to enable this individual change. While the frame also includes hard regulations, e.g. in the housing market, the promotion of certain life styles and access to education to enable these life styles are also set components in fostering this individual responsibility. On a more material level, the provision of a designed infrastructure is important. The discussed design choices are inherently important to guide the daily practices of the smart citizens and as such they must be in accordance with the promoted life style, especially the shift towards walking and cycling. Another instrument to guide the practices of the smart citizen is the active promotion of knowledge about specific fields, such as health. In pushing a certain form of knowledge, an issue is made important within the general discussion. This is also accompanied by services that do not just distribute knowledge, but also actively support citizens to implement the new knowledge. The last governance instrument can be found in measuring the effects of urban life within the city. Examples for this are the measurement of air pollution or gender inequalities. By measuring, the issue at hand is made tangible and therefore actively constructed as an issue. The structure is made visible in order to problematise it in relation to the imaginary of the smart citizen. The city of Vienna is well aware of this important function of the ecosystem it creates by measurements, material sites, and services.

## 5.4 INNOVATION

Until now we have discussed the rather static parts of the Smart City Wien. Both resource preservation and quality of living present fixed ideas of the life in the smart city and its fundamental foundations. Innovation, the third dimension of the strategy, is the connecting element and in its basic understanding very different to the before mentioned ones.

While the framework strategy lists the dimensions in the order resource preservation, innovation, and quality of living, I changed the sequence of the different dimensions, because innovation, as one of the three main dimensions of the Smart City Wien, differs in important aspects from quality of living and

resource preservation. Whereas the other two dimensions present the general goals or the necessary objectives of the Smart City Wien, the innovation dimension signifies the dynamic conception of the smart city. With this, it actively links together resource preservation and quality of living.

*Smart City Wien means making use of innovations early and in an intelligent fashion, developing competencies and potentials and enabling the city to take a dynamic road into the future. (Framework Strategy, p. 59)*

Innovation is very important to the idea of the smart city, as it guides Vienna into the future. The last quote tells us that this road is dynamic and to arrive in the right future we cannot do nothing or the same, but we must make use of innovations. The image on a dynamic road is very interesting here. This picture emphasises the dynamic approach of the smart city. The road to the future is neither static nor straightforward. Instead, this road confronts the smart city with changes along the way. Again, this is a dynamic approach as these innovations are not just guiding us, but the city must develop competencies and potentials to hit this road to the future. Innovation is positioned as an important element constituting the smart city here.

*Innovation is key for linking resource preservation to high quality of living for all Viennese. [...] However, many of these ambitious goals cannot be attained by simply perpetuating time-tried formulas: new forms of service delivery must be developed for Vienna. (Framework Strategy, p. 59f)*

Innovation draws its legitimisation from the fact that the goals are not reachable by *old* strategies. Additionally, installing a certain idea of quality of living gives the other two dimensions its legitimisation. Without the visions of a good life, both ideas, resource preservation and especially the idea of innovation, would stand by themselves – in need of explaining why we even need them. In linking resource preservation and the ambitious goals of the smart city to the good life, they gain acceptance or become socially grounded. However, since these goals are so ambitious that the current instruments are not sufficient, innovation is the only possibility – it becomes a necessity if we want to live the good life that is imagined in the document. Voilà! Innovation is the main driver of our smart existence. This is stated even more explicitly in the Urban Development Plan 2025:

*In the field of urban development, however, the efforts to undertake in coming years cannot be limited to just maintaining this level of success and these standards. Rather, innovations must be prepared to safeguard high-quality urban growth despite increasingly tight resources. (STEP 2025, p. 18)*

In contrast to the quote from the framework strategy, the Urban Development Plan 2025 adds another threatening dimension to the future perspective. Innovation is not just necessary to maintain our current level of quality of living, but we must do so even in the wake of tight resources. Therefore innovation is not just needed to come up with new ways, but these alternatives must also foster the

efficiency of urban processes. By placing innovation at the centre of the Smart City Wien dimensions, innovation does not only signify a basic element of the smart city, but very consciously also a basic element of the smart citizens.

*The more diverse a city, the higher its potential for dynamic development. These potentials of society must be made use of, and the inclusion of broad strata of the population is a prerequisite of any successful, innovative city. This calls for opportunities for all to develop according to their possibilities as well as for good education and training options or skill building across the entire population. In its turn, this presupposes a major task of the city, i.e. to provide frame conditions, institutions and supporting services from infant pedagogy at the kindergarten to universities and an innovative economy. (Framework Strategy, p. 59)*

The innovative city needs innovative citizens. Here we see the broad idea of innovation, where it is not sufficient to foster the development of a small elite, but to enable every person to come up with innovative ideas and solutions. Being innovative and develop to one's own optimum becomes the imperative of the smart city. Only if every person develops accordingly to his/her possibilities, the goals of the smart city can be realised. The city rests on this broad idea of innovation and strives to utilise it to become smart. As we have seen in the last chapter, this development is based on education. The ideas that have been touched upon only shortly when it comes to quality of living are now directly formulated. In addition, this understanding of a citizen-based innovation is implying a voluntarily shift to new practices and the adoption of new technologies.

Additionally, the quote again shows the idea of frame conditions to foster this idea of (social) innovation. To enable the population to become smart or innovative, the city must intervene and provide certain services. In this general climate of innovation-friendliness the city has to prepare the *1.7 million brains* so it can use them. As the framework strategy states:

*The motto of the Smart City Wien campaign – “Vienna has 1.7 million brains. Let’s use them!” – is nowhere more applicable than here. (Framework Strategy, p. 59)*

This conception of the 1.7 million brains brings two different perspectives together. In the interviews the role of participation as a knowledge pool was emphasised several times. The population is knowledgeable and can therefore contribute to the change processes within the smart city by providing that knowledge to the city administration.

*Because one should not forget, I mean, the participation topic is, I mean, the idea behind it is, that we know, the population has a big potential, that they know a lot. They are quasi experts on, experts regarding their personal living environment. So, there is on one side a lot of knowledge to collect, or ideas. I think this is a major point in the participation sector. (MA 18, 413-418)*

The smart citizens play an active role in shaping the change processes and therefore in shaping the social and technological innovation within the city. This way, the social innovations that are needed to make the smart city happen are directly related to the social worlds of Vienna's citizens. Innovation, however, is not evident in itself. We have seen this before: innovation is the major element in linking the goals of the smart city with a certain idea of life and social order. In achieving the formulated goals innovation is necessary. Yet, if the smart city is innovation-centred it also needs innovating citizens, companies, and research institutions. The innovation is not located in the city administration per se, but is a general approach for all institutions and residents within the Smart City Wien.

Innovation is also not located in one institution, but is distributed in the realms of different actors. On the one hand, Vienna's research institutions and enterprises should develop innovative solutions for the city. This resembles the idea that the city as such is not innovating alone but relies on the possibilities and potentials of the population and the social system of the smart city.

*It is crucial to get away from the traditional thinking that all well-being is dependent on concrete actions of the city. Instead, it is somehow about accomplishing a shift, away from government to governance and opening up spaces of action. Creating opportunities. (Madreiter, 86-90)*

For the city, the governance aspect is much more important in this respect. Developing new technologies or innovations is not as important as the actual selection and influencing of emerging innovations, which are coming from a general climate of innovation. On the other hand, the city of Vienna provides services itself. These services should also be innovative and excellent. As discussed before, the overall service ecosystem is also a way to foster a specific idea of (social) innovation. Being innovative in service provision and in regard of the services available enables the city administration to influence the change processes within the innovative ecosystem of a smart city. Supporting social innovation is even named as a distinct aim of the city administration in the context of this dimension of the smart city. Since change is a central element of the smart city, engaging with and fostering these change systems is a crucial element of smart urban development.

*Conversely, the economy, society and administration must also be ready and able to absorb innovations from all over the world in a timely and intelligent manner. This calls for openness to science, research and innovation at all levels and in a way that is dynamic, reflective and, if possible, participatory. Education, research and, last but not least, a dynamic economy are crucial aspects for the future evolution of Vienna into a truly smart city. (Framework Strategy, p. 60)*

In the quote above these two crucial elements regarding an innovation-led transformation are pointed out. The population – including economy and administration – must be able to integrate new innovations in its systems. To ensure this ability of integrating – or absorbing, as the document states

– innovations into the daily life, certain abilities on the individual and the institutional level are required. The social structure must be prepared to absorb innovations, social and technological ones alike. As a result, the smart citizen needs training to achieve these required abilities.

The second aspect is more aiming at the smart mind-set. Smart citizens must be *ready* to absorb these innovations. This again refers to the idea that the only stable concept in a smart city is the idea of change. In this context, readiness to absorb innovations translates into the willingness to change established routines on a regular basis. The goals of the Smart City Wien are not accomplished by external constraints and innovation is not introduced against the resistance of the population. Innovation is embraced by the smart citizen because the smart citizen realises its necessity (Madreiter, 241-243). These outlined ideas of the smart city's innovation dimension are further developed in the three sub-dimensions of the innovation pillar.

#### 5.4.1 RESEARCH

The first of the three sub-dimensions is concerned with Vienna as a hub for cutting-edge research and the integration of new technologies.

*Research and new technologies generate added value, ensure high-quality workplaces and help to protect quality of living. At the same time, in order to realise its smart city ambitions, Vienna needs both the ability to absorb research findings from all over the world in a productive manner and the capacity to be a high-ranking research and university location in its own right. (Framework Strategy, p. 60)*

Again we find the idea that innovation is necessary for our current quality of living. Innovation is protecting it, emphasising the fact that Vienna already is a liveable place and the future is threatening our way of life. However, to protect our good life, we must integrate already existing technologies and innovations but also develop the ability to innovate ourselves. This is the logical continuation of the before outlined rationale. What this quote adds to the discussion above is the absorption of innovations not just in an intelligent but also productive manner. The productivity of innovation and the capitalisation of research results within the innovation ecosystem are important in relation to the formulated objectives. Innovation is needed to achieve resource preservation and to secure the high living standard in Vienna.

So far the description of innovation in the smart city was very process-oriented. However, the framework strategy tries to make the innovativeness of Vienna measureable. In this regard, it refers to the research output, and the number of researchers and students in Vienna (Framework Strategy, p. 60f). While this objective is not quantified per se, the overall aim is to position Vienna under the five biggest research hubs in Europe (Framework Strategy, p. 60). Innovation and the usage of new



technologies is not limited to the general population or the institutional science system of Vienna, but is also integrated into the city administration plans. Vienna's plan to become an innovation leader also extends to public sectors.

*Vienna systematically pursues the ambition of positioning itself as an innovation leader in public service delivery. The Austrian capital favours living labs in the deployment of innovations so as to further develop and network its public services. The municipal administration and its spinoff enterprises promote technical and social innovations and the use of the latest technologies in their various areas of work so as to both improve public service quality and render administrative processes more efficient. (Framework Strategy, p. 61)*

Vienna has the ambition to position itself as innovation leader in public services, but who is meant by Vienna? This question is important because the framework strategy talks about promoting technical and social innovations. To whom is it promoted? First, the services must be promoted in the population to be accepted and therefore to be effective. As a result, the innovative service provider needs an innovation-affine audience. The second interpretation concerns the city administration itself. The quote reinforces the idea of innovative public services provided by the city administration. As such, the municipal administration does not just absorb innovation, as discussed earlier, but is also a provider and producer of innovation within its own institutional setting. These novel ways of service providing should first be promoted within the city administration to include the different departments in this transformation process. The city of Vienna strives to network its public services, i.e. a stronger integration of separated initiatives and departments is necessary. To enable this integration, an orientation toward an innovation-driven approach is necessary. The Smart City Wien framework strategy therefore also has an integrating momentum, where the different departments are linked together and integrated in and by the socio-technical imaginary of the Smart City Wien.

This is not just true for the city administration but also for spinoffs like the TINA Vienna. TINA Vienna is a spinoff enterprise that is 100% owned by the city of Vienna. It realised various projects in the thematic field of technologies and innovation for the city of Vienna. TINA Vienna is also the parent organisation of the Smart City Agency. With this approach of being innovative, the city administration is also a role model for the general transformation process. In absorbing innovation itself it creates a point of reference for further innovation processes in the population. Living labs take a special role in the process of promoting this openness toward innovation. The most famous area that is related to that term is the Smart City Lab in Aspern, where a whole new city quarter is built and serves as a testing field for new technologies, such as smart grid technologies (ASCR, n.d.).

#### 5.4.2 ECONOMY

The second sub-dimension discusses the economy of the smart city. In this section, the framework strategy is concerned with industry within the city and the conditions of work. Yet, this dimension is not clearly separable from the others – it is also a common theme within the smart city initiative of Vienna.

*Due to their diversity, density and innovative clout, cities are ideal breeding grounds for a strong economy. [...] While the service sector predominates, the city does dispose of an excellent industrial basis with highly resource-conserving production methods, good productivity and strong export orientation. Regarding the consideration of environmental aspects ("green GDP"), too, Vienna may be called exemplary. (Framework Strategy, p. 62)*

In this paragraph, the framework strategy directly links the most important smart city attributes – density, diversity, and innovativeness – to the concept of a strong economy. These ideas are present in the document and the discourse the Smart City Wien. Diversity is thereby not just an attribute of the city's population but is also applied on the Vienna's economy. The imaginary of a smart city includes a strong industry within the city borders. This is also connected with a shift in the characteristics we relate to the term industry – especially in this context, often the high-tech sector is meant. The quote of an interview partner also describes industry in relation to the latest technological developments, e.g. smart factories.<sup>18</sup>

*We see now these tendencies, industry 4.0, internet of everything, the maker- something, 3D printer, I am producing everything by myself. In the last, I don't know, 30, 40, 50 years we banished industry from the cities and when they were outside of the cities we banished them to Asia and co. because of CO2 certificates. When the transformation is completed, I believe, that they are coming back. And they are not coming back to low income countries, but they are coming back, where the know-how is, where they have to go only three meters to their production facility. So, I see this is an unbelievable economic chance. (TINA Vienna, 260-268)*

According to TINA Vienna, the transformation into a smart city is a way to bring back the industry to the cities. This is directly connected to the education within these cities, as knowledgeable employees and experts are needed to carry the smart and high-tech industry. In this imaginary of the future the industrial production plays an important role. In Aspern, the Smart City Lab of the city of Vienna, a smart factory, is realised as a pilot project to test possible scenarios and applications for this technology (Vienna City Administration, 2015).

