7 Social Innovation in Environmental Sustainability

Promoting Sharing Public Spaces for Bicycle Use

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Introduction

This chapter studies civil society's engagement in social innovations that facilitate, promote or challenge the sharing of public spaces for bicycle use in cities. The chapter illustrates civil society organisation's expanding role with innovative practices aimed at changing local environmental, social, cultural or economic unsustainable patterns and, impacting the field of environmental sustainability (van der Have & Rubalcaba, 2016; Howaldt et al., 2015; Jessop et al., 2013).

Civil society organisations encompass a wide range, including community-based organisations, grassroots organisations, coalitions or advocacy groups and other associations operating between the state, individuals and the market (Androff, 2012; Belloni, 2001). Across Europe, there has been a proliferation of civil society organisation's engagement in social innovation practices seeking to affect complex environmental challenges. Adding motivation to these organisations's innovative work for sustainability is the strong mobilisation of the international community that in 2015 adopted two high-level agreements targeting seventeen sustainable development goals and limits to climate change. European nations and local authorities have been supporting these two high-level agendas for many years and a number of European cities have been leading and supporting innovative solutions that contribute to achieving sustainability goals (Københavns Kommune, 2012). The stream of social innovation explored in this chapter focuses on the practices of engaged actors regarding the promotion of sustainable living patterns and sharing soft-modes of transportation in cities, specifically bicycle use.

Bicycles provide a soft and flexible mode of transportation in urban areas. Their use is associated with numerous positive environmental, social and economic impacts ranging from improved human health to cleaner air and lower carbon emissions, from reduced noise to an overall improvement in a city's quality of social life (Rabl & de Nazelle, 2012; World Health Organization, 2010; Oja et al., 2011; Woodcock et al., 2014).

Many European cities have invested in building new and improving existing bicycle infrastructure to facilitate increasing and safe bicycle use (Pucher & Buehler, 2008). European public actors, in general, seem to understand well and increasingly promote the benefits and opportunities of supporting cycling and walking (European Cycling Federation, 2016; Pucher & Buehler, 2008). The number of research and advocacy reports and projects offering recommendations to all levels of public and private city decision-makers has multiplied over the last decade (Colville-Andersen, 2018). Additionally, new forms of multi-stakeholder agreements are proliferating in many cities (Handy et al., 2014; Pucher et al., 2010).

Urban studies and direct observations confirm that improvements made in bicycle infrastructure's quality and level of provision results in additional cycling in cities, whereas a lack of safe infrastructure can severely limit the scope of sharing space for bicycle use (Pucher & Buehler, 2006; Andrade et al., 2011). Beyond this knowledge, however, there is still a lack of understanding of the role that social engagement and civil society organisations can play to deter, mobilise and sustain bike traffic in a city.

This chapter contributes to increasing our understanding of the role of civil society's organisations in the field of environmental sustainability through an analysis of social innovative practices and the impact they produce concerning the promotion of bicycle use in cities. We compare the role of social innovation in four cities: Copenhagen, Frankfurt, Milan and Brno. The questions guiding this analysis are the following:

- How is social innovation shaping, accelerating or decelerating change trajectories in promoting bicycle use in these four European cities?
- How have these particular forms of social innovation emerged and evolved over time within their local contexts?

Central Concepts

Environmental Sustainability in Cities

The environment is where we all live and cities are home to more than half of the world population. These two aspects are inseparable, as stated in 1987 by the Brundtland report (United Nations, 1993). Achieving sustainability in cities requires attending to all the dimensions: economic, environmental and social, and considering present and future generations' needs. Although grounded in the field of *environmental* sustainability, our study considers all these dimensions. From its inception, the concept of sustainability created the framework and narrative that prompted nations' and cities' actors to act. The year 1993 is used here as the base year to initiate observations in the four cities under investigation. The assumption is that the year 1993 created an initial moment of contention (Fligstein & McAdam, 2014), which

affected all four cities with a seminal understanding of sustainability in a similar way (Figueroa et al., 2015).

Social Innovation for Environmental Sustainability

Beyond an understanding of social innovation as 'the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations' (European Commission, 2013, p. 6); we emphasise new ways of resolving environmental problems by civil society groups. We seek to understand the impact and forms of engagement in collective efforts and practices and in their interactions with state, business and other non-state actors. We distinguish some components to refine our understanding of social innovation within environmental sustainability drawn from the literature (van der Have & Rubalcaba, 2016). We select and compare social innovation cases that promote: (a) a move from individual to community approaches; (b) help create a sense of empowerment toward solving common urban environmental problems or meeting common needs; (c) deal with issues of sharing urban space to scale up a sustainable solution; (d) promote creative participatory processes that are oriented to social/environmental goals.

Thus, we try to understand how social innovation actions can contribute to and be directed by the achievement of mutual understanding among individuals and communities, and how the resulting understanding can facilitate advancing coordinated actions (van der Have & Rubalcaba, 2016; Moulaert et al., 2013). We will argue that civil society's social innovative practices can facilitate achieving a level of social coordination that is based on a collective interpretation of the social context (Habermas, 1984; Cajaiba-Santana, 2014) and supported by innovative practices. With support from Habermas and Cajaiba-Santana's concepts we will seek to develop an understanding of how social innovative actions are part of a process of communicative action that confers legitimacy to the practices of sharing space for bicycling and how this process can potentially spark a virtual cycle. An example of this occurs in at least one of our cities. Key in this understanding is that social innovation can help create a practice that people accept as worth imitating, supporting and sustaining (Cajaiba-Santana, 2014).

