An inquiry into changes in everyday bicycling cultures: The case of Johannesburg in conversation with Amsterdam, Beijing and Chicago

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A thesis submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in fulfilment of the requirements for the degree of Doctor of Philosophy.

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I. Declaration

I declare that this thesis is my own unaided work. It is being submitted for the degree of Doctor of Philosophy to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other university.

_____

(Signature of candidate)

____ day of _____ year _____

II. Abstract

This thesis examines shifts in the everyday use of bicycles in the different contexts that are the subject of this study. In doing so it explores how associated symbolic meanings are produced and reproduced and shape everyday cycling. While many studies have shown how meanings and other cultural attributes influence cycling, there has been insufficient focus into their formation in the cycling literature leading to calls for greater understanding into their formation. Other studies shedding light into production processes reside in different scholarly traditions, limiting the possibility of interdisciplinary learning. Understanding how meanings are produced and the role of context in particular, responds to queries in the cycling literature. It can also support context sensitive policy solutions to promote bicycling for transport. To explore these questions and objectives, a historical comparative study into the changing use of bicycles for everyday purposes in Johannesburg, Amsterdam, Beijing and Chicago is undertaken.

Using a framework of analysis from transitions theory, the thesis argues that meanings emerge and change through a dynamic interrelated process involving actor activities in building or unravelling a bicycling socio-technical system and alternative ground transport solutions, contextual characteristics and associated changes, and cycling experiences. In these processes, (in)equalities in social relations resident in contexts play an important role in the production of meaning. Moreover, as meanings emerge, they do so together with user practices, technology, infrastructures, social norms, and other elements that constitute transport systems. Since there are multiple co-interacting factors that produce meanings about bicycling, policy efforts could with advantage pay attention to these and in particular how they assume specificities in contexts. The thesis also breaks ground by offering a novel empirical history of everyday cycling in Johannesburg.

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VII. Key terms

Automobility

In a ground-breaking theoretical framing, Sheller and Urry (2000) re-conceptualised cars as part of a system. They argued that rather than thinking of cars "as a neutral technology, permitting social patterns of life that would happen anyway, or as a fiendish interloper" (Sheller & Urry 2000, p.738), we should instead think of cars as part of an interlocking system in six dimensions (automobility). The first is the car as a manufactured object connecting the car as an object to industry. The second is the car as a consumer commodity that provides status; as an object that can be anthropomorphised, and one that in its operations has social consequences. Third, as a technical object whose use relies upon linkages to other socio-economic sectors, such as road building and in the advertising industry. Fourth, we should think of it as the hegemonic mode of private transportation that weakens other modes of mobility and shapes all forms of social life. Fifth, it is emblematic of a dominant cultural system about what constitutes the meaning of a good life. Lastly, it should be thought of as a major cause of environmental degradation. In effect, the car is a socio-technical system. Frank Geels, a leading scholar in transition studies has offered a similar formulation that can be applied to different transport technologies. He argues that a "transport system... [is] a semi-coherent configuration of mutually aligned elements, which include technology, industry, markets, consumer behaviour, policy, infrastructure, spatial arrangements and cultural meaning" (Geels, *et al*. 2011, p.16).

Culture

As Miles (2007, p.32) has observed, culture is one of the most complex notions. Aldred and Jungnickel (2013, p.1) argue "that definitions of 'culture' are contested in both academic and public discourse." Following Williams (1985),

Miles (2007, p.35) reflects on three types of meanings of culture; these are i) "a general process of intellectual, spiritual and aesthetic development," ii) "a particular way of life whether of a people, a period or a group" and iii) "the works and practices of intellectual and especially artistic activity." In this thesis, my conception of culture best approximates the second formulation. As I will show through discussions in chapters 2 and 3, it embraces habits, beliefs, symbolic meanings, attitudes, social norms, public perceptions about bicycling (or the image of bicycling), and the actual practices of bicycling. One can divide this constellation of cultural factors into two – intangible and tangible. The former refers to habits, beliefs, symbolic meanings, attitudes, social norms, public perceptions about bicycling, while the latter refers to the actual practices of cycling, including riding styles and accessories used. An important distinction to make here is that, in my formulation, culture is understood as an outcome of other factors. This study investigates how one dimension of this cultural constellation – symbolic meanings – is produced, and the role of contexts in particular.

Everyday bicycling

I will use this term to refer to bicycling where the main objective is transportation; the movement of passenger(s) and their goods to various destinations. This is distinct to cycling practices conducted primarily for their sport or recreational purposes. While everyday cycling can offer the same benefits, such as fitness and relaxation sought out by those who conduct sport or recreational cycling, these outcomes would be secondary to the conveyance purpose.

Mode share

I will use mode or modal share, as used in transport planning, to refer to the proportion of users of a particular transport technology (for example, the proportion of people in an urban area using bicycles for transport). Others use the

term modal split in the same way. I will usually express this in percentage (%) terms.

Status symbol

Goffman (1951) argued that status symbols have a communicative and categorical role. They show others "the rights and obligations... [which accord with someone] acting in a given social capacity" (Goffman 1951, p.294). Symbols serve in a social context to identify in terms of not only material position, but also other attributes associated with that class, including related values, education, skills and so on (ibid). The last point alludes to what Goffman (ibid) defined as the categorical function of status symbols "in that they serve to distinguish and 'socially place' the person who uses the symbol" (Woodward 2007, p.114). Expanding on the last point in a way that draws out the collective significance of status symbols, Goffman (1951, p.294) argued forcefully that they "visibly divide the social world into categories of persons, thereby helping to maintain solidarity within a category and hostility between different categories." As such, objects can communicate one's "sub-cultural affinity, occupation, wealth, participation in a leisure activity, or an aspect of one's social status" (Woodward 2007, p.135). Objects can also express individual or subjective identity, which refers to "personal, cultural and emotional meanings" (Woodward 2007, p.135).

Chapter 1. Overview of thesis

1.1 Introduction

There has been significant debate in the cycling literature about the relationship between cycling infrastructure and prevalence of the practice. In a study, Cervero, Caldwell and Cuellar (2013) argue that increases in cycling to several train stations in San Francisco, was due to provision of bicycle parking facilities and cycle paths. In this line, other studies have found correlations between infrastructure and levels of travelling by bicycle (see, for example, Dill and Carr, 2003; Krizek, Barnes and Thompson, 2009; Krizek, 2012). While there maybe a correlation, others suggest caution on the causal relationship to initiate cycling (Schoner, Cao and Levinson, 2015). In a review of the literature, Buehler and Dill (2015, p. 14) captured this uncertainty by concluding "It remains unclear to what extent bikeways entice individuals to cycle."

In spite of the ongoing debate about the relationship between infrastructure and levels of cycling, the policy agenda sometimes accords a very significant role to infrastructure provision. This is what is known as the 'build it and they will come' approach. In the context of recent global efforts to mitigate climate change, a coalition of international organisations made a strong case for the world shifting to high levels of bicycle use (Mason, Fulton and McDonald, 2015, p. 5). For the report, researchers mapped out what they called a high shift cycling scenario that would see "by 2050… cycling and e-bikes ... account[ing] for 14 percent of urban kilometres of travel" (Mason, Fulton and McDonald, 2015, p. 5). In addition to measures such as changes in laws, provision of information, and integration of land use planning with transportation, the report made a strong call for infrastructure investment (Mason, Fulton and McDonald, 2015, p. 7). This prompted a prominent cycling academic to issue a caution:

> ... going down the path of the high-shift cycling scenario beckons a larger call toward culture, funding and societal characteristics... Bicycling has widely varying social connotations in some cultures and painting it as a silver bullet that is irrespective of these cultures leaves a lot of distance to cover there (Kevin Krizek quoted in Magill, 2015).

This study then explores how societal characteristics shape the formation of what it calls cultural determinants of cycling. These include perceptions, beliefs, meanings, experiences while cycling, habits, and attitudes. These factors - as we shall see in chapter 2 not only encourage or hinder bicycling, but also shape how cycling is practised. This has been called the cultural turn in cycling (Stoffers, 2011). Amongst this body of literature, however, there has been limited focus on the

production and change of these cultural factors (see chapter 2). In this study I am primarily interested in how one of the cultural dimensions – symbolic meanings about everyday bicycling – is produced because of power to shape the possibility of mode shift in low cycling contexts (see for example, Jones and Novo de Azevedo, 2013).

Since some studies have suggested geographic variability in the influence of cultural determinants, I adopt a comparative approach to explore the role of contexts in their formation. Scholars in the transitions' literature have also called for comparative research in order to explore the role of contexts in socio-technical transitions. Appreciating how contexts shapes the production of symbolic meanings can not only contribute to the transitions' literature but it can also add nuance to policy interventions encouraging everyday cycling in the contexts of policy borrowing (see below).

In order to explore how symbolic meanings about everyday bicycling are produced I analyse associated changes in two historical periods in Johannesburg in conversation with contemporaneous changes in Amsterdam, Beijing and Chicago. In the first phase, unfolding after the turn of the 20th century into the middle of the 1930s, the bicycle became an important transport solution for the working classes. In the second, from the mid 1930s to late 1990s, cycling declined as it became a practice associated with poverty and racial inferiority. Given the interrelationships with these two periods, I also examine two other periods – in the late 19th century and from the late 1990s to 2016 – when cycling occupied a niche status with respect to other ground transport solutions (see chapter 10).

This chapter introduces the thesis. It provides a background to the global 'return of the bicycle' in terms of growing use and policy interest. It describes the spatial, economic, environmental, experiential, social, and health reasons that are motivating to borrow Vivanco's (2013) phrase, a reconsideration of the bicycle. In spite of common rationales across the globe for promoting bicycling, we observe spatial differences in bicycling adoption. These differences might be in part understood by examining cultural factors. The chapter then proceeds to describe the rationale for the study, approach to the study, and present the argument and contributions. The last section contains summaries of each of the chapters.

1.2 The return of the bicycle

The bicycle is back. Across the world, scholars and observers report interest in bicycling for transportation. Rathbone (2013) argues that "the rise of the bicycle is, of course, a worldwide phenomenon." In a survey of actions by mega cities to combat climate change conducted in 2011, researchers found that the development of cycling infrastructure recorded the highest number of actions in any category (ARUP and C40 Cities, 2011, p. 28).

Proponents promote bicycles for transport for a wide range of reasons. The environmental benefits are regularly cited. As Parkin (2012, p. 4) argues, bicycling "produces little greenhouse gas relative to motorised transport, emit[s] virtually no air pollution and [is] nearly noiseless." In this line researchers recently calculated that if the global mode share of bicycling (including electric powered bicycles) increased by 14%, there would be an 11 % reduction in global carbon emissions by the year 2050 (Mason, Fulton and McDonald, 2015). Therefore, as Cox (2015a, p. 2) notes the "bicycle [is seen] as an important component in sustainable urban transport networks."

The spatial advantages of bicycles are also regularly pointed out with advocates insisting they physically occupy smaller urban spaces than automobiles (Börjesson and Eliasson, 2012, p. 248; Parkin, 2012, p. 4). This rationale (as a tool that does not produce urban congestion), along with the environmental benefits (reductions in air and noise pollution), and population health benefits connects with liveability arguments. That is, bicycle use is argued to contribute to more pleasant urban spaces characterised by stillness, cleaner air and convivial social interactions. While bicycling, the user is said to connect more closely with the social and physical environment through which they move (Aldred, 2010, p. 39; Parkin, 2012, p. 5). However, such pleasure is not possible "within a car world, [where] bicyclists often experience a challenging sensory environment"(Lee, 2016, p. 5). Some hold that for children, bicycles can be a tool of freedom granting them greater autonomy in spatial mobility (Parkin, 2012, p. 4). Along the same lines it is argued that "females and lower social classes … have, at times in the history of cycling, been the groups most starkly transformed by the emancipating power of self-propulsion" (Parkin, 2012, p. 4).

Bicycle use is also seen as a boon to "population health" (Börjesson and Eliasson, 2012, p. 248) where these benefits encompass physical, mental and societal health (in terms of social cohesion) (Garrard, Rose and Lo, 2008). Solely limited to the physical health dimension, a recent review of

the health benefits of cycling (which also examined the possible health risks associated, such as through air pollution and risks to bodily harm in collisions) concluded that "based on a large body of evidence, planners, health professionals, and decision-makers can be rest assured that benefits from cycling-related physical activity are worth pursuing" (Götschi, Garrard and Giles-Corti, 2015, p. 1). In other words, "scientific studies show that the health benefits of cycling far offset the traffic dangers" (Rutter and Jacobsen, 2012, p. 142). The health benefits of cycling are often seen in relation to car use; that is when populations shift away from car use onto bicycles, there is reduced air and noise pollution (Garrard, Rissel and Bauman, 2012, p. 31).

Some argue that depending on circumstances, bicycles are a faster mode of transport (Börjesson and Eliasson, 2012, p. 248). Using the concept of effective speed where all the costs (monetary and otherwise), associated with a particular transport technology are converted into the time component of the equation to calculate speed (distance over time), Tranter (2012) argues cycling can be a faster mode of transport than cars in most cities across the world. For this reason Börjesson and Eliasson (2012, p. 266) make an impassioned plea to advocates "to focus on the bicycle as a highly efficient means of transport, and not reduce it to a second-best remedy for obesity or climate issues."

Bicycles are also argued to be a more affordable mode of transport and therefore potentially more "democratic" (Börjesson and Eliasson, 2012, p. 248). These costs relate to acquiring, operating, maintaining other transport technologies, and their infrastructures and energy requirements (Mason, Fulton and McDonald, 2015, p. 31). On a global scale it has recently been modelled that if the modal share of bicycling rose to 14%, it "would save the world … US$24 trillion between 2015 and 2050"(Mason, Fulton and McDonald, 2015, p. 6). Dovetailing with the point about the liberating power of bicycles, some argue that since bicycles are cheaper to purchase and maintain than automobiles, they provide economic freedom to users (Parkin, 2012, p. 4).

1.3 Spatial variations in utilitarian bicycle use

While the reasons for encouraging cycling for transport may be similar across the globe, the actual user uptake is uneven. In an often quoted article, Pucher, *et al*. (1999) argued that across North America there were signs of increased utilitarian bicycle use. An updated article published in 2011 found continued growth (Pucher, Buehler and Seinen, 2011). Northern European countries, such as the Netherlands and Denmark have the highest cycling rates, with 27% and 18% respectively of all

trips made by bicycle in both countries (Pucher and Buehler, 2008, p. 498). Bicycle ownership around the world was also found to be highest in Northern Europe (Oke *et al.*, 2015). The Netherlands[1] is unique across the world because "it is the entire country, not just one city" (Fishman, 2016, p. 1) where cycling levels are high (ibid).

Commentators observing developments in Latin America, have described the region as being amidst a cycling "craze" (Rathbone, 2013). The highest rates of bicycle ownership in Latin America are estimated to be in Brazil[2], Belize, Ecuador, Guyana, Costa Rica, Uruguay and Argentina, where about 60% of households own a bicycle (Rabesandratana, 2016). Bicycle use across the Middle East is low, with researchers estimating the mode share to be 2% in urban areas (Mason, Fulton and McDonald, 2015, p. 11). In Asia, some Chinese, Indian and Japanese cities have the highest modal shares of cycling (CAI-Asia Center, 2010; Mason, Fulton and McDonald, 2015, p. 11). Researchers estimate the average mode share in urban areas in Chinese, Japanese and Indian cities is respectively 19%, 17% and 8% (Mason, Fulton and McDonald, 2015, p. 11).

Researchers estimate that the bicycle mode share in urban areas in Sub-Saharan Africa is 5% (Mason, Fulton and McDonald, 2015, p. 11). Sietchiping, *et al*. (2012, p. 184) argue that in Sub-Saharan Africa cycling and other forms of active mobility are neglected in the policy domain. It is therefore difficult to obtain data on cycling rates. In South Africa, the national modal share of utility cycling is about 1%. It is estimated that 20% of households across South Africa own bicycles (Rabesandratana, 2016). Some of the highest levels of bicycle use reported across the continent are recorded in two small cities in Ethiopia – Bahir Dar and Hawassa – where, in 2012, the proportion of bicycles to other modes was reported to be 90.32% and 87.71% respectively (Bogale, 2012). Burkina Faso has also recently been identified as the African country with the highest levels of bicycle ownership with "84 per cent of households owning a bicycle in 2010" (Rabesandratana, 2016). Furthermore, there is reportedly high quality bicycle infrastructure available in the road network (ibid).

How do we understand these spatial variations?

1 Nevertheless, even within the Netherlands, there is wide variation among cities with, for instance, 38% of all trips made by bike in Groningen versus 16% in Rotterdam (Pucher and Buehler, 2008, p. 498).

2 In Brazil 3% of all trips are made by bicycle (Jones and Novo de Azevedo, 2013). Recent estimates revise cycling levels in Brazilian urban areas downwards to 2% (Mason, Fulton and McDonald, 2015, p. 11).

1.4 Culture, contexts and mode choice

Differences across the globe in levels of bicycle use might be explained by the variable impacts of factors, such as the built and natural environment, socio-economic positions of users, urban form and policy measures restricting or promoting cycling for transport (see section 2.2). However, given some debate on how much explanatory power these factors should be granted (Bamberg, 2012; Nkurunziza *et al.*, 2012; Oosterhuis, 2013), the study examined cultural factors. The role of context specific cultural factors in shaping cycling practices has been the subject of speculation. For example, examining everyday cycling across the United States, Barnes and Krizek (2005, p. 50) find wide spatial differences that lead them to conclude that "these variations are far larger than can be reasonably explained by differences in formal policies and facilities." These differences, they speculate, might instead be due to "local or even subcultural attitudes and perhaps history" (ibid).

As noted above, a range of studies demonstrate how cultural factors, such as meanings, beliefs, perceptions, shape cycling practices and policy actions. For example, in contexts where cars are the dominant mode of transportation, cycling tends to have a lower social status and is also sometimes seen as wayward behaviour (Vandenbulcke *et al.*, 2011). A global report examining the uneven development of policies to support walking and cycling argued that in spite of "the long-standing and growing evidence of NMT [non-motorised transport] use, and the value of non-motorized travel, countries have been slow to provide for this mode [because] NMT is seen as a low-status alternative" (UN Environment, 2016, pp. 35–36). Observing the situation in American cities, Pucher, *et al*. (1999, p. 22) note that "in cities, where the vast majority of utilitarian cycling takes place, cyclists suffer from a renegade image associated with disobedience of traffic laws, and a pervasive sense of cyclists as an alien presence on roads intended for cars." They argue that "the perceptions of cycling as lying outside the mainstream of American life discourage bicycle use" (ibid). A policy intervention to resurrect everyday cycling in Beijing, China while noting other obstacles to bicycle use, similarly argues that "one of the major challenges to encourage Beijing residents to return to cycling is the perception that cycling is not an option for daily use and that a car is an indicator of success" (BUZA, 2015). On the other hand, positive public perceptions of cycling appear to engender a positive feedback loop (see, for example, De la Bruhèze, 2000). A more extended discussion of these cultural factors is carried out in chapter 2.

Given the role of cultural factors in shaping transportation patterns, policy-focused research exploring what it might require to stimulate modal shifts towards bicycling has suggested that especially in low cycling contexts it would be vital to focus on cultural development (Nkurunziza *et al.*, 2012) to support any planned infrastructure development. Jones and Novo de Azevedo (2013, p. 11) make this argument explicitly, saying:

> Perhaps the biggest challenge for national government, states and municipalities is, not so much engineering infrastructure, but developing a culture where cycling is seen as a normal part of Brazilian mobile identity. This is important if policies to promote use of that infrastructure are to succeed.

1.5 Summary of research problem and significance

While many studies in the cycling literature have drawn attention to the influence of cultural factors such as symbolic meanings on cycling, there has been insufficient focus into their formation. As a result some scholars in the cycling literature have called for investigations into their formation (see, for example Chatterjee, Sherwin and Jain, 2013, p. 2; Handy, van Wee and Kroesen, 2014, p. 9, also more in chapter 2). More broadly, in the transitions' literature, there have been calls for comparative work to understand how contexts shape socio-technical transitions. In this study, I focus on understanding the production of symbolic meanings given their influence on decisions to cycle in low-cycling contexts. Some bodies of literature provide insight some into production processes including on the influence of contexts and associated changes, actor activities and the experience of cycling. A separate reading of these accounts might foreclose the possibility for a more integrated perspective of how habits, meanings, beliefs, perceptions and cycling practices might be formed.

While an integrated understanding of their production is necessary for nuanced theorisation, how contexts shape the production of meanings is of interest given observations of their variable impacts in contexts within the cycling literature (see chapter 2). Scholars in the transitions' literature have called for an examination of how contexts shape socio-technical transitions (STRN, 2010, p. 18; Coenen and Truffer, 2012, p. 969). They argue that such a comprehension might shed light on the possibilities of transferring solutions from one context to another (STRN, 2010, p. 18). Scholars in the cycling literature have also expressed interest in understanding how cultural factors obtained in contexts might shape utility cycling (Barnes and Krizek, 2005, p. 50; Pucher, Buehler and Seinen, 2011, p. S122; Börjesson and Eliasson, 2012, p. 247; Magill, 2015). This is of relevance to cycling policy where scholars have observed global circulation of solutions (Stehlin, 2014). For example, the concept of bicycle sharing schemes, which involve public rental of bikes for short distances

from one station to another, is not only present on almost every single continent (O'Brien, 2014), but also operate very similarly (Fishman, Washington and Haworth, 2013). The policy agenda promoting cycling-friendly cities is also often driven by similar advocacy, funding, intergovernmental and consulting firms. For example, the Dutch consulting firm, the Interface for Cycling Expertise (I-CE), has a fingerprint in many cycling studies, programmes and strategies across the world (I-CE, 2014).

1.6 Research questions

In light of the above, this study has one main research question and several sub-questions:

- How do we understand historical and recent shifts in the everyday use of bicycles in the different contexts that are the subject of this study?
    - What were the shifts in the everyday use of bicycles in the different contexts?
    - How were the associated symbolic meanings produced and reproduced?
    - How did the changing symbolic meanings further influence everyday cycling?
    - How did contextual characteristics and processes such as degrees of social inequality and political and institutional change influence these changes?
    - How did the evolution of other forms of transport such as especially the private motor car influence everyday cycling?
    - How did transformations within the industry and market of cycling, including technology and price, influence change in everyday cycling?

1.7 The study

The purpose of this study is to analyse shifts in the everyday use of bicycles in Amsterdam, Beijing, Chicago and Johannesburg. In doing so it explores transformations in associated symbolic meanings. To do this, I situate the analysis using the multi-level perspective in transitions theory on historical durations of transformation. Within transitions theory, changes in a system of provision of a societal function known as a socio-technical system (STS) which include symbolic meanings, technology itself, policy, regulations, infrastructures, industry, maintenance system, user practices and social norms are theorised to unfold over long periods of time. As the way in which a societal function is provided for changes, so does the constituent elements. Theoretically then, such periods

of transformation offer rich episodes to explore dynamics of change. A main criterion therefore for selecting study sites was variation in everyday cycling trajectories – in particular selecting sites in which bicycles along with other STS elements had become or ceased being an important ground transportation solution.

Empirically, the study is located in urban areas since that is the domain of bicycle promotion in the wake of the return of the bicycle discussed above. I selected Johannesburg (as an African city), as the main site of inquiry two main reasons. Firstly, a majority of similar inquiries have been conducted in North America, Europe and Asia (see chapter 5). Secondly, over the period of inquiry (from late 19th century to 2016) Johannesburg has demonstrated a relatively 'static' contextual attribute – economic inequality – while other contexts have not demonstrated this stability. In this light, Johannesburg offers a relatively stable historical characteristic whose effects can be compared and contrasted in other contexts. Furthermore, it was the city within which I lived at the time of research and was also involved in bicycling promotion activities. In addition to possessing major variations in everyday use of bicycles, the other sites, Amsterdam, Beijing and Chicago have over time featured divergent histories of inequality. Amsterdam almost in complete opposite to Johannesburg, has a long tradition of egalitarianism. Furthermore, as we shall see in chapter 6, unlike Johannesburg, Amsterdam has sustained a much higher level of everyday cycling over time even at its lowest in 1973. This therefore raises interesting questions about possible particular contextual conditions in Amsterdam enabling cycling. With respect to changes in social equality, Beijing has gyrated from extreme forms of inequality into a project of egalitarianism via Communism and then to heightened inequalities in the turn to a market economy. Transformations in everyday cycling have followed a similarly 'see-sawing' pattern moving from niche status, to dominance, then marginality and finally, the possibility of resurgence. Beijing is therefore a useful empirical case to explore relationships between changing social relations with respect to inequality and everyday cycling. Finally, Chicago is most similar to Johannesburg featuring traditions of social polarisation – albeit more muted ones. Within this context, it is only in a more contemporary phase where everyday cycling appears to be on an upward trajectory as a solution for ground transportation. Chicago therefore offers insights into the possible fortunes of everyday cycling within a context of the study sites, that is most similar to Johannesburg.

The study compares and contrasts major changes associated with the use of bicycles in Johannesburg with those in the other three study sites. I identified two significant historical changes

in the public image of bicycling in Johannesburg. In the first one, bicycles were the most numerous mode of private transportation up to 1936. The roots of this I argue can be found in earlier processes especially in the late 19th and early 20th century, when bicycles were a symbol of prestige (in wealth and racial superiority). In the second period unfolding from the turn of the 20th century into the mid-1930s, bicycling for transport became stigmatised as a practice for the poor and the socially subservient. These two transformations, following transitions theory, are identified as socio-technical changes since they involved a fundamental transformation in the provision of a societal function (see chapter 4). In the second phase, automobiles overtook bicycles numerically and in status value. Since the mid-1930s, the system of automobility has been reproduced and enacted by proponents and users creating powerful path dependencies. Some of these include user habits, meanings, user practices, road design, and social norms. While these two are the primary objects of analysis, the study also examines dynamics in the late 19th century and from the late 1990s to 2016 when bicycles occupy niche status since their situation is intimately connected to the other two.

1.8 Argument and contributions

This study offers two contributions. Following insights in transitions theory and the multilevel perspective in particular, this thesis argues that symbolic meanings about everyday cycling emerge through a dynamic process involving actor activities in building up (or not) everyday cycling socio-technical system and alternative ground transport solutions, contextual characteristics and associated changes, and the experiences of cycling. It therefore weaves together more closely, disparate insights from some scholarship, that sheds insights into relationships between symbolic meanings and transportation behaviour. With specific reference to context, it draws attention to (in)equality in economic and social relations as a particularly important variable in facilitating the extent to which bicycles and other transport technologies become subject to status appraisals. It therefore offers a response to queries i) in the transition literature to examine the role of contexts in shaping socio-technical transitions, ii) and in the cycling literature for investigation into how cultural factors in contexts influence everyday cycling.

Secondly, it presents a history of everyday cycling in Johannesburg from the beginning of the urban centre to 2016. In chapter 9, I argue that while there are other accounts depicting recreational and sports cycling about Johannesburg, there is none that describes the use of bicycles for transport. Reflecting on South Africa in general, the novelist and Nobel Prize laureate J.M. Coetzee argues

that “a social history of the bicycle in South Africa has yet to be written” (Coetzee, 2012). This thesis is a small correction in that regard. While the account is limited to Johannesburg, as will be argued in parts of this thesis, it reflects a broader South African story.

1.9 Policy recommendations

Following a dynamic, context-sensitive understanding of the production of symbolic meanings about everyday cycling, I offer some policy recommendations in section 11.7 for low cycling contexts. These can be summarised as:

- Build social networks as a first step in the bicycling niche development process. Such social networks can produce the other two planks of a niche technology, which enable wider diffusion given weaknesses with incumbent socio-technical regime and landscape developments; i) visions and expectations and ii) learning.
- Modify cycling promotion policies as appropriate (see section 2.2) given context-specific characteristics. For example, the necessity and design of bicycling infrastructures (lanes for example) is contingent on the nature of social values, which produce particular kinds of road etiquette (see section 11.3).
- Diminish the circulation of symbolic meanings associated with car use by enacting bans on automobile advertising.
- As per the previous recommendation, take advantage of relevant landscape developments, such as an emerging preference for urban living to promote bicycling.
- Reduce economic inequality in order to suppress the tendency for “consumption” of automobiles for the purposes of communicating dignity and prestige.

1.10 Structure of the thesis

Chapter 2 provides a rationale for focusing on cultural variables that influence everyday cycling. These variables include meanings, habits, beliefs, and perceptions about bicycles and bicycling. It argues that while a range of studies have found socio-economic, natural and built environmental factors to be important (though not absolute) determinants of bicycle use, other studies have also shown that cultural factors play a considerably important role in shaping transport mode choice. These studies show, for example, where bicycles are associated with poverty, low social power,

backwardness, danger and other negative attributes, people are unlikely to use them. In the opposite direction, other studies have found that when bicycle use is thought to connote modernity, cosmopolitan urbanism, and other signals that are esteemed in particular contexts, then use is high. However, these studies do not show how these cultural factors are formed and shed little insight into reasons for variable impacts across contexts.