This transformation includes the climate goals and production methods that are low in CO2 emissions. Low greenhouse gas emissions in combination with an innovative population therefore enable a strong economy. Consequently, the imaginary of a strong economy with its potential to create jobs is here

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<sup>18</sup> The term *smart factory* refers to the idea of self-regulating and self-controlling production processes. In a smart factory the different elements are equipped with sensors and communication modules which enable the total automatisations of the production process (Lucke, Constantinescu, & Westkämper, 2008).

connected to one of the main dimensions of the smart city. This narrative is continued in the presented ideas of labour, which are also mentioned in the quality of living dimension. On the one hand, the framework strategy states, that

*Prosperity goes beyond mere material security; for this reason, Vienna aims for a top position in existing and future alternative methods of measuring prosperity. (Framework Strategy, p. 62)*

In this approach, something similar as in the quality of living dimension is pursued – presenting a specific idea of the good life that differs from established ones. Going beyond material measurements of the living quality – here just another word for prosperity – is in line with the quality of living pillar. However, this paragraph also tries to indicate possible measurements, meaning that the Smart City Wien tries to institutionalise its understanding of quality of living and therefore the basis of the socio-technical imaginary. What is pursued with this formulation is the future positioning of Vienna as one of the most liveable cities in the world. Prosperity, measured in diverse ways, is an important factor in this regard. This idea connects to the theme that the current level of quality of living must be safeguarded. On the other hand, the smart city strategy acknowledges that the financial dimension of the economy is important.

*Vienna offers and enables meaningful work for all. In this, workplaces in Vienna correspond to the criteria of “good work”, i.e. employment is for an indeterminate period and fulltime (if requested by the worker); payment corresponds to a “living wage” standard; collective bargaining regulations are complied with. Access to the labour market is low-threshold and equitable, in particular also for less advantaged parts of Vienna’s population. Persons with special needs are integrated into the primary labour market. Women and men contribute equally to generating this prosperity; there are no wage or salary gaps. (Framework Strategy, p. 62ff)*

This section emphasises the need for proper payment and the integration of all in the labour market. In principle, the ideas of the social inclusion sub-dimension are repeated here. However, in this paragraph, we find the idea of a meaningful and good work. Whereas the meaning of the first formulation is kept open, a meaningful work is a highly subjective matter and again milieu dependent, good work is qualified as indeterminate and fulltime with a payment that enables living in the Smart City Wien. This construction of good work is interesting in the context of the smart city insofar as it presents a rather static picture. Whereas the smart city is a very dynamic enterprise and the capability for change is seen as a necessity, this does not seem to apply to the labour market. Flexibility in jobs and working hours is not pursued, but instead the idea of the 40-hour workweek in one job for a longer period – if not until retirement – is reinforced. This connects to the traditional values of social democrats, which is the party with the majority in Vienna’s city council.

Another idea that is more or less taken one by one from quality of living is the value of social inclusion. The labour market should be open for everyone and especially for marginalised groups. Again, we can also find the idea of gender equality in the agenda of eliminate salary gaps. This reflects also the idea of a structure that enables every smart citizen to realise one's own potential in the Smart City Wien.

### 5.4.3 EDUCATION

The third and last sub-dimension of the smart city innovation pillar is the “education and qualification as a basis for Vienna as a smart city” (Framework Strategy, p. 65). This sentence, which is the headline of the sub-dimension, in itself is very interesting as it proclaims education as the basic fundament the smart city is built upon. Of course, a smart city needs smart people. However, being smart is not an end in itself.

*A high level of education signifies equal opportunities and possibilities of participation. Education touches the very core of any smart city: the possibility of changing things either as an individual or as a group and to be able to realise one's professional and private plans underpin each and every structure and system. (Framework Strategy, p. 65)*

Education is the basic starting point of a smart city if the social dimension of it is taken seriously. Why is that? As discussed before, education provides the ability to adapt innovations. Since the Smart City Wien emphasises change processes as an integral part of achieving the formulated goals, this change is of course essential in being part of the smart city. As a result, the ability to change things is directly linked to education in the quote. This is important because change, not education, is the centre of this socio-technical imaginary. Education becomes a prerequisite of this change and therefore of the smart city. In addition, as the smart city is aiming at sophisticated socio-technical changes and high technology as important part of the future economy, a high level of education is especially important. The education system of the smart city is therefore seen as an instrument to enable and produce qualified workers for the smart economy and citizens that are willing to change their behaviour.

*Universities, universities of applied sciences and vocational training make sure that the skills profile of labour supply will largely coincide with labour demand. (Framework Strategy, p. 64)*

Education is truly instrumental in this understanding. In this quote, the idea of a high-tech industry is also reflected, as the providers of skilled workers for the future labour demand are clearly named here: universities and universities of applied sciences. In this socio-technical imaginary of the future labour market, predictions on the working environment in a digital society are already integrated. Studies are predicting that up to 50% of non-qualified work will be lost to automated and intelligent systems

(Frey & Osborne, 2013). As a result of these predictions, high qualification seems necessary in a smart city, which utilises ICTs as its nervous system (Framework Strategy, p. 55). What kind of education is needed is left open in this regard, but there is a strong orientation towards the economy and the labour market.

*In the future, only a strategy of lifelong learning will make it possible to meet the high standards of the modern work environment. The city will take measures to ensure a correspondingly high level of education and training of workers. (Framework Strategy, p. 65)*

While education is seen as a necessity for quality of living and innovation, lifelong learning is only explicitly linked with the idea of the future's economy. On the implicit level, lifelong learning is a prerequisite to enable lifelong change and innovation within the smart city. However, the future economy of the Smart City Wien makes it necessary to embrace this idea of lifelong learning and education as an enabler of smart citizens. This idea is continued in the second aim of the education sub-dimension, which is the qualification of children and young people. This objective aims at reducing the number of early school-leavers and to increase the number of "people with formal educational qualifications above the compulsory level in the primary educational systems" (Framework Strategy, p. 66). Again, a mix of social inclusion and innovation can be seen.

#### 5.4.4 SUMMARY

Innovation is the last of the three dimensions of the Smart City Wien and as such it has a special function within the overall construction of the presented conception of Vienna's future. As the framework strategy itself states, it links resource preservation and quality of living (see Framework Strategy, p. 59) and describes the dynamic and process-oriented dimension of the Smart City Wien. With a general positive attitude toward new technologies and social change, both are parts of the broader term innovation, and an innovation-friendly climate, the smart city, and its population create the solutions that are needed to accomplish the needed changes and meet the formulated goals. Research and development are needed within this socio-technical imaginary to find and provide these solutions. Research in the smart city has therefore an instrumental character and a very specific function.

This instrumental character of this dimension of the Smart City Wien is also reflected in the construction of the smart citizen. To enable change and innovation within society, the population must be trained and educated. Only then the residents are able to adopt and adapt new technologies. Innovation is not just a product that is thrown on the market but also needs a population that is able to integrate these technologies or new social practices. As a result, education is a key element in enabling the smart citizen and subsequently the smart city. In addition, the envisioned high-tech

industry needs well-trained employees. The smart economy is an essential part of the smart city imaginary, in which smart factories are only one example for the envisioned economy based on high-technology development. Knowledge, created by research and development, and specially trained employees are seen as the main asset of a smart city's population to bring back industry and strengthen the urban economy. To produce these highly skilled labour forces, citizens of a smart city also need a good and extensive education. In a work environment where new situations are emerging on a regular basis, lifelong learning is an important pre-condition and property for and of the smart citizen. Education therefore has two functions within the Smart City Wien. First, it should produce a skilled population and therefore strengthen Vienna as an industrial location. Second, through education, the residents should be enabled to participate in the Smart City Wien. Consequently, the smart citizen must be able to adapt to new situations and adopt new technologies and practices. In the imaginary of the Smart City Wien citizens therefore have the responsibility to develop an open attitude towards innovation – social and technological alike – and to produce innovations themselves. However, the imagined frame conditions to do so are relating to a social democratic idea of work. A smart citizen has a meaningful full-time job and is paid a living wage. Additionally, every person is treated equally in and has easy access to the labour market. Although this is an imaginary of the Smart City Wien, it is not directly related to the governance of the city population nor can it be related directly to characteristics of the smart citizen.

In this general climate of innovation the city administration is not just demanding an open attitude towards innovation from its citizens but is also actively building an innovation ecosystem and embraces the idea of innovation itself. In creating new services and promoting innovation within the own organisational boundaries, the city administration becomes a role model for the smart citizens. In this it actively shapes the innovative approach within the city. Yet, the city also creates a possibility to actively engage with change processes within the city by providing a wide range of services to the citizens. Especially participation is seen as an important instrument in this regard, as it allows including the knowledge and innovative ideas of the citizens in the general development of the Smart City Wien.

The city of Vienna is creating a general innovation ecosystem. It does so by actively engaging with citizens but also through promoting innovations through its own channels, such as spinoffs, and by fostering education within the population of the smart city. The city administration creates the imaginary of the smart city and the smart population that is needed for this future. The outcome of these efforts is measured in order to adapt the instruments. Indicators for prosperity and innovation are making the specific qualities of the innovation ecosystem visible and therefore changeable.

Through these services, a mixed climate of fostering bottom-up innovation and selecting and directing change processes is created which is an important element of the governance of innovation within the smart city.

As I have discussed above, the imaginary of the Smart City Wien is heavily related to the idea of a general climate of innovation and the selection of innovations that are compatible with the goals formulated within the three dimensions of the Smart City Wien. Each of these dimensions demands specific qualities of smart citizens. However, the discussed dimensions relate to each other in specific ways and construct the Smart City Wien based on necessary goals, normative ideas and formulated ways to achieve these. In a similar way the smart citizen is the result of the assemblage of different qualities. In the next chapter I will discuss how the smart citizen must be assembled to fit into this complex system of smart city processes.

## 6 RE-ASSEMBLING THE SMART CITIZEN

*If you want to build a ship, don't drum up people to collect wood and don't assign them tasks and work, but rather teach them to long for the endless immensity of the sea. (Thomas Madreiter citing Antoine de Saint-Exupery at a conference on citizen participation)*

In the last chapter I discussed the overall construction of the Smart City Wien and its three main dimensions – resource preservation, quality of living, and innovation – and how each of these dimensions creates a distinct perspective on the smart citizen. In this chapter, I will take up these different constructions and reassemble the smart citizen as a resident of the Smart City Wien. To do so, it is important to understand the different functions of the dimensions in the construction of the smart city narrative in Vienna.

While each dimension has its individual qualities and a specific function, a clear-cut separation between the different dimensions cannot be observed. Yet there is one important difference between the innovation pillar and the other two dimensions concerning its specific quality: the emphasis on dynamic processes of constant change. In the narrative, the formulated goals are achievable only by embracing constant change. Stability, as it is emphasised in the idea of the sustainable city, is not enough. In addition, the innovation dimension does not focus on a specific state of the urban environment or the city per se but opens up the perspective on how to reach it. Therefore the smart city's most basic quality is its orientation and reliance on innovation processes within the population.

From all these dimensions, resource preservation is the most technical one, as it refers to specific technologies and the urge to make use of them to meet the most pressing challenges for Vienna: urbanisation and climate change. These challenges pose an actual threat to urban life as we know it and therefore must be tackled. In this dimension, the goals are formulated very concretely and are also related to wider discourse, e.g. climate goals of the European Union, and therefore tell us what we must do to safeguard Vienna's position as a liveable city. As such, the research preservation dimension creates an imaginary of a dystopic future and urgency.

Quality of living as a dimension of the Smart City Wien makes this imaginary of a liveable city more tangible and therefore has its very own function. The quality of living is, as we have seen earlier, the main legitimisation for the other two dimensions. Where resource preservation tells us what should be changed and innovation creates a general climate of change to find the right solutions in relation to the formulated goals, quality of living answers the question, why we should even bother. In this dimension – and as a general theme of the framework strategy – Vienna is presented as city with an already very high quality of living. However, introducing the narrative that liveability in Vienna is at



its best at the moment is not enough to justify action or change. The introduced challenges urbanisation and climate change are actively threatening this superlative. As a result, the quality of living dimension gives the smart citizens a reason to pursue these goals and to actively create this innovative climate.

Each of these dimensions has its specific function within the Smart City Wien and they relate in a very specific way to each other. Additionally, they formulate various attributes and properties of the smart citizen from their specific perspective. Putting them together gives us an assemblage or the construction of the smart citizen within the smart city. So what are the different attributes of the smart citizen then? In the interplay of the different dimensions, the characteristic smart citizen is specifically constructed in four different fields: Personal responsibility, openness to innovation and change, social inclusion, and a smart work life.

## 6.1 OPENNESS FOR INNOVATION AND CHANGE

As already discussed, innovation is an important element in the socio-technical imaginary of the Smart City Wien. At the centre of the smart city imaginary is constant change, which is needed to realise the formulated goals. Therefore this quality must also be found in the residents of the city. Flexibility and openness to innovation and change are major concerns when it comes to smart citizens. Only if the residents of the smart city are willing to adopt changes within their daily practices and socio-technical ecosystem, the necessary changes to realise the smart city are possible. The smart city might be an imaginary where certain technologies, not least ICTs, are very important, but without a population that adopts these technologies the whole idea of the Smart City Wien would be destined to fail.

Especially energy-efficient technologies and renovation activities are important to achieve reduction in energy consumption and greenhouse gas emissions. The smart citizen therefore must embrace these technologies and actively integrate them into her/his daily life. This attitude towards new technologies is necessary to foster the diffusion and adoption rates (see Rogers, 2003). These examples are important in the context of resource preservation. Yet, a general openness towards innovation is necessary to enable the imagined bottom-up innovation ecosystem (see section 5.4).

In the definition of the socio-technical imaginary, Jasanoff (2015) emphasises the role of science and technology to attain a desirable future. In the imaginary of the Smart City Wien however, the meaning of technology and innovation is not a fixed one, but the smart citizen is actively put into a situation with the constant need to renegotiate the meanings of socio-technical processes.

Consequently the role of knowledge in a broader sense – so not just techno-scientific knowledge – is constantly open for contestation. In the framework of co-production, this knowledge is the result of “processes of sense-making through which human beings come to grips with worlds in which science and technology have become permanent fixtures” (Jasanoff, 2004, p. 38). Yet, science and technology are only permanent fixtures on a very abstract level in the context of the Smart City Wien. Openness toward innovation means in this respect an openness to question the collectively agreed and negotiated knowledge.

This is not just a considerable demand for a citizen of the smart city, but it also presumes a high level of flexibility in practices on the one hand, and on the other hand the ability to not just change one's practices but also the ability to learn the handling of new technologies in a high frequency and during one's whole life. Education is therefore a prerequisite to operate new technological artefacts or to do things in an environment that has now a changed idea “how things ought to go” (Taylor, 2004, p. 24). Adapting to these new circumstances and gaining the knowledge necessary to prevail in this dynamic world become individual responsibilities.