Methods

Case Selection

This study focuses on four European cities: Brno (Czech Republic, pop. 378,000 in 2017), Copenhagen (Denmark, pop. 1,304,000 in 2017), Frankfurt (Germany, pop. 749,000 in 2017) and Milan (Italy, pop. 1,700,000 in 2017) (United Nations, Population Division, 2018). These

four cities share some traits that are important for our investigation, including population, overall density and each city's economic vitality with respect to the nation state. Moreover, these four cities provided an exemplary variety of environmental initiatives and a level of experimentation important for social innovativeness in the promotion of sharing space for bicycle use. Despite the commonalities, we will observe major differences in how the social innovation materialises. We found the most advanced cases of social innovation in sharing space for bicycle use in Copenhagen, whereas Frankfurt, where most of the infrastructure for cycling is in place, is a city where the promotion and use of bicycles and the degree of social innovation are less significant. Milan is a case where high social innovativeness promoting sharing is meeting a sparse provision of safe cycling infrastructure. Brno, in turn, is starting to develop its cycling infrastructure but social innovation processes are not concurrent with an emergent meaning that creates a supportive push for sharing space for bicycle use in this city.

Data Collection

Our central tool for organising data collection was mapping of key events based on desktop research, literature review and expert interviews for each city. We selected a period of 20 years to follow with this approach, highlighting key observations between 1993 and 2015. For each city, the initial and current conditions serve as guiding milestones to trace the evolution of the stream of innovation. The mapping of activities and milestones developed for each city served as a tool to refine the interview questions prepared for those actors actively engaged in the social innovation process. The interview questions targeted the evolution of the particular social innovation around key milestones and allowed us to trace events and actors back in time to the origins of the stream and within the past two decades. The mapping helped us identify key actors within organisations. We targeted them for a follow-up interview process. This step helped us further refine our reflexive process. We completed thirty-nine expert and practitioner interviews in the four cities as shown in Table 7.1.

Table 7.1 Number of organisations and persons interviewed

	Third sector	*Government*	*External expert*	*Total*
Germany	8 (11)*	1 (4)	4 (6)	13 (21)
Denmark	6 (6)	5 (5)	2 (2)	13 (13)
Italy	6 (8)	2 (2)	2 (2)	10 (12)
Czech Republic	2 (4)	1 (2)	–	3 (6)
TOTAL	22 (29)	9 (13)	8 (10)	39 (52)

* Number of organisations/initiatives interviewed, number of people included in brackets.

Tracing the Social Innovation Stream

Tracing the evolution of the stream of social innovation included selecting intermediate milestones during the period and mapping the contributions of key actors in advancing the innovation toward that milestone as reached within each respective city. The resulting analysis produced a thick story for each city. We discuss the results in the next sections covering them in three parts: the city background, the dimensions of innovativeness and the evolution of social innovation. As mentioned earlier, local developments happened against a joint agenda and against global developments that drive this agenda. Table 7.2 illustrates the main milestones considered in observing the city evolution from 1993 to 2005. The global insight driving events is the knowledge that biking might serve as one potent means of sustainability in cities. After 1993 many academic debates and international advocacy groups strongly promoted a shift away from car culture, promotion of safe bike lanes and other bike facilities in the urban planning process. We find some of these ideas reflected in the evolution of our four cities. However, it will become clear that implementation of these principles differ remarkably across cities.

Social Innovation (SI) Stream in Copenhagen: Creating Social Value and Legitimacy for Sharing Space for Bikes

Copenhagen is one of the world cities that has achieved the greatest dynamism in sharing urban space for bicycle promotion and use. By 2016, 62% of all inhabitants biked to their workplaces or education places, and 45% of all those who travel for work or study used their bike. The number of people who bike to work or education in Copenhagen has continued to grow from 36% in 2004 to 45% in 2014 (Københavns Kommune, 2002, 2006, 2007, 2011, 2014a, 2014b).

Table 7.2 Milestones delimiting the period of observation and coding in process tracing for all cities

1993 (UN Conference on Environment Rio/Local Agenda 21)	2015
No approach for sharing public spaces and no link between bike culture and sustainability	Higher acceptance of sharing of public space and biking as one key aspect in promoting sustainability in cities
Car culture more promoted	Alternative traffic culture promoted
Transport infrastructure does not include bike lanes by default and design	All roads typically include safe lanes for bicycle use
No existence of widespread off-road facilities for parking or storage	Extensive bike facilities (safe parking/ near public transport)

An increasing number of civil society organisations and from all sectors whose work contributes to support the biking agenda shows the dynamism of this field of social innovation. Engaged actors range from direct interest organisations like the Danish Cyclists' Federation to other non-biking non-profits such as the Danish Cancer Society, the Danish Heart Association and the Danish Diabetes Society, to many municipalities (Copenhagen, Odense, Aarhus), to private firms like Gehl Architects, to national institutions like the Ministry of Foreign Affairs and ambassadors around the world. New civil society organisations such as Cycling Without Age and Copenhagenize are important actors in this field that are promoting the bicycle culture of Copenhagen to other countries and localities (Colville-Andersen, 2011). Milestones pertaining to infrastructure, policy implementation and cultural lifestyle factors have co-evolved and over time, helped create an intense dynamism as discussed in the following.

Milestones

NATIONAL HISTORY

The history of bicycle use in Denmark dates back a long time (Colville-Andersen, 2018), but in contrast to Copenhagen bike use nationally has slightly decreased of late (Britz Nicolaisen, 2016). After a law passed in 2012 lowered fees and taxation of motorised traffic (Government et al., 2012), the share of people who bike nationwide has started to stagnate and then even dropped. Recent numbers show that young people overall are biking less, perhaps due to a good offer of public transport service including access to Wi-Fi on board, whereas it is illegal to use a phone when riding a bike. Bicycling has become a political priority in Copenhagen, but according to interviewed experts, this is not the case at the national or regional level where existing power structures, wealthy constituencies and powerful political actors support maintaining car traffic and oil imports. The bicycle traffic indicators show that outside Copenhagen, bicycle use levels drop and do so significantly in rural areas.