Chapter 3 then takes up the questions raised in chapter 2 about formation processes and role of context in particular. In doing so, the chapter reviews, a wide range of literatures providing insights into the relationships between symbolic meanings and transportation behaviour. These include, consumer studies, the mobilities literature, social practice theory, transition studies (multi-level perspective in particular), and social construction of technology. Based on this review, I conclude that process of meaning formation about everyday cycling can be analysed in the dynamic interrelationships between actor activities in building (or not) a bicycling socio-technical system and alternative ground transport solutions, contextual characteristics and associated changes, and the very practices of movement.

Chapter 4 describes the analytical framework to investigate formation and changes of symbolic meanings about everyday cycling. I argue that the multi-level perspective (MLP) in transitions theory is an appropriate framework because it simultaneously pays attention to agency, society and associated changes (called landscape developments), and practices as enactments of structure. Furthermore, meanings are seen as elements of socio-technical system (and thereby not as abstracted individual properties), which co-evolve over long periods of time. The long temporal view of the MLP is an advantage over studies discussion in chapter 2, which assume shorter time frames. Change within the MLP can be understood as a dynamic dance where a i) niche technology, including associated meanings, can emerge to greater diffusion if it is sufficiently developed when ii) landscape developments occur putting pressure on iii) an incumbent socio-technical regime, which itself may be facing internal weaknesses and producing negative societal externalities. The chapter also discusses how I enrol the insights from the discussion in chapter 3, into the analytical framework.

Chapter 5 describes the research methodology. In order to explore how contexts shape the

formation of symbolic meanings, I adopt a comparative stance. This also responds to calls in the transition literature for more comparative work. In identifying the case study sites, I followed two criteria. One was changes in the use of bicycles for transport as revealed in mode share data. In transition studies, changes in the provision of a societal function (from one system to another) also involve changes in elements that make up such as system of provision – such as symbolic meanings. Examining empirical processes through which such changes take place can lend insights into change levers. A second criterion was differences in contextual attributes in particular inequality in order to explore influence. These considerations as well as research gaps and pragmatic rationales produced Johannesburg, Beijing, Chicago, and Amsterdam. Since Johannesburg presents a relatively stable history of inequality vis-a-vis other study sites it is the primary study site against which other cases are compared and contrasted. The data collection methods are circumscribed by the analytical framework described in chapter 4.

Having established the theoretical basis and a methodology to the study, chapters 6 to 9 provide historical overviews and analysis of everyday bicycling across the study sites. In telling this story across the different sites, I provide a sense of the demographics of users, bicycle technologies, and street level composition of other transport technologies. Each chapter is divided into historical phases reflecting levels of bicycle use. The reader is given an overview of the respective phases in each chapter's introduction. See also section 5.3.5. Chapter 10 brings together the analyses in chapters 6 to 9 in conversation with each other. It compares the identified changes in Johannesburg from the beginning of the urban agglomeration to 2016 with those in the other study sites. The chapter also highlights the three-dimensional mode of analysing formation of symbolic meanings about everyday cycling: cycling experiences, actor activities in building up or unravelling a bicycling socio-technical systems and alternative ground transport solutions, and contextual characteristics and changes in context.

In chapter 11, I conclude the thesis by reflecting on the model of the production of symbolic meanings about everyday cycling and policy implications that follow. I emphasise the importance of spatial attributes (not only in urban form) but also in other dimensions, such as social values and political-economy in shaping transitions. Bicycle use is therefore inseparable from contexts. I point out that while I situated the study in urban agglomerations, I was repeatedly drawn to other scales at regional, national and international levels to understand local dynamics. I observe that the intensity

of landscape developments and the nature of problems related to an incumbent socio-technical regime shape the possibility of niche emergence. Indeed, in addition to an embryonic bicycling niche, limited landscape pressure and moderate “pain” in car use help explain the absence of transition towards bicycling in Johannesburg. I end by pointing out some limitations of the thesis and identifying potential future research avenues.

Chapter 2. Cultural determinants of everyday bicycling

2.1 Introduction

The purpose of this chapter is provide a rationale for focusing on cultural determinants of everyday cycling. It does this by first considering all the various other factors that influence bicycling, as discussed within the cycling literature. Studies have shown that socio-economic, environmental factors (natural and physical), and policy interventions play important roles in encouraging or restraining utilitarian cycling. Some of these are income, urban form, topography, weather, bicycle infrastructures and traffic-calming. While these studies have helped shed light on some important determinants of utilitarian bicycling, their effects are not always unidirectional. The influence of these factors on cycling practices is also spatially and demographically variable. In addition, some have moderating instead of absolutely debilitating effects across populations. Further, policy interventions, such as infrastructure development or laws and regulations to promote bicycling maybe understood as outcomes of a positive public image about bicycling.

These qualifications, as well as the influence of meanings, beliefs, attitudes, perceptions about cycling and the practices themselves of cycling – which I term cultural determinants – provide the rationale for focusing on culture. I therefore discuss in some detail a range of studies that show that beliefs, perceptions, meanings, social norms, and attitudes about everyday cycling, and the actual practices of cycling, influence whether people cycle, for what purposes they cycle, how they cycle, and even policy solutions. Against this background, I conclude the chapter by discussing calls for cultural transformation in order to stimulate everyday bicycle use by way of setting the stage for the discussion in the following chapter on processes of cultural change.

2.2 Socio-economic, policy, and environmental factors

Studies have found that cycling for everyday purposes is influenced by socio-economic, policy, natural, and built environmental factors. These factors have been comprehensively reviewed in the literature. See for example (Pucher and Buehler, 2008; Heinen, van Wee and Maat, 2010; Pucher, Dill and Handy, 2010; Yang *et al.*, 2010; Stewart, Anokye and Pokhrel, 2015). This section will therefore provide a schematic introduction to those factors and not attempt to repeat previous work.

Topography is thought to be important in influencing cycling because of the level of effort required to pedal (Heinen, van Wee and Maat, 2010, p. 67). This is an especially important variable for utilitarian bicycling (Cervero *et al.*, 2009, p. 219). Other research has found that some recreational and more experienced bicycle users prefer cycling in hilly environments (Heinen, van Wee and Maat, 2010, p. 67). While important factors, Oosterhuis (2013, p. 24) suggests that natural environmental variables should be seen as moderating and not absolute barriers to everyday bicycling.

Many studies show that compact urban form with diverse land uses is ideal for cycling given the shorter travel times (Heinen, van Wee and Maat, 2010, p. 65). While there is some debate about what might constitute a 'bike-able' distance with studies finding this may vary across gender or amongst individuals (Heinen, van Wee and Maat, 2010, p. 65), Nkurunziza, *et al*. (2012) refer to a study that suggests that anything beyond 15 kilometres is too onerous. Bike-able distance is undoubtedly influenced by topography. Furthermore, Fernández-Heredia, *et al*. (2014, p. 2) also suggest that it should be read together with the "flexibility offered by bicycles[s] regarding waiting time for public transport or parking cost for cars." Thus, in some cases, bicycle users might prefer longer distances trading off inconveniences associated with other alternatives.

Bicycling infrastructures are often seen as important in attracting users by addressing safety and increasing convenience. A study of ninety American cities found that "cities with a greater supply of bicycle paths and lanes have higher bicycle commute rates" (Krizek, 2012, p. 119). Not all types of bicycle lanes are seen as equal. Those that are separated physically from motor traffic – known as bicycle paths or tracks in different contexts – are generally held as the gold standard since they increase safety of bicycle users (Heinen, van Wee and Maat, 2010, p. 63). Furthermore, cycle lanes, tracks or paths should form a comprehensive network that takes users to their destinations without interruptions. Thus, lanes or paths that end suddenly or are not linked to prevailing mobility patterns may not enjoy much use. Other types of infrastructures that are argued to encourage cycling include parking facilities, showers at work, lockers at public transit destinations and facilities to carry bicycles on public transit (Pucher and Buehler, 2008, p. 512; Heinen, van Wee and Maat, 2010, pp. 54–66). These make cycling more convenient.

There are other interventions in the built environment argued to increase the safety of bicycle users

and therefore encourage use. One example is traffic-calming, which can be achieved by laws that reduce speed limits in certain areas or, engineering measures, such as speed bumps and narrower roads. Traffic calming can also be achieved by banning cars from certain roads altogether. Other engineering measures to encourage utility cycling include bicycle stopping zones in advance of cars at road intersections, and cycling specific traffic signals, such as those that are synchronised at the rates of bicycle speeds to ensure a continuous movement (Pucher and Buehler, 2008, p. 512).

It is however noteworthy that there is some debate about the role of engineering interventions in encouraging bicycling. Some question the directionality of analysis wondering whether cycling infrastructure follows social acceptance and vice versa (Dill and Carr, 2003; Emanuel, 2012, p. 87). Highlighting the limitations of infrastructure-led approaches Bamberg (2012) refers to some studies, which hold that cycling infrastructure is responsible for 4–9% of decisions to commute by bicycle. Schoner, *et al.* (2015, p. 7), in a study into the relationship between bicycle infrastructure and decisions to travel by bicycle conclude that "bicycle lanes act as 'magnets' to attract bicyclists to a neighbourhood, rather than being the 'catalyst' that encourages non-bikers to shift modes." The debate continues.

Formal laws and regulations governing bicycling, as well as the interactions between bicycle users and other road users, can also influence rates of everyday bicycling. These include "traffic law[s], [and] traffic regulation, such as STOP signs and traffic lights..." (Pelzer, 2010, p. 27). In this light it is argued that legal regimes that place the burden of responsibility of road safety on motorists increase cycling, since they encourage more cautious conduct amongst drivers (Pucher and Dijkstra, 2003, pp. 1513–1514). Like the debate about the role of infrastructure in stimulating bicycling, such formal laws and regulations may be seen as an outcome of a positive public image about bicycling from policy-makers and other proponents who lobby for infrastructure development.

Turning to demographic factors, many studies suggest that men tend to bicycle more than women, but this appears to be a function of the overall rate of cycling in each context, rather than something specific about gender. That is, in contexts with higher overall levels of cycling, more women will be found cycling and vice versa (Heinen, van Wee and Maat, 2010, p. 69). As such, Fernández-Heredia, *et al*. (2014, p. 2) drawing on Garrard, Rose, & Lo (2008), suggest that this variable is "related more to cycling culture than to bicycle use." Here while Fernández-Heredia, *et al*. (2014) do not define what they mean by culture, they are pointing the degree of normalisation of everyday

cycling in each context. While physical deterioration associated with ageing contributes to reduced cycling, studies suggest it is difficult to generalise across all geographic and demographic contexts (Heinen, van Wee and Maat, 2010).

A similar degree of ambiguity exists in the relationship between cycling and income. Some studies find positive relationships between high levels of income and cycling, while others find the opposite to be true (Heinen, van Wee and Maat, 2010, pp. 69–70). Related to income, studies do find that the costs associated with other alternative modes of transport will influence the decision to cycle (Handy, van Wee and Kroesen, 2014, p. 9). Moreover, it goes without saying that "access to a bicycle is obviously a necessary condition for cycling" (Handy, van Wee and Kroesen, 2014, p. 8), which is in part determined by income.

Studies have found that "car ownership decreases cycling" (Heinen, van Wee and Maat, 2010, p. 80). For this reason, Pucher, *et al*. (2010, p. S121), comparing the influence of car use between northern Europe and America on bicycling, argue that the higher rates of bicycle use in the former can partly be explained by stronger policy sticks against car use (such as taxes, car free zones, limited parking spaces and so on), than the latter.

A major emerging theme here is how the impact of some of these factors is geographically variable. For example, in France, Belgium, the United States, Great Britain, Australia and Canada, everyday bicycle users tend to be men, the youth and students. In Denmark, Germany and the Netherlands, the demography of people cycling corresponds to national populations (Oosterhuis, 2013, p. 25). From their survey of the literature, Heinen, *et al*. (2010, p. 76) suggest that the influence of socio-economic factors – age, income gender – is inconclusive, especially given their variance across spaces.

Other scholars examine how changes to socio-economic factors might encourage or discourage bicycle use. Some of these include "changes in housing, employment, health, and family status" (Bonham and Wilson, 2012, p. 195). These changes interact with the aforementioned factors in a dynamic way. For example, if individuals switch jobs located further from their homes, they are likely to reduce if not switch to other modes. In the other direction, individuals may opt to work or live in locations that reduce their travel distances enabling them to bicycle (Oakil *et al.*, 2016, p.

377).

Changes at the household level can also affect commuting behaviour. For instance “childbirth may generate an extra demand for owning a car because one has to drop off and collect children from day care centers, schools, etc.” (Oakil *et al.*, 2016, p. 377). Research has also found that older populations may seek out cycling in their transport for its health benefits. Inversely poor health may reduce the use of active travel modes, such as bicycles (Chatterjee, Sherwin and Jain, 2013, p. 10). Such changes may be influenced by built environment attributes. For example, more compact urban spaces featuring good bicycle facilities may still allow families with children to use bicycles for transport. In this line of influence, a study found that “life events were usually the trigger for a change in cycling but external changes to the bicycle environment played a facilitating role in enabling change” (Chatterjee, Sherwin and Jain, 2013, p. 1). That is, improved cycling conditions, such as availability of bicycle infrastructure encouraged those for whom changes in “education, employment, family, residential [locations], health, leisure” (Chatterjee, Sherwin and Jain, 2013, p. 5) had persuaded them to consider cycling.

2.3 Cultural factors

While the aforementioned studies have provided unparalleled insights into the decisions to cycle, some scholars have also sought to highlight psychosocial factors. These include attitudes, perceptions, beliefs, social norms, values, habits, meanings, and experiences while travelling (Jensen, 2009; Heinen, van Wee and Maat, 2010, pp. 71–74; Willis, Manaugh and El-Geneidy, 2015) – which have been termed as “intangible factors” (Rietveld and Daniel, 2004, p. 523) – and associated practices of bicycling (Fincham, 2007; Kidder, 2008; Spotswood *et al.*, 2015). The attention to these factors has been dubbed as the cultural turn in transportation (Divall and Revill, 2005), and in cycling (Stoffers, 2011, p. 157) more particularly. I discuss these below.

Research has found that there is a close relationship between having a positive attitude about bicycling – where an attitude is defined “as the expectation of all the outcomes of an activity, and the personal value of these outcomes”(Heinen, van Wee and Maat, 2010, p. 71) – and the practice. Studies find that habits strongly influence the possibility of everyday cycling, where “individuals who have a habit of cycling are more likely to cycle in the future” (Willis, Manaugh and El-Geneidy, 2015, p. 576). These habits can be related to other modes of transport influencing

everyday cycling. For instance, a large scale study found that one reason for low levels of walking and cycling in England was "the extent to which... car use ha[d] become normal, and habitual" (Pooley, 2012, p. 2). While Schwanen, Banister, & Anable Schwanen (2012, p. 522) seek to reformulate the conception of habits as simply individually-based, un-reflected upon, repetitive conduct to one that is integrated into social customs and embodiment, they still understand habits as important in shaping transport practices.

Some cycling practices, especially those with an outlaw image, tend to work against normalising cycling. They tend to attract few (Colville-Andersen, 2009). For example, the riding practices of bicycle messengers who tend to dart and dive amidst motor traffic as they search the quickest routes to complete their delivery can be intimidating for some people, while others find them thrilling (Daley and Rissel, 2011). Thus, Horton and Parkin (Horton and Parkin, 2012, p. 307) show a negative self-reinforcing cycle where if cycling is "hard to do, only the hardy will do it... and they will develop practices that distinguish themselves and create distance between themselves and others rather than inspiring 'the masses' to join them."

Other studies have shown that the materials used in cycling can influence perceptions and participation. For example, a study found that Lycra clothing often worn by sports cyclists discouraged some since it projected a degree of capability not possessed by ordinary people. On the other hand, some users thought that wearing Lycra clothing would elevate the social status of cycling therefore making acceptable for them to participate (Daley and Rissel, 2011). Similarly, another study focusing on the effects of the forms of cycling found that "if cycling is seen as an activity for children or as a competitive sport, residents may be less inclined to cycle as a means of transport" (Handy, van Wee and Kroesen, 2014, p. 9). Thus, what people see is important in influencing what they believe.

The role of social meanings in shaping transportation patterns was underscored in a seminal study by Adri Albert de la Bruhèze and Frank Veraart. They studied historical changes in bicycling use in the time between 1920–1995, in nine European cities (Copenhagen, Basel, Hanover, Antwerp, Manchester, Amsterdam, Eindhoven, Enschede, and South East Limburg) (De la Bruhèze, 2000). They argued in their analytical framework that there were several co-interacting factors that shaped bicycle use in these cities in the chosen period. These are urban form and travel distance, car ownership and use, municipal focus on the bicycle for transportation, and the public image of

bicycling. Out of these they concluded that while all factors were vital in shaping the trajectory of bicycling, the "most important factor in their view was what they called the 'image of the bicycle'" (Ebert, 2004, p. 349). Here by image they meant the symbolic significance of the bicycle. They argued that what explained the relatively lower level of decline in cycling amongst Dutch cities[3] after World War II, in contrast to the other cities in their sample "were stronger and more persistent positive collective images of cycling, which curbed the anti-cycling traffic policies dominating elsewhere during the 1950s and 1960s" (Stoffers, 2011, p. 159). Further, that "this image not only influenced the actual cyclist on the streets, but also had a great impact on politics and traffic legislation and shaped the conditions for cycling" (Ebert, 2004, p. 349). In cities such as Antwerp, Manchester and Hanover, which experienced a decline in bicycle use "the bicycle only received negative attention, for example in traffic accident statistics... [and] policy makers and the press actively and consciously reinforced the image that the bicycle was an unsafe, old fashioned and [a] shabby way of transportation" (De la Bruhèze, 2000, p. 3).

Studies in other geographical contexts have also demonstrated how the image of cycling influences use. A retrospective study asking adults in the United States about their decisions to abandon bicycling found that "the way in which participants thought about bicycling changed from elementary school to high school, leading to decreased bicycling in teenage years" (Underwood *et al.*, 2014, p. 17). Here the authors found that as teenagers, some respondents saw cycling as "uncool or the equivalent" (Underwood *et al.*, 2014, p. 20), and therefore switched to other ways of travelling.

Other research finds that in locations where cycling is perceived as a transportation for the poor, people are unlikely to take up the practice (Nkurunziza *et al.*, 2012, p. 257). This is the case in many African countries where cycling (and indeed walking) "are not viewed as fundamental options and legitimate activities in public and private transport discussions" (Sietchiping, Permezel and Ngomsi, 2012, p. 184).

Research also shows how different symbolic meanings attached to cycling lead to particular practices. Aldred & Jungnickel (2013), drawing on a larger study of cycling in four British urban areas (Bristol, Cambridge, Hackney and Hull), found a close correspondence between social meanings prevalent in each area and cycling practices. In Bristol, utilitarian cycling was more

3 Amsterdam, Eindhoven, Enschede, and South East Limburg.

linked to a middle class social status with participants using expensive bicycles. In contrast, in Hull, cycling was linked to poverty, and thus seen as a transportation mode performed due to the absence of other choices. In Hackney, though cyclists tended to be middle class, it was more closely connected with an "arty" community, which cultivated its difference even in its bicycling practices. People cycling in this community tended to use unconventional bicycles, such as home-made ones or those without gears (called fixed gear). In Cambridge, cycling was seen as a choice (as opposed to driving a car), which allowed participants to perform a variety of values including healthy living, environmentalism and contributing to reduction in traffic congestion. In a related vein, Steinbach, Green, Datta, & Edwards (2011), in a study of cycling practices in London, show how different social meanings that differ across gender, ethnicity and class produce variation in practices. For example, they found amongst their female respondents who had a stronger need to comport themselves in a strongly gendered manner, a strong resistance to cycling since it would damage their looks and thereby violate their identities. On the other hand, they found synchronisation between utilitarian cycling and a middle class identity associated with environmental consciousness, left of centre politics, and health-seeking behaviour. In other words, other population groups in London not holding this "bourgeois sensibility" (Steinbach *et al.*, 2011, p. 1126), would be unlikely to cycle.

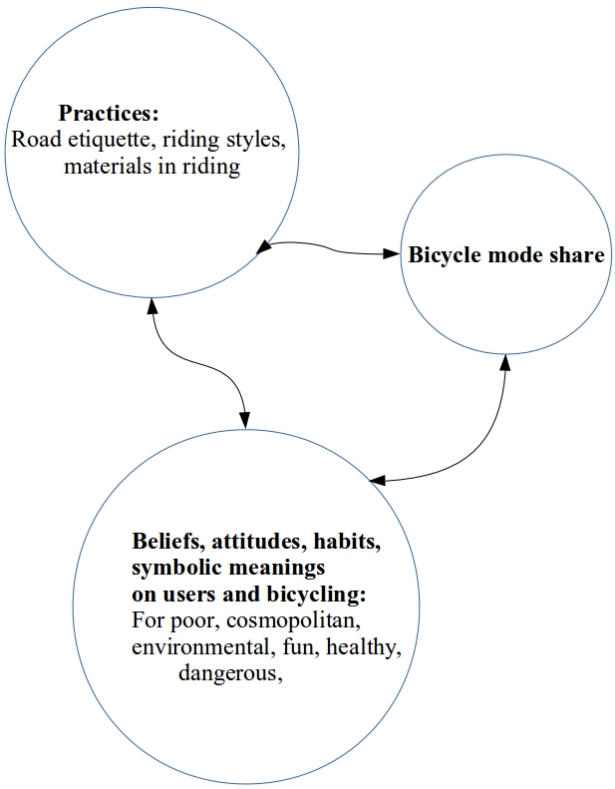


Figure 2.3.1: Interrelationship between practices, cultural factors and bicycle mode share

Figure 2.3.1 summarises this discussion about how cultural factors shape, and are shaped, by practices, and in turn influence bicycling mode share.

2.4 Calls to transform culture for everyday cycling

Given the way in which cultural variables shape cycling practices, scholars now take them seriously. For example, Stoffers (2011, p. 161) argues that "taken together, these attitudes, images, meanings, values and ideologies constitute a collective and public cycling culture that can either stimulate or restrain bicycle use." Underlining the importance of these variables, Oldenziel and De la Bruhèze (2011, p. 30) argue that they can not only shape bicycling practices but also influence policy solutions. Börjesson & Eliasson (2012, p. 252) hypothesise that "cultural factors are probably the main reason behind the fact that seemingly similar cities and countries may develop very different levels of cycling." By culture, they mean "general attitudes to cycling, such as views on status, social connotation and the extent to which people actively consider the bicycle as a travel option" (Börjesson and Eliasson, 2012, p. 257).

Against this background, there have been calls for cultural transformation. Nkurunziza, *et al*. (2012, p. 257) argue that "a cultural change is essential, suggesting a need to improve the image of cycling so that it is seen as a daily travel mode that can be undertaken by almost any one." Echoing this sentiment, Daley and Rissel (2011, p. 211) hold that "there is a need to improve the public acceptability of cycling and change public norms so it is seen as an everyday activity that can be undertaken by almost anyone without the need for special clothing, expensive equipment or limited to purpose built facilities."

Changing the image of cycling is thought to be especially important in low cycling contexts (Jones and Novo de Azevedo, 2013, p. 11; see, for example, Harms, Bertolini and Brömmelstroet, 2015, p. 16). One reason for this is that in such contexts bicycle use is seen to connote poverty. This is a common challenge in many so-called developing countries, where there are low levels of car ownership but high aspirations of ownership. To put this into some perspective by way of example, in India "45% of households own a bicycle" (Brussel and Zuidgeest, 2012, p. 184). However, this is a population that does not use bicycles out of choice. Bicycles in India are stigmatised as tools of the poor. In the context of economic development, this is a population likely to migrate over to motorised transport, such as motorcycles, scooters and cheaper cars (Brussel and Zuidgeest, 2012, p. 184). Brussel & Zuidgeest (2012, p. 184) in fact argue that "we witness in India a reduction in bicycle use among people with a higher income and education."

Is it possible to intentionally transform culture to support everyday bicycling, as the previous calls assume? Can actors – policy makers, civic organisations and others – intervene in social life to affect how bicycling is seen and practised? Nkurunziza, *et al*. (2012, p. 257) acknowledge that "changing attitudes of commuters has traditionally not fallen within the realm of transportation planners." However, they suggest that planners should "expand the realm of strategies [they] typically consider and... partner with other organisations with experience in bringing about attitudinal changes" (Nkurunziza *et al.*, 2012, p. 258).

This raises questions about how cultural transformation occurs. Handy, *et al. (2014, p. 9)* argue that "compared to other modes of transport relatively little is known about the possible dimensions of cycling attitudes and preferences, and about the formation of these factors." Further, Chatterjee, *et al*. (2013, p. 2), in reviewing a range of "socio-psychological studies of cycling" argue that while those studies show that "internal factors... are relevant for individuals to cycle... [they]... leave uncertainty about [the] role of external factors in shaping these internal factors." In other words, how are these seemingly internal factors formed?

I would agree with these assessments since many such studies adopt short temporal periods of investigation when cultural factors would have formed. The studies are situated within historical periods outside of socio-technical transitions when mobility patterns have settled down under the aegis of particular technologies such as automobiles for private transport. A case in point here are the studies discussed above, other than De la Bruhèze (2000). Other limited exceptions are those by historians of cycling (see, e.g., Ebert, 2004; Carstensen and Ebert, 2012; Emanuel, 2012; Stoffers, 2012) who examine developments in the Netherlands, Denmark, Sweden and Germany. It is therefore useful to think through how these cultural factors are formed. In this study I am primarily interested in how the symbolic meanings about everyday bicycling develop given the discussion above how they influence uptake in low cycling contexts. This will be a task of the next section.

2.5 Conclusions

The purpose of this chapter was to situate the study in perspectives that examine how perceptions, beliefs, meanings, habits and practices shape everyday bicycle use. I show that such literature provides some insights into why people may or may not use bicycles for transport. Furthermore, it shines some spotlight onto rationales for user practices and even policy solutions. These are

important contributions. However, since they emerge from insights of studies undertaken in short temporal windows, they do not show how these cultural factors are formed. In other words, it is not possible to understand how cultural factors are formed within short historical periods. Given the calls for cultural transformation in order to stimulate everyday bicycle use, understanding how bicycle cultures emerge and change is important. Another important observation was how cultural factors have geographical variability and impact upon everyday cycling practices. This suggests that contexts matter. Exploring then, how contexts shape the production of cultural factors – symbolic meanings in particular given this study's focus - is vital. The next chapter moves on to considering these questions.

Chapter 3. Formation and changes in cultural determinants of everyday cycling

3.1 Introduction

In the previous chapter, we saw that cultural factors influence everyday bicycling. These include beliefs, perceptions, meanings, social norms, and attitudes about everyday cycling, and the actual practices of cycling. Understanding how they are formed would therefore support policy intentions to promote bicycling. I also discussed how some scholars have suggested that their formation and change is not adequately theorised (for example, Chatterjee, Sherwin and Jain, 2013, p. 2; Handy, van Wee and Kroesen, 2014, p. 9). The purpose of this chapter is therefore to explore how one of these cultural determinants - symbolic meanings – is formed and therefore changes. I focus only on symbolic meanings for the sake of precision and given their power to influence uptake in low cycling contexts.

This chapter will also explore, due to the observation in chapter 2 about the geographical variability in the impacts of cultural determinants, how contexts influence formation and change processes. I undertake this exploration by reading a wide body of literatures that shed insights into relationships between symbolic meanings and transportation behaviour. These include, consumer studies, the mobilities literature, social practice theory, transition studies (multi-level perspective in particular), and social construction of technology. Based on this review, I conclude that process of meaning formation about everyday cycling can be analysed in the dynamic interrelationships between i) actor activities who are ii) embedded in contexts that undergo change and the iii) very practices of movement.

3.2 Societal characteristics in formation and change

Some insights from theory locate societal characteristics as the basis for the formation of cultural determinants of everyday cycling. Here I discuss insights from consumer studies, some strands of the mobilities literature and the multilevel perspective in transitions theory.

3.2.1 Consumption studies

Within the broad field of the consumption studies, "A primary assertion...is that objects have the ability to signify things – or establish social meanings – on behalf of people, or do 'social work'"(Woodward, 2007, p. 4). In this field, scholars have shown how the use of material objects is shaped by the social-economic context – in particular inequality. Distilling Thorstein Veblen's argument (a key scholar in this field), Schor argues (2007, p. 18)"The core of the approach is a hierarchical social structure driven by a competitive status competition in which position is determined by wealth." In such differentiated societies, prestige is accorded to those who can accumulate great wealth since they are seen as holding certain skills or competencies that others do not have. At an individual level, the basis of self-esteem is premised on wealth accumulation: "since the consumption of these more excellent goods is an evidence of wealth, it becomes honorific; and conversely, the failure to consume in due quantity and quality becomes a mark of inferiority and demerit" (Veblen, 2009, p. 53).