Yet, in relation to innovation the smart citizen is not just a passive object that waits until technologies and new habits are entering her/his world. In a general climate of innovation, the smart citizen needs to be active rather than just re-active. *Innovativeness* therefore is an important characteristic of the smart citizen. The basic construction of the Smart City Wien as a breeding ground for manifold and different innovations makes it necessary that the smart citizen her-/himself is innovative and innovating. This way the yet unknown solutions for the voiced challenges can emerge out of the general climate of innovation.

## 6.2 INDIVIDUAL RESPONSIBILITY

Creating the Smart City Wien needs changes in behaviour of Vienna's residents. Most of the presented ideas of change rest on the idea of optimising efficiency of existing systems, like medical treatment or mobility. Yet, the changes on the system heavily rely on changed practices on the individual level. Health explicitly mentions the need for physical exercise and health literacy to reduce the number of people who are in need for medical care. As a consequence, the efficiency of the system is seen as partly in the responsibility of the individual. The imaginary of the Smart City Wien envisions a shift in responsibility and agency. While the old approach of the city of Vienna was a more paternalistic one, the framework strategy is aiming towards a shift to governance. Changes in the smart city are not only located in the mayor's house, but are a responsibility of all smart citizens. Values like

individuality, flexibility, and personal motivation for behavioural changes are emphasised and promoted. In this regard the Smart City Wien rests on individual responsibility of each citizen to realise and safeguard the high quality of living Vienna offers at the moment. The smart citizen must develop a consciousness for this responsibility in order to change her/his behaviour.

This individual responsibility is expressed in the notion of an optimised lifestyle. In a constantly shifting and changing environment of the Smart City Wien, flexibility to achieve these different optima is highly emphasised. This flexibility of course relocates the responsibility to organise daily life on the individual life. Optimising the different areas of life becomes a duty of the smart citizen. In the presented imaginary of the Smart City Wien these duties include a healthy lifestyle, energy-consciousness, and a readiness to change the individual mobility behaviour.

In the context of the smart city, *energy-conscious behaviour* is one of the main issues, as it directly connects with one of the core challenges for the smart city: climate change. Energy-conscious behaviour first of all means that the personal energy consumption is becoming problematised in the first place. Based on the awareness of the personal energy consumption, the smart citizen should then adapt her/his behaviour in order to reduce the personal carbon footprint. In the framework strategy, energy-conscious behaviour is seen in addition to the adoption of energy-efficient technologies. Achieving the goal of reducing greenhouse gas emission is therefore the interplay between the openness to new technologies and the awareness of the own impact.

In a similar way the smart citizen is conceptualised by her/his *mobility behaviour*, i.e. to abstain motorised individual traffic as a mean of transportation. Smart citizens should very consciously choose walking, biking, or public transport over other mobility alternatives. In the framework strategy, motorised individual traffic is connected to several issues of urban life, such as air pollution, noise, greenhouse gas emissions, and health problems. Therefore the quality of life can be safeguarded by realising the personal responsibility to use eco-friendly means of transportation. In addition, this mode of transportation is seen as promoting the goals of a healthy lifestyle, based on the choices made by the smart city's residents.

The framework strategy emphasises equal access to the health system. However, in order to utilise the potentials of the system in the wake of scarce financial resources, the smart citizen has to carry her/his share to minimise the need for direct medical treatment – the smart citizen should therefore have a *healthy lifestyle*. This includes physical exercise, at best on a daily basis, and healthy nutrition. In order to realise such a healthy lifestyle, the smart citizen must become literate in health issues. Therefore the goal of the city administration is to promote health literacy in the population. Health

literacy thereby marks knowledge of the body and how to keep it fit and healthy, and what kind of practices the individual should avoid. Health literacy is therefore an expression of the individual responsibility to know what is good for oneself. This responsibility is related to the wider health system, as the individual is contributing to the maintaining of an accessible and high quality health service.

As I have argued in the last section, *education and lifelong learning* is a necessity to prevail in the ever-changing system of the Smart City Wien. Similar to the other characteristics discussed in this section, this represents a duty and personal responsibility of the smart citizen. The envisioned innovation climate of the Smart City Wien, as one could provocatively state, is another instance of the motto: survival of the fittest. The fit smart citizen has consequently the ability and the willingness to embrace the idea of lifelong learning. The imaginary of the Smart City Wien heavily relies on well-trained and educated residents. On the one hand, education is seen as an important element to distribute the needed expertise and knowledge within the population to meet the emerging demands in a new labour market. This is not at least important, as the future economy of the smart city is actively seeking to bring high-tech industry to Vienna. On the other hand, education is seen as a key element to provide the smart citizens with the ability to adopt innovations and – even more important – to come up with new innovations. In a general climate of innovation-friendliness, education becomes overly important. Therefore education is making the smart citizens fit for the Smart City Wien. The smart citizen is not a prerequisite of the smart city. Rather than that, the smart citizen is actively adapting her-/himself to the changing environment of the Smart City Wien.

In these characteristics, individual responsibility is based on the change of behaviour through voluntary adaption processes. There is no disciplining force from outside – the smart citizen is changing her/his behaviour because it is natural to do so, because it is part of the shared idea of social order and it is an expected interaction, that is how the things should go (Taylor, 2004). As such, the socio-technical imaginary of the smart city envisions the normative framework for such changes. The vision holds the changes necessary to attain the smart city vision of a desirable future (Jasanoff, 2015). The knowledge of how things ought to go within a smart city manifests in these ways, and smart citizens are acting. Constructing the individual responsibility of energy-conscious behaviour, a healthy lifestyle, changed mobility behaviour, and the need to educate oneself actively links the imaginary of the smart city to the practices taking place in it. The construction of these responsibilities is therefore a way to foster the practices needed to create the smart city as a socio-technical system that is more than just steel and concrete without actively enforcing it.

## 6.3 WORK LIFE

The imaginary of the smart city also includes the work life of its residents. Thereby the idea of work is closely related to the high-tech industry and how *skilled workers* are capable of enabling such an industry sector. The overall aim of this conception is bringing back the industry to the cities. As a result, the idea of education reinforced. Education is not only a mean to establish the needed knowledge to change one's behaviour or to enable the diffusion of certain technologies. Education for the smart citizens is also key for enabling high-tech industry and smart production sites. Education is therefore directly linked to economic growth.

This relation of innovation and economic growth can also be seen in the demand that smart citizens should be able to *capitalise innovation*. In order to have an effect for the local economy, residents of the smart city must use innovation in economic ways. Therefore, innovation does not only have an instrumental character in regard of climate change or quality of living, but should have an impact on the local economy. This dimension of innovation is of course not new, and many scholars – most prominently Peter Schumpeter – formulated the use of innovation in relation to economic benefit. Yet, in a bottom-up innovation ecosystem the ability to capitalise innovations is not just an ability of the entrepreneur, but must become a general characteristic of smart citizens. This connects to the formulation of the framework strategy that smart citizens are doing *meaningful work*, i.e. the work is seen as contributing to a greater goal. Work is not just securing a monthly salary, but has a meaning that goes beyond the material security of the workers. In an economy that relies on educated individuals and their motivation to gain new knowledge and adapt to new situations, this characteristic is extremely important.

Work in the context of the Smart City Wien has also been discussed in terms of structural questions and working conditions. As such the smart citizen is *working fulltime*, her/his salary is higher than the *living wage* and every person has *equal access to the labour market*. These demands are interesting in the context of the Smart City Wien insofar, as these characteristics are neither located in the responsibility of the city administration, nor are they individual responsibilities of the smart citizens. These ideas of the labour market are simply outside of Vienna's reach and must be regulated on the national level. As such they are connected to a social democratic ideal, but aside from that they are unrelated to the rest of the smart city discourse.

The different dimensions in the construction of the smart citizen and their relation reveal a much deeper tension in the Smart City Wien. The idea of productivity and a strong and efficient economy relates to a cooperate smart city vision (see Hollands, 2015; Söderström et al., 2014; Townsend, 2013).

Therefore the local translation contains elements of the international and business-driven discourse on smart cities. However, the city of Vienna seems to be not ready to sacrifice the achievements of long fights for worker rights. In the general development and the translation of the Smart City Wien imaginary into actual urban development, this tension will be an interesting element in negotiating the Smart City Wien between different actors.

In the framework of co-production and socio-technical imaginaries this can also be understood as a clash of different imaginaries. As Jasanoff & Kim (2009) point out, there never exists just one (socio-technical) imaginary in a given society. Different imaginaries are present, representing different systems of beliefs, norms, and assumptions. In occasions like this, different imaginaries can collide with each other, taking different positions on social phenomena like work life. The question then is, which socio-technical imaginary becomes dominant and how so. In the current case this is even more interesting, as potential conflicting normative aims and visions about desirable states of being are included into one imaginary. As such, the processes of dissolving this tension is not just a process of persuading others (Jasanoff, 2015), but also to dissolve this tension within the institutionalised formation of the imaginary – here the city of Vienna.

## 6.4 SOCIAL INTEGRATION

The smart citizen is a herd animal. Social inclusion and social interaction are very important to her/him. Urban life for the smart citizen is primarily defined by *intensive interaction* and a general feeling of density, expressed in the *preference for a dense city*. Exchange with other persons and a high level of social integration are essential elements of this understanding of urban life. As a result, the proclaimed dense and polycentric city, which is seen as a sustainable structure of an urban environment, is the preferred habitat of the smart citizen. Density, social as well as spatial, supports the achievement of several objectives outlined in the framework strategy in this logic.

This intense interaction with the social environment is expressed in various ways. A reoccurring element demonstrating this social integration as element of the dense city that was discussed is sharing in various manifestations (see Framework Strategy, p. 50). It is also a way to combine social integration with the goal of resource preservation. Car sharing, for example, is seen as a way to reduce traffic within the city and therefore sharing has a positive effect on the environment. At the same time, sharing and the intensive interaction that results from this interaction is creating a higher social cohesion.

The smart citizen is an active and *engaged* person. S/he is interested in the city's political and cultural processes. As such, s/he takes part in discussions and events regarding urban development and social questions. This describes for one a prototype of the political involved democratic citizen, but it also is a necessity for general climate of innovation. The smart citizen must be engaged with the issues and processes within the city in order to be able to create solutions to these issues. Additionally, the solutions must be shared and developed with other citizens and the city administration. Therefore engagement and social integration are enabling the bottom-up innovation processes.

Social inclusion within the smart city comes with normative ideas about the quality of social inclusion. Residents of the Smart City Wien are *tolerant*, especially toward gender choices, but also toward different ethnicities. Gender equality is an important value within the Smart City Wien. All residents of the Smart City Wien are paid the same wage (for a similar position), all genders have equal access to the labour market, and discrimination based on gender or ethnicity has no place in the Smart City Wien. The different life choices of the smart citizens do not affect their position in the social structure.

Social interaction is seen as overly important in the framework strategy, therefore smart citizens are united by a *common language*. In the Smart City Wien everybody speaks German. This does not exclude other languages, but German is seen as the connecting element in Vienna. Through the common language, social integration and therefore social interaction is fostered and intensified.

Inclusion, for one is necessary to create the proclaimed (social) density of the Smart City Wien, which leads to the discussed benefits for the environment. Additionally, it fosters community building. In the framework of co-production and socio-technical imaginaries, a community is bound together by common imaginaries (Anderson, 2006; Jasanoff, 2015). These imaginaries are necessary to create a community where social control is no longer possible through direct interaction. As a result, the individual must develop a feeling of belonging – an identity. Through this, identity, however, is not just creating a feeling of belonging but also comes with the knowledge how social life is organised (Taylor, 2004). Identity and the related values must therefore be internalised by the individual to become effective. The knowledge that is connected to the imaginary must become prevalent in some way. Anderson (2006) relies on instruments of the state, especially as print media, and Jasanoff (2015) emphasises public performances of the visions. Yet, knowledge also travels in social networks from one member of the group to another. Therefore, identities are also a result of local socialisation processes. Anderson (2006) is right insofar, as social control in big groups is problematic. This is certainly true for a whole city population, where the possibilities of controlling each other's behaviour are limited. Therefore forcing the value and belief systems inbuilt into the identity of the smart citizen is hardly

possible. Yet, knowledge on how we want to live in the world is also distributed by persuading sceptical audiences (Jasanoff, 2004). Consequently, a high degree of social integration of a society means to multiply the possible connections over which an idea and an identity can travel. Social integration is the breeding ground on which a general discourse can create a climate “in which subjects perceive themselves and form their identities” (Vanolo, 2014, p. 885).

## 6.5 FROM CONSTRUCTING TO SHAPING THE SMART CITIZEN

During the empirical phase of my thesis I visited the 7<sup>th</sup> Smart City Forum, which was organised by the Smart City Agency in Vienna. The main topic of this event was the participation of the broader public in the process of realising the Smart City Wien. As such, every resident in Vienna was invited to take part and discuss several topics. In the second half of the event, the participants were asked to form smaller discussion groups and to write up their results of the discussion. I was part of the group that sought ways to create a consciousness to foster smart behaviour. One of my first questions was: What is smart behaviour in the context of the Smart City Wien? The answer was as pragmatic as non-surprising: smart behaviour was defined by one of the moderators as behaviour that supports the goals of the Smart City Wien. In the group, we were discussing how to create a consciousness to support such a smart behaviour. In fact, we were searching for ways to create and shape the smart citizen. In the next chapter I will therefore discuss the governance instruments imagined by the city of Vienna to not just construct the smart citizen discursively, but to actively transform the citizens of Vienna into smart citizens.



## 7 GOVERNANCE OF INNOVATIVE CITIZENS

In the last chapter I discussed how a smart citizen, as s/he is constructed in the imaginary in the Smart City Wien, looks like. The different characteristics as imagined in the smart city initiative of the city of Vienna relate to the goals of the Smart City Wien in one or the other way and represent normative assumptions on how a smart citizen should act – the smart city imaginary is a way to transport, how social (inter)actions should go. These normative assumptions about a right behaviour are an essential part of an imaginary (see Taylor, 2004). As we have seen, the city administration has an understanding of innovation, which is not bound to technology or social interactions alone. In the vision of the Smart City Wien these two are just epiphenomena in a general wake of change within the social structure – a change that is, according to the narrative, necessary in order to keep our societies resilient and fit. In a general climate of innovation that integrates both top-down and bottom-up innovation alike, the question of behaviour that is supporting the goals of the Smart City Wien alone is not sufficient. Consequently, the imaginary of the Smart City Wien also integrates a vision of possible instruments to guide the change processes – the socio-technical imaginary includes modes for the governance of innovative citizens.