LOCAL HISTORY

Bicycles have been present in Copenhagen for many more decades than those covered in the present analysis. During the last decades, by means of a public Bike Fund, the city has channelled investments into the planning, building and maintenance of more than 250 km of biking lanes, keeping account of the number of bike users and using this information to plan for better and safe biking (Københavns Kommune 2012). As a stream of social innovation, bicycle promotion grew stronger between the years 2006 and 2009 when cycling became a more prominent topic supported in the local political agenda, (e.g., two prominent bike-oriented figures became Lord Mayor and Mayor of Technical and Environment Department within the city in

that period). This led to systemic changes and more resources devoted to bike-targeted projects around the city. Leadership from the activist turned political leader and help from the technical side (activist turned city planner) and the municipal level, as well as the pressure and advocacy work of many years (even back in the 1980s) from interest organisations such as the Danish Cyclist Federation, helped to move the city bicycle agenda forward (Cycling Embassy of Denmark, n.d). Advocacy work from very active groups like the Danish Cyclists' Federation and more recently the Bicycle Innovation Lab have contributed to bringing many wishes and proposals into formal policy development pushing the agenda of cyclists. New projects have literally changed the mobility network and improved the possibilities for biking in the city. In addition, market actors have contributed with innovative designs, playing a significant role for the dynamism of the social innovation stream in this city. Some of the major steps are outlined in Figure 7.1 and picked up in the discussion of actors and their interplay.

Actors and Interplay

Sharing space for bicycles in Copenhagen has co-evolved gradually and complementary to the improvement of other forms of mobility in the city, including walking and pedestrian-only central areas. As the biking infrastructure improved, safety has also been enhanced. The work of new civil society organisations such as the Bicycle Innovation Lab and Cycling Without Age is more radical and transformative than previous developments.
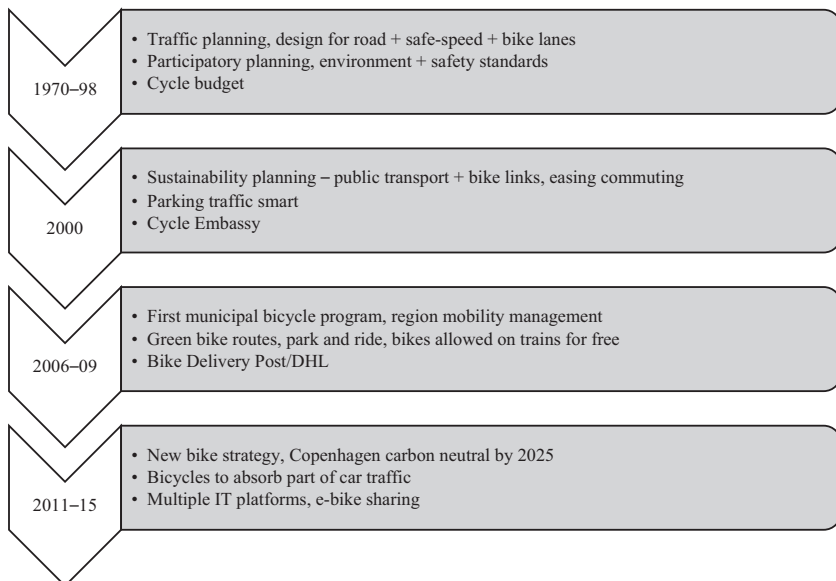

1970–98
• Traffic planning, design for road + safe-speed + bike lanes
• Participatory planning, environment + safety standards
• Cycle budget

2000
• Sustainability planning – public transport + bike links, easing commuting
• Parking traffic smart
• Cycle Embassy

2006–09
• First municipal bicycle program, region mobility management
• Green bike routes, park and ride, bikes allowed on trains for free
• Bike Delivery Post/DHL

2011–15
• New bike strategy, Copenhagen carbon neutral by 2025
• Bicycles to absorb part of car traffic
• Multiple IT platforms, e-bike sharing

Figure 7.1 Copenhagen, Denmark: milestones

The two organisations are rethinking bike use, shifting perceptions of biking as a mere instrument of mobility to a tool to deliver a green, inclusive, healthy, quality of life as well as effective mobility. One interviewee goes even further saying:

> Bike use is not just a means of green and healthy transportation but also a socially innovative force.
>
> (Interviewee from Cycling Without Age)

Cycling Without Age is running a project concerned as much with mobility as with enhancing social life by promoting the improvement of the quality of life for the elderly through biking. Similarly, the Bicycle Innovation Lab promotes bike use in the business world through their mobile Bicycle Library. Here, they promote work-related bike use instead of the use of cars at the Danish Broadcast Corporation. Disruptive changes, innovation and new approaches to bike use seem to come from civil society organisations, rather than from the state actors, though the latter are simply paramount in creating, maintaining and extending bike use with safe conditions for the universal purpose of mobility. People who bike in Copenhagen come from all cultural, social and age backgrounds. The Copenhagen Bike Accounts' efforts to increase safety has also enhanced shared use of space with pedestrians, facilitating the use of bikes by children and people of all ages (Dansk Arkitektur Center, 2014). With high ridership, the arrival of new brands of luxury bicycles creates a counter tendency in the direction of high-end commodification. As the purposes for using bicycles in the city multiply, the market has expanded to offer new models, new services and possibilities from foldable bicycles to family bicycles. Despite being more prohibitive in terms of costs, the rise of luxury bikes does not have a crowding out effect on established bicycle use.

Many years of learning experience in Copenhagen led to a point at which the social value created by the social innovation stream has consolidated the status of the city as a bicycling hub. In other words, the social innovation stream in and around bicycle use in the city has become institutionalised. There is a Cycling Embassy in Copenhagen, and bicycle consultants are constantly developing new business models around bicycle culture and life (Colville-Andersen, 2018). Some ideas occur in the commercialisation of bicycle services. Others are finding opportunities to bring about greater social inclusion. The number of bikes in Copenhagen has grown to a point where congestion is the result at some of the busiest intersections. Increases in bike traffic in Copenhagen may require the achievement of new compromises to limit car traffic and difficult political decisions. Curiously, within Denmark, the innovativeness of the Copenhagen system, instead of serving as a blueprint for other cities, makes it a magnet for innovators, bicycle lovers and even bicycle leaders in the country. This produces what one of the Danish experts called a seesaw effect, where further innovative gains in terms of the resources that organisations invest in Copenhagen, including

time, energy and ideas, come at the cost of deploying these same resources of innovation in other cities.