This is a similar account to Bourdieu's on the role of material resources in conferring honour to people (Gartman, 1991, p. 425). To Schulz (2006, pp. 58–59), what Bourdieu emphasised however was that it is not enough to simply acquire expensive products in order to receive the social distinction that is desired. The material goods need be those that are also socially seen as "tasteful". As a result, an expensive product may actually signal lower social status.

An important concept here is that status is relational. It "derives from the judgements that other members of society make of an individual's position in society" (Trigg, 2001, p. 99), and therefore "for this position to be established there must be a display of wealth" (Trigg, 2001, pp. 99–100), which can be done "through extensive leisure activities and through lavish expenditure on consumption and services" (Trigg, 2001, p. 101). For Veblen, this is a form of society where people are constantly measuring each other's success in material terms. It is therefore a dynamic system where no level of material accumulation provides satisfaction since the level of acquisition is always judged in relation to others who are also constantly seeking the highest honours (Veblen, 2009, pp. 24–26). As a result:

> Veblenian consumers are frustrated because all status is positional and Prisoner's Dilemmas abound. (Absolute increases in spending only yield social value when they improve relative position; when increases in standard of living are general, they are like being on a treadmill, merely keeping people from falling behind.) (Schor, 2007, pp. 18–19).

For Veblen then, consumption occurred in a trickle-down process, where expensive goods were first acquired by the wealthiest and then spread downwards through emulation to the middle and then lower classes (Ilmonen, 2010, p. 3). Others however have suggested a bottom-up process of emulation. Sometimes – the argument goes – the "trickle effect" works in reverse with objects, experiences, services valued by the "lower" classes, percolating upwards (Schor, 2007, p. 20). Blumberg (1974, p. 494) points to empirical cases in the United States whereby fashion sense, entertainment and speech mannerisms from counter-culture parts of society have become status symbols.

The signalling or communicative value is very important in complex, highly mobile, large differentiated societies, where individuals are less likely to have close knowledge of others but are nonetheless in daily life in proximity in common social spaces with other strangers (such as in urban centres versus rural areas). Under such circumstances the onus becomes a display of material prowess in a way that everyone will instantly appreciate (Veblen, 2009, p. 61). Furthermore, material objects that are portable acquire more salience or, rather, are more useful since they can be more readily seen by others (Charles, Hurst and Roussanov, 2009, p. 426). According to this analysis, we can see how automobiles, for example, are a convenient status symbol in large complex urban societies.

Conspicuous consumption then, is not necessarily always a "conscious act, but rather a standard of decency that exerts social pressure on the behaviour of individuals"(Trigg, 2001, p. 113). This understanding of how conspicuous consumption operates is similar to Bourdieu's concept of habitus (Bourdieu, 1992). The point is that the propensity towards conspicuous consumption is not always a rational calculative effort to establish distinction from others. It is a tendency that emerges out of the social milieu in which people find themselves: highly socially differentiated societies. Here consumption for distinction is "*embodied* in 'habitus' and *internalised* in dispositions" (Ilmonen, 2010, p. 5 - emphasis in original). The link here with Veblen is evident since the insights provided in his book, *The Theory of the Leisure Class*, were written as a critical analysis of "the spending patterns of the rich and *nouveau riches* in the late nineteenth century" (Schor, 2007, p. 18). His analysis was based on societies characterised by deep material and social cleavages (Veblen, 2009, p. 7).

Therefore, Veblen's (2009) and Bourdiue's (1992) theoretical work into social differentiation and

distinction respectively, explored in depth how objects (and experiences), which need to be both expensive and "tasteful" become tools in social stratification. Both argued that people will seek out particular objects that they use in a communicative fashion to signal at once their belongingness into a particular social class, but also their distinction from another social class.

Where formation of meanings is understood to be shaped by societal structure, scholars in consumer studies also attribute changes in the symbolic status of objects to societal transformations. Blumberg (1974), for instance, identifies a wide array of social dynamics through which status symbols may lose their allure. These include complete material satiation in society; the influence of the environmental movement, which values modest consumption; the rise of a counter-culture movement, which is anti-materialist, anti-techno-science, and anti-modernism; the rise of egalitarian tendencies, and social shifts towards valuing practical or functional goods against luxurious ones. Similarly, Veblen (2009) argued that the acquisition of material objects became "honorific", following a shift from a feudal political-economy (where honour was bound to the ability to dominate others through conquest[4]), to a capitalist one. Blumberg (1974) acknowledges that there may be other ways in which symbols change (ibid), but he does not discuss them. This is in line with the observation that because of the social power of status symbols, ways and means are always being found to break any restrictions that guard against their widespread use (Goffman, 1951, p. 302). As a result, symbols are always dynamic.

3.2.2 Mobilities literature

Within some strands of the mobilities literature, some also make arguments for changes in meanings due to societal change. For example, in explaining how movement became seen as a positive social practice in Europe from one that was previously frowned upon, some attribute a causal role to long term transformations in political-economy, technology, literature and spatial patterns of habitation (Urry, 2000; Cresswell, 2001). To elaborate, using one of these systemic variables, Cresswell (2001, pp. 10–11) argues that movement became broadly socially acceptable in part due to a change from a feudal to capitalist political-economy. Under a feudal society in the Middle Ages, movement was extremely limited to the domains within those owned by landlords.

4 Stearns makes a similar argument where initially "aristocrats... [differentiated] themselves through prowess in war and/or special political service" (Stearns, 2006, p. 2). Over time however, the acquisition of objects, such as clothing, sugar, jewellery, porcelain, and spices played a more important role in status differentiation (Stearns, 2006, p. 3).

Most people – except the very wealthy who could afford transportation – did not travel over long distances. The production and reproduction of social life in terms of economy (agriculture or artisan trade, for example) and socialisation occurred over small territories. In effect then within this social order, it was simply unusual to travel over long distances. Those who did with any regularity did not have attachments to place and were therefore socially aberrant. As he puts it "to be mobile in the Middle Ages was to be without place, both socially and geographically" (Cresswell, 2001, p. 11).

Change in perceptions of movement were linked to structural transformations of the economy and habitation. As over time capitalism emerged to displace feudalism, particularity mercantile capitalism, more people started moving from place to place in trade. Further, people previously bound to feudal land were displaced as new agricultural technologies reduced the need for manual labour. This produced mass movement outwards to cities and any other places in search of work. Therefore, the sheer volumes of people visibly moving about made that act less unusual. And moreover, since such movement was in search of opportunity, it was possible to link it with themes of freedom. As such, movement begun to acquire a less stigmatised social image and begun to be equated with freedom (Cresswell, 2001, pp. 12–13). Here complex social changes have an "unintended" effect in shifting social perceptions.

3.2.3 Multi-Level perspective in transitions theory

This account of how changes in society lead to changes in social conceptions is observed by transition scholars who also argue that one socio-technical change trajectory is initiated by what they refer to as landscape developments. These are "(i) factors that do not change (or that change very slowly), such as physical climate, (ii) rapid external shocks, such as wars, disasters or oil price fluctuations, and (iii) long-term changes in a certain direction (trend-like patterns), such as demographic changes" (Geels, 2011, p. 36). These may put pressure on an existing system in ways that are so overwhelming that everyone loses faith in a technology, setting off a process for the development of alternative solutions (Geels and Schot, 2007). A more detailed discussion about the landscape level and other aspects of the MLP will be held in chapter 4.

In summary, some insights see the structure of society as well as associated changes in society as producing symbolic meanings about movement and transport technologies. This is an important

insight. However, if this is the only perspective adopted, it may elide agency in such structural accounts. A broader risk is to potentially sublimate the politics of structures. In this light, examining one tendency within some strands of the mobilities' literature, Sheller (2011, p. 3) argues:

> ...the move toward complexity theory within mobilities research is suggestive of non-actor-centered processes of feedback, self-organization and tipping points, which may shape dynamic processes in ways that are not directly caused by reflexive modern humanist subjects.

The next section then considers the role of agents in formation of meanings.

3.3 Agency in cultural formation – within context

Other perspectives provide insights into the role of actors who are influenced by their contexts in the formation of meanings.

3.3.1 Consumption studies

To begin with, within consumption studies as discussed above, while social structure is understood to play an important role in formation of significance, scholars also draw attention to market forces through the fashion mechanism. Here fashion is a tool that allows for the creation and destruction of status symbols and therefore new cycles of consumption. Social agents (designers, sales people and buyers for example) will select particular new products as "being in fashion" out of a vast array. The selected products must be responsive to prevailing social, political, cultural trends – *the Zeitgeist* – otherwise they will fail to catch on in the broader public. For example, for designers to create a successful product, the product needs to point to the future (Blumer, 1969). Such products will be selected over the older options. Novelty is thus important in new rounds of consumption. For Simmel (1957, p. 547), an object ceases to be fashionable once it has spread to all; fashionable items disseminate as members of a social class copy each other. Thus, here the opposite of ubiquity (as destroyer of status symbols) is rarity or scarcity.

For Blumberg (1974, p. 481), the ability of an object to be a status symbol is linked to scarcity. Goffman (1951) distinguishes dimensions of scarcity. One is a natural scarcity where an object cannot be reproduced in great volumes due to technological and material limitations. In addition, an object may derive symbolic value since its producer no longer exists. Such an object may acquire especially high status if there was a lore of great skill attributed to the producer (Goffman, 1951, p.

298). Another kind of scarcity is more expressive; it is closely linked to actual material wealth. Here certain objects by their very use and display simply connote that the owner has great wealth that others in society are unlikely to have. As such its use as a status symbol is somewhat arbitrary since another object out of the menu of wealth may be chosen (ibid).

3.3.2 Social practice theory

Another approach that draws attention to actor activities within structured contexts in meaning formation, is social practice theory (SPT). SPT scholars conceive of a practice such as walking, cycling, or driving as being composed of three linked elements: "materials, competences and meanings"(Shove, Pantzar and Watson, 2012, p. 24). Sharing affinities with transitions research (see more on this in chapter 4), a similar argument within social practice theory is that a practice exists for as long as the different elements are aligned. Further, such processes of alignment are ongoing (Shove, Pantzar and Watson, 2012, p. 24).

For SPT, new meanings[5] pertaining to a practice can be given by social groups. Pointing to an empirical example, Shove & Pantzar (2005)show how Nordic Walking[6] became seen as a positive activity providing health and wellness through the marketing efforts of industry such as walking stick manufactures. In this instance however, such fixing of meaning was only possible because there was already a prevailing societal association between being in nature and well-being (Shove, Pantzar and Watson, 2012, p. 54). Another example is where early motoring could be seen as a masculine practice because of a congruence between pre-existing notions of gender roles where men were believed to be 'fixers' and the requirement to maintain motor cars given their technical design (Shove, Pantzar and Watson, 2012, pp. 36–37).

While SPT scholars draw attention to contextual influences on actor activities, the theory has been criticised for not doing more to locate practices in context. For example, in a review, Schönian and Laube (2013, p. 125) argue that "If there are any shortcomings of the book, it may concern the missing account on power and social change." Theory proponents agree noting "We do not go deep into the questions of power"(Shove, Pantzar and Watson, 2012, p. 119).The SPT focus is ultimately

5 Below, I will discuss another way in which SPT scholars hold meanings can change – through the actual processes of performance.

6 Nordic walking is "a form of walking involving the use of two specially designed poles to increase the intensity of the exercise"(Shove, Pantzar and Watson, 2012, p. 53).

about the doing of practices. For as they argue “our most basic and most obvious contribution is to take practices as the central unit of enquiry and change”(Shove, Pantzar and Watson, 2012, p. 136).

3.3.3 Social construction of technology (SCOT) theory

Another approach that draws attention to the interactions between actor activities and contexts is the social construction of technology (SCOT) theory. Within SCOT, it is understood that social groups defined as organisations, institutions, individuals (whether in cooperation or not) give meanings to technologies (Pinch and Bijker, 2012, pp. 21–22). However, it is not a purely *social* approach, the “content of the artifact”(Pinch and Bijker, 2012, p. 36) matters in meaning formation (Bijker, 2015, p. 136) - as we shall see below with respect to bicycle tires. Examples of social groups “might include engineers, advertisers, consumers...”(Kline and Pinch, 1996, p. 765). Given the diversity of social groups each with their own ways of thinking, there are bound to be variations in meaning and design. As Pinch and Bijker (2012, p. 40)argue “the sociocultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to an artifact.” As “One object can be different things to different people” (Norton, 2011, p. 2) This is what is known as interpretive flexibility (Pinch and Bijker, 1984, pp. 421–424). Divergences in meanings across different social groups are most evident when there are controversies associated with a particular technology (Bijker, 1993, p. 119).

According to SCOT, the many interpretations about a technology can dissolve – referred to as closure. This is not to say that alternative interpretations completely retire, but to the extent that they do, it is within the perspective or framework of the now dominant meanings (Norton, 2011, p. 5). There are a range of possible ways in which closure can occur. Two often cited means are rhetorical closure and redefinition of the problem. With regard to the first, through communicative methods, a dominant interpretation emerges. For example using advertising proponents of a technology could successfully claim that a particular problem associated with a technology does not exist even when it does (Pinch and Bijker, 2012, pp. 38–39). While marketing efforts by advertising industry can lead to stabilisation of meanings and design, they can also given the requirement for constant innovation in search of profits under capitalist political-economies, lead to destabilisation. This creates spaces for the consumption of new technologies (Rosen, 1993, pp. 493–501). This way in which new meanings or interpretations about a technology can emerge highlights that “process[es] of closure and stabilization need not be final”(Kline and Pinch, 1996, p. 766).

A second type of 'closure mechanism' is what is known as "closure by redefinition of the problem"(Norton, 2011, p. 5). Here the problems such as those introduced by a technology, or problems internal to the technical aspects of the technology are re-framed (Norton, 2011, p. 6; Pinch and Bijker, 2012, pp. 38–39). One example given of this process is with regard to the introduction of pneumatic tires for bicycling. Initially, the tires introduced as a solution to excessive vibrations produced by bicycle wheels (old problem) were greeted with scepticism and outright laughter. However, the speed advantage that pneumatic tires produced, won over many sceptics, especially racing cyclists (Bijker *et al.*, 2012, p. 178).

3.3.4 Multi-Level perspective in transitions theory

These social constructivist insights within SCOT have been taken up in transition studies especially within the multi-level perspective (Smith, Voß and Grin, 2010, p. 439; Geels, 2011, p. 30). For transition scholars, a crucial component of the change process is contest over meaning (Geels, 2010, p. 499). Agency lies in the capability of actors to transform the formal and informal rules (such as meanings), which constitute and sustain a particular system (Smith, Voß and Grin, 2010, p. 444). Or, one that has been put "in spite of the fact that transition processes in the end revolve around technological change, and as such deal with changes in artefacts and infrastructures, such material changes presuppose changes in... discursive fields" such as "symbolic sets, regimes, visions, expectations" (Pesch, 2015, p. 4). This view about the discursive or cognitive, as tied in with the material, is distinct from that taken by the theory of planned behaviour whereby beliefs appear as mental constructs.

Staying with Pesch (2015), transitions theory can therefore shed light on intentional cultural change. That is "instead of having emergent processes which lead to the creation or adjustment of discursive fields, research on transitions tries to find out how these discursive fields can be manipulated" (Pesch, 2015, p. 4). A transition occurs when the new discursive fields scale out from minor status to broader society (Pesch, 2015, p. 5), here constituting a new social-technical regime. Such spreading of new meanings can occur through a number of processes according to Pesch (2015). First, by the sheer use of a new technology, which demands of the user a new discursive reorientation (here the technology has some agency on the user). Second, new users of a technology spread to others through face-to-face interactions in different contexts, new conceptions. Third, new

social meanings are carried along to new contexts and users indirectly through media. Here there are no direct face-to-face engagements. Finally, new social meanings are entrenched in society through institutional changes when new formal rules that promote a particular technology are put in place (Pesch, 2015, p. 7). When the last has occurred, a fundamental transformation will then be in place.

These four accounts of how new meanings and associated material and social changes occur, do not strongly foreground the power dynamics involved in changes in social meanings. For Geels and Verhees (2011), changes in public perceptions are suffused with conflict. In this process of contest, a key technique for agents, such as social movements, technology innovators and any other actor interested in dislodging an existing regime, is to re-frame how elements of the regime (such as technologies or social problems) are understood. This is a dynamic battle where proponents of the status quo and opponents wrestle each other in public domains, such as through media and public debates. Opponents of prevailing regimes, such as actors in social movements, may use techniques that draw great attention to their cause, for example through direct actions including protests, petitions and marches (Geels and Verhees, 2011). In this process what is at stake is legitimacy of a prevailing regime. A regime change occurs in part when proponents can mobilise political, financial and popular support. Further, opponents of change may alter their beliefs (Geels, 2010, p. 500), and new collective meanings can be generated (Geels, 2010, pp. 505–506). But since the discursive field is inextricably bound to technologies, institutional norms, social practices and so on, a shift in the discursive field effects commensurate changes (Fuenfschilling and Truffer, 2014, p. 773).

A range of different perspectives then show how social groups acting can mount communicative and representational initiatives that develop new meanings. As they do so they are shaped by the particular logics or rules of their societies. It was alluded here above that in such processes, the technologies such as in their use, also matters. The final section now turns to examine in some detail, how the using of technologies can also lead to meaning formation.

3.4 Practice as a site of cultural formation and change

Finally, I turn to perspectives which shed light into how practices of movement themselves generate meaning.

3.4.1 Mobilities literature

The way in which the 'doing' or 'using' of a technology helps generate new meanings has been explored in other strands of mobilities research. In this research, scholars examine how the experiences of movement generate meanings and can shape modal choice. Here the journey itself is an important process of inquiry, rather than one to be passed over in a focus simply on origin to destination as had been the case with other forms of transportation research (Sheller and Urry, 2006; Jensen, 2009). Of interest then are the experiences of movement as a result of the interactions between embodiment, technologies and infrastructures. Spinney (2011, p. 161), for example, has argued that understanding the "fleeting, ephemeral and often embodied and sensory aspects of movement – is vital if we are to fully understand why and how people move around." To illustrate this point, based on empirical research in Sydney Australia, Kent (2014, p. 2) has argued, for instance, that while not rejecting the practical value served by cars in Sydney where there are vast distances to be travelled to locations of employment "the positive sensuous experiences facilitated by the modern day automobile contribute[s] to popular preferences for car-driving." Kent (ibid) found that the physical comforts associated with driving privately in a car, such as sitting down, having access to air conditioning and, insulation from the elements were important reasons why respondents did not use public transport. Other studies in the cycling literature surface emergent emotions while cycling, such as joy, thrill, and fear (Jones, 2005; Horton, 2007; McIlvenny, 2015). These emotions are seen to either encourage or discourage participation in everyday cycling. In these approaches, meaning-making is emergent out of the interactions between embodiment, surfaces, technologies and context of movement.

3.4.2 Social practice theory

The conception of meaning as emergent in processes of doing is also of inquiry within social-practice theory (SPT). Recalling that under SPT, meanings are one of the three elements along with competencies and materials, which make up a practice. Changes in any of the elements in the processes of a doing a practice can trigger changes in the others. They thus argue that elements "are also mutually shaping"(Shove, Pantzar and Watson, 2012, p. 32). In an example, Watson (2012, pp. 490–491)argues that the cycling performances of bicycle couriers in urban centres in the west (such as their riding styles and their aesthetics with respect to clothes and bags) inspired new generations of bicycle users. That is, bicycle messengers helped to produce new meanings about urban cycling.

These approaches provide important insights about how practices themselves generate meaning. Manderscheid (2016, p. 10) however argues that one weakness of approaches in some mobilities' research which focus on "micro level of experiences, practices and motives... [is the lack of] systematic consideration of their positionality in space, time and the social." If the research only focuses on the phenomenological, without connecting it to broader structural forces, the insights may be limited. For, as D'Andrea, *et al*. (2011, p. 158) argue, "as subjects and objects move across spatial, social and cultural settings, they are not doing so independently of the political and economic structures that shape subjectivity, locality and mobility, but are actually embodying, recoding and updating larger material and symbolic regimes."

Practice and related emergent meanings have to be reconnected to broader social phenomenon. For example, in a discussion of the emergence of different feelings such as "happiness, excitement... anticipation... [and] fear" (Sheller, 2004, p. 227) while driving, Sheller (ibid) also connects these feelings to interactions between road users, "and historically situated car cultures and geographies of automobility." Mobile subjects are intrinsically connected to others in the moment, but also in time. The way in which road users interact (and shape emergent feelings), for example, is shaped by the prevailing social values and norms "that influence the willingness to engage in risky behaviours or willingly choose best safety practice" (Atchley, Shi and Yamamoto, 2014, p. 317). Here then from a safety perspective, the meanings or emotions that might emerge in motion are also dependent on the context-specific cultural values. For example, Atchley, *et al*. (2014, p. 321) argue that "Japan is one of the most uncertainty avoidant countries, and one where drivers recognize they are embedded in a collective experience and should strive to be harmonious with their environment." As a result, "Japanese drivers overestimate the risk of crashes... [and] seem very willing to comply with laws such as seatbelt use" (Atchley, Shi and Yamamoto, 2014, p. 321).

The emergent feelings may also have a relationship with deliberate actor activities. For example, Jensen (2013) recounts how the municipality of Copenhagen has adopted specific cycle track design interventions in order to affect the experience. These include the construction of wider cycle paths that allow parents to ride side by side with their children in conversation at their own pace while faster cyclists have room on the same track to overtake. To facilitate a smooth, quiet rapid journey from the suburbs into the inner city, while at the same time communing with nature, cycle paths are designed to traverse through green and blue spaces and have technical features, such as specific cycle bridges over waterways and highways, as well as traffic signalling systems that prioritise

cyclists moving in high speeds. Such design of cycle paths is intended to cater to the desires of different kinds of cyclists, and in turn secure user loyalty. As such, the experiences obtained in travel are not merely emergent out of infrastructures and social interactions.

3.5 Conclusions

This chapter has reviewed a range of different literatures that shed insight into the formation (and change) of symbolic meanings and how contexts influence such processes. From the review, it is evident that this occurs through complex processes involving actor activities who are embedded in contexts that change, as it does due to the actual practices of movement. If any of these insights or dimensions of the formation and changes of symbolic meanings are read in isolation, we saw that they can lead to a simplified perspective. However, we saw that the different theoretical perspectives (other than the multilevel perspective in transitions theory to be discussed in the next chapter) give more weight to one or two of these dimensions of meaning formation and change. Given the query in chapter 2 about geographical variability in cultural determinant formation, as well as some deficits within some theoretical perspectives reviewed here, it is also useful to further explore the role of contexts.

To summarise, we therefore need a way of simultaneously paying attention to actor activities, context and contextual changes and practices of movements in generating cultural determinants of bicycling. Chapter 4 turns to this integrative task using the multilevel perspective in transitions theory as the key analytical framework. I have already discussed how the MLP accommodates thinking about the formation of meanings, due to both societal change and agent activities. The regime dimension of the MLP as I will show in the following chapter reflects the 'performative' dimension of a system of provision. It is the means through which processes of doing, or 'practising' as per social practice theory that meanings might be reproduced and new ones emerge. In addition to embracing the social constructivist insights from SCOT already enrolled into the MLP, I include others from the discussion in this chapter. One is that equality can be a structural underpinning for emulation tendencies upon which social actors in market processes (such as advertising) can produce status symbols. Secondly, I explore how changes in contexts due to actor decisions can have unintended consequences upon the image of practices of movement. Thirdly, I explore the relationship between emergent meanings in practices and societal characteristics and agent interventions.

Chapter 4. Studying changes in cultural factors that influence everyday cycling

4.1 Introduction

The purpose of this chapter is to set out a conceptual and analytical approach about the formation of cultural meanings about everyday cycling. In doing so, I follow insights from transition studies and, in particular, the multi-level perspective (MLP) within transitions studies, and mobilise insights from literatures in chapter 3 as discussed at the conclusion of the chapter. I have chosen this perspective because consistent with the discussion in chapter 3, intangible aspects of bicycle culture are seen as interwoven with technologies, society and practices. Transition studies refer to socio-technical transformations to draw attention to the co-dependent relationship between technologies and domains, such as "policy, markets, consumer practices, infrastructure, *cultural meaning* and scientific knowledge" (Geels, 2011, p. 24, emphasis added). Secondly, within transitions studies change is theorised to evolve over long time periods. This satisfies the temporal need identified in chapter 2 to adopt longer time horizons in studying change. Thirdly, the MLP offers a way of paying attention to structural factors, agent activities and practices in shaping symbolic meanings. In this chapter I will first further elaborate on these rationales, then proceed to describe the MLP in detail and how I mobilise some insights from literatures discussed in chapter 3 within the MLP.

4.2 Justifying the multilevel perspective

There are a number of reasons I have selected the multi-level perspective as the main anchor analytical approach to explore changes in bicycle cultures. Firstly, it allows inquiry over long periods of time. In chapter 2 it was argued that in the recent attention on how culture influences transport practices, most of these studies are located within short historical windows. Few are located over long temporal periods where shifts in conceptions and practices about transportation modes take place. The transitions literature, which is concerned with understanding how "the dominant way in which a societal need (for example, the need for transportation, energy, or agriculture)... *changes fundamentally*" (Lachman, 2013, p. 270 [emphasis mine]), offers a useful approach to analysing transformations in long historical trajectories. Within transitions studies, change, from one way of providing for a societal function to another, is theorised to take place over long time scales, from decades to about 50 years (Kemp, Dudley and Geels, 2012, p. 5; Markard,

Raven and Truffer, 2012, p. 956; Lachman, 2013, p. 270).

Secondly, related to the point above, since transitions involve fundamental changes in various elements of a socio-technical system including symbolic meanings, they are ideal for exploring the research questions. That is, empirically, they can illuminate processes through which symbolic meanings associated with provision of particular societal functions shift.

Thirdly, the transitions literature and the multi-level perspective in particular, straddle the agency-structure problematic in ways that give attention to the co-constituting role of both dimensions in shaping practices. As Raven, *et al*. (2012, p. 65) note "the MLP... is concerned with the interactions between agency and structure across levels (niches, regimes, landscapes)." It does this in part by drawing on insights from sociology – specifically the concept of structuration advanced by Giddens (Fuenfschilling and Truffer, 2014, p. 773). Giddens defined structures as "properties allowing the 'binding' of time-space in social systems... which make it possible for discernibly similar social practices to exist across varying spans of time and space, and which lend them 'systemic' form" (Sewell, 1992, p. 17). Further, "structures shape people's practices, but it is also people's practices that constitute (and reproduce) structures" (Sewell, 1992, p. 4). As such, agents have freedom because they are part of the process in the reproduction of structures. The freedom of agents also lies in the capability for reflexivity. They are "knowledgeable" and therefore self-reflexive of their own and others actions (Giddens, 1986, p. 30). The agent is aware of the social rules – of the structures that obtain (Giddens, 1986, p. 21). Because agents are self-reflexive – they are aware of what they are doing and have the competencies or capabilities in their actions – then therein lies the possibility of change. Therefore, "if enough people or even a few people who are powerful enough act in innovative ways, their action may have the consequence of transforming the very structures that gave them the capacity to act" (Sewell, 1992, p. 4).

Fourthly, the MLP offers a way of thinking about bicycling culture that is consistent with the discussion in chapter 3. That is, cultural meanings are seen as elements of a socio-technical system. They are not inseparable independent entities. Furthermore, other more intangible elements, such as social norms and beliefs about the use of the technology are seen as underlying rules shaping user conduct (see discussion about socio-technical regimes below). A transportation technology within the MLP and transition studies more broadly, is conceived of as an assembly of different elements consisting of cultural meanings (such as symbolic status), user practices, formal regulations and

policy, related infrastructures, and industry.

Finally, the MLP offers a simplified (though not simplistic) approach of studying complex social change. Within transitions studies, "societal functions such as transportation, communication, housing, energy supply, feeding [are understood to be]...fulfilled by sociotechnical systems, which consist of a cluster of elements, including technology, regulation, user practices and markets, cultural meaning, infrastructure, maintenance networks, and supply networks" (Geels 2005a, p.681). It is the degree of development and linkages between the elements that produces a system allowing a particular technology to fulfil the "societal function". Importantly, foregrounding agency, "elements and linkages of socio-technical systems do not exist autonomously, but are created, (re)produced and refined by social groups"(Geels, 2005a, p. 449). As such, it foregrounds a co-evolutionary perspective between the various elements that come together to form a socio-technical system (Geels and Kemp, 2012, p. 50). Elements of the private car based socio-technical system would include "regulations and policies... maintenance and distribution network... production system and industry... markets and user practices... fuel infrastructures... automobile... culture and symbolic meaning...[and] road infrastructure" (Geels, 2005a, p. 682).