*So, it is a misunderstanding to think, the exciting thing is somehow the app or the input tool that assists me in organizing sharing, but this is not interesting. Instead, the interesting question from my perspective is, what are the underlying social processes, and how can I stimulate these processes and so quasi support the habits, the mechanisms, which provide a relevant contribution for the overarching goals resource preservation and CO2 reduction. (Madreiter, 39-45)*

In its heart, the Smart City Wien is a governance regime for socio-technical practices. Technology is only one of many means to achieve the objectives of the project discussed before. As we have seen in the last chapters, the idea of the Smart City Wien is highly dependent on the idea of constant change, or, as it is called: social and technological innovation. At the same time the goals of the smart city are fixated in the framework strategy. Consequently, the Smart City Wien needs a regime of governance for the innovation processes initiated and supported by the city administration. Otherwise it is impossible to align innovation processes with the formulated goals. In order to govern these innovation processes, the city of Vienna needs to promote the goals of the initiative in the population – the city administration must create the smart citizen. This identity creation is made possible through an assemblage of discourses, institutions, procedures, and tactics with the goal of normalising the population (Foucault, 1991). This set of instruments guides the way how a subject perceives her-/himself and guides the processes that are forming the identity of the smart citizen (Vanolo, 2014).

*This is nothing that, so to say, happens by itself, to motivate the people to switch from the car to the bike or public transport. These are such things, where a lot of awareness changing measures must be introduced. And the Smart City Wien is in this context surely an additional promotion of these goals or of these quasi, so to say, life styles. (MA 18, 270-275)*

The governance of innovation is accomplished through different means within the Smart City Wien, and most of them are not technological by nature but represent the classical instruments of the state (see Anderson, 2006). Two of the most prominent and widely used instruments to create a certain social order are regulations and funding regimes. The governance of technological innovation is directly connected to social innovation as consumer practices. Regulating the technologies or the behaviour directly is of course not really governance approach but the direct usage of the central power of the official institution. These instruments are pushing technologies through regulatory and funding measures. Financial incentives are used for example in the area of sanitising houses (STEP 2025, p. 41).

However, these forms of regulation are not the only ones the city of Vienna can mobilise. These instruments of legal regulations alone could not establish the Smart City Wien as a collective identity. Additionally, funding schemes and regulations can have undesired effects on the diffusion of technology and practices, e.g. if funding schemes are too complicated (see Klinglmair et al., 2015). Consequently, the municipal administration also utilises other instruments, i.e. information, education, participation, and infrastructure as material agent, to stabilise the socio-technical imaginary. This should not imply that participation is only seen in this narrow instrumental perspective, but the potential of performing the Smart City Wien in participation formats should not be underestimated.

## 7.1 PUBLIC PERFORMANCES

An important element of socio-technical imaginaries is the public performance of shared ideas and visions (Jasanoff, 2015). In order to create or perpetuate social order, the vision of a desirable future and the ways we choose to live in the world must be made prevalent within society. Performing an idea is a way to transfer the knowledge of its existence, but it also transfers the imaginary itself. These transfer processes, if persuasive, are therefore actively increasing the number of individuals sharing the imaginary. Performing the Smart City Wien is also important, as there very idea of the smart city is not easily made tangible. In presenting the imaginary with different methods it is made a little more real and relatable. Describing the idea of process-driven urban change is not very intuitive.

*But this is, I think, what is really missing, and this is a crux for me, is still, and we are talking for a long time now about creating images, yes, for the people. And for our colleagues as well. What we are actual, or what means smart. [...] Something tangible, where someone can relate oneself and has the feeling, I have something to contribute. And this is surely still a long way. (MA 18 P9, 730-737)*

The smart city lacks common symbols and visual representations that can convey the meaning of it to the citizens of Vienna. Since the term smart city is rather new and the meaning of the term is geographically specific, there can be no cultural significant understanding of any symbol. The Smart City Wien already has a logo, which also mirrors the three different dimensions. However, in order to create a common identity, the symbol must be connected with specific meanings (Blumer, 1986). Performing the idea is an important instrument to connect the images with the idea. Therefore it is a central element in the governance of the envisioned change. In the context of the Smart City Wien I found three different means of performing the Smart City Wien: information campaigns, participation events as identity building, and the city administration as a role model.

#### 7.1.1 INFORMATION

While in the view of the city administration distributing information is also a form of participation, I distinguish here the mere distribution of knowledge from participation. Participation is often characterised by the idea of deliberative democracy (Hamlett, 2003) and the assumption that active involvement of citizens in technological and scientific decisions improves the quality of technological projects (Irwin, 1995). Therefore, information or transparency is necessary but not enough when it comes to participation. In the context of the Smart City Wien, providing information is more seen as promoting the smart life style and aims at a change in practices within the city. Knowledge, not only in the meaning of scientific or technological, is a central element for establishing these routines and practice. Therefore the distribution of this specific smart city knowledge is one important aspect in the governance of these practices.

*Because this is actual the crux, so to say to explain it in an attractive way, so, make it attractive for someone, that using the bike is actual better and additional to the goal. So, in the mobility sector it is always, so to say, it is on the table what needs to be done. But here as well it is important to make it more understandable for the people. (MA 18 P9, 422-427)*

The information that is framing this knowledge is also aiming at creating a certain consciousness. According to the MA 18 this includes not only the dimension of the objectives, i.e. why these smart city objectives are important, but also how they can be attained (MA 18, 418-422). Information campaigns are therefore not just aiming to foster the popularity of the smart city alone, but also convey the necessary steps. The promotion of the Smart City Wien is not only promoting the general idea, but also an idea of a smart behaviour. At the same time the dimension of personal responsibility

is brought up again. Corresponding to the practices that are suggested the question of one's individual contribution is important. It is not what I have to do, but what I can do. This formulation is less paternalistic than a right-out regulation, but in the context of the created moral climate this formulation is much more powerful.

As Anderson (2006) notes, one of the most important instruments to create a common imaginary in the repertoire of the state is print media. An imaginary can reach a large number of individuals by distributing the ideas and images of a specific society and therefore a common understanding of social life and social order. As a result, the distribution of information via print media is creating a common identity. In a similar way, the Smart City Wien is promoted via the city administration's media channels, not creating a national identity, but a localised smart city identity.

*Look, what can be communication? For example, communication can be to tell the people, and this is possible in form of posters or the oh so ostracized advertisements in the districts' newspapers, that it is smart, if the city of Vienna, for example, uses the water from the Styrian Alps to produced power for 20.000 households, yes. (Madreiter P8, 378-381)*

The city of Vienna has many possibilities to present activities and information on the smart city in print media and via posters. The city of Vienna even has an own print service – distributing information about the activities of the city administration, e.g. in publishing a magazine called *Perspektiven*. In this magazine, the city administration even published a whole issue reporting on the Smart City Wien.

Having these channels to provide information to a large part of the population creates the opportunity to create a mono-voiced *discourse*, framing the Smart City Wien in a specific way. Consequently, the discursive construction of the Smart City Wien serves more as a distribution of central ideas rather than opening up a deeper discussion. The intention of these communication practices is to explain the smart city to the majority. If these explanations are successful, the Smart City Wien will prevail. The governance of social innovation is in this respect a distribution of a belief system – an imaginary. As Jasanoff (2004) notes, knowledge-making is community-making and vice versa. Through these information channels the city administration is creating a specific knowledge about the smart city, e.g. deepening the notion that Vienna is the most liveable city in the world, and creates a specific image of Vienna and its residents. If the knowledge is shared and becomes distributed within society, it creates a Viennese identity and possibly aggregates before separated individuals in a collective, forged by a common vision.

### 7.1.2 PARTICIPATION AS IDENTITY BUILDING

Vienna is a city with a strong tradition in participation. Participatory elements in urban planning as well as in social conflicting areas were always in the scope of the city administration. Yet, when I was visiting two of Vienna's participation events, the picture was revised a little bit. The events were not so much about active participation, but more about talking about the idea of participation.

The setting of these events reflected this rather unidirectional understanding of the smart city. The 7<sup>th</sup> *Smart City Forum*, which actively tackled the topics of participation in the Smart City Wien, was located at the main room of the centre for adult education. In the front of the room there was an at least two metres high stage on which presentations took place during the first half of the day. The audience was sitting in front of the stage, listening to the presentations and being educated about several topics regarding urban issues and agendas. At the end of each presentation there was the possibility to ask questions. However, the time for this was too short – many questions were only insufficiently answered or could not be discussed. The end of this first half of the participation event was a podium discussion on how participation could be made work in the context of the smart city. In the second half of the day, the event developed more into the direction of real participation. However, the topics that could be discussed were present, and the idea of the participation event was to generate ideas how the presented goals and objectives could be attained – participating meant a rather limited extraction of practical knowledge. This group discussion part lasted around two hours, then the results were presented. Everybody seemed to be exhausted and waiting for the possibility to participate at the buffet provided outside the hall.

This short and in no way complete description of the Smart City Forum shows an important aspect of participation understood in the city of Vienna. Participation has not only the function of making urban planning more democratic or to connect these processes to practical knowledge.<sup>19</sup> In addition to these functions, participation also performs the smart city imaginary as a common experience. In presenting and repeating the values, objectives, and threats of and to urban life the idea of the Smart City Wien becomes stable within the collective memory. As such, participation is another channel to transport the information, the discursive framing of the Smart City Wien.

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<sup>19</sup> In fact, in the municipal administration of Vienna, participation is seen rather critical in regard of democratic processes. The question who is represented in these events, who can participate, and how the decisions are made in these forums are serving only a small elite – at the expense of marginalised groups – came up repeatedly (e.g. Madreiter, 302-306). The analogy of old, white men deciding the fate of the whole city population was used several times. Looking at the audience of the Smart City Forum, I got the impression that these are real issues. Most of the participants originated in academia, business, or public service. Any decisions made there are inevitably not representative by any mean.

*As fundamental elements of urban design, art and culture are integrated into development processes even more strongly than before in order to activate existing potentials at the earliest possible moment and make them inspiring, **identity-creating factors** already during planning and construction. [...] The thus realised projects offer citizens numerous possibilities to experience their immediate living environment as attractive and to play an active role in urban design. (STEP 2025, p. 51, my emphasis)*

Participation signifies a second purpose in creating a collective identity. Participation is also about co-producing the urban environment. While participation on the surface is of course about co-determination of urban planning, the question of the exact function of this co-production should be raised. Participation is also seen as an important part of identity building. This identity building is important for the socio-technical imaginary, as it is the glue that holds collectives together. The way these participation events are creating a common identity is discussed in the last quote in connection with the integration in planning processes. This connects well to the idea of a general innovation-fostering climate. Participation in this sense refers to the idea of extracting (practical) knowledge from citizens and transfers it to the city administration. In this innovation ecosystem actively fostering co-production the residents of the Smart City Wien are enabled to experience the material surroundings as their city. The city becomes the materialised reminder of the smart city identity.

*I think that it will be opened up much more in the future, in a wide variety of fields. And even the participation process with the underground, the U5, what colour it has, something many people smiled at. But I talked with social scientists about it and they told me, this is unbelievably important. Because, think of the colour of football teams, how much commitment this creates. What an identity conveying measure colour can be. So, one has to go very deep, to know what great effect this could have for the common good. (TINA Vienna, 461-467)*

This example shows that there is a great variety what is actually possible to change. During the planning of Vienna's new underground line U5, the question which colour should characterise the new line came up. Every underground line has its own distinct colour that is used for signs and plans of the underground system. The colour of the new underground line was fixated in a democratic participation process. However, the fabric of the urban environment has not really changed with this moment of democratic adventure. The colour of the underground line – when realised – will be a constant reminder of the participation process. This refers less to shaping the city in a functional way, but in installing culturally significant symbols. As a result, the city becomes readable to the knowledgeable citizen (Amin & Thrift, 2002). The ability to recognise one's own city by this arrangement of co-produced symbols distinguishes the citizen from the visitor. The ability to understand the codes of the Smart City Wien creates a distinction and consequently an identity. In the smart city, even the built environment is reflecting participation within urban planning and therefore performing the collective identity itself.

If the general framing of participation found in the official documents and the interviews is contrasted with my experiences from the participation events I have visited, the identity building dimension of participation in the Smart City Wien becomes visible. The city of Vienna is interested in practical knowledge of its citizens, yet the events were staged around a strong regime of “formalized mechanisms of voicing” (Michael & Brown, 2005, p. 51). The topics were pre-defined and as such creating only very specific discussions. The participation events are used to convey the content of the Smart City Wien framework strategy and to perform the overall narrative of the Smart City Wien (see chapter 5). The way information and consultation were balanced clearly shows an emphasis on information provisions. In the consultation parts of the events the agenda was clearly set and there was little to no way to break out of the pre-defined issues to discuss. Practical knowledge of Vienna’s citizens was *harvested* only in very specific areas, supporting the pre-defined goals of the Smart City Wien.

Performing the challenges and goals of the Smart City Wien in various presentations and talks together with the fixed agenda for citizen discussions created a very specific public. At the same time, many public servants were present. In the discussion that I personally attended, an employee of the city administration acted – somehow – as a watch guard of the smart city initiative. When we lost track and moved in a direction of formulating critique on the Smart City Wien, s/he defended the different elements of the initiative, e.g. the Seestadt Aspern, and tried to bring us back to discussing our original topic. In this, the implicit assumptions about the event and the smart city were made explicit in order to keep the original format intact. Because of this framing, we did not just explore ways how to create a smart citizen but we also learned what it means to be part of this specific group. We learned, what it means to be a part of this specific public (Michael, 2009).

As a result of the staging of participation, the participants are becoming knowledgeable members of the smart city public. The information campaign built into these events and the level of autonomy the participants are granted can be seen as parts of what Irwin (2001) calls a technology of communities (p. 15). In his paper, Irwin (2001) distinguishes two opposed technologies of community: social research and deliberative democracy. The social research model is described as a “highly professional customer-responsive mode” (Irwin, 2001, pp. 15–16) of staging participation events to make the gathered information relevant and digestible. The Smart City Forum shows these characteristics. However, it extends the definition, as the purpose is not just to make the information gathered digestible for policy makers. The participation event feeds back into the self-understanding of the consulted public (Michael, 1998). In the context of the Smart City Wien this is done purposefully and

therefore the professional mode is not limited to make the information digestible for the policy makers but also to provide input to the participants that is understandable and persuasive to them.

### 7.1.3 THE CITY AS A ROLE MODEL

Another way of performing the Smart City Wien includes direct actions and enterprises of the city administration itself. The city administration is becoming a role model in regards of innovativeness and change in order to help attaining the formulated goals. This idea is exemplified by public buildings:

*In addition, it is essential for the city to lead by example regarding its own buildings, with special priority assigned to the use of green systems (district heating and renewables) for space and water heating. (Framework Strategy, p. 53)*

The idea of installing green technologies, such as district heating, in the public administration's buildings creates the image of authenticity. As such, the general idea of the Smart City Wien, and the change described earlier, are getting more legitimisation. The city of Vienna is not just leading by the word, but also by example. Additionally, making these technologies tangible in giving the citizens the chance to experience them is fostering the diffusion of these technologies within society (Rogers, 2003).