SI Stream in Frankfurt: Improvements in Infrastructure but Deficits in Bicycle Culture

The number of people that use bikes has significantly increased within the last 20 years: starting at 6% of the whole traffic in Frankfurt in 1998, bike use increased to about 11–13% by 2013.

Milestones

NATIONAL HISTORY

Biking has a long tradition in Germany, but local developments in recent years are more important for understanding the SI stream than lines of national history. At the national level, a recent report called the 'Sinus Study' commissioned by the Ministry of Transport in 2015 has shown deficiencies in relation to the aims in the 'national bicycle traffic plan' issued a year before by the same Ministry (Bundesministerium für Verkehr und digitale Infrastruktur, 2014; Sinus Markt- und Sozialforschung GmbH, 2015). The first report proposed the aspiration of increasing the share of bike travel further from the level of 10%. The Sinus Study instead points out that the popularity of bike travel has decreased in the population as compared to previous years. A study in 2014 has furthermore shown that the concept of e-mobility, mainly concerning cars but also bikes, is less accepted in Germany than in other European countries, for example the Netherlands or Norway (Breitinger, 2014). This provides evidence that in Frankfurt, as in the rest of Germany, a strong pro-auto narrative is present.

LOCAL HISTORY

Frankfurt is labelled the 'city of commuters' and this branding resonates with the automobile narrative referred to previously. Despite this, the ambition in Frankfurt has been to increase the share of biking relative to other forms of transport. As a social innovation stream, promoting bike use has picked up in terms of trajectories and dynamism in recent years and much effort is devoted to expanding public spaces for bicycles in the city. The opening of one-way streets to counter-directed bike traffic, which had peaked around 2006–2009, for instance, has been of great influence for improving the bicycling conditions in the city (Allgemeiner Studierendenausschuss Goethe Universität Frankfurt am Main, 2016). The use of bikes is essentially not a pay-for-service system and comparatively the cheapest form of transport available. This might have changed slightly by the initiation of bike renting systems, which comes still at low costs, or the increase of e-mobility, which makes bikes significantly more expensive.

Similar factors, but also demographic characteristics may have an influence on the stratification of bicycle use across society. In Frankfurt, but also across Germany, local government officials expressed the view in the interview that the use of bicycles is becoming trendy, mainly by young urban people. The fact that e-bikes are currently still expensive makes them more attractive to wealthier target groups than to others. Among immigrant groups, the observation is for a tendency to use fewer bicycles than among people without a migration background (interviewee from Frankfurt). Yet, this may be changing. Another interviewee indicated the share of bikes is on the rise, partly because public transport is comparatively expensive. Altogether, biking does not have a special target group and, if anything, the heterogeneity of bicycle users has steadily increased as compared to previous years, adding:

> It is becoming more diverse. There are significant shares of bike users in all groups of society.
>
> (Interviewee 9 from Frankfurt)

Cycling users span all types of people and all ages and is available to everybody. However, the number of users has currently stagnated and political actors interviewed, while having the ambition to increase shares further, think that there is not much room for further improvement. This was despite initiatives promoted by ADFC Frankfurt (the local branch of the national cyclists' association Allgemeiner Deutscher Fahrrad Club) such as 'bike + business' or 'Frankfurt bike night' that are meant to increase bike use among employees and bike culture generally. These and further milestones discussed in the following are illustrated in Figure 7.2.
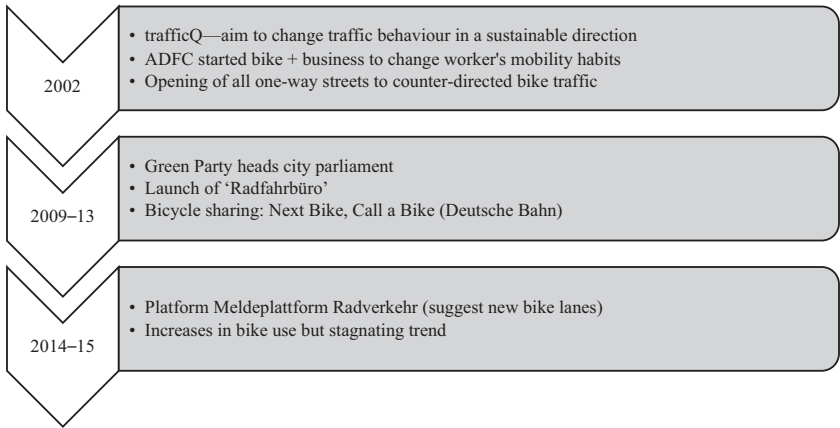

2002
- trafficQ—aim to change traffic behaviour in a sustainable direction
- ADFC started bike + business to change worker's mobility habits
- Opening of all one-way streets to counter-directed bike traffic

2009–13
- Green Party heads city parliament
- Launch of 'Radfahrbüro'
- Bicycle sharing: Next Bike, Call a Bike (Deutsche Bahn)

2014–15
- Platform Meldeplattform Radverkehr (suggest new bike lanes)
- Increases in bike use but stagnating trend

Figure 7.2 Frankfurt, Germany: milestones

Actors and Interplay

In Frankfurt, all identified actors have a great interest in promoting bicycle use and the responsible actors are mostly seeking forms of pro-active cooperation. The interviewees pointed at the importance of personal relationships as a key to initiating and maintaining such collaboration: '[E]verything fits together, and we are a small family, and all of us know each other'. Another person reiterated the network aspects and called it a form of 'give and take' between the involved organisations:

> There is a network of people, who know each other well and who, and this is the prerequisite for this to work, each give and take, people who can work pragmatically and who try to build a good working atmosphere.
>
> <div align="right">(Interviewee 4 from Frankfurt)</div>

As a result, for example, ADFC Frankfurt and the City of Frankfurt, along with other (quasi)public actors such as IVM (a mobility management agency) or traffiQ (the regional public transport provider), are working in a cooperative way and not against each other. This is what, according to the interviewees, differentiates Frankfurt from other German cities even within the same federal state and at close proximity.