Transitions involve transformation in all elements that constitute a socio-technical system. It involves "technological, material, organizational, institutional, political, economic, and socio-cultural" (Markard, Raven and Truffer, 2012, p. 956) change. However, these tend to be self-stabilising, since they entail sunk costs (Geels, 2011, p. 25), where costs relate to resources allocated to infrastructure, institutional development, and cultural meanings about the technologies and other elements of the system. As such, transitions from one socio-technical system to another require changes in multiple dimensions. The MLP organises these elements of change into three domains in relation to each other – landscape, regime and niche. Having justified my selection of the MLP, I can then proceed to describe its components, as well as how I employ it.

4.3 Landscape level

The landscape level can be understood as "an external structure or context for actor interactions"(Morone *et al.*, 2015, p. 3). It contains three types of factors or elements: "(1) factors that do not change (or that change very slowly), such as physical climate, (2) rapid external shocks, such as wars, disasters or oil price fluctuations, and (3) long-term changes in a certain direction

(trend-like patterns), such as demographic changes" (Geels, 2011, p. 36) or "growing environmental awareness" (Smith, Voß and Grin, 2010, p. 441). Further examples of landscape elements include the "material aspect of society, for example, the material and spatial arrangements of cities, highways and electricity infrastructures" (Geels, 2005b, p. 451) and "political ideologies, societal values, and macro-economic patterns" (Geels, 2011, p. 28). Culture is also located here (Whitmarsh, 2012, p. 484) as an example of a slow-changing phenomenon. Here culture is understood to refer to wider social beliefs, norms or meanings beyond a particular socio-technical system. Recalling the discussion about my use of the term culture, these would be societal attributes that generate particular cultural factors.

The landscape level therefore contains environmental, social, material, economic and political phenomenon. Another way of thinking of the landscape level is that it comprises factors that are very difficult for actors to transform, at least in the short term (Geels, 2012, p. 473). It is the background or context within which the other two levels exist and as such the "landscape will differ from place to place"(Geels and Kemp, 2012, p. 58). The implication here is that different cultural factors – at least as a result of landscape factors – will obtain in different spaces. This foregrounds the benefit of studying difference contexts (see chapter 5).

Focusing on context and related changes is important since, as Cox has observed, "meanings are not imputed to practices simply by acts of will or as products of inevitable circumstances, but within the context of wider social structures, political regimes and physical spaces" (Cox, 2015b, p. 206). As Stoffers (2011, p. 161) has argued, focusing on "prevalent 'mental attitudes' associated with cycling is highly relevant [but doing so requires] that they are understood as part of a specific cultural and political context." Similarly, Pinch and Bijker (1984, p. 427) have argued that "the sociocultural and political situation of a social group shapes its norms and values, which in turn influence the meaning given to an artefact." This discussion highlights the importance of paying attention to the particularities of contexts in shaping transitions.

The role of contexts in shaping socio-technical transitions has been of concern in transition studies. In a research mission statement, scholars in the field of transition studies argued that one limitation at the time was that "existing analyses, drawing predominantly on single or comparative case studies, fail to explain if and how (spatial) contexts matters" (STRN, 2010, p. 18). While the reference to space might suggest they were after more geographical attributes, such as physical

space, they were interested in the nature of "locally bound competencies, cultures, cooperation styles" (STRN, 2010, p. 19) and the malleability of socio-technical regimes to different contexts, and the agency of actors in embedding or dis-embedding socio-technical systems given landscape, regime or niche dynamics (ibid). This study therefore responds to these calls to examine how different contexts shape transitions (with specific reference to symbolic meanings) by adopting a comparative approach (See chapter 5 for more on this).

While the prevailing features of a context can shape a socio-technical regime, associated changes can "prompt responses from within the regime... [thereby] generat[ing] opportunities for niches" (Smith, Voß and Grin, 2010, p. 441). Here any of the landscape developments discussed above whether slow moving, sudden, or trend-like can de-legitimise a socio-technical system leading users to seek out alternative solutions. For example, in analysing change from horse-drawn wagons to automobiles for urban transport in the late 19th century in the United States, Geels (Geels, 2005b) foregrounds contextual developments. He argues that an array of major landscape changes, including urbanisation, introduction and mass availability of electricity, attention towards urban hygiene, growing middle class and other pressures led to an appraisal about horses as a mode of transport. This stimulated a search for new solutions. Along the way, many were tried but caught use very briefly. These included electric trams, bicycles, electric cars and steam driven cars. However, it was the gasoline powered internal combustion engine that prevailed. It is important to note however that landscape developments do not necessarily always challenge regimes, they can also "reinforce regime trajectories" (Smith, Voß and Grin, 2010, p. 441). That is, pressures on a regime could, instead of leading to the emergence of a new socio-technical regime, instead produce reforms that stabilise an existing regime.

Therefore, in studying how symbolic meanings about everyday cycling would change, I pay attention to the landscape dynamics, as summarised in the table 4.3.1. Such dynamics depending on the historical period of bicycle technology development (see discussion below about niches) might act to support the emergence of, or weaken the use of bicycles vis-à-vis other urban transport socio-technical systems. I categorise the types of landscape factors using Driel and Schot's (2005) tripartite demarcation into slow moving, trends and sudden events. In identifying the factors that can shape bicycle cultures, I draw on the discussion in this chapter about the landscape level, but also on the discussion on the formation of cultural factors.

Slow moving or glacial factors	Trends	Sudden events
Political-economy, religious beliefs, social-inequality, social values, urban form, gender relations	Environmental awareness, consumerism, demographic change, changes to the slow moving or glacial factors	Wars, economic crisis, political crisis such as electoral deadlock, natural disasters such as droughts and floods, resource scarcities such as petroleum shortages

Table 4.3.1: Summary of landscape factors that can put pressure on regimes

4.4 Regime level

The regime level consists of rules (formal and informal) that produce and reproduce a particular socio-technical system (Geels, 2011, p. 26) that fulfills a "societal function such as transportation, communication, housing, health care, supply of resources and supply of energy" (Geels, 2005b, p. 445). Clarifying the distinction between a socio-technical system and regime, Geels (2011, p. 31) argues that:

> ... system then refers to tangible and measurable elements (such as artefacts, market shares, infrastructure, regulations, consumption patterns, public opinion), whereas regimes refer to intangible and underlying deep structures (such as engineering beliefs, heuristics, rules of thumb, routines, standardized ways of doing things, policy paradigms, visions, promises, social expectations and norms).

Geels (2004) uses Scott's (2001) approach to distinguish among three different kinds of rules. The first refers to "explicit, formal rules, which constrain behaviour and regulate interactions" (Geels, 2004, p. 904). These rules will have legal force with associated "rewards and punishments" (Geels, 2004, p. 904). Here we can include "regulations [and] legally binding contracts" (Geels, 2011, p. 27). A good example here are road rules that govern interactions between different users.

A second type of rule is informal. These are "normative rules [which] confer values, norms, role expectations, duties, rights, responsibilities" (Geels, 2004, p. 904). These rules are usually not written down somewhere but are known through social immersion (ibid). Continuing with the example of the road rules, the informal dimension would be ways of interacting on the roads that are not formally prescribed, but are enacted nevertheless by residents of a particular space. Cultural meanings associated with a particular technology (Smith, Voß and Grin, 2010, p. 441), habits as

conceived as “ways of doing things” (Whitmarsh, 2012, p. 483), and “visions, promises, social expectations and norms”(Geels, 2011, p. 31) are other examples of such informal rules. An important observation is that such normative rules are coercive. Since they are socially given, individuals are under peer pressure from deviation. The development of these types of informal rules - here symbolic meaning - is an important object of this study.

Thirdly, there are “cognitive rules [through which] the nature of reality [is understood] and [are] the frames through which meaning or sense is made” (Geels, 2004, p. 904). These would include elements, such as knowledge, skills and procedures related to the production and maintenance of a particular system. Or “engineering beliefs, heuristics, rules of thumb, routines, standardized ways of doing things, policy paradigms” (Geels, 2011, p. 27). Some specific examples here might include knowledge about design of infrastructures for particular socio-technical systems, such as roads for automobiles or bicycle lanes.

Regime rules are developed and enacted by actors. Actors are “different groups [which] share different rules... [about a socio-technical system] for example, technological or design regimes, policy regimes, science regimes, financial regimes and societal or user regimes” (Geels, 2004, p. 905). In other words, there are different constellations of social groups aligned with a particular element of a social-technical system who share similar rules. There are also formal and informal mechanisms through which rules are circulated within the group. These might include specialised publications, workshops, seminars, conferences member associations, clubs and other such for a (Geels, 2004, p. 905). It is the alignment of different sub-regimes that forms a socio-technical regime linked to a particular socio-technical system (ibid).

The different groups, as per the sub-regimes of a socio-technical system are not necessarily actively aligned. Coherence emerges through their various independent and interdependent activities (Geels, 2005a, p. 683). Even though these social groups may be generally aligned in the production and reproduction of a particular socio-technical system “there are often internal tensions, disagreement and conflicts of interests” (Geels, 2011, p. 32). Once a socio-technical regime has formed, it is difficult to dislodge given the web of alliances amongst different social groups, investments that have been allocated towards forming the various rules and, most importantly, because of the development of the social, routinised and physical aspects of the social-technical system. Path-dependencies set in (Geels, 2004, p. 911). As such, a socio-technical regime is seen as a means of

reproducing and providing stability to a socio-technical system.

To summarise, a socio-technical regime can be understood as an alliance of formal and informal rules, which are shared and enacted by different social groups regarding a particular socio-technical system. The regime therefore acts to stabilise or reproduce a socio-technical system. Because of the degree of coherence and interdependence of rules within different sub-regimes, a socio-technical regime is associated with a dominant way of providing for a societal function. The socio-technical regime is therefore very important because it helps determine whether a socio-technical system is sustained. Indeed, a socio-technical transition is defined "as changes from one sociotechnical regime to another" (Geels and Schot, 2007, p. 399). That is, a transition in social-technical systems from one way of providing for a societal function to another, occurs when the connections between different sub-regimes de-link. In other words, when the alignment between different rules shared by different social groups frays (Geels, 2004, pp. 914–915). This fraying weakens and even destroys a socio-technical regime generating "'windows of opportunity' for the breakthrough of radical novelties" (Geels, 2004, p. 915).

In spite of the stabilising tendencies of a socio-technical regime, fundamental change can occur. However due to the reproductive andadaptative nature of a regime, it is often argued that pressure comes from the niche or landscape levels (see, e.g., Fuenfschilling and Truffer, 2014, p. 773). Nevertheless, internal problems and "externalities" caused by an associated socio-technical system can contribute to transitions. Problems internal to the existing socio-technical system, such as technical problems that cannot be resolved through improvements may be a reason for a change. Such problems can cause users to reappraise their loyalties (Geels, 2004, p. 914, 2005b, p. 452). In addition, the socio-technical system may also create own "negative externalities" (Geels, 2005a, p. 685), which trigger changes in the sub-regimes of the associated regime (Geels, 2005a, p. 687). An example here might be untenable air pollution by automobiles leading policy-makers to ban their use stimulating a shift to alternative transport modes, such as trains or buses. Here in terms of the sub-regimes of the system of automobility, policy regimes would become unaligned to technological and user regimes. Other types of externalities generated by a socio-technical system include "health risks and concerns about safety" (Geels, 2004, p. 914).

Table 4.4.1 contains dynamics within socio-technical regimes I examine that can contribute to weaknesses of STS. That is, it contains phenomena that can weaken the three types of regime

elements discussed above. As with examination of the impact of landscape factors in shifting appraisal and practices, I am also drawing on the discussion from chapter 3 on practice as a source of cultural formation, in particular insights in the mobilities literature where the experience of movement, which is in part shaped by the transport technology generates meanings that support or discourage use.

Internal dynamics	**"Externalities" caused by STS**
Any emergent technical problems	Impact on social life, environment, and space

Table 4.4.1: Internal sources of regime weaknesses

4.5 Niche level

The niche level refers to spaces that are relatively protected from disruption from where innovation in practices, technologies "or special government interventions" (Geels and Kemp, 2012, p. 53) emerge. In contrast, "change within the regime tends to be incremental and path dependent" (Smith, Voß and Grin, 2010, p. 440). Examples of niche spaces include technology laboratories, demonstration projects (Geels, 2011, p. 27), and activities of social movements (Seyfang and Smith, 2007, p. 589). The notion of protection is deemed particularly important for socio-technical change in the sustainability domain, because often there is no obvious demand. Without protection, new innovations are likely to fail especially given "a too harsh selection environment" (Raven, 2006, p. 584). Like the regime level, the niche level also embraces the actors within it that are the champions of alternatives to existing systems (Geels, 2011, p. 27). Niche actors are understood to wield less power than those in the socio-technical regime who sustain a particular socio-technical system (Raven, Schot and Berkhout, 2012, p. 66). However, unlike actors within a regime, niche actors are "small and unstable" (Lopolito, Morone and Sisto, 2011, p. 28). By definition then, niche spaces are fragile. The technologies emerging are insurgent – they are subordinate to others. However, niche actors have more autonomy in their actions since they are not beholden to established rules (Raven, Schot and Berkhout, 2012, p. 66).

By definition what emerges from niches is innovative because it is different from what exists in the regime level. An existing socio-technical regime can also be challenged by niche developments. The "breakthrough and wide diffusion [of niche technologies] depend[s] on linkages with ongoing

processes at the regime and landscape level" (Geels, 2005a, p. 690). Change occurs "whenever a niche-technology has sufficiently developed coupled with sufficient pressure coming from the landscape level"(Morone *et al.*, 2015, p. 2) to dislodge a particular socio-technical regime. This alignment of processes and technological development does not happen automatically: it is "made by actors" (Geels, 2005a, p. 692). Recalling that the "development" here of the technology is not only technical, but refers to the emergence and alignment of other elements, such as regulations, policies, infrastructures, cultural meanings, markets and user practices, maintenance and distribution networks (Geels, 2005a, p. 682) that constitute the socio-technical system.

The processes through which niche technology develops has been summarised into three dimensions. These are the creation of i) expectations and visions, ii) social networks, and iii) learning (Schot and Geels, 2008, p. 540). These dimensions constitute the prerequisites "for successful development of a technological niche" (Schot and Geels, 2008, p. 540). In other words, they position a niche technology ready for wide societal diffusion. The first dimension can be understood as communicative, involving the creation and acceptance of the idea that a particular technology can provide for a particular societal function (Schot and Geels, 2008, p. 539). A key hurdle that a novel technology faces is uncertainty amongst potential users about the effectiveness of solving a particular problem in the face of other available alternatives. Acceptance requires users gaining confidence that the technology offers a solution (Rogers, 1983). In this niche development phase, the technology would by definition not yet fulfil the social need (such as urban transport); but what is crucial is the belief that at some point the technology can deliver on its promises. As Brown & Michael (Brown and Michael, 2003, p. 3) argue "future expectations and promise are crucial to providing the dynamism and momentum upon which" the development of a niche technology depends. This is therefore also a process of envisioning futures with a particular technology providing for a societal function. These "visions foster collectively endorsed ambitions and a sense of shared direction amongst different kinds of change agents, which should ultimately lead to convergence in terms of action" (Sengers, 2016, p. 3).

The second dimension is self-explanatory. It refers to the recruitment of a community of powerful support behind a technology. Such a community offers financial, technical, political, moral and other support to a technology (Schot and Geels, 2008, p. 540). This community consists of influential actors who can provide resources, as well as legitimacy. A key objective therefore of niche actors is to "win" over a wide range of groups (Geels, 2005b, p. 451; Smith, Voß and Grin,

2010, p. 441) including potential users who learn new ways of incorporating it into their routines (Geels, 2005a, p. 685). Such a recruitment process would involve accepting the promised futures offered by the technology as described in the first dimension. As Sengers (2016, p. 5) notes "transitions toward sustainability are paved by imagination and the crucial first step toward breaking with the structures of incumbent socio-technical systems lies in mobilising the creative capacity of change agents to imagine an alternative future." Smith & Raven (2012, p. 1082)suggest that social networks have more impact "when their membership is broad." Expanding on the composition of social networks, Schot & Geels (2008, p. 541) argue that "the involvement of relative outsiders may be particularly important to broaden cognitive frames and facilitate second-order learning."

The third dimension entails the development of learning in all the dimensions that when aligned constitute a socio-technical system. These would include "technical aspects and design specifications... market and user preferences... cultural and symbolic meaning... infrastructure and maintenance networks... industry and production networks... regulations and government policy... [and] societal and environmental effects" (Schot and Geels, 2008, p. 540). While learning takes place for each of the various elements, these elements need to also link up together to create a system: "These learning processes are both about knowledge development and about the alignment of heterogeneous elements into a working technical configuration" (Geels and Raven, 2006, p. 377).

For example, with respect to the practice dimension of this inquiry, new skills or competencies that are required to operate the technology are learned and transmitted. Social institutions to transmit ways of operating the technology develop. These may be formal (such as training centres) or informal (such as peer or family based) institutions. Symbolic meanings are also given to a particular technology (Kemp, Schot and Hoogma, 1998, p. 190). In terms of the development of cultural or symbolic meaning, as a result of these learning processes "one relevant social group's meaning become dominant" (Bijker, 1997, p. 283). Thus, "a particular meaning either resolves or dissolves problems associated with the artifact" (Ahmed, Qureshi and Khan, 2015, p. 131) and thus "relevant social groups cease to perceive a need for an alternatively designed version of a dominant technology" (Ahmed, Qureshi and Khan, 2015, p. 135). A social norm emerges. Since a particular technology is seen as to be a solution – in this case for transportation – it shapes everyday conduct at the individual level. Here we can see how "habits" are formed. New subjectivities are also formed as the technology and person fuse emerge. For example, with reference to car use, "some

[have] coin[ed] the term ‘carson’ to refer to the merger of car and person” (Paterson, 2007, p. 139). Here the point is that the technology shapes human sensibility and conduct. For example Lupton (1999, p. 63) has shown how the fusing of car drivers and the machines produces entities “that relate to other drivers as machines, and in doing so, often dehumanize them”, enabling them to act in hostile manners.

Further, Schot & Geels (2008, p. 541) hypothesised that “learning processes would contribute more to niche development if they are not only directed at the accumulation of facts and data, i.e. first-order learning, but also enable changes in cognitive frames and assumptions.” The latter they called second order learning (ibid). Their hypothesis was confirmed in latter studies where it was found that where niche proponents also focused on changing the mental frames of users, the results were more successful (Schot and Geels, 2008, p. 541). Such second order learning allows “people [to] question the assumptions and constraints of mainstream systems altogether” (Seyfang and Longhurst, 2013, p. 882) including “underlying norms and values” (Raven, 2006, p. 584).

If all these three processes succeed then a niche innovation is poised for wider social acceptance and use (Geels, 2011; Upham *et al.*, 2015; Hermwille, 2016)constituting a new regime, albeit depending on developments in the landscape and regime levels. Table 4.5.1 contains the dimensions and activities I examine to assess the development of niche technologies.

Expectations or visions	**Development of networks**	**Learning**
Development of new narratives or stories about a technology which can be expressed in advertising, peer to peer contacts, protests, pickets and in media.	Formation of lobby groups and their interactions; recruitment of support particularly social-elite	Training of users on technology use, emergence of meanings of technology, development of information that can allow users to question mainstream systems

Table 4.5.1: Requirements for the development of a niche innovation

These are drawn from the previous discussion but also from section 3.3 where I discussed how cultural formation occurs due to deliberate activities of agents, and section 3.4 where I discuss how practices can be a site of cultural formation. Examining such niche processes helps to determine the

readiness of a particular niche technology to unseat an incumbent one.

4.6 The dynamics of change

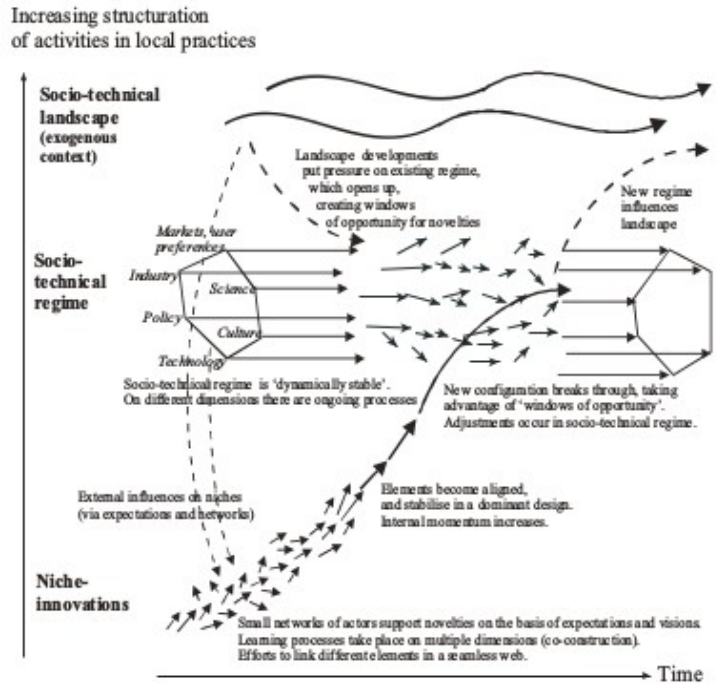


Figure 4.6.1: Interactions in multi-level perspective. Source: (Geels, 2011, p. 28)

While I have discussed changes as occurring from developments in three distinct levels, ultimately these interact. See figure 4.6.1opposite. What is crucial is how change dynamics interact with other levels (nature of interactions), and the timing (Geels and Schot, 2007; STRN, 2010, p. 6). The timing of transitions brings focus to "whether or not niche-innovations are relatively well-developed when landscape pressures occur"(Geels and Kemp, 2012, p. 60), while nature of interactions refers to "whether niche-innovations have a competitive relationship with the existing regime or a symbiotic relationship" (Geels and Kemp, 2012, p. 60). The timing and nature of interactions can produce a range of possible outcomes including regime adaptation (that is mild changes), ongoing reproduction such as when there is no landscape pressure, gradual or sudden overthrow and gradual reconfiguration (Geels and Schot, 2007). Foregrounding agency in such contingencies, Geels, *et al*. (2016, p. 898) have recently emphasised that "the influence of landscape developments arguably depends not only on timing (compared to niche and regime developments), but also on interpretation and mobilization by actors". In addition, "whether niche-innovations are 'symbiotic' or 'disruptive' depends not only on technical characteristics, but also on how such innovations are configured and institutionally embedded" (Geels *et al.*, 2016, pp. 896–897). The table below contains the different developments from each dimension of the multilevel perspective that are examined to explore the research questions.

Niche developments to analyse		
Expectations or visions	*Development of networks*	*Learning*
Development of new narratives or stories about a technology which can be expressed in advertising, peer to peer contacts, protests, pickets and in media.	Formation of lobby groups and their interactions; recruitment of support particularly social-elite	Training of users on technology use, emergence of meanings of technology, development of information that can allow users to question mainstream systems
Regime developments to analyse		
Internal dynamics	*"Externalities" caused by STS*	
Any emergent technical problems	Impact on social life, environment, and space	
Landscape developments to analyse		
Slow moving or glacial factors	*Trends*	*Sudden events*
Political-economy, religious beliefs, social-inequality, social values, urban form, gender relations	Environmental awareness, consumerism, demographic change, changes to the slow moving or glacial factors	Wars, economic crisis, political crisis such as electoral deadlock, natural disasters such as droughts and floods, resource scarcities such as petroleum shortages

Table 4.6.1: Detailed framework of analysis as per the three levels of the MLP.

4.7 Conclusions

In this chapter, I have argued that by studying processes within the regime, landscape and niche levels of the multilevel perspective, one can gain an understanding of how symbolic meanings about bicycling form and change. In other words, the MLP provides a framework for exploring why populations in particular contexts can adopt new perspectives and user practices on bicycles, either adopting their use or drifting away. In order then, to explore how contexts can shape transitions – including formation of symbolic meanings, this study adopts a comparative stance. See following chapter on the adopted approach.

We also saw that internal technical problems and externalities of a competitor urban transport socio-technical regime can cause users and other actors to search for alternatives, including bicycles. The other direction of change is also possible if problems with bicycles were to develop. I also discussed how landscape factors can be a source of reappraisal. They can put pressure on a competitor socio-technical regime to bicycles or in turn weaken social acceptance of everyday bicycling.

Finally, niche developments can upstage bicycles in as much as bicycles as novel technologies can also displace other technologies. Studying niches also offers rich potentials to observe how new symbolic meanings and user practices emerge. Finally, it was discussed that the possibility of a new socio-technical regime and its associated system emerging depend on the degree of development of a niche innovation and how dynamics in each domain of the MLP interact with each other. The next chapter will expand in some detail upon the methodology used to provide material for analysis.

Chapter 5. Methodology

5.1 Introduction

This chapter describes the research methodology. This study is interested in how understanding changes in the everyday use of bicycles and in particular how associated symbolic meanings are formed and change. I therefore adopt a comparative approach identifying multiple study sites. Multiple sites of inquiry with different social, political and economic histories are selected in order to explore how contexts shape socio-technical transitions. Due to paucity of similar work across Africa, and a relatively stable contextual characteristic (inequality), as well as practical advantages (since I lived in the city at the time of research), the primary study site is Johannesburg. The other secondary locations are Amsterdam, Beijing and Chicago which display not only variations in the use of bicycles but also differences in nature and level of inequality. In chapter 4, I presented the multi-level perspective in transitions theory as the preferred analytical framework. The data collection strategies and analytical approach are therefore circumscribed by this framework.

5.2 Methodology

The overall methodology in this research is informed by insights from interpretative and critical theory. It views social reality not as governed by hidden natural laws such as a realist epistemology or a positivist approach might undertake (Sarantakos, 1998, pp. 36–37; Travers, 2001, p. 11), but through the engagement of individuals, given their subjectivities and immersion in their social-cultural contexts (Marvasti, 2003, pp. 5–7). Individuals within social contexts can shape social reality, but it is those with power that have most influence (Sarantakos, 1998, pp. 36–37). Such an approach helps reveal the extent to which given categories such as "beauty, gender, morality, pathology, race, science, and sexuality... [should be understood as]... culturally relative or historically specific" (Weinberg, 2009, p. 283). This requires the researcher to be reflexive and be attuned to the ways in which the intellectual tools themselves deployed for the study have a societal basis (Weinberg, 2009, pp. 292–294). As such, it suggests that the researcher cannot see their role as outside the subject of inquiry.

I therefore acknowledge that the research rationale was partly due to my own personal interests and history in cycling activism in Johannesburg. While a potential limitation is the introduction of bias,

limiting the range of possible answers to the research question, the analytical framework provides an important safeguard. It requires an investigation of change from multiple dimensions; niche, regime and landscape levels (see chapter 4). This demands triangulation by the researcher, involving data collection from multiple sources and relation of results (Gray, 2002, p. 72). I also increased the reliability of the research by examining dynamics in different contexts where I arguably may not have had a vested interest. Indeed, Geels (Geels, 2011, p. 36) has argued that "transition research could probably benefit from the application of other methods such as comparative [ones]." On the other hand, my personal history of involvement in the research was an asset in the data collection process in the more contemporary phase of the research since I was aware of actors and interventions.

5.2.1 Comparative approach

This study adopts a comparative approach in studying how symbolic meanings about everyday cycling develop in a range of different urban sites. As stated earlier, the rationale for adopting a comparative approach is to explore how particular contexts shape socio-technical transitions. We saw in chapter 2, that cultural determinants of everyday cycling have geographic variability. The object of the study then is to explore the formation of one of these – symbolic meanings - across different contexts Such an exercise also responds to recent calls in the transitions' literature as discussed in chapter 4 for more comparative work.

A neglect of spaces in inquiry suggests that transitions can occur anywhere. Coenen, *et al*.(2012, p. 369) argue "transition analyses have over-looked where transitions take place, and the socio-spatial relations and dynamics within which transitions evolve." This sidesteps social, political and economic particularities that may constrain or enable transitions (STRN, 2010). Pointing more particularly to some possible sources of difference in transitions, Coenen and Truffer (2012, p. 369) suggest that "greater focus on the territorial embeddedness helps in disclosing the institutional contingencies and particularities of the various spatial contexts where transition pathways take place." As such, "acknowledging the socio-spatial construction of transition paths may contribute to a more reflexive understanding for the conditions under which findings from one spatial transition context may be transferred to another one" (STRN, 2010, p. 18). Within cycling policy, the importance of understanding the role of contexts in shaping transitions is given special relevance, given the tendency towards policy borrowing discussed in section 1.5.

Comparative research as Peters and Pierre (2012, p. 512) have argued is also useful because it reveals greater differences out of particular contexts. Further, "an observation made repeatedly [can be] given more credence than... a single observation" (Peterson, 2005, p. 257). Thus, here an advantage of "the comparative method is... testing causal relations" (Fielding and Fielding, 2011, p. 57). In this instance, this study is interested in how the characteristics of different contexts may contribute to the formation of different symbolic meanings about everyday cycling. Such meanings would support or hinder everyday cycling.