A second element of this performance is the presentation of the administration's services. The example of Vienna's "EcoBusinessPlan", a service to help Viennese enterprises to implement sustainable means (see section 5.3.3), shows that services have an impact in the general innovation ecosystem. Yet, services of the city of Vienna have a wider impact on the structure of the Smart City Wien. The promotion of smart services is also a necessity to broaden the organisational and institutional foundation of the smart city, as these services are located in new sub-organisations, integrating different departments. In creating these services as an innovation-driven service provider, the idea of the Smart City Wien gets performed here as well. Performing the city's openness towards innovation is an important starting point to legitimise the transformation, as the city can be seen as a role model and makes itself immune to the argument that public servants preach water but drink wine.

*In addition, exemplary and awareness-creating measures in the field of the City of Vienna's activities as an entrepreneur under private law contribute significantly to stimulating awareness among the population, which is a key actor of the Smart City Wien Initiative. This includes the use of renewable energy sources in buildings, car pools or innovative pilot projects to demonstrate the positive attitude of the city towards new developments and innovations. (Framework Strategy, p. 83)*

As can be seen in the last quote, this also applies especially to institutions of the city of Vienna that are entrepreneurs under private law. An example for such an enterprise would be the Smart City Wien Agency, located at the TINA Vienna organisation. Whereas innovative means should be incorporated



into these enterprises, they are also responsible for creating pilot projects. Pilot projects are, to a certain extent, blue prints to exemplify how things could go. As such they serve more than just one function. They demonstrate the possibilities of certain innovations in different fields and are a test environment for new developments. An example for such a pilot project is the smart factory located in the Viennese district Aspern, where new forms of production and collaboration are tested. At the same time these pilot projects are pre-forming a possible way of development. Later developments are referring to these projects in one or the other way. At the same time they are departure points for the distribution of technologies and practices throughout society. It is not so much the technology that is produced in such pilot projects but the very idea of these innovations that are now becoming prevalent. Once the artefact or the technology is created, these pilot projects will be first reference points for stabilising actor networks that are integrating these technologies. As a result, the innovations become translated into different contexts and black boxed, ripped off their original production context. The ideas and technological achievements of these pilot projects are now free to move within a broader social structure. The pilot project gets expanded throughout society (Latour, 1993a).

Establishing the city of Vienna as a role model and including the smart city imaginary in the overall service structure and pilot projects leads to the institutionalisation of the Smart City Wien. Therefore, being a role model is not only a performance of the Smart City Wien but also inscribes the imaginary of urban life within the smart city in the structure of Vienna. Pilot projects become instruments to shape and discipline the residents' imaginations by showing what it means to be part of the group (Jasanoff, 2004) – here: what it means to be a smart citizen. Additionally, the smart city's service structure allows only a specific set of interactions and practices within the institutional environment. The services are assuming a certain behaviour of the citizens and therefore the (inter)actions are controlled. The service structure performs the imaginary of the smart city, but it also becomes an instrument of governmentality, where the subject learns how things ought to be in a regime of practices controlled by processes of governance (Vanolo, 2014).

## 7.2 EDUCATION

As the framework strategy itself states: Education is the basis of the smart city (Framework Strategy, p. 65). So far, education served specific purposes: making residents of the city fit to meet the needs of a future labour market, creating the ability to deal with new technologies needed to increase the overall efficiency, and makes the citizens ready, i.e. it creates an openness to embrace innovations, social as well as technological. Education and specifically institutionalised education, however, serves

also another objective within the imaginary of the Smart City Wien. A specific way to govern social innovation as behavioural change is the integration of topics in educational settings, such as the kindergarten, school, or work education programmes. This aims at the governance of social innovation and the stabilisation of the smart city goals in the long run.

*A health-promoting environment should be instituted, safeguarded and nurtured for all age groups and life circumstances, from infancy to adulthood, from kindergartens and schools to health promotion at the workplace. To ensure the healthy development of children and adolescents, awareness of healthy nutrition modes and physical exercise must be stimulated already in kindergartens and schools. (Framework Strategy, p. 74)*

Through establishing these agendas in kindergartens or school environments, the Smart City Wien strives to establish itself into the curriculum of these institutions. The school is in Foucault's (1995, p. 211) perspective not just a place to convey knowledge, but also to manage a large population, to discipline them, and to make them useful for the state's agendas. The smart citizen is pre-formed in these educational settings and the knowledge, which leads to behavioural discipline that is implanted into the city's residents already at an early stage. In a less drastic formulation, one could argue that integrating these topics into the curricula is a form of socialisation of the next generation. In one interview this socialisation process was described as follows:

*[...] how do you create a generation that only knew one waste bin, how to accomplish, that they are starting by themselves to separate waste and understand what is behind that? And they did it with awareness-building programs in kindergartens. They did musicals, there is the waste witch Rosalie and so on. And they entered the kindergartens and child education, because they knew, one child is educating at least two grown-ups. Because, if they do it in school, then they ask their parents, why they are not separating waste and why they are throwing it away the wrong way and so on. (TINA Vienna, 382-395)*

This is basically the description of regulated behaviour. Social innovation, as understood as changing behaviour, is achieved here by disciplining children through awareness programs. The name awareness programme is a little misleading, as there is no awareness raised, but a value system conveyed. Coming back to the notion of co-production: In these settings the knowledge that forms the citizens and therefore the city is conveyed. Installing smart city agendas therefore trains, forms, and produces the future smart citizens – and as such it is a very powerful means of governance in the repertoire of the city administration. At the same time this intervention is imagined to have a broader effect. Not only do children bring the information back home, but they are also thought to execute social control.

In the educational setting, the re-production of knowledge is the primary goal. A school does not create new knowledge but is an institution to distribute the actual state of the art in our society. Yet, in a Foucauldian sense, the term knowledge is not restricted to scientific or technical facts but also includes knowledge about citizenship (Foucault, 1995). Jasanoff (2004) further states that governance

and knowledge-making are entangled with each other. Knowledge-making means state-making and vice versa. The same holds true for the smart city. The framework of co-production is interested in the knowledgeable actor within society (Jasanoff, 2004). An imaginary is the shared knowledge of desirable futures (Jasanoff, 2015) and how things ought to go (Taylor, 2004). As a result, educational settings are important sites of stabilising an imaginary, as general accepted knowledge is reproduced in these settings. In that sense the creation of smart citizens is not based on knowledge-making, but on the reproduction of knowledge in its widest sense. Paraphrasing Jasanoff, city-making is incorporated into practices of knowledge-remaking.

### 7.3 INFRASTRUCTURE

In the framework strategy, the meaning of the built environment and infrastructure is emphasised several times. As we have seen, the service infrastructure is an important element in the overall governance scheme of the Smart City Wien. Through these diverse services, the Smart City Wien is performed. However, the service infrastructure of the city administration serves also the purpose of directly influencing the change processes within the city. As such they are actively shaping the processes, but are also create the consciousness, which is necessary to bind the individual elements of the Smart City Wien together. Using the public services to promote the smart city idea in the daily work also indicates that these services are shaped in a way that translates interests of citizens in a way that they comply with the needs of the smart city.

*For example urban gardening or urban farming, are for me , quasi, so to say, this has a social component and it has, so to say, a valuable environmental and climate component as well, and additional an awareness building component. (MA 18, 509-512)*

Urban gardening and urban farming are actively promoted by the city administration. As such, these activities are directly in relation to the services provided by the city of Vienna. Urban gardening, for example, is supported by the Gebietsbetreuung<sup>20</sup>. The services tailor support to realise a social innovation – here urban gardening – but at the same time convey the ideas of the smart city. The services are actively shaping the social structure in regard of relations and imaginaries. As such, services of the city administration should be understood as an infrastructure for social relations. Services may not be material in the traditional sense, but they are materialised through diverse practices.

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<sup>20</sup> Gebietsbetreuung can roughly be understood as an area support service and is a service funded by the city of Vienna and subcontracted to private companies to shape city renewal activities on a local level and with local knowledge.

A similar idea of services as infrastructure can be found in the ideas regarding digital innovations as the basis for social change. The services provided by the city or enterprises in Vienna should guide the social relations and foster social innovation. As I have discussed earlier, technology is only seen in a very instrumental way. Values that are connected with it are only mediators for the manifestation of new practices.

*The other thing is, maybe we manage in better way to actually provide tools, which are supporting a resource efficient but also so social meaningful life together. (Madreiter P9, 393-395)*

Digital services and tools should enable a meaningful life within society. This includes resource preservation. In this formulation, the basic idea of the smart city is directly linked to the realm of technological innovation. Where the goals are set and changes in behaviour of the city's residents are identified as the main necessity, technological innovation is always seen as an enabler of new or changed practices – like in car sharing (TINA Vienna, 430-433).

New social practices are resting on material or digital<sup>21</sup> infrastructures and are guided by them. As such, social innovations that are imagined in the Smart City Wien are pre-formed in this service structure. The service offers a certain idea of social order and social innovation is fostered – the apps are enabling certain interactions. As such, services provide instruments to govern the practices of citizens, and therefore the overall service structure becomes an instrument of governmentality (Foucault, 1991), which controls the possibilities to become a subject within the Smart City Wien (Vanolo, 2014). The rather complex matter of organising car sharing within social setting is brought down to a simple application. Beneath the interface, manifold processes of information gathering and documentation are happening – more or less invisible to the user. The app has become a black box, enabling or demanding a certain way to interact with it and therefore with the social environment (Latour, 2005). As such, these digital agents have a tremendous impact on social life. While not determined, but enabled through the possibility of using the innovations, change in social behaviour is selected by the city or the services the city provides itself.

*But we, so to say, this smart city process partially also supports the integration of other components, other aspects, and yes. That also, just saying, that there is an assessment and observation, what innovations are suitable. So, a somewhat critical observation too. (MA 18, 461-465)*

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<sup>21</sup> The distinction between material and digital is not an analytical sharp one, as digital services still need materiality for one, e.g. screens, buttons, computer chips, and at the same time they are actants in the sense that digital services are doing something. Just because the software code is a collection of ones and zeros, it is not material in the common sense, and it does not result in the observation that digital technologies are not material. The materiality is mediated in another way, that's it.

These selection processes are a mean of governance in itself. One of the main ideas of the Smart City Wien is thereby creating a general climate of innovation, fostering diverse developments and selecting compatible one. Selecting innovations that are compatible with the idea of the smart city is, following the argument from the last paragraph, limiting the possibilities to interact with the socio-technical environment. In the context of the Smart City Wien, selecting developments means including and excluding certain technologies. Yet, this also results in a selection of social interaction patterns. As such, the governance of social behaviour is deeply inscribed in the governance of technology. Only the innovations in alignment with the smart city goals are selected. This creates the possibility to include a wide variety of developments, as the strategy is not limiting itself explicitly. However, the general normative background of these innovations is homogeneous. As such, the regulated behaviour is also homogeneous in the inscribed values. The innovations might vary, but the selection criteria are standardised. Therefore this selection process based on fixed and non-negotiable aims is creating custom unified customs and viewpoints. A uniform community of habits in which the smart city imaginary can spread is created (Scott, 1998). Innovation in the imaginary of the Smart City Wien is not at last enabled through providing infrastructure for research (Framework Strategy, p. 60f).

Another way to influence and govern daily practices is the built environment and the material surface of the city, including streets, sidewalks, bike lanes, etc. The dense city is seen as the most energy preserving form of the city. Therefore manifold efforts are taken to increase the density of existing quarters. However, the energy-saving qualities of the dense city are directly connected to a specific pattern of mobility. Polycentric structures that enforce walking and cycling as major mean of transportation are the gold standard of the smart city. Therefore, the dense city is the material precondition for a shift of the transportation system into this direction. Mobility and the density of the city are clear imaginaries about the governance of social processes through the built environment and the supplied infrastructure.

*Let me formulated this with an example of mobility, yes. The city of Vienna provides services, yes. So we extend the underground, we extend the tram lines, we extend bike paths, we are creating just now a concept for pedestrians, so walking becomes more pleasant, yes. The city of Vienna introduces restrictive measures, parking-space management will be expanded, the obligation to provide parking space will be lowered, so there will be fewer parking spaces for private cars. (Madreiter, 67-72)*

Creating an infrastructure that is fostering one mean of transportation, i.e. public transport, walking, and cycling, and limiting another one, i.e. driving, creates a very specific mobility regime. The infrastructure suddenly allows only specific forms of interaction. In figure 5 this becomes visible. The picture was taken in the Seestadt Aspern, which is a smart city quarter built from the ground. Some time ago – before it was known by the name Seestadt – it was an airport; later it became a military

airbase followed by the usage as a site for the Austrian automobile industry. So the site changed its identity and function some times before, but this time it should become a city part of its own, not just having a designated function but to function as an urban environment in general. As a result the city administration of Vienna started the construction of the Seestadt.

This crossing in Fehler! Verweisquelle konnte nicht gefunden werden. shows the materialised maginary of the Smart City Wien. The point where the two streets meet is framed by trees, benches, and walls to demarcate the end of the street. Through material means the crossing has been disabled. While exploring the city quarter by walking is very easy, a car is more an obstacle than an enabler of mobility. The crossing is the materialised governance of mobility and therefore it got a normative quality. Similar to Winner's (1989) observation that material arrangements can be an expression of political ideas, this material arrangement is an expression of a envisioned mobility system.



FIGURE 5 CROSSING IN THE SEESTADT ASPERN

As Jasanoff (2015) notes, the material arrangements are important elements in explaining (in)stability of social order. As such, material arrangements are expressions of socio-technical imaginaries. Especially since “belief systems out of which those materialities emerge and which give them value and meaning” (Jasanoff, 2015, p. 22) are important. Reading the material arrangements means understanding the collectively shared imaginary – the smart city imaginary becomes visible in the arrangements of buildings, streets, walls, etc. Aside from that, the materialised belief system implies

certain use cases and interaction patterns (Akrich, 1992). The material arrangements become another arrow in the quiver of urban planning to establish a regime of practices (Clarke, 2005) in which the subject is forming its identity (Vanolo, 2014). Infrastructural arrangements in general are therefore an expression of imagined practices. In the imaginary of the Smart City Wien, interactions with the urban environment are aligned with the goals and aims of the Smart City Wien, e.g. efficiency, reduced energy consumption, etc., and therefore guiding the individualisation processes of its residents. The identities of smart citizens are therefore a co-production of the knowledge and the normative assumptions on and about urban life. Through infrastructural means the Smart City Wien is guiding, yet not determining, the self-construction of the smart citizen.