   The election into the city parliament of the Green Party in 2011 resulted in a very big influence and produced a major leap in the city's priority given to biking. One result was the foundation of the 'Radfahrbüro' in 2009, which has since become a new central player if not *the* central player in Frankfurt's actor landscape. It is not only important in terms of its coordinative function between actors but also and in particular as a link between these actors and cyclists. In the words of one interviewee:

> The Radfahrbüro has a central function not only with regard to coordinating processes within the public administration, but also since it provides a link to cyclists into the community.
>
> <div align="right">(Interviewee 9 from Frankfurt)</div>

On the municipal level, despite the efforts referred to before, a report in 2014 showed that bike routes in Frankfurt needed further improvement and expansion (Stadt Frankfurt am Main, 2016). The media also frequently reports that bike-parking facilities at Frankfurt main station are few and not well organised. Better examples at close proximity could be found in Bad Homburg or Darmstadt (Rippegather, 2014). Big companies like Deutsche Bahn or Next Bike currently dominate the issue of bike sharing or bike renting, and there is no established private bike sharing culture in Frankfurt. Most interviewees, however, saw these systems as limited in their capacity to substantially leverage bike use further. Overall innovativeness

in the field in Frankfurt is advanced via state intervention in cooperation with the third sector. Market actors are less relevant. Frankfurt demonstrates a solid record of development of facilities, services and integration with public transport but the challenge for Frankfurt to stimulate increasing bike ridership in the city will still require further innovation.

SI in Brno: Social Innovation Stream Challenging Sharing

In Brno, there is a demand for bike sharing particularly from cyclist movements and students who are looking for alternative means of mobility. One of the first successful projects is Mezikavárenská půjčovna kol (Inter-cafeteria bike rental). According to interviewees, bike sharing programmes in Brno were also developing without civil society but they would probably have taken longer and might have focused more on creating a for-profit business than on the promotion of cycling for environmental or other reasons. Promotion of bike use through various cultural contests and campaigns from organised civic associations, and by a change in the attitude of, for instance employers, said one interviewee, explained the current rise of interest in bicycle use (Brněnský cyklo-koordinátor, 2010). In spite of this favourable attention, the topic of bicycle traffic can be highly unpopular within another group of people. This group of people are less welcoming to changes in road traffic to favour cyclists. They are organising to represent their mostly adversarial position to the development of bicycle transportation in the city. As explained by one interviewee, this civil society organisation work reflects:

> The association favours development of a comfortable individual transportation system "exclusive" for private cars, not to accommodate a wide range of the citizens that are considered [by the association] as "transport promiscuous" [wanting to use roads for several means of transport].
>
> (Interview with Brněnský cyklo-koordinátor)

Milestones

Three major factors supported the development of cycling and brought new people into the field. The first one is local tradition: a large share of Brno's inhabitants comes from the neighbouring towns and villages of South Moravia which is a geographically flat region. A biking culture has always been part of these areas and therefore has also become part of the mainstream way of living in Brno. The second factor is the embracement of bike riding as part of leading a healthier life that includes physical exercise. Finally, according to one interviewee, biking in the city has become a part of youth subcultures, especially hipster culture. This together with its economic advantages and the fact that several universities are located in Brno

and thousands of young people live and study in the city, make biking a preferred mobility vehicle of youngsters in the city.

There are some national or regional factors other than culture that have had an influence on biking in Brno. The role of civil society organisations and associations aiming at popularising bicycle use and advocating for the development of particular infrastructure was important. Many of these advocates, but also service providers have not originated in Brno. Prague serves as a source of inspiration and of financial resources: some of the non-governmental organisations (NGOs) working in the field in Brno are local branches of Prague NGOs. Brno has also benefitted from the influence of countries abroad—most notably Austria and Sweden (at least in the field of bike sharing).

LOCAL HISTORY

Bike sharing and bike use in general are seen in Brno partially as a disruptive form of innovation. The most important reason for this categorisation relates to the perception of using public spaces jointly and the aspect of sharing, which have not been pronounced in Czech culture until recent years. A dramatic social, political and economic shift toward privatisation and commercialisation took place after 1989, as a result of which the return of 'sharing' is regarded as something suspicious. This might explain the comparatively strong commercial drive of the bike-sharing initiatives in Brno with some organisations prepared to become fully commercial services once they have enough 'customers'. A dichotomy exists between biking as a social practice and biking as a new form of commercial service.