5.2.2 Selecting the study sites

There were two main interrelated criteria justifying study site selection. One was variation in cycling trajectories over time. That is, I was looking for contexts which had revealed historically fundamental changes in the role of the bicycle as a mode of transport. We saw in chapter 4 that in such changes there would have been changes in the elements that constitute a cycling socio-technical system including symbolic meanings. Further, in such transformations, bicycles would either have at some point played a dominant role for transport and also experienced a decline. I sought out bicycle mode share data where available or vehicle licensing information to understand changes in the use of bicycles for transport. As I will discuss below, in some cases I had to rely on other sources to obtain an understanding of the role of bicycles in the selected study sites.

The second criteria was to identify different contexts with respect to societal characteristics – in particular inequality - in order to explore how different societal attributes might shape the formation of symbolic meanings about cycling, and in turn, use of bicycles As we shall see below;

- Johannesburg is characterised by more enduring forms of social differentiation,
- Amsterdam possesses long traditions of egalitarianism,
- Chicago has had some moderate moves towards reductions in social difference, and,
- Beijing has been characterised by wide gyrations in social (in)equality

Johannesburg then, given the more enduring social structure of inequality can be understood as a baseline case against which other study sites are examined. Even though this study is interested in causal relations, it assumes an interpretative approach given its position within the field of transition

studies where changes in social-technical systems are understood to be complex (Lachman, 2013). In this light, the key analytical framework in this study – the multilevel level perspective - is based on "Process theories [which] do not explain variance in the dependent variable as 'caused' by independent variables, but instead explain outcomes in terms of event *sequences* and the *timing* and *conjunctures* of event-chains," (Geels, 2011, p. 34 [emphasis in original]). As we shall see while changing modes of social difference help to explain changes in everyday cycling across the contexts, such transformations also intersect with other events and processes. These primary criteria intersected with research gaps, and pragmatic considerations to produce Johannesburg, Beijing, Amsterdam and Chicago as I will discuss below.

5.2.2.1 Johannesburg

In addition to more stable features of inequality (see below), I chose Johannesburg as the primary study site in response to gaps in research. There have been very few studies into everyday cycling histories in the African context. A majority of historical cycling studies pertain to North America, Europe and Asia(see, for example, De la Bruhèze, 2000; Moghaddass-Esfehani, 2003; Ebert, 2004; Rhoads, 2012; Stoffers, 2012; Wang, 2012; Longhurst, 2015). One important exception I found is Hahn's (2012) study into the appropriation of bicycles in local societies in West Africa. Remarking on this research gap, Hahn (2012, p. 33) argues "it is astonishing that, until recently, scholarly research on African societies has paid little attention to this phenomenon and its related activities."

Johannesburg as we shall see in chapter 9 has an unknown history of a vibrant everyday cycling culture. This subsequently declined dramatically and even in the face of actor intentions since the late 1990s, appears to resist re-emergence. Johannesburg, in other words has undergone two major socio-technical changes associated with a rise and then decline. Some historical role of the bicycle can be seen in the graph below which shows historical vehicle licensing data from the late 19th century to the middle of the 1970s.

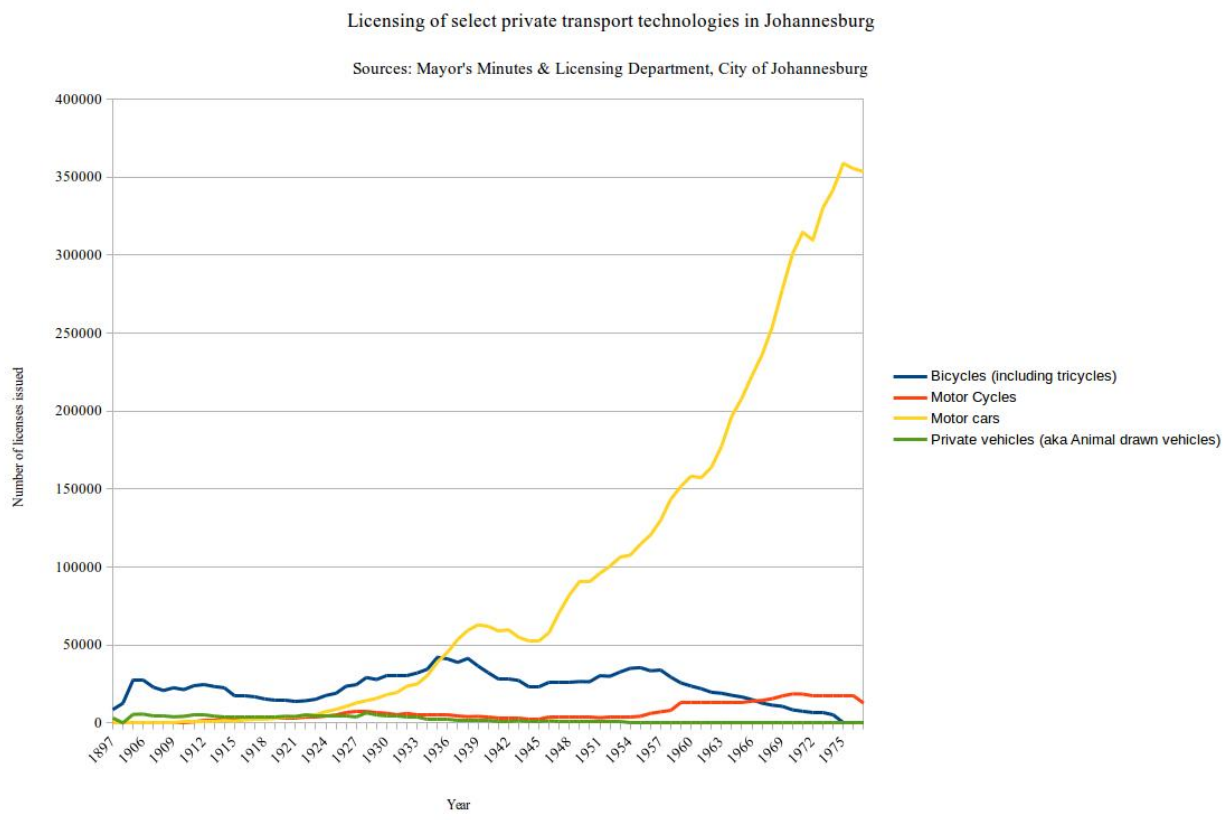


Figure 5.2.2.1.1: Licensing of private modes of transport in Johannesburg

With respect to a key variable discussed in chapter 3, which leads to formation of symbols of social status, Johannesburg is characterised by historically prolonged pattern of inequality. This will be evident in discussion in chapter 9. See also figure 5.2.2.1.3 which shows historical levels of inequality demonstrated by share of the income out of the total national income earned by the top 1% of country populations. It is based on supplementary longitudinal data[7] from Piketty's (2014) path-breaking study. I used this data as a proxy indicator of urban levels of economic inequality in Johannesburg and other study sites. While social relations arguably moved towards inequality with the end of apartheid in 1994, economic inequality remains profound (Leibbrandt, Finn and Woolard, 2012). As such, in the study period (late 19th century to 2016), social stratification can be understood almost as a static attribute of Johannesburg.

7 This is available at http://piketty.pse.ens.fr/en/capital21c2.

Finally, on a practical level, Johannesburg is where I lived during the study, therefore it was easier to conduct research. On a personal level, I had been involved in advocacy activities through an organisation called the Johannesburg Urban Cyclists Association (JUCA, 2015) – I therefore had a personal interest in understanding the reasons for very low levels of everyday cycling and the potential for increase.

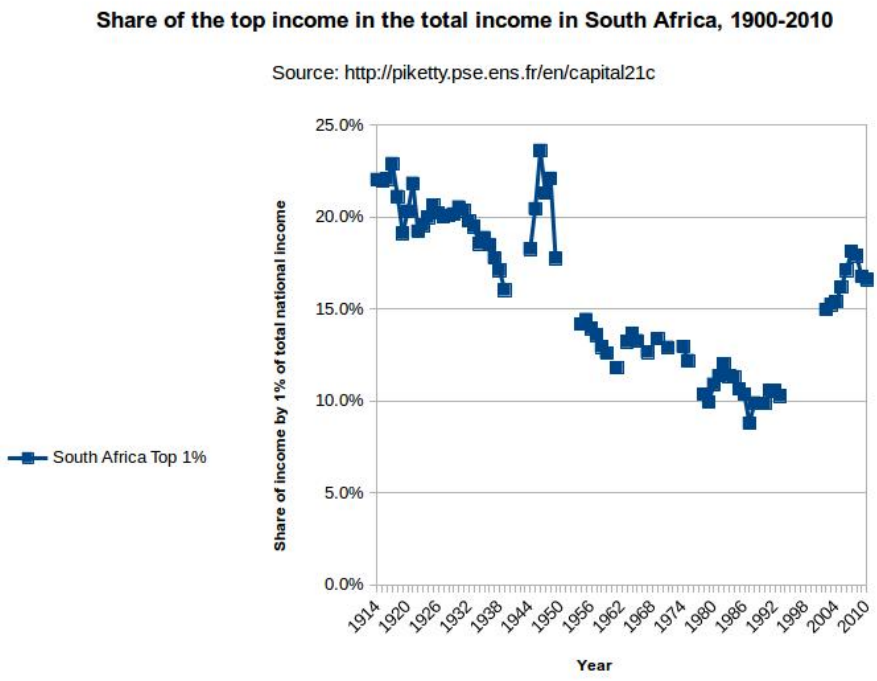


Figure 5.2.2.1.2: Trends in income inequality in South Africa

Johannesburg is conceptually useful for the study because it helps to foreground how everyday cycling can be viewed within a context characterised by inequality and other forms of social difference over a long period. It demonstrates, in the context of other alternatives to connote social status, the difficulties of embedding everyday cycling upon unequal contexts.

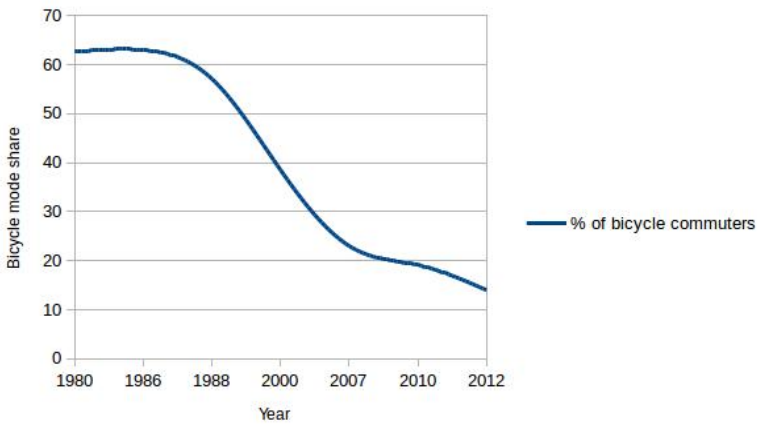


Figure 5.2.2.1.3: Bicycle mode share trends in Beijing. Assembled from (Sit, 1996, p. 265; Rhoads, 2012, p. 111; Zhang, Shaheen and Chen, 2014, p. 322; Zhao, 2014a, p. 3)

5.2.2.2 Beijing

Beijing, China was a next immediate choice. As we shall see in chapter 7, Beijing has witnessed two major changes in the role of the bicycle for transport. One unfolded from 1949 onwards up to the 1980s where 62.7% of all trips in the city were made by bicycle. It was in this period when China was also known as the kingdom of the bicycle.

In 2010 onwards, this trend dramatically reversed, with only 16.7% of all trips being taken by bicycle. See figure 5.2.2.1.3. At the same time, the public image of bicycling diminished. Bicycle use became associated with poverty (Wang, 2012) and as such it was no longer a socially-acceptable practice (Wetherhold, 2012). There maybe some very preliminary signs of a return of the bicycle following the decline, but the direction of change is uncertain.

These transformations have been embedded within different socio-economic systems, such as transitions to communism from feudalism, and more recently to capitalism which has been marked by growing inequality as we shall see in chapter 7. However, Beijing unlike Johannesburg through its communist past has a history of an egalitarian project. A main conceptual advantage then that Beijing provides is to analyse how everyday cycling can be viewed and change amidst dramatic changes in (in)equality.

5.2.2.3 Amsterdam

A next choice was Amsterdam, in the Netherlands. The Netherlands has a social democratic tradition within a capitalist political-economy. See figure 5.2.2.3.1

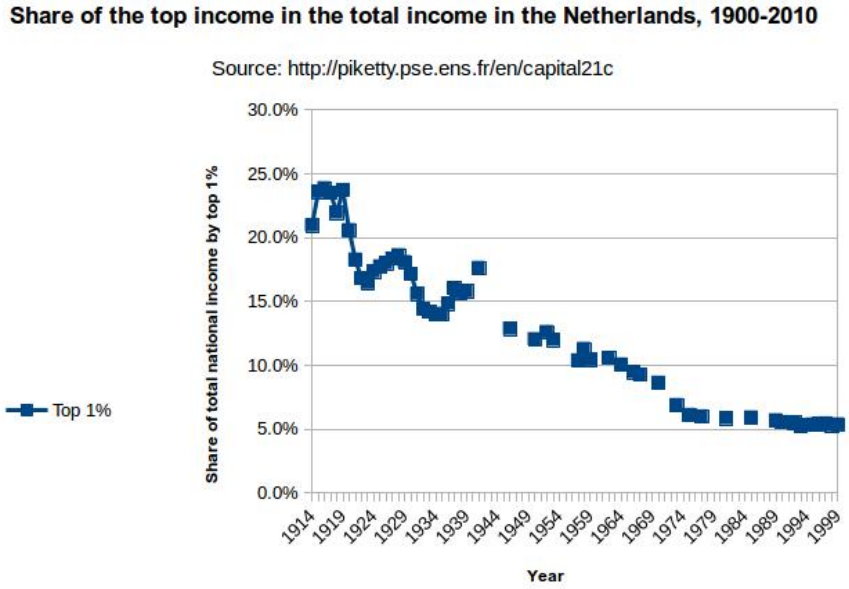


Figure 5.2.2.3.1: Share of national income taken by top 1% of income earners in the Netherlands

for a demonstration of trends. This social-democratic tradition is evident in decreasing social inequality. Amsterdam then, offers a unique perspective into the embedding of everyday cycling within a context characterised by extended traditions of egalitarianism. It helps demonstrate that muted social difference provides a more hospitable context for everyday cycling even though it not the only factor enabling of the practice.

Amsterdam as to be revealed in more detail in chapter 6 has witnessed three major everyday cycling socio-technical transitions. The first occurred after the turn of the 20th century to just after World War II; this was a period of cycling dominance as a ground transport solution. A second one, of decline, occurred subsequently until somewhere in the early 1970s. The final one is of substantial growth henceforth to the point where at the time of research, the bicycle was the most important mode of transport within the city centre. See figure 5.2.2.3.2 for an illustration of trends from the 1930s.

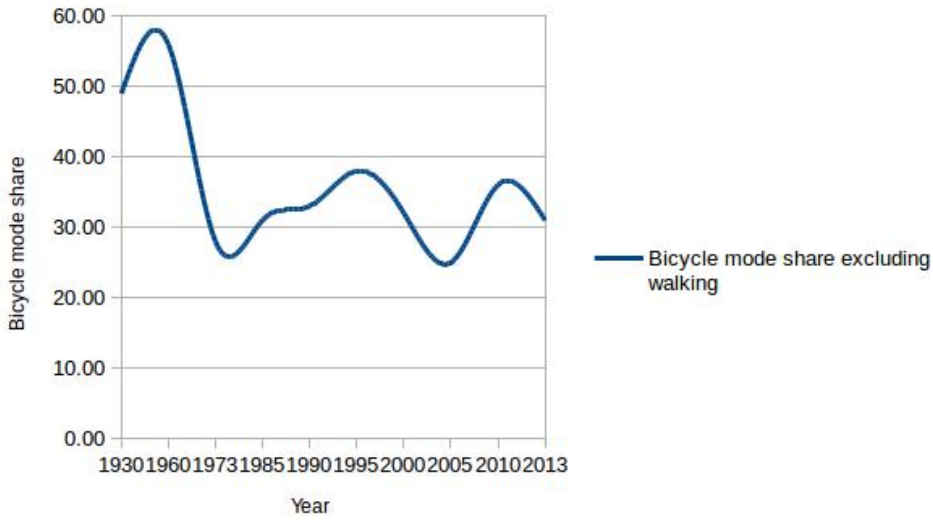


Figure 5.2.2.3.2: Trends in bicycle mode share in Amsterdam. Source: (Oldenziel et al., 2016, p. 205)

5.2.2.4 Chicago

A final choice was Chicago. As we shall see in chapter 8, while since the bicycle's arrival in the late 19th century, there have

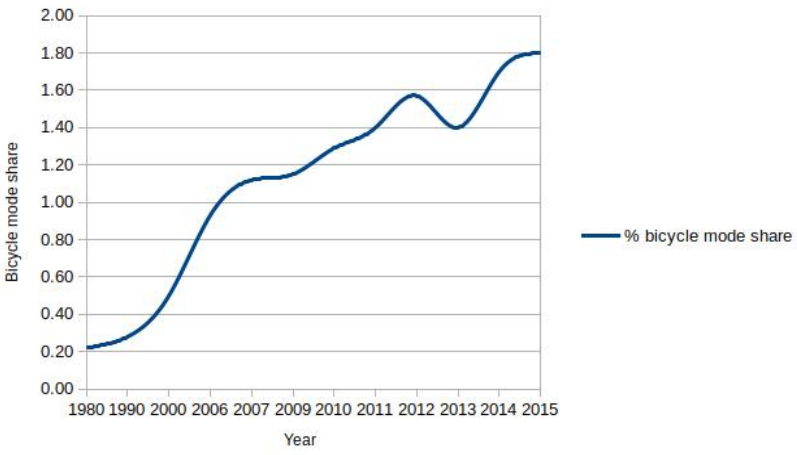


Figure 5.2.2.3.3: Bicycle mode share trends in Chicago. Assembled from (Berkow and Falbo, 2014, p. 3; Vance, 2015; League of American Bicyclists, 2016)

been periods portending a turn to the bicycle as an important ground transport solution, it is only in the contemporary historical phase, where such a transformation appears to be significantly underway. Between 1990 and 2012, the bicycle modal share increased by 459.7%, to 1.6% of all ground transport trips (League of American Bicyclists 2013). See figure 5.2.2.3.3for an illustration in bicycle mode share changes. It was also advantageous to study the city, since I lived there within for approximately a decade. This offered me prior knowledge that would ease the research process.

Of the four study sites, Chicago is most similar to Johannesburg but with important differences. Both have histories of acrimonious race relations, but with different demographic compositions, in terms of power distribution. While both have capitalist political economies, levels of income inequality, as measured by proxy using national patterns in both contexts, vary with Johannesburg possessing higher peaks and durabilities. See figures 5.2.2.4.1 in comparison to 5.2.2.1.2. Chicago then offers useful insights into the changing fortunes of everyday cycling in a context characterised by a moderate trajectory towards reduced but persistent social difference. The last historical period described in chapter 7 suggests that even within social inequality different symbolic meanings albeit resonant with less materially deprived groups can emerge to also encourage cycling growth.

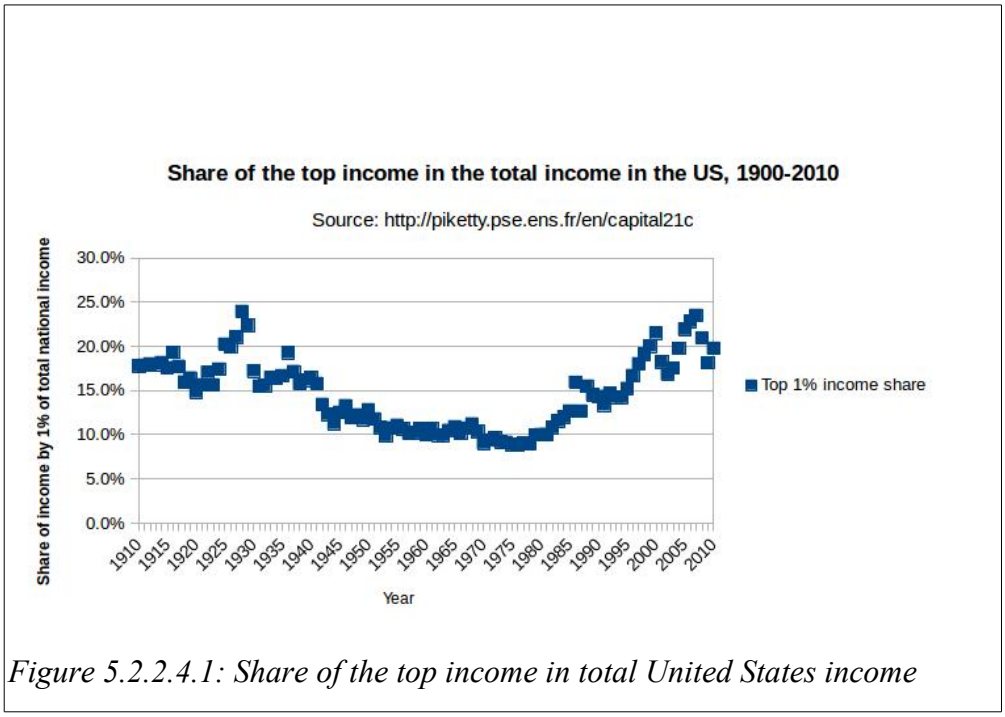


Figure 5.2.2.4.1: Share of the top income in total United States income

5.3 Data collection and analysis

This section describes the data collection techniques, tools and approaches to analysis. The methods

here follow the dimensions of the multilevel perspective in transitions theory (MLP), as discussed in chapter 4. This section will first describe the overall approach pertaining to each domain of the MLP and then provide a more detailed collective description subsequently. Data collection was undertaken separately for each study site using a variety of methods discussed below.

5.3.1 Landscape

In chapter 4, we saw that the characteristics of social contexts influence how social groups frame and users *see* transport technologies. Here social inequality, the nature of social relations, politics, economic systems, religious beliefs and other social attributes are important. We also saw that endogenous and exogenous changes in, and to, social contexts can emerge eliciting new appraisals of transport technologies. For each study site, I needed to obtain this understanding from a historical perspective. The table below provides an overview of the type of information that I sought for each context as well as how I obtained it.

Dimension	**Data**	**Data sources**
Slow moving or glacial factors	Political-economy, religious beliefs, social-inequality, social values, urban form, other available urban transport technologies, gender relations	Document review, museum visits
Trends	Environmental awareness, consumerism, demographic change, changes to the slow moving or glacial factors	Document review, museum visits
Sudden events	Wars, economic crisis, political crisis such as electoral deadlock, natural disasters such as droughts and floods, resource scarcities such as petroleum shortages	Document review, museum visits

Table 5.3.1.1: Data collection strategy pertaining to landscape characteristics and developments

5.3.2 Regime-level processes

As discussed in section 4.4, a socio-technical regime refers to an alliance of formal and informal rules that produce and reproduce a socio-technical system. These are intangible elements, such as

visions, expectations, meanings, social norms, knowledge systems, and routines pertaining to every dimension of a socio-technical system. Geels and Kemp (2012, p. 56)observe that in various contexts there exist different socio-technical regimes related for example to the "train, tram, bus or cycling." What distinguishes them is their modal share and as such they may be "subaltern [or] dominant" (ibid). This research is interested in understanding the processes through which everyday cycling moves from one position to another, using Geels and Kemp's (2012, p. 56) terms – from the subaltern to dominance – and vice a versa. Following the discussion in section 4.4, developments that can contribute to transitions – the unravelling of alignments in the formal and informal rules of the different sub-regimes of a socio-technical regime – include internal technical problems and onset of "externalities"[8] deemed unacceptable by users and other actors in urban spaces. This pertains to bicycles (in periods of decline) but also other dominant urban transport socio-technical systems (in periods of bicycling growth). I collected information as per the table below.

Dimension	**Data**	**Data Sources**
Were there any emergent internal problems?	Fraying of meanings, norms, technical weaknesses in performance, unavailability of supplies	Document review, ethnography, interviews, street level photograph and film or video footage
What externalit(ies) did incumbent develop? How severe?	Air pollution, street congestion, accidents,	Document review, ethnography, interviews, street level photograph and film or video footage

Table 5.3.2.1: Data collection strategy pertaining to regime-level developments

5.3.3 Niche-level processes

Alternatives to a dominant socio-technical regime and associated socio-technical system are built within niche-level processes. It is where new cultural meanings, beliefs, social norms, practices and perceptions related to a particular technology emerge and potentially diffuse more widely. This happens as discussed in section 4.5, if proponents can recruit influential actors behind a new technology (social network building), if people believe that at some point new technology can

8 I will put externalities in brackets to indicate their integral nature to the socio-technical system. Nevertheless, the slight distinction applied helps to draw attention to externalities as an "output".

provide for a societal function (articulation of expectations or visions), and if relevant learning occurs (Schot and Geels, 2008, p. 540). Such a transformation takes time. On completion, depending on dynamics at the landscape level and nature of problems associated with a competitor dominant socio-technical system, the niche technology may "break out". Depending on the historical moments, everyday bicycling may emerge or decline as a viable alternative to other urban transport socio-technical systems.

The data collection therefore involved searching for historical and contemporary information on the processes through which proponents sought to effect this change in each context. Table 5.3.1.1 below summarises the data collection strategy for each of the three dimensions.

Dimension	**Data**	**Data sources**
Articulation of expectations or visions	Visions expressed by proponents of bicycling and motoring	Published material by proponents, secondary studies, interviews, history of cycling studies
	Societal attitudes towards everyday bicycling	Studies, surveys, newspaper reports
Building of social networks	Formation of lobby groups and allied influential actors	Organisational literature, key informant interviews, history of cycling studies, observations
Learning processes	Development of formal and informal institutions	Organisational literature, key informant interviews, observations, history of cycling studies
	Development of cultural meanings, beliefs, attitudes about bicycles	Advertising (videos, newspaper advertisements, etc.), organisational materials, history of cycling studies, participation in cycling events in each site
	Development of road etiquette	Municipal records, media reports, observations, history of cycling studies

Table 5.3.3.1 Data collection strategy pertaining to niche-level developments

5.3.4 Description of data collection methods

This section describes the data collection strategies which were used to provide information as described in sections 5.3.1 , 5.3.2 and 5.3.3. While these were employed for all of the study sites, due to the comprehensiveness of information available as per the research questions, some strategies received more prominence in respective historical periods across the different contexts. In other words, while it was possible to obtain some data using the other four data collection strategies, some provided more information per the identified transition period (see 5.3.5). The table below shows which data collection strategies were prominent per context.

Context	**Prominent data collection strategy(ies)**	**Transition period(s)**
Amsterdam	Document review especially academic literature	All
Beijing	Document review especially academic literature	All
Chicago	Interviews	Late 1960s to 2016
	Document review especially archived information	Late 19th century to late 1960s
Johannesburg	Visual materials	Late 19th century to 1990s
	Document review especially archived information	All

Table 5.3.4.1: Summary of prominent data collection strategy per study site

5.3.4.1 Document review

One method of gaining insight into processes in all dimensions of the MLP was through document review. Document review was especially essential to understand landscape processes. I conducted a close reading of a wide variety of published literatures in history, sociology, transport history and political-economy pertaining to each space. Given the complexity of such a task, I relied upon, by way of introduction, literatures providing historical accounts of developments in each urban space. Relevant examples include Pacyga (2011); Mak (2001); Beavon (2004); Harrison, *et al*. (2014). Historical news compilations were also very useful in the same light (for example Clarke, 1987).

I was also able to gain insight into historical developments pertaining to incumbent and niche systems in document review. Amsterdam and Beijing in particular have been well studied generating many publications including peer reviewed literature so I was able to rely on this body of literature. The relevant key texts for each context are noted in the introductions of chapter 6 and 7 respectively. There was considerably much more historical information published about urban transport histories in Amsterdam, Beijing and Chicago than was the case in Johannesburg. I therefore had to construct the story about Johannesburg from the ground up, as it were, using every available shred of evidence. In this regard, municipal records held in archives (such as annual reports), records of automobile associations, historical newspaper accounts, and tangential information contained in books about the history of Johannesburg were especially useful. Data gathering processes for Johannesburg were therefore very onerous and often hampered by poor means of record keeping such as at archives. An important limitation affecting Johannesburg, Amsterdam and Beijing was that I only examined information in English since I was not conversant in any of the other languages in the written record. See chapter 11 for more on this limitation.

5.3.4.2 Museum studies

Secondly, in each context I visited institutions containing urban and national histories (i.e. museums). In Chicago, the Chicago History Museum, the Newberry Library and the Museum of Science & Industry; in Beijing, the National Museum of China, the Capital Museum, the Palace Museum, Beijing Planning Exhibition Hall, the China Railway Museum and the Beijing Auto Museum; in Amsterdam, the Amsterdam Museum, and the Rijksmuseum; in Johannesburg, the James Hall Museum of Transport and Museum Africa.