## 7.4 ANOTHER BRICK IN THE SMART CITY?

In this chapter I described the instruments of governing civic innovation processes within the Smart City Wien. An important notion throughout the whole work was the search for the smart citizen. In a way, the Smart City Wien and the framework strategy are also searching for the smart citizen – but by their own means. The smart citizen is not just something the Smart City Wien needs in order to make the whole imaginary work, but also something that is actively constructed – not just in a discourse but also by means of social control and governmentality. Coming back to the most recent definition of socio-technical imaginaries (Jasanoff, 2015), two elements are especially important for the Smart City Wien. For one, the vision of Vienna as a smart city is performed in various ways. By doing so, the imaginary is enabled to travel within society and becomes a prevalent reference system. In the different demonstrations of the smart city, the residents learn what it means to be a smart citizen. Similar to Anderson's (2006) main instrument of performing a national identity – print media – the city administration is using diverse communication channels to perform an urban identity. Infrastructural means are ways that let the citizens perform the smart city themselves. Through regulating possible interactions and therefore fostering implicitly normative behaviour a regime of practices is created in which the residents are constructing their identities. As soon as practices are seen as normal and necessary, they become part of what the collective expects in socio-technical interactions. That is exactly when they become a shared imaginary – a commonly shared understanding how things ought to go (Taylor, 2004). Education is the most disciplinary element in the triad of governance instruments. Educational settings are seen as possibilities to directly install value and belief systems into the smart citizens. Schools as disciplinary settings are not a new idea (see Foucault, 1995), yet in the framework of an innovation- and knowledge-driven society they are

powerful instruments to regulate behaviour. As Jasanoff (2004) states, knowledge-making is state-making. It is also creating the city.

The smart citizen is therefore not only a vision of the city administration, but as Vanolo (2014) argues, the smart citizen is also a product of the smart city. I would extend this finding. The smart citizen is a product of the smart city produced by the governance instruments discussed in this chapter, but the smart city is also a product by practices of the smart citizens (see Farías & Bender, 2010). Because of this co-production of the city, the imaginary has to include ways to ensure its stabilisation – and therefore it is not enough to just search for the smart citizen. Searching for the smart citizen also means searching for the smart city regime that produces this citizen.



## 8 BUILDING CITIES, BUILDING CITIZENS – A CONCLUSION

In the very beginning of this thesis I asked you to imagine different scenarios of urban life in smart cities. While both of them are real and both are called a smart city, the characteristics of these urban sites are very different. How a smart city is realised is highly dependent on the local setting. A smart city in central Europe is different from a smart city in central Asia. And the Smart City Wien is very different from the smart city Barcelona. Yet, the differences are not only present in zoning plans, built infrastructure and buildings. Each of the incarnations of a smart city signifies a different understanding and realisation of relations between the urban environment and its residents. Each smart city is imagining and producing its own version of the smart citizen.

To understand what connects and separates these different initiatives and what form of social life is imagined by the planners of these smart cities, a closer look at the local transformation processes is important. That is exactly what I tried in this thesis – taking a closer look at the Smart City Wien and searching for Vienna’s smart citizens. In this case I did not ask you to imagine a vision of urban life yourself – I asked you to follow me through the existing imaginary of the newly emerging Vienna. I asked you to wander with me through dense city quarters, explore offices of innovative industry companies and listen to information campaigns and participation events. I asked you to visit all these places of the imagined Smart City Wien for one specific reason: to find the smart citizen in Vienna.

In each corner of the Smart City Wien imaginary we found a small piece of the puzzle – the smart citizen is not described or imagined as a whole, but is dispersed in all the pillars, dimensions and goals. In chapter 5 we were on exactly this journey, collecting demands, thoughts and ideas about the smart citizen. Putting it all together is not a simple task. In chapter 6 I re-assembled the pieces that we found and I presented you what I think is the smart citizen in Vienna’s smart city. Yet, this is not the only way how these pieces could be re-assembled – nor are these the only or all pieces that could be found. The picture of the smart citizen I presented is not a detailed copy of the *real* smart citizen, it is more an impressionist drawing, created from my perspective and based on how I perceived the imagined smart citizen. Therefore I ask you one last time to use your imagination – and meet the smart citizen that I have found.

### 8.1 THE CO-PRODUCED SMART CITY

The smart city is more than just ICT gadgets built into the urban fabric, and it is more than just an environment of disciplinary power. A city is a complex system of interactions between different

elements and actors. Infrastructure and material arrangements are pre-assuming certain ways of interaction, and they have the power to divide society in different groups (Graham & Marvin, 2001). In regulating access and non-access (Graham, 2005) as well as pre-assuming certain ways of interaction (Akrich, 1992) in infrastructure, urban planners have a tremendous power of regulating social life and social order within the city. At the same time, the city is in constant flux and is changing. New buildings are created and old ones are destroyed and new ideas of urban life and social interaction are emerging (Hommels, 2005). While there are some newly built smart cities, like Songdo, the vast majority of the smart city initiatives are such re-building and transformation processes. The transformation of Vienna into the Smart City Wien is an example for such a transformation. Yet, this transformation is not only a change in the material structure, but it also reshapes social structure and the self-perception of the citizens. This process of change and the need to negotiate stability subverts the segregating power and control over social structure that planners can invoke by infrastructural means.

In shifting our gaze from the city as a given entity, and perceive it as an achievement, the question is then why a city is not falling apart into millions of different entities, not connected at all. Creating a coherent smart city, a commonly accepted pattern of practices must be established. The smart city is partly characterised by the integration of energy efficient technologies as well as specific modes of transportation. Yet, if only a minority is adopting these technologies, the smart city as it is described falls apart. While urban assemblages (Farías & Bender, 2010) are making us aware that the city is an unstable entity, where the ontological status of the city is achieved by practices connecting material elements, the question remains open, what guides these practices. An imaginary of the urban is needed to explain the emerging city as we find it. Giving several sites and practices meaning guides the citizens and gives them an understanding of how the city ought to be – to paraphrase Taylor (2004). Because the smart city needs a certain set of practices to make itself obdurate, the question how the city ought to be also creates an imaginary of how the smart citizen ought to be. The stabilised smart city needs a common imaginary, where not the single action of an individual creates the specific ontology of the smart city, but where aggregates of collective action are realising a common vision of urban life. The imaginary is constructing the smart city and the smart citizen at the same time. Urban life is the result of distributed knowledge in form of a shared imaginary.

When Hollands (2008) asked the real smart city to stand up, he formulated a critique on the corporate smart city imaginary, where business plans and high-tech are the only solutions to urban challenges. Yet, these ideas of a corporate smart city neglect the need to translate the imaginary into actual practices of the city's residents. Without the smart citizen the smart city is nothing, but a failed

imaginary. The socio-technical imaginary (Jasanoff, 2015) of the Smart City Wien provides such a common vision of urban future and social order by urban technologies and their appropriation. In order to be successful, urban development must reside on a shared knowledge how we choose to life in this world (Jasanoff, 2004).

## 8.2 THE COMPETENT CITIZEN

In the very beginning of my work for this thesis I was wondering what social relations and personal qualities of Vienna's residents are imagined in the Smart City Wien initiative. When I was confronted with the idea of the Smart City Wien, I was asking myself: A city for whom? In chapter 6 I put together the specific qualities and attributes of the imagined smart citizens. A common element of the found and re-assembled pieces is the insight that urban life in a smart city in general, and in the Smart City Wien specifically, relies on responsible and competent residents. This is also reflected by the way, the Smart City Wien imaginary constructs the smart citizen. In order to be successful, any vision of an urban life relies on the practices of citizens (Fariás, 2010).

An imagined typical resident of the smart city is engaged and competent in several ways. The smart citizen leads a healthy lifestyle and educates him/herself. Consequently, the smart citizen is enabling him/herself to fit the new demands of the smart city. Education and lifelong learning are especially important, as the dynamic innovation ecosystem creates new demands based on new found ways to achieve the goals of the Smart City Wien. Vienna's citizens also are competent in actively pursuing these goals. With an energy-conscious behaviour and changed mobility patterns the goals of the Smart City Wien are directly supported.

The other qualities of the smart citizen are also, although indirectly, supporting the goals and aims of the Smart City Wien. The most important quality in this respect is the openness for innovations and change in the citizens' technological and material environment as well as in social structure and interaction patterns. This change is, in the vision of the Smart City Wien, central for the ability to realise new forms of common life that sustains quality of living as it is found right now. As a result, innovation is granted a central position in the architecture of the Smart City Wien. Innovation should create new ideas and forms of social practices, which will support urban life as it is imagined in the initiative. As such, innovation also becomes an individual responsibility. Adopting socio-technical innovations relies heavily on the established practices and the willingness to integrate new ways of living into the social fabric – and to enable oneself to do so. Again, (self-)education is important to realise the smart city. This is also true in the envisioned work life. The smart citizen is flexible and

competent in optimising his/her work/life balance and is able, i.e. educated and trained, to work in the newly emerging high-tech industry. Additionally to the discussed qualities, the smart citizen is also prone to a dense lifestyle that is reflected by a high degree of social interaction and social inclusion. Smart citizens in the city of Vienna are described as open to diverse lifestyles. Additionally, a common language connects all of them. These qualities foster a high degree of social exchange. While a dense lifestyle, that also implies a dense city structure, connects to ideas of the dense city in general and a more efficient resource usage within the city, this is also important in another respect. Within a dense network of social interactions the idea of the smart city can wander within the social network. The higher the density of this network the more effective the social control mechanisms and the socialisation processes (Coleman, 1988).

Taken together, these qualities and attributes are constructing a competent and responsible citizen, who is actively engaged in constructing and stabilising the Smart City Wien. In chapter 6 the different areas in which a smart citizen is imagined to be competent are discussed in detail and therefore are repeated here only briefly. However, responsabilisation of individual and competent residents as part of the imaginary is installing the vision of self-controlled behaviour. Instead of creating an adapting environment (Gabrys, 2014), the vision of the Smart City Wien relies on adapting citizens. This adaption, however, cannot be forced from the outside in a liberal democratic society, but must create its own legitimisation (Ezrahi, 1990) and a subtle environment of governed interactions in which the individual can construct itself as smart citizen (Vanolo, 2014). As such this identity building must be relatable to the actual residents of the smart city.

There is a second answer to the main questions of this work. In the official discourse, citizens are imagined as a very specific social group. This picture of the typical smart citizen invokes pictures of young, urban middle class residents with a tendency towards the political left. At the same time the picture of a liveable city and a quality life is very much based on these assumptions. Diversity is mentioned in the framework strategy, yet the discussed attributes are not representing a diverse population but resembling a lot the current middle class citizen. Although I did not analyse visual representations, browsing through the framework strategy made me aware that the images found in the document are strangely homogenous. All of the pictures are showing children or young adults, dismissing a huge part of Vienna's population. Additionally, there are no images of persons who could be identified as people of colour or from different cultural backgrounds, including sub-cultures. The document presents the smart citizens as young and white. While this alone might not say too much, in combination with the discursive construction found in the framework strategy this presents a coherent picture. The socio-technical imaginary is very specific in its anticipated audience.

As described, the attainable future, or better, the future in which the level of liveability did not change is the main legitimisation in the construction of the smart city. In constructing urban life that does not relate to Vienna's actual residents threatens the whole construction of the imaginary. In order to be able to create a common identity, a feeling of belonging is important. The socio-technical imaginary does not stand by itself, but must be relatable to other imaginaries in place (Felt, 2015). If the socio-technical imaginary allows no identification or – even worse – directly contradicts well established belief systems, the idea of the smart city might not diffuse in society as the city administration would it wish to. The normative assumptions of social life must be translated into different contexts in order to really gain momentum. The Smart City Wien will only be inhabited by smart citizens, if this idea is relatable to the people that are already living, dwelling, working and moving in the city.

While the smart citizen is constructed in such a way, the socio-technical imaginary is in constant flux, resulting in the possibility of changing the imaginary of a smart citizen. The city of Vienna has many possibilities to ground their understanding of the smart citizen in the actual social worlds of Vienna's residents. Participation in this respect should not only be seen as a way to convey a smart city identity but also to evaluate this idea against the empirical and social reality. As Scott (1998) argued in his book, central planning catastrophically failed because the state's elite had no practical knowledge of life within their planned territory. Simplifications to govern the population and to make planning possible may be inevitable, but it must be accompanied with repeated reality checks. This is the momentary starting point for the city of Vienna. Participation is therefore an instrument of democratisation as it prevents the drifting apart of vision and social reality. With participation understood as a forum to negotiate the gaze of the state and the visions subsumed under the term smart citizen or smart city and how to attain it, the transformation in a liveable and sustainable city could actually become reality.

### 8.3 GUIDING COLLECTIVE ACTION

Urban STS conceptualises the city as a result of negotiations between different social groups (Aibar & Bijker, 1997; Hommels, 2005) or social practices creating diverging ontologies of the urban (Farías & Bender, 2010). Yet, the question how the city is possible as the result or achievement of collective actions is hardly looked at so far. How the practices of residents are guided and influenced to create a common social world and how individuals of the smart collective are persuaded to internalise the Smart City Wien imaginary? To paraphrase Anderson (2006): what are the instruments of city-making in the case of the Smart City Wien?

The smart city relies on the residents' acceptance of the normative vision it presents. The vision of a smart city is not at least realised by bottom-up practices of its citizens. The Smart City Wien relies on competent and responsible citizens, who control their practices by themselves. However, the identity formation and the self-regulation of behaviour are happening in an environment that enables or hinders certain forms of (inter-)actions within the smart city (Vanolo, 2014). The strategies of governing these identity formation processes are already parts of the imaginary. As Jasanoff (2015) states, the socio-technical imaginaries are institutionally stabilised and publicly performed. Each imaginary that becomes shared by a group of significant size needs such mechanisms of forming and controlling a collective. The Smart City Wien envisions thereby a rather indirect form social control. Instead of utilising a paternalistic and disciplinary form of power, the Smart City Wien searches for ways to shape the knowledge of Vienna's residents about urban life. In this respect, the Smart City Wien can be seen as an instrument of producing a specific form of knowledge. In becoming an important player on urban knowledge production, the city administration is also an important actor in defining urban life. By creating a dominant knowledge how urban life actually *is*, the Smart City Wien consequently becomes an instrument to normalise urban practices. The city fosters the behaviour it needs to sustain itself.