We discuss three major countertrends regarding bicycle sharing in Brno beyond those mentioned previously. First, there is a strong perception that biking is part of a personal lifestyle that makes the bicycle a symbol of the particular social status of its owner. This combined with the 'civic privatism' just referred to, may lead to the development of biking subcultures but not necessarily to substantial increases in the use of bikes. Second, there are initiatives driven partially by the right-wing parties and civil society actors supported especially by the elderly citizens who object to the creation of spaces for biking at the expense of individual car transportation, particularly during the reconstruction of the streets and squares. This represents the continuation of a trend that favours development of a comfortable individual transportation system exclusive for private cars anywhere in the country as a sort of 'citizens' right' for which they are 'paying their taxes' (Bárta, 2010). Third, and paradoxically, the existence of a very dense and well-operated network of public transportation which fully supplements individual car transportation may discourage citizens from using bikes.
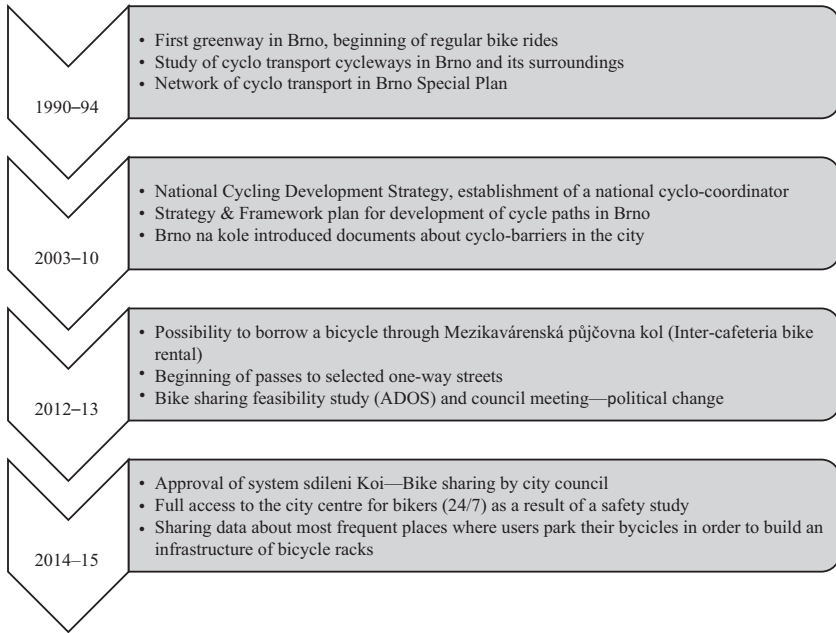
Figure 7.3 Brno, Czech Republic: milestones

Furthermore, bicycle infrastructure lacks connectivity to the public transportation network of trams and buses and other necessary infrastructure (e.g., there is lack of bicycle parking, not enough space for bicycle transportation on board trams across the city, low number of bicycle friendly buses, etc.).

Thus, we find two trends clashing in Brno. First, we witness a quantitative increase in users and beyond that a gradual rehabilitation (if not invention) of bike transportation as part of the city's transportation strategies. This trend is accompanied by a rise in investment in infrastructure and by a relatively low and declining levels of resistance of significant political forces (see Figure 7.3 for the major milestones). The availability of public resources for the construction of biking infrastructure and Brno's geography are two important restrictive factors. In contrast to the region, Brno's topography is quite mountainous, a circumstance which likely decreases the attractiveness of cycling.

Actors and Interplay

There is a mix of motives and reasons of actors active in the field. On the one hand, most of the activities which aim to support cycling are driven

by civil society organisations. These are usually motivated by environmental and cultural values—dealing with environmental pollution, gentrification of some part of the city, transportation problems etc. At the same time, bike sharing is promoted by organisations between the profit and non-profit motives who aim at some form of ethical business rather than strictly non-profit activities. Many of these organisations consider themselves 'start-ups' rather than NGOs and have business ambitions for the future. At the same time and for the reasons mentioned previously, the cycling culture has become commercialised and many cycling events or projects are sponsored by businesses which aim at targeting certain parts of the population with their products (sports equipment, alcohol, media etc.). While cycling is available for most of the citizens and no stigmatisation of users for old or cheap bikes is visible, bicycling is also seen as an attribute of a certain type of leisure activity, related to fitness and a healthy lifestyle and thus, associated with the habitus of the educated middle class. In this sense, the field can be seen as stratified and excluding of certain social groups.

SI Stream in Milan: Creative Innovation Confronting Paucity of Safe Bike Infrastructure

In recent years, more bike paths have been built in the city of Milan and by 2011 there were 130 kilometres of cycle paths. Additionally, the restriction of car entry into the city centre has encouraged citizens to use their bicycles more. An important factor according to one of the interviewees had also been the economic crisis:

> people can't afford anymore all the expenses related to car maintenance, namely: insurance, taxes, petrol, etc. they are therefore opting for the cheaper alternative—the bicycle.
>
> (Interviewee Municipality of Milan)

The cyclist image has changed deeply within Milan with businesspersons riding the yellow bicycles that are part of the municipal bike sharing initiative. The bicycles in Milan are often considered a fashion item, and some of them are expensive because of the peculiar design or layout.

In Milan, the state has recently adopted strategies and deployed resources in direct interaction with market actors. Market actors are coming forward with innovative ideas that might gain attraction in other cities, since they are making biking fashionable in Italy and potentially beyond. Conditions for safe bike riding, however, are not yet present in Milan, which might be another factor contributing to the fact that biking is currently most relevant among the young, healthy and those interested in fashion.

Milestones

NATIONAL HISTORY

Bicycles have been present in Italy as in several other European nations since the end of the nineteenth century. Bicycles are a part of many aspects of Italian life (work, sports, leisure) and for many decades the interactions of bicycles in public space and even the bicycle's social meaning has changed (Mari, 2015). The space available for bicycling in Italian cities is characterised by frequent discontinuities. Usually bicyclists are in need to share off-street facilities or to share space with either motorised vehicles or pedestrians. Nationally, guidelines such as the Codice della Strada, along with the Decreto Ministeriale number 557 of 1999 set the structural and functional features regulating cycling facilities. These guidelines regulate bike path planning and design and state the objective of achieving a proper level of safety and functionality to help promote bicycle use to reduce congestion and meet environmental sustainability goals (Bernardi & Rupi, 2015). However, these guidelines are not always followed since local administrators may see some of these indications as limitations; frequently, provisions of cycling facilities standards are waived and the separation from pedestrians is assessed merely by means of a painted stripe. Thus, with the design of some sub-standard facilities and no sufficient space for both cyclists and pedestrians a decrease in number of cyclists and in safety of the users follows (Bernardi & Rupi, 2015).