While in the museums I took notes physically in a book, but also took photographic images to which I could later refer. Photographs were useful in the museum experience. This is because of the vast amounts of information presented, making it difficult to intellectually engage with the content at the point of visit. Some museums, however, strictly prohibited the use of cameras, and in these instances I took handwritten notes. Visits to museums not only helped deepen the broad historical overview obtained in the previous phase pertaining to landscape processes, but also to obtain granular information histories of everyday cycling and their relationships with other transport technologies. Given the limited written information about Johannesburg, museum visits provided a

rich source of information through photographs, bicycles and other related artefacts.

5.3.4.3 Ethnography

The third data collection approach involved immersion into each context. The intention was to relate the knowledge obtained to everyday social life and, more importantly, to connect it with my personal experiences. In reflecting on the role of ethnography, it has been suggested "that an intuitive familiarity with the facts... can only be acquired by watching, talking to, and interacting with people first hand" (Atkinson and Delamont, 2010, p. 17). What I strove for, where possible, though was limited by financial and logistical constraints, approximate to "complete membership" (Adler 1987, quoted in Marvasti, 2003, p. 51).

Ethnography in the contemporary phase of research was especially useful in helping to make connections between the three levels of the MLP in the contemporary phase of research. Critically, for a comparative study such as this one, ethnography was invaluable for revealing at a 'granular scale', differences and similarities across contexts with respect to these dimensions of analysis. For example, it allowed an exploration of how societal characteristics and developments may strengthen particular incumbents and thereby constrain emergence of niches. For example by riding a bicycle in Johannesburg I could experience the marginal status of the practice (niche) reflected in minimal allocations in the urban environment and hostile motorist conduct which in themselves continued to suppress cycling growth (regime). This niche status of cycling in Johannesburg, I argue, is partly a function of landscape processes such as historical inequality and urban expansion (landscape). In the other direction, in Amsterdam while on a bicycle I experienced belonging in a normalised incumbent system that is well provided for in urban environment and is treated with respect or deference by other road users (regime). This dominant system has been produced over time through niche strategies, by weaknesses with alternatives (such as externalities of then incumbent regime in 60s and 70s), landscape developments (such as WWII, and 1970s oil crises) as well ongoing regime reproductive processes and enhancements by newer landscape developments (such as intercity competition for economic investments).

As suggested above, one important data collection approach in the contemporary phase was therefore riding a bicycle in the different study sites. As Larsen (2014, p. 60) notes, "in autoethnography, the researcher's own embodied participation makes up the empirical material and

features as the main protagonist in the text." However, it is important to note that this research draws *partly* on autoethnographic methods. Therefore, the text reflects some limited elements of my experiences across the study sites. An auto-ethnographic approach in cycling research is now a common method including the use of digital devices (see, for example, Spinney, 2006, 2011). This approach enabled me to deepen my understanding of the contemporary experiences of cycling, the spatial and demographic variations in cycling practices, and patterns of interactions with different modes of transport in the study contexts. In each of the study sites, I rode a bicycle during the morning and evening rush hours, when I could immerse myself in the everyday riding conditions therein. In these rides, I would also informally follow bicycle users when I identified them. Part of the objective was to observe riding styles and modes of interactions with other road users.

My data collection tools for this aspect of the research were an audio recording device and video camera mounted onto the bicycle. During and primarily after a ride, I would record my impressions into the audio recording device and later transcribe these impressions. The video camera recordings were particularly useful for later reliving the moments and comparing them visually on a computer screen. This use of video devices "allows the researcher to 'see there' when being there is not possible" (Spinney, 2011, p. 174).

Other data collection approaches included:

- Observations of interactions on the roads such as at street intersections. While I observed the interactions, I would take photos and videos.
- Participation in cycling related events (such as social rides),
- Monitoring of representations (advertising) of everyday bicycling and other modes of transport (private cars in particular) in media, public life (such as by retail outlets),
- Noting the nature of conversations about bicycling that strangers, friends or family in the different contexts would initiate with me.
- Moving about each context especially during peak travel times in the mornings and evenings by all the different modes of transportation available in addition to cycling as above.
- Inhabiting a wide range of diverse spaces within each city and interacting with residents.

Consequently, I visited each study site. I conducted fieldwork in Amsterdam in June 2014, in Chicago in July 2014 and April 2015, and in Beijing in November 2015. Since I lived in Johannesburg for the period of the thesis and prior to it, I relied on this previous experience. I was

able to draw on my own participation in cycling advocacy as part of the Johannesburg Urban Cyclists Association, prior to the study and afterwards for data collection. That is, I was aware of niche-level processes since 2011 attempting to create an everyday bicycling culture in the city. This includes actors, activities, as well as the outcomes.

By virtue of my lengthy time spent in Johannesburg, and to a lesser extent in Chicago, these were given longer fieldwork exposure as my prior history of living there means my "dataset" is richest and can thus, in terms of the fieldwork roles described by Adler (1987), fit in closest to "complete membership". The fieldwork roles in Amsterdam, and Beijing can best be understood as filling the "peripheral membership" role, which "implies marginal involvement in... [the] study" (Marvasti, 2003, p. 51). In both cities, I did not an attempt an ethnography of everyday cycling unlike Johannesburg and Chicago. This was because there was substantially more published information including peer reviewed literature.

5.3.4.4 Visual materials

As mentioned before, in all cases it was not possible to obtain an understanding of bicycle role in transport through evidence such as mode share. This was particularly relevant for early historical periods in all contexts. I therefore resorted to examining street level photography and film footage available from archives, such as (Pearson, 1886; Barnett and Barnett, 1913; Times Media Collection, 1957) and Museum Africa (2016) in Johannesburg – as well as from various internet-based archives (such as British Pathé[9] and British Movietone[10]), which provided visual insight into the changing road environment (in terms of transport technologies and users).

Other scholars have used such visual information to 'read' aspects of histories of transport in different contexts. For example, Rhoads (2012) relies partly on visual evidence such as posters and pictures to construct a history of the bicycle in China. So does Longhurst (2015) in a history of the bicycle in the United States of America. Such data sources certainly only provide partial accounts which have to be then supplemented by and triangulated with other data sources. Moreover, they may reveal only particular perspectives depending on the availability of information.

9 http://www.britishpathe.com/

10 https://www.youtube.com/channel/UCHq777_waKMJw6SZdABmyaA

5.3.4.5 Interviews

Fourthly, I supplemented information gathered as above with interviews with expert practitioners in each context. While some researchers draw information from many respondents based on the assumption that each respondent can relate common human experiences, others limit the interactions to a smaller sample who are believed to have more subject-specific knowledge (Marvasti, 2003, pp. 15–16). I assumed the latter approach. I identified individuals familiar with or involved in urban transport policies in the respective cities. I first identified a few respondents using internet searches where I sought authors of published materials on cycling matters in each context such as blogs. I also identified active and knowledgable participants on everyday cycling in each context on the social media platform, Twitter. Others were recommended by the first cohort using a snowball methodology. Respondents included municipal officials, civil society actors, and individuals in private sector organisations. These were respondents with intimate knowledge of cycling histories in their contexts obtained through immersion as advocates, policy-makers, academics, and private sector practitioners such as bicycle retailers. It is certainly likely that I could have interviewed other people but internet searches which revealed their publications and roles in cycling practices in their contexts and recommendations through the snowball process, suggested that my respondents were knowledgable. The bulk of respondents from Chicago – which is one study site that I conducted most of the interviews – were deeply involved in the city's cycling trajectory as users, policy-makers and advocates from the 1970s onwards. This was a period with limited documentation and therefore their responses provided crucial information such as on policy rationales, demographics of users, marketing strategies, and insights into cycling proponents.

The number of interviews I conducted per study site was shaped by degree of available literature, and in the case of Johannesburg, my knowledge of processes in the post apartheid period (see section 5.2.2.1). The cycling emergence in Chicago described in the last historical period in chapter 8 did not have much peer reviewed literature. It was therefore necessary to conduct numerous interviews in order to sharpen my data and analysis. In total I conducted 37 interviews across the study sites. See appendix A for a detailed breakdown of respondents and their roles at time of interviews per study sites.

I used a semi-structured interview format to elicit information. One advantage of unstructured interviews is that they "allow more fluid interaction between the researcher and the respondent" (Marvasti, 2003, p. 20). However, such interviews can be inefficient. To overcome that problem, I

sought a hybrid format – the semi-structured interview – where I developed interview questions that would offer general guidance to the discussion. This allowed for flexibility in the range of themes I could cover depending on the respondent. With consent, these interviews were digitally recorded and then transcribed. Even though the respondents were affiliated to particular organisations, I interviewed them in their personal capacity. This was made clear in the interview consent form that respondents signed (See in the appendix b).

5.3.5 Situating the analysis in transition periods

The data I collected produced a history of everyday cycling in each context. In the case of Johannesburg, that history is original. Elements of the historical account about Chicago particularly about the 1960s/1970s brief cycling resurgence as well as ongoing renaissance are also original. From each historical arc, I then identified transition periods associated either with growth or decline of the use of the bicycle for transportation. As we saw in chapter 4, a transition is defined as a fundamental transformation in the provision of a societal function. Such a transformation, which is understood to unfold over long time periods, involves a technological change but also other related elements, such as policy, meaning, infrastructures, user practices and social norms. I identified transition periods based on quantitative data of bicycle use and other related ground transportation technologies. For these purposes, longitudinal quantitative data, such as bicycle mode share and vehicle licensing information, was useful. However, in some instances, such quantitative data was not available. Therefore, I relied on scrutiny of street-level photographs, videos, histories of urban transport in the different contexts, as well as observations to understand levels of bicycle use. These transition periods are shown below.

5.3.5.1 Amsterdam

State	**Period**
Novelty	Late 19th century
Growth	Early 20th century to mid 1950s
Collapse	Mid 1950s ~ 1973
Growth	~ 1973 to 2016

Table 5.3.5.1.1: Transition periods in Amsterdam

5.3.5.2 Beijing

State	Period
Novelty	Late 19th century to ~ 1949
Growth	~1949 to ~ mid 1980s
Collapse	~ mid 1980s to 2016
Return?	2016 onwards

Table 5.3.5.2.1: Transition periods in Beijing

5.3.5.3 Chicago

State	Period
Novelty	Late 19th century
Waning	Early 20th century to late 1960s
Brief emergence	Late 1960s to early 1970s
Back to invisibility	Early 1970s to 1980s
Growth	Late 1980s to 2016

Table 5.3.5.3.1: Transition periods in Chicago

5.3.5.4 Johannesburg

State	Period
Novelty	Late 19th century
Growth	Early 20th century to mid 1930s
Decline	Mid 1930s to 1990s
Actors rediscover the bicycle	Late 1990s to 2016

Table 5.3.5.4.1: Transition periods in Johannesburg

I then used the multilevel perspective in transitions theory as a framework to analyse the change dynamics in each transition period for each context. In conducting the analysis, I developed narratives containing answers to the questions for each dimension of the MLP as per the table below. The table is a summary of the overarching analytical approach contained in table 4.6.1.

MLP Dimension	Questions
Niche developments	What expectations or visions were being developed?
	What actor-networks were being developed?
	What forms of learning were taking place?
Regime developments	Were there any emergent internal problems?
	What were social and environmental impacts of incumbent?
Landscape developments	What slow moving or glacial factors were unfolding?
	What trends were unfolding?
	What sudden events occurred?

Table 5.3.5.4.2: Summary of questions organising analysis

The results of the analysis are available in chapters 6 through 9. Chapter 10 brings these individual analysis in comparison. In particular, it explores why the transition periods in Johannesburg, were similar to or different from the ones in other study sites.

5.4 Limitations

There are a number of limitations that constrained the study. One of these related to incomplete or unavailable data – a phenomenon compounded by the fact that the study deals with long term horizons across multiple sites. For example, in Johannesburg, municipal council registration information did not always accurately reflect the precise number of bicycles on the streets. Some users simply failed to register their machines. Each year in the Minute of the Mayor, the Chief Traffic Officer would record the number of "unlicensed pedal cycles" that had been "reported... convictions [issued]... [violations]... withdrawn or discharged" (City of Johannesburg, 1939, p. 213). After 1974, the City of Johannesburg ceased issuing licences for bicycles. There is therefore no consistent quantitative records following 1974 of the presence of bicycles in Johannesburg. I sought to fill out this gap by examining street level photography and film footage, as well as witness observations. I also mentioned that in Johannesburg, data collection was hamstrung by poor archiving such as library management. One result is that I sometimes *accidentally* came across vital information. Information was also spread across different institutions. One implication is that there are likely records awaiting to be discovered somewhere in an institution. Another notable gap was longitudinal statistical data on income inequality in China before "the mid-1980s" (Piketty, 2014, p.

326). I also mentioned that I was not able to conduct extensive ethnography in Amsterdam and Beijing relying instead on secondary accounts. For more discussion on study limitations see section 11.9 which also draws attention to language barriers, and complexity of a study such as this one.

5.5 Conclusions

This chapter described the research methodology, data collection and analysis approach. The latter two were influenced by domains of the MLP. The following four chapters contain a mix of the empirical material and analysis.

Chapter 6. Amsterdam

6.1 Introduction

This chapter provides a historical description and analysis of everyday cycling in Amsterdam from the late 19th century to 2016. Sources from this account are mainly drawn from document review especially (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999; Mak, 2001; Ebert, 2004; Pelzer, 2010; Feddes, 2012; Jordan, 2013; Oldenziel and de la Bruhèze, 2016) and complemented by ethnography in the last historical period. The chapter identifies four major historical periods associated with bicycle use. The first one called novelty, refers to the situation in the late 19th century when bicycles were expensive niche technology generating excitement amongst the upper classes within an unequal context.

The second period, unfolding from the turn of the 20th century to the middle of the 1950s is aptly called growth. Bicycles evolved into the most important mode of ground transportation. In this growth, actor activities such as framing strategies were influenced and supported by landscape characteristics and developments in the context of weaknesses with alternatives.

In the second period, from the middle of the 1950s into the early 1970s, everyday cycling in quantity as well symbolic meanings, collapsed. In this transformation, sudden and severe landscape event (World War II) proved devastating. Niche actors for the system of automobility took advantage of this weakness and were supported by other landscape developments (such as economic growth).

Finally, in the last historical phase, unfolding from the early 1970s to 2016 (though foreshadowed by earlier processes) cycling recovers into a normal practice that is also dominant. While in the previous phase, landscape pressures were forerunner forces dislodging cycling, in this phase, the negative externalities of competitor alternative (system of automobility) stimulated a groundswell reappraisal of the bicycle. This reconsideration of the bicycle was supported by sudden and severe landscape events against incumbent strengthening niche development processes. Subsequently, regime reproductive processes and landscape developments strengthened everyday cycling. The chapter is structured in these historical phases.

6.2 Novelty: Late 19th century

The first form of the bicycle – the velocipede[11] – appeared in the Netherlands in 1868 (Pelzer, 2010, p. 60; Tjong Tjin Tai, Veraart and Davids, 2014, p. 4). This was imported from Paris (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 11). It was while on one such a velocipede in the late 19th century that a user travelling "between Diemerbrug and Amsterdam [reported that] my front wheel was hit with such a heavy chunk of coal that it broke" (Unknown quoted in Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 13). Carstensen & Ebert (2012, p. 28) describe similar incidents of conflict in the 1880s and 1890s across Western Europe, between bicycle users and farmers, city dwellers, and horse users.

With technological innovations producing new bicycle forms called a high wheeler[12] and then the safety[13], bicycle use grew in Amsterdam (Jordan, 2013, p. 22) and elsewhere around the world (Herlihy, 2006, p. 225). However, the bicycle footprint in Amsterdam remained small. In this period "85 per cent of Dutch trade in bicycles in 1895 was ... from English manufacturers" (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 12).

Bicycles were a niche product restricted to the wealthy "since the bikes were expensive, lessons costly, proper riding attire expected and leisure time required"(Jordan, 2013, p. 27). Across the Netherlands, the price of bicycles "started at 40 guilders and ran to 350 guilders... [which was]... far too high for the average skilied (sic) labourer in the big cities, whose disposable income was less

11 The velocipede was invented by a Karl von Drais in Germany in 1817. It was made of wood and featured two wheels positioned in the front and back, amidst which sat the rider. The rider would propel themselves by running both feet along the ground (Herlihy, 2006, pp. 19–21). As such it was known as a running machine or velocipede "from the Latin words meaning fast foot" (Herlihy, 2006, p. 21). It also came to be known as the Draisine after the inventor's name (Herlihy, 2006, p. 27) and later the "boneshaker" due to its effect on the rider (Learmont, 1990, p. 30) in the absence of cushioning pneumatic tyres.

12 The next technological successor after the velocipede emerged in the 1870s from Europe (Herlihy, 2006, p. 157). It went under various names including the "high wheeler", "ordinary" and the "penny farthing" "for the disparity in diameters" (Herlihy, 2006, p. 163). It had one large front wheel and a much smaller one in the rear. The rider sat atop the front wheel, from where they steered and pushed pedals attached directly to the front wheel.

13 Safety concerns associated with using the high-wheeler (Herlihy, 2006, pp. 200–221) eventually produced technical innovations that introduced the world to the current dominant bicycle form. The bicycle had "two equally-sized wheels... [and] a 'diamond-shaped' frame" (Reid, 2015, p. 13), and with "pneumatic tires[s]" (Herlihy, 2006, p. 246).

than two guilders per week" (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 12). Underscoring the elite nature of cycling at this period, at a national government level, bicycles had been taxed "as luxury items" (Ebert, 2012, p. 123) from 1899 (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 16).

Early users were not only wealthy but also primarily men who had some contact with England from where they obtained bicycles[14] and learned associated social practices such as creating bicycle clubs (Ebert, 2004, p. 350). Much the same could be said of Copenhagen (Tragellis, Lopez and Ilyashenko, 2010, p. 3). In this light Carstensen & Ebert (2012, p. 27) refer to a "transnational bourgeois cycling culture in Europe during the 1890s" with England acting as a focal point of circulation from where bicycle manufacturing in Europe centred at the time (ibid).

A primary use of the bicycle was for recreation and sporting. Jordan (2013, pp. 24–27) paints a picture of Amsterdammers flocking to a park - called Vondelpark – to try out their machines. Some whom were still learning to ride would crash into each other. Others including women visited indoor establishments from where they could safely learn how to ride without crashing – at least into pedestrians. This recreational and competitive use of the bicycle was also common across the Netherlands. Ebert (2012, p. 116) argues that for a national bicycle association in the Netherlands, "the bike was first and foremost a leisure and sports tool."

6.2.1 Analysis

From a transitions' perspective, in Amsterdam, the bicycle was in the late 19th century a niche technology but one that generated excitement amongst the upper classes[15]. Bicycles were expensive affordable to the wealthy in a bifurcated society. In the late 19th century Amsterdam, was a polluted and dirty city (Mak, 2001, p. 191). Life expectancy for some was very short with "half of all boys reach[ing] the age of 35... and... simple labourers ... hardly more than 30" (Mak, 2001, p. 192). Others had grander lives living in larger houses situated next to a beautiful large park (Feddes,

14 Even though at this time there was a fledgling domestic bicycle manufacturing industry in 1895 "85 per cent of Dutch trade in bicycles...was...from English Manufacturers" (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 12).

15 While there were high passions associated with cycling in the late 19th century in Amsterdam and the rest of the Netherlands – what Carstensen & Ebert (2012, p. 25)refer to as the "golden age of cycling" – Jordan (2013, p. 30) argues that the excitement paled into comparison to that in the United States of America.

2012, pp. 176–177). There were therefore strong economic differences, which might have helped foster social distinction dynamics with the bicycle in the middle.

Furthermore, as suggested above, the bicycle was not a vital transport tool. There were a few cars used by the very wealthy given their costs. Moreover, they were seen as nuisances given their loud noises and dust blowing (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 16). More significant was walking, use of animal drawn transport including a horse-drawn tram service, and pushcarts (Feddes, 2012, p. 163; Jordan, 2013, pp. 30–31; City of Amsterdam, 2016).

In the following century however, processes unfolded that made cycling by the mid 1950s, the most important mode of ground transportation. The next section therefore turns to this narrative and analysis.

6.3 Growth: Early 20th century to mid-1950s

This section describes the development of an everyday bicycling socio-technical system in Amsterdam. At the end of it, bicycles were the most dominant ground transportation technology. This was however, as is with the case with transitions, not a sudden development. As Oldenziel & de la Bruhèze (2016, p. 18) show even after the turn of the 20th century, cycling had a niche status against other systems:

> Since 1900, electric trams and pedestrians dominated the streets. People walked to work; as soon as their incomes allowed, male wage earners took to trains to commute between the centre and the residential harbor areas.

Indeed, Jordan (2013, p. 30) notes that at the turn of the 20th century, it was the electric tram (after conversion from being pulled by horses) that was "the new transportation rage in Amsterdam." Jordan's (2013, pp. 30–33) research depicts street scenes well into the end of World War I where most people were walking, using pushcarts (to sell or transport goods), taking trams, riding horses or horse-drawn vehicles. Some were on bicycles, while others were using private motorised vehicles such as motor cycles and motor cars. Bicycles were still expensive beyond the reach of many: "For example, in 1910, the cheapest bicycle was about 55 guilders, which equalled the monthly median income"(Tjong Tjin Tai, Veraart and Davids, 2014, p. 12). At this time, in 1910, there was one large bicycle manufacturing company based in Amsterdam employing 200 workers

(Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 13).

Following the end of World War I, there was growth in bicycle ownership as "the bicycle provided a quick alternative for travel by foot"(Pelzer, 2010, p. 59) in the context of diminishing prices. By the 1920s Jordan (2013, p. 53) described bicycles as "King[s] of the Street" in Amsterdam. In a picture of a street scene in 1924, people on bicycles are most numerous while others are walking (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 22). This was a common phenomenon across the Netherlands where Ebert (2012, p. 116) argues that "the bicycle had become a common means of transportation by the 1920s." Growth in bicycle ownership at this period was aided by diminishing costs as prices dropped steadily down for example from "129 Guilders in 1919 to 61 Guilders in 1925" (Jordan, 2013, p. 56). Affordable bicycles meant that people in the working classes became a large segment of users across the Netherlands (Tjong Tjin Tai, Veraart and Davids, 2014, p. 19) and in Amsterdam. Recalling the discussion about users being primarily upper to middle income in the late 19th century, this was a significant transformation.

While bicycle ownership was increasing in the 1920s so did cars. Those who switched to cars were for example "some of the upper-class clientele, who purchased high-priced bicycles"(Tjong Tjin Tai, Veraart and Davids, 2014, p. 12). One consequence was that bicycle users increasingly came under attack. They were depicted as responsible for the growing number of accidents and inconsiderate traffic participants vis-a-vis other transport modes, and hogs of available road space. The bicycle was also branded as a dangerous transport mode. Such characterisations were even discussed in the Amsterdam city council. Some policy-makers saw the motor car as the transport solution of the future with the already high rates of car ownership in the United States as a model. They were supported in this agenda by an organisation representing car interests which released films depicting people walking as hindrance to this future (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 24; Oldenziel and De la Bruhèze, 2011, p. 33; Oldenziel and de la Bruhèze, 2016, pp. 18–19). This anti-cycling agenda however failed to gain purchase at this time. This was in part due to the support that cycling commanded as well as the type of urban life within which it fit. For example, prior to the outbreak of World War II, the municipality had plans to expand infrastructure for automobility in the city. One of this was a grand plan to build a highway connecting the city centre with other parts of the city. However due to fierce opposition from the public since its execution would depend on demolishing houses, the project was cancelled (Pelzer, 2010, p. 62).

Still, the rate of car ownership in the 1920s should be put into some perspective as it paled in comparison to that of bicycles: “Cars accounted for only 3 percent of the traffic”(Oldenziel and de la Bruhèze, 2016, p. 18). Towards the end of following decade across the Netherlands, there were 3.5 million bicycles versus 100, 000 cars (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 18). As such it could be reported in the middle of the 1930s that “Every working day, some 400, 000 cyclists commute[...] in and out of Amsterdam alone”(Herlihy, 2006, p. 328). Children also joined the throng of people cycling as their parents were able to purchase them (Jordan, 2013, p. 118). In the 1930s then, Jordan (2013, p. 119)recounts “That an entire generation of the city’s youths were being raised as cyclists.” The share of people using the trams had then declined (Oldenziel and de la Bruhèze, 2016, p. 18).

Oldenziel & De la Bruhèze (2011, p. 33) argue that the Netherlands was unique from other Western European countries[16] in that in the interwar period between World War I and World War II, the bicycle remained an acceptable mode of transport for everyone. In other countries, the middle and upper classes with increasing bicycle use by the lower working classes, abandoned the bicycle for cars.

Growth in cycling continued apace up to the beginning of World War II (WWII). By 1940, across the whole of the Netherlands, “the bicycle had become common place, with an average of 1 bicycle for every 2 inhabitants” (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 18). Under German occupation during WWII, bicycle use increased massively with “Within days after the capitulation, so many motorists [in Amsterdam] switch[ing] to cycling that sales more than doubled at some bike shops” (Jordan, 2013, p. 164). This switch was because the German military had seized fuels and closely controlled how any remainder was used (Jordan, 2013, p. 164). Consequently, “Civilian car traffic halted”(Oldenziel and de la Bruhèze, 2016, p. 20). Trams were later also not an option since the electric supply was shut off (Jordan, 2013, p. 220)

However, as the occupation wore on, cycling continued under difficult circumstances and did decline. One reason was because the German military increasingly adopted a hostile stance towards cycling practices in Amsterdam. For instance, they banished riding abreast and the holding of hands

16 Denmark, Belgium, Germany, Great Britain, Switzerland, France and Italy

between two people on different bicycles. Materials such as spares also became increasingly difficult to obtain in the context of general scarcities and requisitions for the war (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 19; Jordan, 2013, pp. 169–233).

After the end of World War II, there was a surge in bicycling in Amsterdam, as well as across the rest of the Netherlands (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 20). Moreover, the decimated manufacturing industry recovered making available not only new bicycles but also spares (Jordan, 2013, pp. 242–243). Thus, as Oldenziel and De la Bruhèze (2016, p. 21) note "Amsterdammers kept on cycling in large numbers in the post-war period." Birds-eye view pictures taken off a traffic intersection by a government agency one day in August 1953 shows swarms of people on bicycles with very few motor vehicles and some trams (Feddes, 2012, p. 268). Growth in cycling levels peaked somewhere towards the middle off the 1950s (see graph by, Oldenziel and de la Bruhèze, 2016, p. 20) with "In 1954...cyclists ma[king] up *75 percent of the traffic in the city*"(Oldenziel and de la Bruhèze, 2016, p. 21 - emphasis added).

However, just as cycling recovered so was it poised for a crash. This crash will be the subject of a forthcoming section. First, we turn to exploring in more detail the reasons for the emergence of cycling as the most dominant transport mode.

6.3.1 Analysis

The rise of the bicycle in Amsterdam after the turn of the 20th century into the 1950s can be understood by examining processes in the three dimensions of the multi-level perspective in transitions theory. While these can be examined independently, they interacted and relied upon each other as I shall show below.

To begin with, cycling grew in part due to weaknesses with existing alternatives. While the electric tram had been popular at the turn of the 20th century, increasing fares made cycling a cheaper solution (Jordan, 2013, p. 56; Oldenziel and de la Bruhèze, 2016, p. 20). Furthermore, up to the 1960s, the public transport network was limited (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 23). A domestic automobile industry (such as one situated in Amsterdam called Spijker) could also not thrive because with the small Dutch population,

manufacturers could not achieve economies of scale. As a result, most cars were imported at great costs. This is unlike the United States where due to mass production methods pioneered there, entry level cars were greatly affordable by the 1920s (Jordan, 2013, p. 100). In any case had there been an increase in car ownership, Amsterdam's narrow streets would not have proved very amenable to motoring. Reflecting on the period between 1920 and 1955, Oldenziel and De la Bruhèze (2016, p. 18) support this argument by arguing that "radial streets in particular were too narrow and intersections ill equipped to handle the anticipated flows of fast motorised traffic."

Turning to the landscape dimension, there were a range of developments that suppressed the potential emergence of the system of automobility in favour of cycling. In the 1920s, Amsterdammers and others across the Netherlands could acquire bicycles cheaply from Germany given the unfolding hyperinflation next door (Jordan, 2013, p. 53). Similarly, in the 1930s, the Great Depression increased cycling (Oldenziel and de la Bruhèze, 2016, p. 20)constraining growth in car ownership (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 18). Parents even purchased bicycles for their children further expanding the demographic of bicycle users. Thus, in the 1930s it became common in Amsterdam to not only children being carried by their parents on bicycles but also children riding own bicycles (Jordan, 2013, p. 118). Both World Wars also incentivized cycling as we saw above. And even though there were declines in rate of cycling as wars ground on, there were no other viable alternatives other than walking. Thus, Jordan (2013, pp. 212–214) recounts that some resorted to desperate measures including using wood, rope or any other available object to line bicycle rims in the absence of tires and inner tubes.