In chapter 7 I discussed the different instruments of governing the innovative citizen. Most of them are aiming on knowledge production or re-production. The Smart City Wien is institutionalising the performance of its normative vision and therefore makes it visible for a wide audience. This includes diverse media channels, such as newspapers, through which information on urban development, the challenges ahead, but also the solutions and goals provided by the smart city are provided. In utilising one-directional media channels the city is creating a mono-voiced discourse, shaping the horizon of possibilities for the future. In a similar way, the city is presenting itself as a role model for smart behaviour. Emphasising own enterprises and examples, compatible with the presented vision of a smart future, the city creates a reference point for its residents. Referring to these best practice examples creates the possibility to learn and imitate smart practices. Additionally, in presenting itself as already smart, the city administration creates legitimisation for demanding a similar behaviour from its citizens.

Another way of performing the Smart City Wien is the extensive effort to enable participation within urban planning. The participation events are often staged in a form that only certain aspects of the Smart City Wien are being discussed. The goals of the initiative and the – sometimes tacit – assumptions about good life are not contestable in these settings. In emphasising only certain elements of urban development by “formalized mechanisms of voicing” (Michael & Brown, 2005, p. 51) the form

of the knowledgeable smart city is preformed and a specific idea of urban citizenship is constructed (Kurath, forthcoming). I do not want to imply that this is the original or sole purpose of participation events within the Smart City Wien framework. I also do not want to create the impression that the only intention of the city administration is the control of Vienna's population by participation. However, in the way these events are staged, including an extensive information campaign, they fulfil this function of performing the smart city and shaping a smart citizen identity.

Education, as an element of governing innovative citizens, is mostly connected with knowledge reproduction. Within the Smart City Wien initiative education is seen as overly important for two reasons. First, education enables the smart citizens to participate within an environment that is becoming more complex and demanding. Education is a key dimension for personal, collective and economic development. However, education is also an important element in conveying the knowledge how a smart citizen should be and how social interactions within the smart city ought to go. Establishing smart city agendas in educational settings, such as schools, kindergartens or work education programmes, creates ways to teach health literacy, literacy in environmental aspects, energy conscious behaviour, etc. – in short, education is a way to create smart city literacy and to convey the Smart City Wien goals.

Another way to shape interactions within the Smart City Wien is the control of the city's infrastructure. New social practices must be aligned with material and service infrastructures. Change in social behaviour is selected by the city or the services the city provides itself, by integrating scripts (Akrich, 1992) in the residents' environment. Creating horizons of interaction and limiting them at the same time gives the city administration the possibility to pre-select social and technological innovations, which seem compatible with the vision of the Smart City Wien. Infrastructure therefore transports a certain idea of social order and social innovation by enabling or disabling patterns of interaction. Therefore infrastructure becomes an instrument of governmentality (Foucault, 1991), which controls the possibilities to become a subject within the Smart City Wien (Vanolo, 2014). The material and service arrangements of the Smart City Wien are an expression of the socio-technical imaginary (Jasanoff, 2015).

The common element of these governance instruments is a focus on institutionalising the distribution of knowledge, which is here understood rather broad. Scientific or technical knowledge is included as far as it is necessary to support the interactions within the smart city. The knowledge conveyed by these institutions encompasses also a common idea of a liveable life, expected and accepted forms of interaction, the reasons and goals of the smart city and an awareness for one's individual

responsibility. The instruments of governance are not disciplining the smart citizens directly, rather than shaping knowledgeable actors. The collective action is therefore an expression of collective knowledge (Jasanoff, 2004). All of these instruments are creating possibilities to learn what it means to be a smart citizen. Performing the smart city as well as creating regimes of interactions through material arrangements enables the resident to create a feeling of belonging and to learn “how things ought to go” (Taylor, 2004, p. 24). With these different moments of socialisation common expectations in social situations are created and enable common action of the population (Appadurai, 1996).

On a more abstract level, one major conclusion of this work is that an imaginary of urban development – or any kind of envisioned future – always has to include imaginaries of instruments to create the social structure it needs. What Jasanoff (2015) called the institutionalisation and public performance of these visions are central elements to understand socio-technical imaginaries. Opening the black-boxes created by these two terms and taking a good look on the institutionalisation processes creates a deeper understanding of how such an imaginary seeks to shape social life and creates social order. The instruments of governance imagined are therefore crucial elements in the analysis and unpacking of future visions. *What* future is imagined and *how* it should be created cannot be separated, but are in correspondence with each other. Including these dimensions in the analysis can explain why a certain imaginary became dominant. A scholar of the social construction of technology (SCOT) framework would now argue that this is exactly what the SCOT approach has done all the time, and s/he would be right. However, by taking institutionalised forms of negotiating into account *after* an imaginary became dominant also explains why the imaginary is not only dominant but also stabilised over time. By shaping social structure, the imaginary is reproduced on the individual level, which then again shapes society. The individual level and the macro level are co-constructing each other, by circulating knowledge through social structure. The smart citizen and the smart city are only two sides of the same coin.

## 8.4 WHAT’S LEFT TO DO?

When I started my work on the Smart City Wien, I was searching for a vision of a digital city, deeply influenced by a techno-deterministic worldview. When I learned that the Smart City Wien is a socially driven enterprise with a holistic perspective on socio-technical development, I was astonished and positively surprised. An important aspect of the Smart City Wien is the integrating momentum that it creates by its holistic perspective on urban development. By creating a common vision, various urban processes are brought together and aligned toward a common goal. This is true for the functionally diverse departments of the city administration, and it is true for the various social groups living in the



same urban environment. While the name for such an imaginary is not necessarily important, it provides a common focal point and a frame of reference to locate the imagined social and technological orderings as well as the stable future of Vienna as a liveable city. Yet, the question remains, if the Smart City Wien is really necessary in terms of building a collective imaginary or if Vienna as a common frame for these normative assumptions is sufficient. The answer to this question is yes and no at the same time. For the residents of Vienna it seems irrelevant what such an initiative is called – to some degree the new term can become even irritating. At the Smart City Forum one of the participants told the story, where citizens of her administrative district raised the question: What else is going to be smart? They have been astonished by the extensive and integrative nature of the Smart City Wien initiative. This implies that the general idea of smartness seems not necessary to create a common normative frame, or can even be hindering. There is a set of meanings attached to the term *smart*, and the Smart City Wien initiative tries to challenge these established meanings, reframing smartness, so it becomes compatible to its own visions and ideas of urban development and socio-technical practices.

On another level of inspection however, the label Smart City Wien has enormous effects. On the international level, the term allows the constitution of a smart city community, where the characteristics of the European smart city are negotiated. The Smart City Keys project (“CITYKeys - The Project,” n.d.) is only one example for these processes. At the same time the political power behind this notion of the smart city enables the city administration to establish the Smart City Wien imaginary, and the related goals and objectives, within all departments of the city of Vienna. The Smart City Wien imaginary has therefore not only an identity building momentum in constructing the smart citizen, but is also integrating the different sections of urban administration, and as a result, creating what we might call a smart administration. Since the work at hand is only the size of a master’s thesis, the question which mechanisms are utilised to create such communities and to establish the socio-technical imaginary on different levels remains open.

Another interesting and important question that I could not look into during my work on the Smart City Wien is the question how this governance framework operates in the empirical field. Now we know the imagined or already established instruments of governance. Yet, I could only provide a short glimpse on the actual governance practices and how they relate to the everyday practices of the smart city’s residents. Especially, the Smart City Lab Aspern, where the discussed governance via material and service infrastructure is in place, would provide an interesting and important field for further inquiries and hopefully answers to the questions, how such ideas of governance are translated in specific contexts and how this material governance regime is capable of changing practices of the

anticipated individuals. In the end, the imaginary is only one part of social life. Much more important is the question how such imaginaries are filled with life by the people negotiating its contents. Knowing these different instruments of governance creates the opportunities to observe moments of subversion and irritation. Distortions in the process of creation of a common identity open up spaces for negotiating other understandings of the smart citizen and the competences needed to fit into the ecosystem of a Smart City Wien. These are the moments, when the individual resident is not another brick in the wall of the Smart City Wien. These are the moments, in which the interactions between social structure and shared imaginaries are constructing the *real smart city*.

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## 10 INDEX OF FIGURES

Figure 1 Data Collection.....	30
Figure 2 Predefined Categories of Actors in Situational Analysis.....	37
Figure 3 Early Situational Map.....	41
Figure 4 Smart City Wien Logo.....	46
Figure 5 Crossing in the Seestadt Aspern .....	102

# APPENDIX

## EMPIRICAL MATERIAL

### INTERVIEWS

*AIT*: Researcher at the Energy Department of the Austrian Institute of Technology in Vienna, Vienna, June 2015

*MA 18*: two staff members of the *Municipal Authority 18 - Urban Development and Planning*, Vienna, June 2015

*Madreiter*: Thomas Madreiter, *Director of Urban Planning* in Vienna's city administration, Vienna, June 2015

*TINA Vienna*: a staff member of TINA Vienna and the Smart City Wien Agency, Vienna, April 2015

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## ORIGINAL QUOTES

### CHAPTER 5

*Weil wenn mir berichtet wird, also sieht, dass es in Südkorea oder in Japan sogenannte Smart Cities gibt, wo das smarte daran ist, daran ist, dass so quasi eine gated community so quasi den Zaun virtuell gestaltet, muss ich sagen, das ist interessant, hat aber mit unserer Smart City Theorie genau überhaupt nichts zu tun, ja. (Madreiter, 142-146)*

*Und die Konnotation der sustainable city ist eher auf: schauen wir, dass es so bleibt wie es ist beziehungsweise balanciert wird, ja. Da hingegen hat eine, eine Smart City auch nach Wiener Verständnis schon eine viel stärkere entwicklungsdynamische Perspektive, ja. [...] Sondern wir versuchen wirklich Innovationen zu stimulieren. (Madreiter, 166-177)*

*Was ist smart an einer Smart City? Also meines Erachtens geht es bei der Smart City letzten Endes irgendwie um nachhaltige Stadtentwicklung nach wie vor, auch wenn man sozusagen das Leitbild, ein Leitbild davor sozusagen war, ein Leitbild früher. Ich denke, es ist jetzt so aus einer planerischen Sicht, liegt die Innovation bei dem Smart City-Ansatz wahrscheinlich eher auf der, wie soll man sagen, so auf der Prozessebene und liegt darin, ist da zu suchen,*

oder ist ein anderer Weg Dinge zu tun die man bisher auch schon versucht hat. (AIT, 126-132)

Und wir haben eigentlich von Anfang an eine sehr breite Ansichtsweise, also einen sehr breiten Ansatz zum Thema Smart City gehabt. Also für mich war das zum Beispiel schon klar, wir beschäftigen, also wir wollen die Energiepolitik oder die Energieziele umsetzen, aber trotzdem war eine Smart City nie rein auf Energiethemen ausgerichtet und das ist in manchen Städten schon gewesen. Ändert sich jetzt immer mehr. Und ich bin zum Beispiel der Überzeugung, dass diese, also wir haben ja immer gesagt, wir wollen unbedingt diese sozioökonomischen Aspekte drinnen haben, die sozialen Aspekte, Umwelt, Lebensqualität und so weiter. (MA18, 121-128)

Es gibt auch nationale Initiativen zu Smart Cities. [...] Also Smart City ist unglaublich sexy und da dampft gerade extrem viel aus dem Boden, wo wir aber glaub' ich drüber stehen, weil wir nie von Smart City per se sprechen, sondern wir sprechen immer von Smart City Wien, weil wir das einfach definiert haben, was es heißt. Weil bei uns ist es ein Branding. (TINA Vienna, 287-291)

Ich baue einen neuen Stadtteil und schau, dass der zero Emission ist und null Energie und so weiter großartig, aber er muss auch sozial verträglich sein und es muss die Partizipation und soziale Inklusion dabei sein, dass ich überhaupt etwas baue, was die Leute wollen und akzeptieren. (TINA Vienna, 113-123)

Sicherheit, das kommt alles über die Lebensqualität und das ist finde ich die oberste Prämisse. Wenn man schaut, ich will nicht die technologischste Stadt, ich will auch nicht die Stadt, die am schnellsten zu 100% aus erneuerbaren Energien gespeist wird, nein, ich will die lebenswerteste Stadt, die sozial verträglich ist. (TINA Vienna, 677-680)

Weil die ressourcenschonende Stadt, und jetzt können wir uns über Smart City und Gadgets und Technik erzählen was wir wollen, ist am Ende des Tages die dichte Stadt, also die kompakte Stadt. (Madreiter, 463-465)

IKT ist für uns das Nervensystem der Stadt. Effizienzsteigerung ist teilweise nur mit IKT möglich. Weil wenn ich jetzt elektrische Systeme habe, oder infrastrukturelle, da muss irgendeine Sensorik oder ein Computer sein und das schalten, weil einfach der Mensch die Reaktion nicht hat. Das heißt Effizienzsteigerung ist nur mit IKT möglich, also, aber es nicht zentral. IKT dort wo es wirklich einen Sinn macht. (TINA Vienna, 163-167)

Also bei uns hat Technologie, IKT hat einen unglaublich wichtigen Stellenwert. Aber wir wissen genau das IKT ist etwas, das läuft im Hintergrund und ist Mittel zum Zweck, aber es muss irgendwie vorn das höheren Ziels stehen, irgendwie eine Verbesserung, der wie schon gesagt, Ressourceneffizienz, Energieeffizienz, Lebensqualität oder auch der sozialen Verträglichkeit haben. (TINA Vienna, 175-184)

Wir leben formal noch in der Welt der Charta von Athen, also sprich: durchlüftet die Stadt und irgendwie große Grünflächen und Freiflächen und niedere Dichten, ja, erzeugen damit aber etwas, was die Leute in Wahrheit überhaupt nicht als attraktiv empfinden. Es ist zwar nominell schön, also es scheint den ganzen Tag die Sonne beim Fenster herein, aber eigentlich, warum bin ich in der Stadt, per se? Weil ich Intensität will, weil ich Austausch will. Also wenn ich das nicht will bin ich in Litschau besser aufgehoben, ja. (Madreiter, 446-452)

Du kannst sagen: was hat das mit Ressourcenschonung zu tun? Na sehr wohl hat das was mit Ressourcenschonung zu tun, jetzt erschließe ich mir eine Metaebene ja, weil wenn das Zusammenleben funktioniert, ja. Also wenn ich nicht gezwungen bin, mit jedem sozialen Statuswechsel meine Umgebung zu wechseln, ja, wenn ich nicht gezwungen bin aus meiner Wohnumgebung jedes Wochenende zu flüchten, weil ich mich dort nicht wohlfühle, na

*selbstverständlich ist das ressourcenschonend, ja. Und das meine ich ja mit der sozialen Komponente, ja. (Madreiter, 433-439)*