LOCAL HISTORY

In Milan, recent data highlight an increasing number of bikes and bike-sharing users. This number has increased by 26% over the last eight years and by 56% compared with 2003. The highest number of passengers use the bike-sharing service to move from home to work. More recently, after a slight reduction in 2013, the data have risen again and are now close to their value in 2012, with the total number of bike riders at 34,100 (FIAB Milano, Ciclobby, 2013).

The inspiration for change comes from the programmes run by the municipality in partnership with the private sector. In this partnership, the private sector offers financial support with projects such as the one called 'Bicittadini', an educational project aiming at increasing awareness in the use of bikes in the city (AMAT, FIAB, 2015). Another factor driving the inspiration are grassroots organisations, e.g., 'Massamarmocchi' consisting of parents who are educating their children to be responsible for the environment by picking a less polluting means of transport. The bike-sharing service is more and more successful as evidenced by the fact that more than 13% of the bicycles counted in the town centre belong to the public bike-sharing service with a peak in the Largo Augusto area.

   All the groups mentioned, along with others to be discussed in more depth later, have been lobbying for better policies and safer biking lanes. The municipality, from 2007 onwards, has made a great effort to promote a biking culture in Milan. There are more people using bicycles because of improved infrastructure, but according to one interviewee:

> Milan's main problems are cars that occupy public spaces impeding the development of alternative means of mobility.
>
> (Interviewee Municipality of Milan)

Figure 7.4 displays the milestones referred to in the preceding; they will be guiding the expanded discussion in the following section on engaged actors and their interplay.

Actors and Interplay

The strength of the SI stream started picking up toward 2005, when various institutions were involved in the Mobility Management Project. In 2011, a new mayor was elected. Letizia Moratti began to implement some
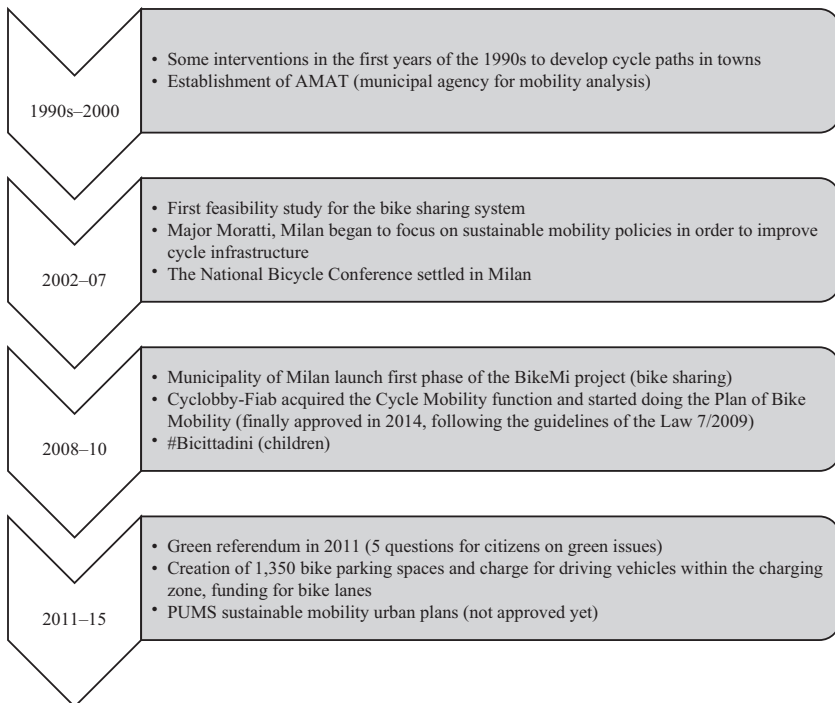

1990s–2000
- Some interventions in the first years of the 1990s to develop cycle paths in towns
- Establishment of AMAT (municipal agency for mobility analysis)

2002–07
- First feasibility study for the bike sharing system
- Major Moratti, Milan began to focus on sustainable mobility policies in order to improve cycle infrastructure
- The National Bicycle Conference settled in Milan

2008–10
- Municipality of Milan launch first phase of the BikeMi project (bike sharing)
- Cyclobby-Fiab acquired the Cycle Mobility function and started doing the Plan of Bike Mobility (finally approved in 2014, following the guidelines of the Law 7/2009)
- #Bicittadini (children)

2011–15
- Green referendum in 2011 (5 questions for citizens on green issues)
- Creation of 1,350 bike parking spaces and charge for driving vehicles within the charging zone, funding for bike lanes
- PUMS sustainable mobility urban plans (not approved yet)

Figure 7.4 Milan, Italy: milestones

interventions, building new infrastructures and promoting cycling events. First, she proposed the 'Green Rays Project' that defined and promoted a new 'slow mobility', designing green corridors in Milan's urban fabric. There have been countertrends to a broadening spread of bike use in Milan; one of the more prominent ones is the fashion movement that bike sharing has created. The more expensive and uniquely designed the bike is, the more status it gives to the cyclist. Most of the bike sharing activities and campaigns are done in collaboration with the municipality and are mainly driven by the private sector. It is the private sector players that act as lobbyists and often engage as co-financiers to municipality-run projects (e.g., #Bicittadini). Civil society in the form of self-organised parent groups also play an important role in trying to create awareness in the general population of the environmental benefits of biking. There have however been instances where the city of Milan has not worked in partnership with third sector organisations specifically the project 'Cyclobby-Fiab' with the result of undesirable outcomes, according to one interviewee:

> In Milan it has always been preferred to build expensive and, sometimes, useless infrastructure rather than listening to the cyclists' voice and save money!
>
> (Interviewee from Cyclobby-Fiab)

Milan has the state and market as the primary innovating actors in the field. The state in Milan, to a certain extent is ahead of Frankfurt and Copenhagen in engaging on two fronts: first, by directly strategising and entering partnerships with business, and second, by waging the first confrontational battles to limit access to car owners (taxes and imposing access restrictions). These may be unpopular policies but they also create the demand markets require to thrive. Whether or not that will help drive the use of bikes as much as the civic system that Copenhagen has been capable of, remains an open question. Milan seems to be tapping into the high-end forms of idea creation and innovativeness observed in Copenhagen, however, the physical supporting infrastructure for safe riding is simply not there. Therefore, a large and all-encompassing increase in ridership seems unlikely.