These developments, and others I will discuss below, intersected or complemented the activities of cycling proponents. With respect to wars, a powerful lobby group, the ANWB[17], which was regularly consulted by national government "...when considering policy changes"(Tjong Tjin Tai, Veraart and Davids, 2014, p. 20) advised its members to ride their bicycles as a way of achieving inner calm. They could so on the growing network of touring bicycle paths that it had been help build nationwide. Or even in urban areas as an alternative to public transport, motor traffic and trains (Ebert, 2012, p. 119). In the words of Ebert (2004, p. 355) "cycling helped to form manly,

17 In 1883, the ANWB was created as a national organisation representing the interests of cyclists of all pursuits including racing, touring and even indoor cycling. It was mainly a middle class organisation but with no specific religious affiliation. The lack of religious affiliation is important because the Netherlands had strong divisions between Protestants and Catholics (Stoffers, 2012, p. 102).

self-controlled, balanced and self-reliant individuals [and that the bicycle was the] tool of the grown-up, manly citizen." Thus, "the politics of the ANWB during the war years [World War I] can best be described as an introspective, introverted kind of nationalism, which used the symbol of the bike to reaffirm a neutral, balanced, level-headed Dutch identity" (Ebert, 2012, p. 120). Evoking a rhetoric used by the ANWB during World War I to encourage bicycle use, in 1939 when World War II broke out, a public commentator in Amsterdam argued:

> Our Queen rides a bike...do you know a calmer people in Europe? What could be better for international politics than if each of those hot-headed gentlemen were gifted a bicycle? Then the world would quickly be freed from all of its misery (Jordan, 2013, p. 161).

The ANWB in particular undertook a variety of such framing strategies to construct inclusive meanings about cycling and car use. These strategies as with the case above relied upon contextual developments. Ebert (2004, pp. 360–361)argues that the semiotic work undertaken by the ANWB prior to the turn of the 20th century was important in the mass uptake of cycling in the Netherlands. That is, the ANWB worked to frame the bicycle as an object that could be used by everyone, regardless of capability[18], for national identification and not one of class distinction. She argues that initially it was the bourgeois who used bicycles in the Netherlands. When the working classes started using bicycles with the availability of cheaper bicycles, the ANWB welcomed[19] them into its ranks – even though some elite bicycle users in the public were not happy by this erosion of status. As a result, some switched to the car to assert their social difference (Ebert, 2004, pp. 360–361). Those who did, according to ANWB semiotic work, were understood to prefer to travel somewhere very quickly without using their own energy. In contrast, bicycles were for those who enjoyed exerting some of their own effort and desired a sense of accomplishment in locomotion (Ebert, 2004, pp. 360–361).

18 In the late 19th century, into the early part of the next, cycle racing in the Netherlands and in many European countries was becoming popular. The ANWB itself had been hosting races. However, at a time when it sought to link national identity with bicycle use, it saw cycle racing as in conflict with this goal. While racing, one could not experience the nation. One could not connect with the landscape or urban environment. Therefore, in 1898 it stopped promoting cycle races. It also lobbied the national government and succeeded in enacting a piece of legislation in 1905, banning bicycle racing on the streets in the Netherlands. Racing could occur but only inside in buildings – out of public sight (Ebert, 2004, pp. 360–361; Stoffers, 2012, p. 106).

19 Vanman and Maddock (2010, pp. 39–40) suggest that a similar process may have occurred in Denmark during and after World War I: "as all classes of society began to cycle, the Danish Cyclists Association (Dansk Cyklist Forbund, or DCF) threw itself into promoting the interests of *all* the new cyclists" [emphasis mine]. This is important because the DCF had an upper class pedigree as it was "founded by a number of prominent middle and upper class citizens in 1905" (Vanman and Maddock, 2010, p. 40).

The choice by the ANWB to associate cycling with nationalism was however delimited. Work by Ebert (2004)and Stoffers (2012)shows that the ANWB's decision in the late 19th century into the early 20th century to link cycling with Dutch national identity can be understood as a response to prevailing political developments. The Netherlands and indeed other countries in Europe were in the midst of a deeply nationalist historical period. Germany next door had recently united and was seen as a possible threat. The newly established constitutional monarchy was being challenged by new political and social groups. The country was rapidly urbanising. For the ANWB, the strategic decision was clear; in order to make bicycles more acceptable in the Netherlands, it needed to appeal to these developments.

Other extensive accounts of how the ANWB fostered the link between bicycle use and national identity can be found in Ebert (2004) and Stoffers (2012). However, one instructive example was when Queen Wilhelmina was to be crowned as the first female Dutch monarch. The organisation prepared a bicycle parade in her honour three years in advance. At this ride, participants wore outfits that evoked "traditional" Dutch dress and others attached small windmills behind their bikes (Ebert, 2004, pp. 360–361). This not only set the stage for future support from the Royal Family but it also made "the link between the bicycle and Dutch citizenship" (Ebert, 2004, p. 357). As a result, it is perhaps not surprising that Dutch royalty from the 1930s took conscious decisions to start using bicycles in public life "both as an expression and confirmation of the middle-class ethos dominating Dutch society and politics, denying strong class differences and conflicting interests" (Stoffers, 2012, p. 107). Here we see the activities of niche actors being influenced by the characteristics of, and unfolding events in, a particular context.

Similarly, the framing of cycling as an inclusive practice was also aided by increasing egalitarianism and Calvinist ethics. With respect to egalitarianism, following Nijman (1999, p. 153), the societal basis supporting bicycle use over cars would have been stimulated in the late 19th century as a culture of egalitarianism arose. These egalitarian ideals in the Netherlands led to the introduction of a host of progressive social policies covering health, education and labour rights for example persisting to at least the 1970s (Nijman, 1999, pp. 153–155). See also figure 5.2.2.3.1, representing consistent declines of the share out of the total national income taken by the 1% income bracket from 1914 to 1999.

While there were objective material reductions in social difference in Amsterdam, which would have minimised desires for "consuming" autos for distinction purposes, this tendency was supported by a prevailing Calvinist ethic[20]. As Nijman (1999, pp. 151–153) argues, the Calvinist ethic shuns luxury and ostentation. It is not opposed to the entrepreneurial spirit but seeks to mould it against extravagance. Instead, the entrepreneur should save and plough back earnings into the business. This idea of how one should comport themselves in relation to material objects existed in Amsterdam as early as the 16th century (Schama, 1997, p. 188) and is argued to be one of the key ingredients that made the city into a global economic powerhouse in the 17th century (Nijman, 1999, pp. 151–153). In this line of religious belief, Amsterdammers and other Dutch people influenced by Calvinism would have been less inclined to seek out the expensive car, preferring the more humble bicycle: In the Netherlands "where a more Calvinistic ethic reigned, the display of one's wealth was largely disparaged [and therefore] all walks of Dutch society could – and did – cycle comfortably, free from ridicule" (Jordan, 2013, p. 111).

Finally, Amsterdam had an early advantage in being a favourable bicycle context given 17th century urban form built to a pedestrian scale featuring mixed land uses (Pelzer, 2010, p. 61). The value of a compact urban form was further endorsed in 1935 when the municipality developed a spatial development plan based on bicycle distances. It intended for work and residential locations to be no more than 30 minutes from one another. The plan however, was poorly implemented in the subsequent decades (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 23). In spite of this, Pelzer (2010, p. 64) argues that "the strict spatial planning regime in the Netherlands functioned as a buffer against sprawl" up to the outbreak of

20 It is useful here to briefly elaborate on Calvinist ideas, following Weber (2001), for whom the attitude towards wealth, consumption and luxury can be linked back to the foundational notion of predestination within Calvinist belief. The concept of predestination holds that "only a small proportion of men are chosen for eternal grace" (Weber, 2001, pp. 59–60). According to the theology advanced by John Calvin, it was not possible for the individual to know if they were chosen, nor if another had been chosen, for it would be highly presumptuous to know God. The solution instead was to believe that one was chosen and manifest this belief in everyday conduct. By acting according to the ideals of God in the world, one could also shed away any lingering self-doubt about their status as chosen. Thus, every moment in life – which was understood to be short – was to be dedicated to God. This gave rise to a premium on working, and against laziness or sloth. In the course of working, the individual could accumulate wealth but this was not for its own sake. It was valued because it was a demonstration of the individual supplicating themselves to God; by not being idle but by being industrious. What they earned they would use to obtain "necessary and practical things" (Weber, 2001, p. 115), save the rest and give it away to the community. The problem with wealth was thus how it could be used. If it was used to increase sloth or frittered away in luxury, it was seen as acting against the injunction to spend one's time manifesting their chosen status (ibid).

World War II Pelzer (2010, p. 61). More explicitly, by “Around the year 1940, the maximum trip distance in the city [was] seven km”(Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 37).

6.4 Collapse: Mid-1950s ~ 1973

Given the previous description of stratospheric levels of cycling, it is difficult to imagine a decline. Even up “until the 1960s, commuter traffic consisted largely of pedestrians and cyclists and, to a lesser extent, tram and train passengers” (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 23). More specifically the “Modal split of all trips by [bicycle by] Amsterdam residents excluding walking...in 1960 was 56[%]”(Oldenziel *et al.*, 2016, p. 205). Yet one did occur – and in a dramatic fashion from the middle of the 1950s.

From a modal split high as we saw in 1954 of 75% of all traffic being bicycles, the streets were instead increasingly swarming with automobiles as they “became cheaper and more widely accessible”(Pelzer, 2010, p. 62). In this transformation “Cars became symbols of modernity, whereas the bicycle was the anachronistic ‘horse of democracy’”(Pelzer, 2010, p. 62). Scooters also gradually appeared on city streets terrifying some people on bicycles as they passed them from any direction (Jordan, 2013, pp. 293–294). As streets became occupied by other modes of transport, so were restrictions on cycling placed (Jordan, 2013, pp. 281–283). A demonstration ensued against such one street closure to cycling, but the campaign did not succeed in reversing the decision (Jordan, 2013, p. 285).

In this context, cycling conditions deteriorated to the extent that a head of Amsterdam's police said “cycling nowadays is tantamount to attempting suicide” (Jordan, 2013, p. 296). There were “fatal street accidents involving playing children, pedestrians and cyclists”(Oldenziel and de la Bruhèze, 2016, p. 22). Across the Netherlands, where cycling was also declining, traffic safety also declined (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 30). Within two decades, “cycling levels plummeted to reach an all-time low in 1973” (Oldenziel and de la Bruhèze, 2016, p. 21). In about two decades, bicycles had been overtaken by cars as the main mode of ground transportation with in 1973 the “Modal Split of all trips by Amsterdam residents excluding walking [being] 53% [for cars and] 28% [for bicycles]”(Oldenziel and de la Bruhèze, 2016, p. 205). How do we understand this decline?

6.4.1 Analysis

The overall outline of change was that significant landscape pressures weakened the cycling regime – in particular its symbolic meanings – in favour of the system of automobility. A landscape development – economic growth - then enabled users to purchase cars. Given de-legitimised image of cycling, a range of actor-networks then emerged as niche proponents and implemented measures (in as much as car users also in the roads) to further weaken cycling. This was compounded by another landscape development – urban expansion. This model of change conforms closest to what Geels and Schot (2007, p. 409) refer to as "Technological substitution." In this mode "If there is much land-scape pressure ('specific shock', 'avalanche change', 'disruptive change') at a moment when niche-innovations have developed sufficiently, the latter will break through and replace the existing regime" (Geels and Schot, 2007, p. 409).

In chapter 4, it was discussed that transitions rarely occur suddenly. It takes time for the various elements of a socio-technical system to form and align. Therefore, retrospective developments are useful in understanding future dynamics. In the case of the collapse of cycling in Amsterdam, World War II proved critical in unravelling the symbolic meaning of everyday cycling. Towards the end of World War II, the material conditions deteriorated greatly. The German occupying forces took increasingly severe measures in order to procure resources to support their war effort. The bleakness is illustrated in a diary recording:

> We live... without gas, light electricity, without enough fuel, without enough food. There are no longer any films, no trams, no showers or baths, no clothing available, no luxury, no comfort. What we have to survive on: one kilogram of gain (1¼ loaves of bread) and one kilogram of potatoes per week. One by one, the other rations have been scratched from the calendar. Meat, milk, butter and sugar have become historical concepts. Cheese also ran out this week (Jordan, 2013, pp. 220–221).

Recall also as discussed above, even as cycling continued, it was under increasing difficulties for example as the machines themselves could hardly function as spares were difficult to obtain. Given such memories, in the post-war reconstruction era, many policy-makers and general members of the public were eager to forget the hardship times, therefore leaving the bicycle behind. The image of the bicycle in the minds of eyes of some politicians had withered. It had become a symbol of deprivation. A reminder of a difficult time was towards the end of World War II, when food was scarce, leading to famine (Jordan, 2013, p. 313).

Reflecting on post-World War II changes in the Netherlands and other European countries, Oldenziel and De la Bruhèze (2011, p. 39) argue that "the associations [of poverty and hardship] turned the bicycle into the antithesis of motorized transport." In this "U.S.-inspired visions of middle-class mobility, peace, and abundance" (Oldenziel and De la Bruhèze, 2011, p. 39) were appealing. Cox (2015a, p. 24) also observes how in Italy after World War II, there was "rejection of cycling in the post-war era since the bicycle was so firmly grounded as a wartime symbol that the population wanted to leave behind."

As the symbolic meaning of cycling withered, so did that of car use gain favour. Car acquisition was made possible by post-war economic growth in the Netherlands (Jordan, 2013, p. 278). Between 1948 and 1960 incomes on average increased by fourty four per cent. By 1970 this rate of growth had grown (from 1948) by over two hundred per cent (Wagenbuur, 2011). The technical potential of bicycles was also weakened by urban expansion. As we saw above based on Oldenziel & De la Bruhèze (2011), such expansion itself was part and parcel of the creation of a more prosperous future. New suburbs[21] were constructed, in some cases more than 25 kilometres from the city centre. It was presumed that employers would create jobs in these areas. This increased travel distances. For instance, the outermost bicycle travel distances more than doubled from seven kilometres in 1940 to 15 kilometres in 1970 (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 37).

A variety of niche actor-networks then emerged as strident proponents of automobiles. As Jordan (2013, p. 283) notes, people using cars were powerful:

> Motorists, though constituting a small minority of road users at the time, almost universally belonged to politically active motor organizations. More important, virtually anyone who had influence over traffic policy (elected officials, high-ranking civil servants, etc.) either owned a car or, as a job perk, had one at his or her disposal.

Traffic police conducted educational campaigns in which they sought to prioritise roads for motor vehicles (see for example, Amsterdam - Verzamelde Historische Filmbeelden, 2014)[22]. Politicians

21 There had also been other far-reaching plans for urban change. Large parts of the historic core featuring low rise buildings were to be demolished and replaced with new, much grander buildings. Roads were to be widened, multi-level parking garages built, and a new subway system inaugurated. However, these were moderated while others were cancelled (Mak, 2001, pp. 300–305).

22 An English translation version can be found at https://www.youtube.com/watch?v=yIA48yNpuxY.

at city and national level, on both sides of the spectrum, publicly increasingly emerged in support of car use. For example, in 1964 the then Mayor of Amsterdam proudly announced that he had ridden a bicycle only once since 1947 (Jordan, 2013, pp. 294–295). Mr Joop den Uyl – Prime Minister of the Netherlands from 1973 until 1977 – was in 1967 (then a leader of a left-leaning political party) was quoted as saying:

> ... yes, I've had a car since 1953. I find it delightful. I've always defended the car from cultural pessimists. I think it's hypocritical to have something against cars... everyone has the right to own a car (Jordan, 2013, p. 295).

A new political party – the Safer Political Party – exclusively devoted to promoting the interests of automobility secured enough votes to gain a seat in the Amsterdam city council (Jordan 2013, pp.294–295). Stoffers (2012, p.104) reports that in the 1960s, the bicycle lobby group formed in the 19th century, which also later started providing support to motorists – the ANWB – "finally developed into a car lobby." With increased car use – "between 1960 and 1970 the amount of cars quadrupled" (Aluvihare, te Brömmelstroet and van der Horst, 2014, p. 7) – came traffic congestion. To solve this problem, a chief police officer proposed that some city canals be filled in order to build new roads for cars (Mak, 2001, pp. 285–287).

Mirroring these developments, the national government in 1966 developed a spatial policy framework that envisaged cars becoming "the dominant[23] element in... society... which will have to find its expression throughout the whole spatial pattern" (Feddes, 2012, p. 263). While the policy saw an automotive future it nevertheless gave some consideration to pedestrians, urban space and public transport (ibid). This position is attributed to the "moderate political culture in which Dutch spatial planning took shape" (Feddes, 2012, p. 263). Nevertheless, "From 1950 to 1976, the bicycle was almost entirely excluded from the government's [national] vision"(Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 31).

In this context "bicycles had to behave like other vehicles; sharing the same roads and adhering to the same traffic regulation"(Pelzer, 2010, p. 62). Over arguments that there was insufficient space within Amsterdam's streets to cater to bicycles, there were no dedicated cycle paths allocated (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 37). It is difficult to comprehend how people continued to cycle under these conditions. Perhaps by sheer

23 While the policy saw an automotive future, it nevertheless gave some consideration to pedestrians, urban space and public transport (ibid). This position is attributed to the "moderate political culture in which Dutch spatial planning took shape" (Feddes, 2012, p. 263).

numbers alone, because even at the lowest level in 1973, the modal split was about 23%, they were able to mitigate motorist conduct and thereby somewhat increase their cycling safety as some studies have found (see, e.g., Elvik and Bjørnskau, 2017; Fyhri *et al.*, 2017). Yet is also important to observe as pointed out in chapter 2 via (De la Bruhèze, 2000), even as cycling declined, the public image was not as negative in Amsterdam as other European cities in the same period. Nevertheless, it would have been difficult to see how cycling could sustain much longer under these conditions. However, instead of a further downward spiral, growth occurred. To this we now turn.

6.5 Return of the bicycle: ~ 1973 to 2016

After the almost two decade period of cycling being pushed aside by car use as a dominant form of ground transportation, trends reversed yet again. A variety of actor-networks supporting everyday cycling emerged. These included grassroots organisations[24] such as some called Car Free Amsterdam, Provos, The Troublesome Amsterdammer, The Gnomes and Stop de Kindermoord (Stop the Murder of Children) (Pelzer, 2010, p. 62; Reid, 2017, pp. 202–203). A national union of regional bicycle associations called Fietersbond that was founded in 1975 (interview with Rob Smiers, 18 June 2014; Stoffers, 2012, p. 105) had a branch in Amsterdam (Jordan, 2013, p. 372). The arrival of the Fietersbond was important at this period because as we saw previously, it had in the 1960s, reoriented its gaze towards the car.

The city council which had previously been antagonistic towards cycling, seeing the motor car as the transport solution of the future begun to embrace the bicycle. In 1978, the city council produced a cycling strategy which prioritised bicycles. For example, cycle paths were to be introduced, people cycling would have priority at intersections, have permission to travel on both ways on one-way streets, and have reduced waiting times at traffic stops (Oldenziel and de la Bruhèze, 2016, pp. 23–24).

In 1976, the national government agreed to help municipalities to construct bicycle infrastructure by providing eighty percent of funding. The budget item allocated to this function increased subsequently. This financial support led to a dramatic increase in bicycle infrastructure across the Netherlands. In 10 years – between 1978 and 1988 – the length of bicycle lanes grew by seventy-

24 Most of these organasiations have organisations that appeared in the 1960s and 1970s have faded away. Fietersbond remains: https://fietsersbond.amsterdam/home

three percent (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, pp. 42–43).

Oldenziel & de la Bruhèze (2016, p. 24) however caution that it was not a straightforward trajectory. In spite of the turnaround towards the bicycle the 1980s and 1990s were an uneven period with losses and gains. Different entities whether private actors, national government, railway agencies and others and even within the municipal council would undermine each other – sometimes acting in the interests of the bicycle and other times not.

However, on the back of these developments, the share of trips taken by bicycle rose from their lows in 1973 onwards - though not at the fast rate of decline from the middle of the 1950s (Oldenziel and de la Bruhèze, 2016, p. 20). For example "By one measure, between 1980 and 1995, the number of people cycling in the city center had increased by more than 29 percent, while the number of those driving had dropped by 24 percent"(Jordan, 2013, pp. 370–371).

Signalling growing acceptability of cycling regardless of the political divides, "By the year 2000, bicycle policy went mainstream...[with] the traditional divide between social democrats and right-leaning politicians … weaken[ing]"(Oldenziel and de la Bruhèze, 2016, p. 25). Part of this transformation was due to the perceived economic advantages of a cycling city. The municipality begun to see cycling as a way of attracting tourists and workers employed in the services and knowledge sectors since they were believed to value bicycle use (Pelzer, 2010, pp. 63–64). In Amsterdam, and in the rest of the Netherlands and Denmark cycling "also bec[a]me a national trademark or brand with capacity for export"(Carstensen and Ebert, 2012, p. 47).

Bicycle ownership grew with "77% of the population own[ing] one or more bicycles, a rate of 1.27 bicycles per person"(Gilderbloom, Hanka and Lasley, 2009, p. 485). In contrast, "only one out two households own[ed] an auto"(Feddes, 2012, p. 264). Consequently, at the time of research within central Amsterdam, a region bounded by a circular highway, "more than sixty percent of journeys… are taken by bike" (Aluvihare, te Brömmelstroet and van der Horst, 2014, p. 3), whereas it approaches "50 percent in the city as a whole" (Aluvihare, te Brömmelstroet and van der Horst, 2014, p. 9). Information released by the City of Amsterdam in early 2016 revealed that more people travel by bicycle in Amsterdam than any other mode, including public transport (te Brömmelstroet,

2016).

This growth has been so pronounced that there are now shortages of parking spaces and bicycle lanes, and street crossroads are regularly congested (City of Amsterdam, 2012, p. 1). Oldenziel and De la Bruhèze (2016, p. 26) refer to a "crisis of bicycle parking at train stations." In an acknowledgement of the problem, the City of Amsterdam argued "the cycling infrastructure requires significant investment during the next few years to restore the balance between supply and demand" (City of Amsterdam, 2012, p. 1).

Demographically, bicycle users in Amsterdam are very diverse, including even "people with a higher education" (Aluvihare, te Brömmelstroet and van der Horst, 2014, p. 11). My own observations in June 2014 revealed this diversity of practitioners. See figure 6.5.1 for an example that shows children, and men and women of different age groups, all using bicycles. While users are diverse as residents, some immigrants as across the Netherlands "especially people originating from non-Western countries" (Harms, Bertolini and te Brömmelstroet, 2014, p. 238), who have been a growing population group since the 1980s, tend to use bicycles less (ibid). The diversity of bicycles has also increased with the traditional plain black bicycle form being joined by an array of other colour templates and technical forms (Onderzoek en Statistiek, 2013, p. 43).



Figure 6.5.1: Cycling to school and work, June 2014. (Source: Author's collection)

In Amsterdam then, cycling is pervasive. It is a reflection of the city. Feddes (2012, p. 264) aptly captures this arguing:

> The city bicycle is not a novelty gadget, but a utilitarian object with a low threshold for users – most comparable perhaps with an umbrella. Its social status is neutral; everyone can bicycle without drawing attention to themselves, and thus the bicycle is not especially for children, students, the poor or losers, or members of a trendy vanguard. The dominant urban style for

> riding is nonchalant, with a touch of anarchism, because traffic rules are generally regarded as merely global indications.

While Feddes (2012) may overstate the extent to which everyone can cycle in Amsterdam – such as immigrants and other visitors who need to at least acquaint themselves with the particular cycling practices prevalent[25] therein as I discovered during my fieldwork – this is an accurate reflection of the status quo at the time of my fieldwork. Cycling, then, has again replaced driving as the dominant ground transport socio-technical system. The next section explores the reasons for this transformation.

6.5.1 Analysis

In the previous phase of cycling collapse, landscape pressures and developments opened up a window of opportunity for system of automobility. While we will also see landscape developments playing an important role (1970s oil crises for example), arguably it was the internal and external problems of the car regime upon Amsterdam (congestion and accidents for example) that initiated a search for alternatives. Cycling as the niche (which had not really disappeared from the urban landscape) gained support from a range of proponents. Over time the cycling regime has been reinforced by landscape developments.

A forerunner explanation for the return of everyday cycling in Amsterdam were the negative 'externalities' of car use. Some grass-roots organisations such as the Fietersbond had environmental rationales at the fore – at least initially (Stoffers, 2012). But car dominance in urban space also motivated the Fietersbond as it did other groups (Reid, 2017, p. 192) mentioned above. According to Reid (2017, p. 197), a significant concern that motivated many to 'stand up' was decreasing road safety. In an indication of the unsafe road conditions, it was reported that "in 1971, deaths by motor vehicles reached record levels, with 3 300 people dead, 500 of whom were children" (LCC, 2011). Campaigns to address road safety under the Stop de Kindermoord initiative " - along with others that preceded it – persuaded the authorities, drip by drip, to extend and improve the already extensive cycling infrastructure"(Reid, 2017, p. 197).

While the perhaps more evident consequences of car use initiated a groundswell of protest

25 For more on this see http://cyclingacademics.blogspot.co.za/2017/07/illustrations-of-swarming.html?view=classic

movements, it is also the case that the broader symbolic, political-economic, and even questions about what kind of city Amsterdam was becoming via the automobile animated concerns. One of these movements – called Provos[26] – was concerned that Amsterdam was not only becoming a less liveable city (Pelzer, 2010, p. 62), but that it also framed its actions in a "wider political critique linking cars to unjust capitalist infrastructures, environmental pollution and consumer ideology" (Furness, 2010, p. 56). Indeed, the group had other interventions related to social housing, health care for women, free childcare for young children, an anti pollution scheme (Ibid). They also supported public transport use, gay rights, cultural access for the working class (extended hours for museums), urban densification and so on (Jordan, 2013, p. 308).

In other words at this time, there was also a battle against all the features of modernisation (Mak, 2001, pp. 296–308; Pelzer, 2010, p. 63). Here recall that it was precisely the symbolic meanings of car use as signifier of progress and material abundance that had motivated some to turn to the car. The fight then against this agenda "...by the beginning of the 1970s [made] the city … become renowned worldwide as a countercultural hot spot"(Jordan, 2013, p. 343). This was also a generational fight pitting on the one side, those who had lived through the World War II era of hardship, and on the other, a generation born after World War II (baby boomers), which had no experience of scarcity Mak (2001, p. 306)summarising the work of Mamadouh (1992). For the former, cycling represented hardship.

On the back of these processes, a sudden event further legitimised car use: the Organization of Petroleum Exporting Countries (OPEC) oil crisis. The oil producing nations imposed complete bans on oil supplies to other nations deemed to be sympathetic to Israel during the Yom Kippur War including the Netherlands (Mabro, 2007, p. 57; Ostrander and Lowry, 2012, p. 390). The crisis hit the Netherlands severely[27] for a range of factors. First as the embargo unfolded unlike other countries that were deemed to assume a more amenable stance by OPEC countries, the Netherlands did not enjoy allowances in oil flows (Mabro, 2007, p. 57). Secondly "the Netherlands was dependent on oil for roughly 53% of its total energy needs [with] two-thirds of this oil [coming]

26 For a riveting account of the antics of the Provos see (Jordan, 2013, pp. 297–313).

27 The OPEC oil crisis was also seen as potentially "a major setback for the Dutch government's aim to stimulate the economy and *achieve a more egalitarian society*" (Hellema, Wiebes and Witte, 2004, p. 98, emphasis added). Following the long trajectory of this project, Nijman (1999, p. 154) argues that "this form of egalitarianism reached its peak in the 1970s." At this point the redistributive burden was placing enormous strains on the fiscus (ibid). And thus national government was searching for solutions.

from the Middle East"(Hellema, Wiebes and Witte, 2004, p. 99). Furthermore, "oil was also an important raw material for the Dutch oil processing and petrochemical industry" (Hellema, Wiebes and Witte, 2004, p. 99). Oil imports from the Middle East therefore contributed greatly to the Dutch economy.

In response to the embargo, the national government banned[28] the use of private cars on Sundays[29] from November 1973 until January 1974 (Wagenbuur, 2013). In January 1974 the use of petrol was further restricted through a rationing policy. It was instructive of the degree of pressure that the Netherlands faced from the oil embargo that the then Prime Minister – who had in the 1960s boasted about his car use and argued that car use was a right of every Dutch person – orchestrated a public relations event prior to the launch of the Car Free Sundays featuring him on a bicycle (Jordan, 2013, p. 354). These difficulties led to increased bicycle, public transport and horse-drawn vehicle use (Jordan, 2013, pp. 353–356; Wagenbuur, 2013). At this time, the then "Queen Juliana was publicly making use of the bicycle" (Hellema, Wiebes and Witte, 2004, p. 107) in solidarity with the fuel use restrictions.