*Und ich glaube, dass es da noch viele Herausforderungen gibt, wie man smarte Ziele, die auch eigentlich einhergehen mit wirklich hohen Standards [...]. Weil der geförderte Wohnbau an sich finanzielle Limits hat. Und das wird für Wien glaub ich eine große Herausforderung sein, wie man die sozusagen, diese Standards gewährleistet und gleichzeitig den geförderten Wohnbau ermöglicht. (MA 18, 761-767)*

*Weil man darf eines nicht vergessen, ich meine, das Partizipationsthema ist ja, ich meine, die Idee, die dahinter steckt, ist eigentlich, dass wir wissen, dass in der Bevölkerung ein großes Potential ist, dass sie einfach sehr viel wissen. Die sind quasi Experten, auf, Experten was ihr persönliches Lebensumfeld betrifft. Also da ist ja einerseits auch sehr viel Wissen abzuholen, oder Ideen abzuholen. Das ist glaube ich ein wesentlicher Punkt in dem Partizipationsbereich. (MA 18, 413-418)*

*Das Entscheidende ist glaub' ich auch ein bisschen ein Wegkommen von der tradierten Denke, sämtliche sowohl und wehe er hängt jetzt von dem ab, was die Stadt ganz konkret selber macht. Sondern ein bisschen geht es da schon auch darum, einen Shift weg von Gouvernement hin zu Governance zu schaffen und eben Handlungsräume aufmachen. Möglichkeiten zu eröffnen. (Madreiter, 86-90)*

*Wenn wir jetzt da sehen diese Tendenzen, Industrie 4.0, Internet of Everything, die Maker-irgendwas, 3D-Drucker, ich produziere mir alles selbst. Wir haben die letzten, weiß ich nicht, 30, 40, 50 Jahre Industrie aus den Städten verbannt und als sie draußen war aus den Städten, nach Asien und Co. verbannt aufgrund von den CO2-Zertifikaten. Sollte aber dieser Transformationsprozess abgeschlossen sein, glaube ich, dass die wieder zurückkommen. Und die kommen aber nicht in Billiglohnländer zurück, sondern die kommen dort zurück, wo das Know-how ist, wo sie nur mehr drei Meter gehen müssen zu den Produktionsanlagen. Also ich sehe das ist unglaublich wirtschaftliche Chance. (TINA Vienna, 260-268)*

## CHAPTER 7

*Also das ist ja ein Missverständnis zu meinen, das Spannende daran sei jetzt irgendwie die App oder das Eingabetool mithilfe dessen ich das Sharing organisiere, sondern das ist ja nicht das Interessante. Sondern die interessante Fragestellung aus meiner Sicht ist ja, was sind eigentlich die dem zu Grunde liegenden sozialen Prozesse, und wie kann ich diese sozialen Prozesse stimulieren und so quasi jene Verhaltensweisen, jene Mechanismen unterstützen, die erkennbar einen relevanten Beitrag hin in Richtung dieser übergeordneten Ziele Ressourcenschonung, CO2 Einsparung bieten. (Madreiter, 39-45)*

*Das ist ja auch nichts, was sozusagen einfach von selbst passiert, die Leute zu motivieren vom Auto aufs Rad zu steigen oder vom Auto in den öffentlichen Verkehr umzusteigen. Das sind halt so Sachen, wo halt ganz viel auch bewusstmachende Maßnahmen oder so gesetzt werden müssen. Und in dem Zusammenhang ist die Smart City Wien sicher auch noch eine zusätzliche Promotion von diesen Zielen oder von diesen quasi sozusagen Lebensweisen. (MA 18, 270-275)*

*Aber es sind trotzdem, ich glaube, was wirklich fehlt und das ist für mich ein Knickpunkt, ist jetzt noch immer und wir reden total lange davon Bilder zu schaffen ja, für die Menschen. Und auch für unsere Kollegen was wir eigentlich, oder was bedeutet ein smart. [...] Also etwas zum Angreifen wo man sich dann wirklich drinnen sieht und auch das Gefühl hat, ich habe da etwas dazu beigetragen. Und das ist sicher noch ein langer Weg. (MA 18 P9, 730-737)*

*Weil das ist eigentlich so dieser Knackpunkt, auch einfach sozusagen das Ganze attraktiv zu erklären, also jemandem einfach attraktiv machen, dass aufs Rad zu steigen eigentlich besser ist und zusätzlich zu dem Ziel. Also beim Mobilitätsbereich ist immer sehr sozusagen no na es liegt eh auf dem Tisch was zu tun ist. Aber auch da ist einfach ganz stark gefragt, dass du das den Leuten einfach verständlicher machst. (MA 18 P9, 422-427)*

*Schauen Sie, was kann Kommunikation sein? Kommunikation kann zum Beispiel sein, dass man den Leuten einfach erzählt und das halt auch in Form von Plakaten oder von den ach so verfeimten Einschaltungen in Bezirkszeitungen, das es einfach gescheit ist wenn die Stadt Wien beispielsweise das Wasser aus den steirischen Alpen dazu nutzt, um Strom für 20.000 Haushalte zu erzielen, ja. (Madreiter P8, 378-381)*

*Ich glaube, dass es in Zukunft viel mehr aufgemacht wird, auf unterschiedlichste Bereiche. Und selbst dieser partizipative Prozess mit der U-Bahn, mit der U5, welche Farbe hat sie, was auch von vielen belächelt worden ist. Aber ich habe mit Sozialwissenschaftlern darüber geredet und die haben gesagt, das ist unglaublich wichtig. Weil nehmen Sie einmal an die Farben von Fußballmannschaften, wie sehr das bindet. Welche identitätsstiftende Maßnahmen Farben sein kann. Also man muss da schon sehr tief gehen, damit man weiß was könnte das für einen großartigen Effekt für das Gemeinwohl [haben]. (TINA Vienna, 461-467)*

*[...] wie schafft man eine Generation die nur einen einzigen Abfalleimer gekannt hat, wie schafft man das, dass die aus einem selbst heraus anfangt zu trennen und versteht was dahinter ist. Und man hat es gemacht mit Awareness-Building-Programmen in Kindergärten. Man hat Musicals gemacht, da gibt es auch die Müllhexe Rosalie und so weiter. Und man ist immer in Kindergärten reingegangen und in die Kinderbildung, weil man gewusst hat, ein Kind bindet, bildet Minimum zwei Erwachsene. Weil wenn sie es in der Schule machen, dann, dann schimpfen sie ihre Eltern warum dort nicht getrennt wird und warum sie das falsch gehauen und so weiter. (TINA Vienna, 382-395)*

*Zum Beispiel Urban Gardening oder Urban Farming ist auch für mich eine, eine, quasi sozusagen das hat dann eine soziale Komponente und das hat aber auch sozusagen eine wertvolle umweltbezogene oder klimatische Komponente und zusätzlich auch eine bewussteinbildende Komponente. (MA 18, 509-512)*

*Das andere ist aber, vielleicht gelingt es uns viel besser noch tatsächlich Tools anzubieten, die jetzt ein ressourcenschonendes aber auch ein sozial sinnvolles Zusammenleben unterstützen. (Madreiter P9, 393-395)*

*Aber wir, sozusagen in diesem Smart-City-Prozess wird ein Stück weit ja auch unterstützt, dass eben genau da auch andere Komponenten einfließen, dass andere Aspekte einfließen, und ja. Dass auch ein ich sage jetzt einmal, dass da auch ein Stück weit beurteilt oder beobachtet wird, was sich für Innovationen eignen, sage ich. Also ein bisschen ein kritischer, kritische Beobachtung auch. (MA 18 P9, 461-465)*

*Lassen Sie mich das mit einem Beispiel der Mobilität formulieren, ja. Die Stadt Wien setzt Angebote, ja. Also wir bauen die U-Bahn aus, wir bauen die Straßenbahn aus, wir bauen Radwege aus, wir machen gerade ein Fußgängerkonzept, also damit man angenehmer gehen kann, ja. Die Stadt Wien setzt einschränkende Maßnahmen, Parkraumbewirtschaftung wird ausgedehnt, die Stellplatzverpflichtung wird herunter gesetzt, also es wird weniger Stellplatz geben für privat PKWs. (Madreiter, 67-72)*

ANT	Actor-Network Theory
CCTV	Closed Circuit Television
CO2	Carbon dioxide
GDP	Gross Domestic Product
IBM	International Business Machines
ICT	Information and Communication Technology
IT	Information Technology
LTS	Large Technological Systems
MA	Magistratsabteilung/Municipal Authority
SCOT	Social Construction of Technology
SMS	Short Message System
STEP 2025	Stadtentwicklungsplan 2025
STS	Science and Technology Studies
VAC	Women's Advisory Committees on Housing



## ABSTRACT

Smart cities (seemingly) represent new paradigm of urban development, which is often discussed as a whole new dimension of the integration of ICT in the urban environment. Smart cities therefore are often understood as mainly technological endeavours, aiming at optimising urban processes with digital means. However, the notion of the smart city is highly contingent and a wide variety of ideas, values and imaginaries are subsumed under this term. There is no such thing as *the one* smart city (Albino, Berardi, & Dangelico, 2015; Angelidou, 2014). The actual smart city is a translation of this more general vision on urban planning into local contexts. As a result every local translation of a smart city emphasises different aspects, adds new meanings to the term or tries to subvert the original meaning completely. These translations of the smart city concept often take place in municipal governments and the offices of official urban planners. Their plans and ideas regarding the development of the smart city are integral parts of defining social life and social order within the imagined smart city. At the same time these imaginaries construct what one could call a smart citizen. Urban planning in general, and the smart city in particular, are constructing a certain image of its future residents, assuming characteristics and formulating demands.

Starting from that observation, this thesis explores the smart city initiative of Vienna and how it constructs this smart citizen in relation to the formulated goals and visions of the future Smart City Wien. The search for Vienna's smart citizen engages thereby in the discursive construction of the imagined residents and her/his characteristics per se, but also explores the imagined and partly already realised instruments of governance to actively create a smart population. To do so, the analysis relies on the theoretical concepts of co-production (Jasanoff, 2004) and socio-technical imaginaries (Jasanoff & Kim, 2009; Jasanoff, 2015). Empirically, the smart citizen was re-assembled in this study by bringing together official documents and strategies regarding the Smart City Wien, interviews with stakeholders and observations from participation events taking place in Vienna and from newly built city quarters as a materialisation of the smart city imaginary.

The result of this thesis suggests that the smart citizen is constructed as an individualistic, competent and responsible member of the smart city community. Through processes of responsabilisation, the Smart City Wien is heavily based on voluntary changes in practices and a smart city consciousness of its residents. The major recourse for this changed practices and values is a prevalent and commonly shared form of knowledge, from which each individual can derive, what it means to be a smart citizen. To stabilise the discursive construction of the smart citizen within Vienna's population, the city

administration utilises different instruments to actively shape and (re-)produce this knowledge and to establish a specific vision of the smart city – the Smart City Wien imaginary.

## ZUSAMMENFASSUNG

Smart Cities repräsentieren (scheinbar) ein neues Paradigma innerhalb der Stadtplanung und städtischen Entwicklungen, welches oft als seine neue Dimension der Integration von IKT in die städtische Umgebung diskutiert wird. Im Zuge dessen werden Smart Cities oft als rein technologische Unternehmungen, mit dem Ziel urbane Prozesse durch digitale Mittel zu optimieren, verstanden. Das Konzept der Smart City ist jedoch kontingent und subsumiert eine große Bandbreite von Ideen, Werten und Visionen unter diesem Begriff. Es gibt nicht *die eine* Smart City (Albino, Berardi, & Dangelico, 2015; Angelidou, 2014). Stattdessen stellt die tatsächlich anzutreffende Smart City eine Übersetzung dieser sehr allgemein gehaltenen Vision von Stadtplanung in den jeweiligen lokalen Kontext dar. Daraus resultiert, dass jede Smart City Übersetzung unterschiedliche Aspekte betont, den Begriff mit neuen Bedeutungen auflädt oder die ursprüngliche Bedeutung unterminiert. Diese Übersetzungsleistungen des Smart City Konzepts finden oft innerhalb der Stadtregierungen und den Büros offizieller StadtplanerInnen statt. Die Pläne diese Akteure in Bezug auf die weitere Entwicklung der Smart City sind integrale Bestandteile der Definition von sozialem Leben und sozialer Ordnung innerhalb der imaginierten Smart City. Zur selben Zeit konstruieren diese Visionen etwas, das wir einen Smart Citizen nennen könnten. Dabei werden bestimmte Charakteristika der Smart Citizens angenommen und Forderungen an eben jene formuliert.

Beginnend von dieser Beobachtung erforscht diese Arbeit die Smart City Initiative der Stadt Wien und wie diese den Smart Citizen in Bezug auf die formulierten Ziele und Visionen der zukünftigen Smart City Wien konstruiert. Die Suche nach Wiens Smart Citizen beschäftigt sich dabei mit der diskursiven Konstruktion der StadtbewohnerInnen und ihrer/seiner Charakteristiken, aber auch mit den imaginierten und teilweise bereits realisierten Governance-Instrumente, welche aktiv eine smarte Bevölkerung erzeugen sollen. Die Arbeit bedient sich dabei der theoretischen Konzepte co-production (Jasanoff, 2004) und socio-technical imaginaries (Jasanoff & Kim, 2009, 2015). Auf der empirischen Ebene wurde der Smart Citizen durch die Analyse von offiziellen Dokumenten und Strategien mit Bezug zur Smart City Wien, Interviews mit wichtigen Akteuren und Beobachtungen von Partizipationsveranstaltungen innerhalb Wiens sowie von neu gebauten Stadteilen als die Materialisierung der Smart City Vision zusammen gesetzt.

Die Ergebnisse dieser Studie legen nahe, dass der Smart Citizen als ein individualistisches, kompetentes und verantwortungsvolles Mitglied der Smart City Gemeinschaft konstruiert wird. Durch Prozesse der Responsibilisierung basiert die Smart City Wien zu einem hohen Grad auf freiwillige Verhaltensänderungen und einem Smart City Bewusstsein seiner BewohnerInnen. Eine wichtige

Ressource für diese geänderten Praktiken und Wertsysteme ist eine prävalente und allgemein geteilte Form des Wissens. Dieses Wissen ermöglicht jedem Individuum abzuleiten, was es bedeutet ein Smart Citizen zu sein. Um diese diskursive Konstruktion innerhalb Wiens Bevölkerung zu stabilisieren, nutzt die Stadtverwaltung verschiedene Instrumente um dieses Wissen aktiv zu gestalten und zu (re-)produzieren und so eine spezifische Version der Smart City zu etablieren – die Smart City Wien Imaginary.