Synthesis

Comparative Analysis

Historical and geographical conditions are different between these four cities and therefore, each city context produces specific conditions affecting the resulting stream of innovation. Common to the four cities is timely key intervention from state actors highlighted in the milestones throughout the period considered. We have seen how state intervention sets the ground for sharing

space and with it social innovation begins to take root and, in some places, starts flourishing. A clear progression takes place in all four locations toward greater sharing of space for bicycles. However, counternarratives or deviations (biking as a fashion), as well as barriers (motorised traffic) have been observed. In Copenhagen, the social innovation stream has reached maturity in comparison with the other three cities. However, the strength of state presence and support to the stream of innovation further promotes creativity from civil society and fruitful opportunities for market actors. In Frankfurt, there is a strong lead from state actors, while organisations from civil society are fewer but also important. Despite joint efforts, the use of bicycles has stagnated at a comparatively low level in recent years. Systemic foundations for a strong value promotion are there but the creativity of civil society and the market is tempered by a strong car culture prevailing in the city spaces. In Brno, the innovativeness of the stream is still in the ideation phase. Some civil society actors engage in the promotion of bicycle use wanting to become business actors and they are taking sharing initiatives to the test. However, Brno is also an example of a place where organised civil society efforts may be capable of producing a profound move against sharing. In Brno, appreciation of the value of sharing space for bicycling is challenged by historical narratives questioning this new meaning for 'sharing' in a post-socialist era.

The cases demonstrate how civil society organisations can contribute to producing a concrete form of social value, in particular the value exercising acceptance and giving legitimacy to adopting norms, good aspects but also inconveniences associated with sharing public space for bicycles beyond pure mobility purposes. A common observation in the four cities is that the narratives that generate more traction and innovativeness in sharing space for bicycling are less related to awareness and political prioritisation of environmentally friendly practices per se, and more linked to improving health (all), enjoying life (Milan/Copenhagen) or recovering local traditions (Brno) in the urban context.

Where the collective value of sharing space for bicycle use is stronger, scalability to levels of significance for environmental sustainability are possible. This is the case only in the city with the most vibrant stream of innovation of the four cities, Copenhagen. Civil society is also demonstrating strong creativity in Milan but there needs to be a match with provision of safe infrastructure that permits further increases in bike use there. Social innovation in environmental sustainability for sharing urban space can contribute to a re-embedding of social meanings and values of public space use. Social innovation enhances volunteer practices and contributes to innovating services but its possible values and meanings will be contextual. More generally, in the four cities, sharing space relies upon the networks and interactions supported by social innovation from organised civil actors, in interplay with actions from state and market actors. We have sought to document this interplay between stakeholders but further analysis such as network analysis could prove this further.

Learnings

We have answered the question of how social innovation is shaping change trajectories in the case of promotion of sharing space for bicycle use in Brno, Milan, Frankfurt and Copenhagen. Our qualitative analysis of these four cities highlights a systemic and dynamic interplay between organisations and actors, where practices, narratives, stakeholder claims, new and old struggles, are simultaneously and continuously in interplay resulting in opportunities but also challenging the sharing of space for biking in these cities. The analysis highlights the dynamic interplay of civil society actors in practices of social innovation. Over time, we argue that SI contributes to consolidation particularly supporting social narratives, aiming at re-embedding social claims of how and why the right to mobility in a city can be distributed. The longitudinal evolution of social narratives and claims related to bicycle use in each city reflects a process of societal practical learning. As this practical learning accumulates over time, we observed the emergence of a form of legitimation of sharing space as a form of collective interpretation. We observed a form of communicative value system around bicycle use that citizens learn to recognise and (partly) embrace. In the most successful of our four cities, this legitimation works in facilitating and supporting the scaling up of bicycle use. In the other three cities, other forces are preventing consolidation of a similar collective value gain that legitimates sharing of space for bicycle use. These other forces (e.g., lack of bike infrastructure, a car-oriented culture) remain at work and social innovation alone may not have the same impact there. Further studies are necessary to understand why and how social innovation promoting bicycle use can become part of a virtuous cycle in some cities but remain in an embryonic stage in others. The most important realisation is that social innovation has a potential for unlocking seemingly locked-in conditions. Our results illustrate how experimentation in social innovation can produce forms of social coping mechanisms that can help advancing new imaginaries for long-term desired social and environmental change.

Conclusions

We answered how the SI stream and the local variations thereof have emerged and evolved over time within their local context.

Social innovation is contextual, therefore, social innovation for environmental aims is difficult to replicate from city to city. A key role in the evolution of social innovation for environmental sustainability in all the cities is played by the state. Concerning bicycle use, the state creates a safe playing field with clear rules and appropriate infrastructure that supports the emergence of creative innovative efforts from civil society. Remarkably, where there was a lack of provided infrastructure (Brno and Milan), market actors engaged more profoundly, but also with (more) limited capabilities of

promoting bike use effectively. Copenhagen shows that a supportive culture is indispensable for reaching dimensions that have a lasting environmental impact, but it is less clear how the other cities could engage in creating a similar larger impact. The study confronted a number of limitations as to the insights produced in this regard. A more rigorous implementation of the process tracing would have been needed, which would have required delving more concretely into tracing events at the organisational level, potentially linking actors' roles to specific outcomes in a more detailed fashion than we have been capable of. We have added different steps to gain further traction in our analysis but not sufficient to claim that we have established causal relations. The process has been fruitful nonetheless, to identify systemic and relational dimensions, plausible links and elements. Further research in analysing specific individualised segments of influence and interaction concerning the SI stream can build on these insights.

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