It is important that this discussion does not provide the impression that the return to bicycling was only due to the OPEC oil crisis. As Loorbach and Rotmans (2006, p. 3) have argued "a transition can be accelerated by one-time events...but cannot be caused by such events." This is because a transition involves a "co-evolution of a set of slow changes that determine the undercurrent for a fundamental change" (Loorbach and Rotmans, 2006, p. 3). As I discussed above, by the late 1960s a wide range of pressure groups had emerged campaigning for safer, liveable, bicycling friendly cities. It was also due to "its [Amsterdam's] robust cycling tradition, unique libertarian, alternative culture, and the historic centre's advantageous scale and morphology"(Oldenziel and de la Bruhèze, 2016, p. 18).

Thus, a cascade of interlocking dynamics at the landscape, regime and niche levels in the 1960s and 1970s returned Amsterdam onto a cycling city path. Over time, the cycling regime has reproduced

28 Denmark, also as a result of the OPEC oil crisis, "implemented car-free Sundays" (Vanman and Maddock, 2010, p. 43).

29 There had been other Car Free Sundays in 1939, 1946 and 1956. These were also linked to fuel scarcity before and after World War II. In 1956, oil trans-shipments along the Suez Canal were halted due to a regional conflict when Israel, France and Britain invaded Egypt. Jordan (2013, p. 353) argues that these did not have as significant effect, since in those periods, car use was low.

itself through ongoing actions of users and proponents described above. Within a reproductive transition path such as have been the case since the late 1960s, “Reinforcing landscape developments help stabilise the regime”(Geels and Schot, 2007, p. 406.). For example the urban environmental sustainability agenda which has found strong purchase in Europe (Beatley, 2012) is a source of reinforcement. In this light Gilderbloom et al. (2009, p. 485) describe Amsterdam as “the green city” within which the bicycle figures as an indicator of sustainability. A final but not the only example of landscape trends that have further embedded cycling, as described above, is interurban competition for economic growth where cycling figures as an incentive for tourists, investments and even workers.

6.6 Conclusions

This chapter has described and analysed four historical phases of everyday cycling in Amsterdam. In these transformations, contextual characteristics, developments and sudden events were vital in initiating and reinforcing change. But these contextual dynamics shaped and interacted with actor activities and ongoing user practices with respect to incumbent and insurgent systems. Amsterdam provides insights into the embedding of everyday cycling into a context with a long history of egalitarianism. It suggests given the relatively robust history of bicycle mode share when considered over long time scales, that such a context might be more hospitable for bicycling. Nevertheless, the chapter also demonstrated that there were other contextual attributes such as the influence of Calvinism and compact spatial form that contributed to a more amenable bicycling habitat so nuance is also necessary. See also the discussion in 11.7 which shows that reductions in inequality is not a sufficient condition on its own to encourage everyday cycling. An ongoing background question to be addressed more fully in chapter 11, is how differences in contextual dynamics shape formation and changes in cultural determinants of cycling – in this case symbolic meaning. The next chapter moves on to consider developments in Beijing.

Chapter 7. Beijing

7.1 Introduction

The history of everyday cycling in Beijing from the late 19th century is in this chapter told in four phases. In the first one – unfolding from the late 19th century to about 1949 - cycling was a niche practice confined to the wealthy and those seeking associations with themes of modernity linked to the 'west.' Cycling occupied a limited role in ground transport due to high costs, cheaper alternatives and landscape developments that constrained wider growth of the practice.

In a second phase from the turn to Communism in 1949 to the mid-1980s, cycling became the dominant transport solution. There were limited alternatives given landscape characteristics and developments. Unintentional actions by the Chinese Communist Party (CCP) transformed cycling into a status symbol. Subsequent decisions by the CCP (market liberalisation for example) then allowed suppressed desire for cycling to be satisfied. Flourishing of cycling was also enabled by a compact urban morphology.

From the middle of the 1980s to 2016, cycling collapsed. Actor intentions to resurrect cycling appeared to bear no fruit. Landscape developments that occurred in the prior phase (market liberalisation) which allowed suppressed demand for cycling to be achieved, led to erosion of the symbolic power of the bicycle. Users then turned to the automobile as new expensive tool within a context of inequality with acquisition enabled by a growing economy. Cycling was further weakened by landscape developments (such as urban expansion).

In a last phase occurring after completion of fieldwork, there were reports of a cycling renaissance. The renaissance was associated with a use of dockless bicycle sharing systems accessible through smartphone technology. Such bicycles were reported to be ubiquitous in Beijing and other Chinese cities. Since the phenomenon occurred after my fieldwork was completed, no conclusions are drawn. Future studies should investigate this new phase.

This chapter is organised following the four phases above. Data about the history of everyday cycling in Beijing was primarily obtained from document review especially Wang (2012); Zhang,

Shaheen and Chen (2014); Rhoads (2012); Haixiao (2012) and Lusk (2012). This was supplemented by information from some interviews and ethnography.

7.2 Novelty: Late 19th century to ~ 1949

This section presents the early history of bicycles in Beijing from the late 19th century until the turn to Communism in 1949. As we shall see, in this period cycling was a marginal mode of transport amidst other options. Walking, rickshaws, buses and use of streetcars (albeit limited in provision) were cheaper alternatives. Like bicycles, motor cars were very limited in number. They were also very expensive therefore only used by the extremely wealthy.

Turning to the overview, in Beijing as the rest of China, it was "Western missionaries, businessmen or colonial officers" (Wang, 2012, p. 12) who first used the bicycle. Moghaddass-Esfehani (2003, p. 95) agrees writing that "between the 1870s and the early 1890s, European and American expatriates... [such as] in the Chinese capital Beijing, were practically the only cyclists in China." For this reason, bicycles were initially viewed as foreign objects (Wang, 2012, p. 12).

Elite Chinese would not ride bicycles since it was thought that it would tarnish their image as people of leisure and means, who moved around by being carried on chairs known as Palanquins, or pushed in rickshaws (Moghaddass-Esfehani, 2003, p. 97; Lusk, 2012, p. 21; Rhoads, 2012; Seiler, 2012, p. 366). In an illustration of this prejudice against expending own effort amongst the elite in China, when American adventurers who had been touring the world "called on the Prime Minister of China... [he]... wondered why anyone would want to travel under his own power if could rely on someone else's" (Herlihy, 2006, p. 255). Moghaddass-Esfehani (2003, p. 97) discovered that "as late as 1926, a university professor in Beijing 'confessed' in a letter to the editor of a journal that to save transportation costs, but also to comply with social expectations, he usually called a rickshaw to pick him up, walked most of the distance, then took another rickshaw to reach his destination gracefully." We will see later, historically, as cycling collapses, some in Beijing making similar choices due to social pressure.

Chinese who did adopt the bicycle were the wealthy seeking to associate themselves with the 'west' and themes of modernity. It was initially the wealthy who rode bicycles due to cost. Wang (2012)

has examined changing bicycle prices since the arrival of the machine in China in the late 19th century. She shows that "Even after three bicycle factories opened in 1937, a bicycle would still cost more than $50, the equivalent of several months' salary of an urban worker"(Wang, 2012, p. 13). She concludes that "before 1949 a bicycle was a middle to upper-class possession"(Wang, 2012, p. 13). Forms of ground transport such as wheelbarrows (Moghaddass-Esfehani, 2003, p. 97) and "traveling by rickshaw, street car[30] and bus were much cheaper choices" (Wang, 2012, p. 13) for the working class than bicycles.

Users were not only wealthy but also had a cosmopolitan bearing with connections to global capitals. They were also those who had been exposed to the machines in their travels overseas such as for studies (Lusk, 2012, p. 21), or for work as diplomats, sailors, and merchants (Rhoads, 2012, p. 25). Since bicycles were being adopted by people seeking affinities with modernity, Rhoads (2012, p. 25) observes that across China it was "Shanghai, China's most modern and cosmopolitan city [at the time] was where several Chinese groups took the lead in embracing the bicycle." Underlining the importance of association with the 'west' and themes of modernity as rationale for use, during fieldwork in Beijing, I discovered that one of the members of the imperial family to use a bicycle – Emperor Puyi as a young man– was introduced to one by his English tutor (6 November 2015, Palace Museum Visit). The Emperor became such an enthusiastic bicycle user, that he had several doors in the Royal Palace – the Forbidden City – altered in order to facilitate bike use (Wang, 2012, p. 14).

7.2.1 Analysis

Bicycles then remained as a relatively small part of ground transport amidst other options. Haw (2008, p. 111)describes the transport options available in the late 1940s: "There were some buses and trolley buses in the city, but most public transport was peddle tricycles, rickshaws and carts pulled by horses and mules." They could offer distinction to users because of high costs within an unequal society. In this early period Beijing and the rest of China was a feudal monarchical society. This meant that the social world was broadly "divided between a mass of peasant families and a landed upper class" (Skocpol, 1979, p. 49). The feudal monarchic characteristics of China only

30 A short tram spanning 7.5 kilometres had been constructed in 1899, but was later destroyed in 1900 during a rebellion against foreign occupation. The tram was targeted ostensibly since it had been built by the foreign occupying powers (3 November 2015, China Railway Museum visit). Electric tram services only commenced in 1924 (Wang, 2012, p. 14; 3 November 2015, China Railway Museum visit).

begun to transform with the fall of the last emperor in 1911, when the "Qing dynasty and the monarchical system were overthrown in the Republican Revolution of 1911" (Rhoads, 2012, p. 96). The intent and programmes to further erase social-economic inequalities gained urgency with the triumph of the Chinese Communist Party in 1949. The car given costs did in the 1920s and 1930s begin to supplant the status conferring advantage of cycling (Rhoads, 2012, p. 100). However, growth in automobile use was not sustained, in part due to a poor economy and wars (Rhoads, 2012, p. 103).

It was only after 1949, as we shall see in the next section that cycling was to grow significantly in use and in fact for many decades, constitute the most important ground transport socio-technical system.

7.3 Growth: ~1949 to ~ mid-1980s

After remaining a niche transportation technology, bicycles increased on Beijing's streets after 1949 (Wang, 2012, p. 16)once the People's Republic of China was founded. This growth process as we shall see unfolded until the 1980s. However, within this period, there were two rates of growth. The first a moderate one until about the early 1970s, and the second thereafter into the 1980s when ownership and use exploded.

In the 1950s and 1960s, bicycles were not yet a significant mode of transport in Beijing. Rhoads (2012, p. 106) argues that "annual bicycle production [was] 80,000 in 1952." Certainly bicycle use was on an upswing from its low base. Wang (2012, p. 16) shows that between 1960 and 1965, bicycle ownership per 100 urban households increased from 41.3 to 46.2 between 1960 and 1965. Yet this is also to say using Wang's (2012) data that in 1960, 5 households would have had access to 2 bicycles between them. At this time, available bicycles were produced domestically by companies controlled by the Communist Party. Companies previously owned by Japanese businesspeople were nationalised, "in 1945... first by the Nationalists and soon after by the Communists"(Rhoads, 2012, p. 105). Other smaller firms were also taken over and amalgamated by the Communist Party (Wang, 2012, pp. 17–18).

Bicycles were not only, not very abundant but they were also expensive in the 1950s through to the

1970s in relation to worker incomes: “In 1952, a bicycle cost more than 35% of an urban worker‘s annual salary, a ratio that decreased to about 25% by 1978”(Wang, 2012, p. 24). Workers, then, would have to save over long periods to acquire a machine. As we shall see later, in subsequent decades, ownership was enabled by “Subsidies ...to the workers who commuted by bicycle”(Lusk, 2012, p. 24). In the context of other alternatives such as public transport being overcrowded and limited, bicycles then, were highly sought out transport solutions.

While rational transportation tools, bicycles also became status symbols (Chen Si, 2009, p. 51) due to their scarcity and expense (Goffman, 1951; Blumberg, 1974). As Rhoads (2012, p. 106) points out bicycles “became a marker of social status, along with wristwatches and sewing machines [which were one of the] three things that go round (san zhuan) that women required of their boyfriends before they would marry them.” As such they were “popular props for weddings” (Sartor, 2011, p. 48). Underlining the extent to which bicycles were desired, “bicycles on the black market… were 20–100 per cent higher than the state-listed prices in the shops, depending on the brand of bicycles and the location of the market” (Zhang, 1992, p. 113). It is somewhat of an irony then that under a society founded to pursue egalitarian ideals, the public became very brand conscious:

> Chinese cyclists were keenly aware of the relative merits of the different brands. In particular, they most desired one or another of the three name brands—the Feige, the Yongjiu, and (since 1958) the Fenghuang (Phoenix)—while they disparaged all the rest (Rhoads, 2012, p. 107).

As we shall see below in mode detail, there was a significant desire by the Chinese Communist Party (CCP) to promote cycling. This was manifest for example in infrastructure provision. From about the middle of the 1960s (Lusk, 2012, p. 24), an extensive network of bicycle infrastructure was built (Wang, 2012). Prior to that “the main roads were 14 to 21 meters wide (46 to 69 feet), primarily for cars, and without separation for bicyclists”(Lusk, 2012, p. 24). However, the absence of cycle lanes would not have been a hindrance for bicycling given low levels of car ownership (to be discussed below). Later, with new road building projects, cycle lanes physically separate from roads were erected (Wang, 2012). Some of which “were 22 feet wide with landscaped separations from car traffic that were 18 feet wide” (Lusk, 2012, p. 26).

Bicycle use and ownership really took off however from the late 1970s and early 1980s: “By 1978, the total number of bicycles had increased five times to 2,546,190, an average of 1.35 bicycles per urban household” (Wang, 2012, p. 16). In 1980 there were now 2,880,000 bicycles in Beijing up

from 190, 000 in 1950 (Rhoads, 2012, p. 107). The mode share[31] of cycling continued to rise and by "1983, 37 percent of commutes were by bicycle compared to 19.5 percent for mass transit" (Lusk, 2012, p. 25). In 1986 bicycle modal share stood at 54% (Zhang, Shaheen and Chen, 2014, p. 318) rising to "In 1988, 57.1 percent" (Lusk, 2012, p. 25). In the year before, the national market for bicycles had become "fully saturated" (Zhang, 1992, p. 133). Everyone who wanted a bicycle could get one. Thus, "cycling became the predominant mode of commuting for most residents in the city" (Wang, 2012, p. 20). In this context of ubiquitous bicycle use[32], road intersections were seen as in mayhem and bicycles as a hazard for pedestrians (Sit, 1996).

Therefore, over a period of fourty years, cycling came to dominate Beijing streets. Moreover, by the bicycle had become a status symbol. The rise of everyday cycling as in the foregoing description was intimately tied to the shift in governance and prior historical developments which shaped the agency of the Chinese Communist Party (CCP). As we shall see, governance choices by the CCP, whether deliberate or not, influenced not only the character of the insurgent niche but also alternatives. The next section interrogates this transition.

7.3.1 Analysis

As stated above, the rise of the bicycle in Beijing was due to national developments as China came under CCP rule. This seems obvious in retrospect, but in fact as Lusk (2012, p. 26) argues, the CCP as advised by the then Soviet Union may have chosen public transportation as arguably the mode most compatible with socialist goals of *collectively* conveying workers to and from factories. However, such an endeavour would have relied on enormous capital outlays[33] which were not available in the aftermath of a series of wars. Rhoads (2012, p. 103) draws attention to this conflictual backdrop upon which the CCP came to power:

> From 1937 on, China was at war for most of the next eighteen years, first against the Japanese (1937–45), then between the Nationalists and the Communists leading to the triumph of the latter in 1949, and finally against the Americans in Korea (1950–53).

31 There is some discrepancy in the literature on exact numbers. One account suggests that in 1980 bicycle mode share was 62.6% (Zhao, 2014a, p. 56). However, all the literature in this period points to a dramatic surge in bicycling.

32 See a picture of street scene in the 1980s taken by a newspaper photographer: http://www.chinadaily.com.cn/photo/wangwenlan/2009-12/07/content_9128656_2.htm

33 Lusk (2012, p. 23) suggests that a reason for why it would have been very expensive to build a public transport system them was "due [to] the existing Imperial grid of wide straight avenues and also the smaller grids of narrow neighborhood streets."

The economy was therefore in poor shape (Rhoads, 2012, p. 103), and as such "Rationing was common during the first three decades and more of the People's Republic of China"(Haw, 2008, p. 112). A robust public transportation system was therefore not developed immediately and for many decades thereafter. In the 1960s public "buses often broke down, and passengers were frequently mobilized to push them to restart the engine...what's more, buses were alarmingly over-crowded during rush hours" (Chen Si, 2009, p. 54). Describing conditions as late as 1989, Sit (1996, p. 262) argued that "the provision of public buses and trolley buses in Beijing can only be described as 'poor', especially considering the lack of other motorized means and only 40km of underground railway." This then incentivised bicycle use with "during the peak hours, riding bicycles for journey-to-work [being] 18% faster than riding buses and trolley buses" (Sit, 1996, p. 263).

Cars on the other hand, were seen as incompatible with a socialist agenda. In the 1950s, official government policy did not act "to develop passenger cars, [since they were] considered bourgeois luxury items" (Chu, 2011, p. 1239). Recall in the previous discussion that some wealthy elites prior to the revolutions had been turning to the car. Not only did the government not seek to develop a mass market for automobiles, individual car ownership was "not allowed"[34] (Chen Si, 2009, p. 52). Only senior officials in government could use cars (Chen Si, 2009, p. 52; Rhoads, 2012, p. 106). Seiler (2012, p. 370) recounts that the CCP denigrated the automobile "through popular culture and political rhetoric." Through these exercises "Owning and driving a car, then, meant not only performing counterrevolutionary class subjectivity but also contributing to the disintegration of utopian socialist society"(Seiler, 2012, pp. 370–371). Therefore, "prior to 1978, Beijing only had fewer than 130,000 motor vehicles"(Wang, 2012, p. 25).

What was left then, was the bicycle, which given the poor economic condition described above was affordable. Moreover, by provision in scale it could meet the collectivist ideology acting as a "mass-transit-by-bike system" (Lusk, 2012, p. 26) for the many workers needed to support the country's industrialisation strategy (Lusk, 2012, p. 24; Seiler, 2012, p. 316). For these reasons then, as Seiler (2012, p. 369) notes "Mao and the Chinese Communist Party (CCP) prescribed the bicycle as the means to a healthy socialist physical culture and the forward progress of the masses." The

34 Vanman & Maddock (2010, p. 40) also argue that "the use of the bicycle made so much headway in Denmark … [because of] a ban in importing cars... [which] was in place for a number of years following the war [World War II]."

bicycle could then be promoted as the "people's vehicle" (Sartor, 2011). Here we see unlike the car, which was subject to rhetorical assaults, the meanings about bicycles being constructed affirmatively in line with the CCP's ideological project. It was upon this basis that the bicycle infrastructure described above, emerged.

However, how then, do we understand how an object that was supposed to be seen by the masses as a patriotic tool, became a status symbol? The broad answer is that this was an inadvertent outcome of CCP decisions. As discussed in chapter 2, following Blumberg (1974) and Goffman (1951), one key condition for the formation of a status symbol is scarcity. As we saw above until the late 1970s, bicycles remained difficult to obtain. Rhoads (2012, p. 107) argues that "given China's large and growing population, bicycle production, even though it was increasing rapidly, was hard pressed to meet domestic demand." There were no imports of bicycles "because of the U.S.-led trade embargo against the new Communist regime"(Rhoads, 2012, p. 105). It was also difficult to obtain bicycles with access requiring a "coupon" (Chen Si, 2009, p. 52). The coupons were allocated at the place of work as a part of the communist welfare regime (Wang, 2012, p. 24). Obtaining a bicycle, along with a sewing machine or a watch, was not as easy as other items provided in the welfare system. There were waiting lists for such items (ibid). Due to rationing policies, sometimes those who desired a bicycle had to wait for up to three years (Rhoads, 2012, p. 107).

The scarcity of bikes occurred due to a range of other processes. One was that workers' earnings stayed relatively stable over time. Wang's (2012) price data regarding bicycles, in relation to other material goods for the period from 1952 to the late 1980s, shows that the cost of the bicycle was always high for an average worker's salary, in relation to their monthly wages. Additionally, there were price controls utilised to promote social stability and macroeconomic stability in the context of population growth and industrial growth. Consequently, "before 1978, the bicycle market in China had been in *excess demand* for many years" (Zhang, 1992, p. 113 [emphasis added]).

It was on the confluence of the aforementioned processes that in the late 1970s and 1980s that the explosion in bicycle ownership occurred – facilitated by new landscape developments. First to retrace the foregoing: there was suppressed demand/*desire* for bicycles for many decades and limited viable alternatives. In addition, travel distances were generally not that significant with most taking less than 30 minutes (Rhoads, 2012, p. 107). Such short travel distances were possible because of compact land-use (Wang, 2012, pp. 21–22). The integrated land use was supported by

“danwei compounds... prevalent in China before Deng Xiaoping's economic reforms in the 1980s, when most living, working, and recreational activities were within comfortable walking or cycling distance” (Yang *et al.*, 2015, p. 176). Beijing remained a compact city well into the 1980s.

The new landscape development that occurred on the back of these favourable cycling conditions was CCP market liberalisation under Deng Xiaoping (Zhang, Shaheen and Chen, 2014, p. 319). Zhang (1992) notes that in 1979, the CCP took a decision to support light industries which included the bicycle industry (manufacturers and components). This support came in three dimensions. First such industries received preferential treatment with regard to materials, power, and other inputs. A second dimension involved increasing the number of manufacturing plants by converting some former industries into production of bicycles and spares. And thirdly, increased financial provision. Market liberalisation also allowed foreign companies to produce and sell bicycles in China (Wang, 2012, p. 26). On top of these incentives, bicycle use was also encouraged as workers were offered subsidies to purchase bicycles (Sit, 1996, p. 266; Rhoads, 2012, p. 108). These changes and increasing personal incomes as the economy expanded under market liberalisation (Zhang, 1992, p. 111), propelled bicycle ownership and use ever upwards. The rate of bicycle production and purchase was so high in the late 1970s into the mid-1980s that by 1983 Zhang (1992) reports the market had almost been saturated. By the turn of the 1990s, the domestic bicycle market had reached full capacity with ubiquitous ownership (Wang, 2012) The unsatisfied *desire* for bicycles long present had finally been fulfilled.

Yet just as cycling became the dominant way of travelling in Beijing, so was it set to collapse. The next section now turns to this narrative and will argue that in fact the seeds for decline were established in this phase.

7.4 Collapse: ~ mid-1980s to 2016

In the previous section, we saw everyday cycling peaked in the middle of the 1980s. However just as it peaked, so did it begin to collapse. As figure 5.2.2.1.3 shows, the mode share of bicycles dropped precipitously from its highs in the mid-1980s. The public image of cycling also declined as the levels of use collapsed. The bicycle was increasingly regarded as backwards even by political leadership (Zacharias, 2002, p. 311; Rhoads, 2012, p. 112). Recall, that in the previous era – in the 1950s to 1970s especially – bicycles were held in very high prestige. They were status symbols.

Instead, it was the car that replaced the bicycle in social status. In public narratives, bicycles were depicted unfavourably such as in this statement: "Society continues to develop, and our lives continue to improve...Why should we cycle when we can afford to drive?"(Lu Rucai, 2007, p. 29). Expanding on the social status that the car confers in China, Zhao (2014a, p. 60) argued:

> ... owning a car is often seen as equivalent to having a 'face' and the car has thus become a symbol of social status: the more expensive the car, the higher social status the owner appears to have. The car is even seen as a household necessity when young people marry.

The role of automobiles in providing social status was also found in a study where researchers found that one purchasing rationale[35] was the degree of 'face' a car could provide. A more expensive car was associated with higher social status (Bai and Dongyan, 2008). This has been collaborated by others. David Wang – an entrepreneur in Beijing producing bicycles made from Bamboos argues that "there is so much cultural value attached to car ownership in China... that even if you don't need a car for transportation needs, you need it for social needs" (quoted in, Horton, 2015).

A research respondent[36] recalled that in the middle of the 2000s, while working with a telecommunications' company, she was under severe pressure to use a car:

> I was in an international high tech company and all my colleagues had studied abroad. They had good jobs...and they kind of always asked me 'what car will you buy?'... And I said "no I am not going to buy a car" and they said "no you have to buy a car, you have money, you are from Germany, you need to buy a car" and I was like "no, this city is great for cycling, I have been cycling the whole time, I love cycling, it's a great workout, I can free my mind, my mind gets all emptied after work, I can get somewhere on time and really fast because the streets are like empty I never get [into] traffic jams" and they were like 'no you still have to buy a car' (interview with Innes Brunn, 5 November 2015).

She also spoke about her peers being under pressure to show success by arriving in cars even if it meant incurring unnecessary costs or at the expense of efficiency:

> ...It was all about what you resemble. So they might have taken a subway and a bus. But some of them who were in sales who were doing a little better would always take a taxi for a little just to pretend they came by taxi. A lot of them already lived quite far outside of the city... If we met really high level people … or some big Chinese companies, we would have to drive there, even if its just [really close]. We would have to drive there. We [would] have to arrive with a car because it shows we are wealthy (interview with Innes Brunn, 5 November 2015).

Here recall the case above of Moghaddass-Esfehani (2003)discovering a lawyer in the 1920s who

35 Other rationales included safety, value for money, comfort and after-sale maintenance.

36 She is an expatriate. She eventually opened a bicycle shop.

behaved similarly due to social pressure. To arrive in a bicycle in this period of decline would have been to lose "face" as captured in a remark by a Beijing resident to a journalist:

> Although I did save a lot of time while cycling, there are disadvantages to cycling. There is nowhere to park near my company, and I had to take a cab when meeting clients. What would they think of me if I cycled up to them? Quoted in Lu Rucai (2007, p. 29).

The resident had responded affirmatively to a call by the government to use bicycles to travel to work in the wake of an international event in order to reduce congestion. He had found using a bicycle efficient as his travel time to work had halved. However, after the international event was over, he got back to driving citing image as a major hindrance.

As the image of cycling withered so did policymakers in China and in Beijing turn their backs. Sit (1996, p. 269) reports that in Beijing "measures proposed included[d] restrictions on the use of main arterial routes by bicycles, imposi[tion] of a bicycle licence fee, and the abandoning of bicycle subsidy by work units to their employees". By the early 1990s these had been implemented (ibid). For example, in November 1998, bicycles were banned from a particular street called Xisidong Avenue in an effort to relieve car congestion. This was the first street where such a restriction had ever occurred in Beijing. When a news reporter asked someone cycling about the decision, he seemed unconcerned accepting it as in inevitable transformation towards a car future (Rosenthal, 1998). Landscaping such as trees that had previously used to create barriers between cycle lanes and car lanes were sometimes removed in order to expand space for motor vehicles (interview with Innes Brunn, 5 November 2015). The national government also adopted a hostile stance towards the bicycle seeing them as the source of conflict of automobiles on the roadways (Zhang, Shaheen and Chen, 2014, p. 318).

Cycling conditions also became unsafe with many reported injuries and fatalities (Wang, 2012, p. 41). While bicycle manufacturing remained high, most units were for export (Rhoads, 2012, p. 111). A domestic market[37] for high performance and expensive bicycles used for recreation and sports emerged in the first decade of the 21st century (Wang, 2012, pp. 21–23). Almost as a signal of the end of cycling, in 2004, in the wake of the diminishing bicycle use, "Beijing stopped requiring bicycle registration" (Seiler, 2012, p. 370).

37 See Christensen (2017) also on the rise of "mountain and sports biking."

During my fieldwork in November 2015, the existing proportion of bicycle users, as the testimony of research respondents and my own observations revealed, were primarily low income people (interview with Innes Brunn, 5 November 2015; Yang and Zacharias, 2015, p. 22). This was also the case across other Chinese cities, where bicycle users were mainly low- to medium-income earners (Zhang, Shaheen and Chen, 2014, p. 326). However, there was also a small stratum of middle class users who were generally young adults, and a fraction of whom were foreign expatriates (interview with Innes Brunn, 5 November 2015).



Figure 7.4.1: Bicycle, moped, e-bike traffic in Beijing, November 2015. (Source: Author's collection)

While the indications were that I was observing the unravelling of an important transportation mode, yet there were other signals. Street interactions between people cycling and other road users were not entirely hostile. For example, people using automobiles seemed aware of the presence of bicycle users. Undoubtedly there seemed to be a degree of "chaos" especially at intersections where traffic lights were regarded as offering general but not absolute guidelines. Nevertheless, this did not translate into



Figure 7.4.2: A bus and car on wide bicycle lane in Beijing, 3 November 2015. (Source: Author's collection)

overt hostile conflict[38]. However, it is also not to suggest that relations on the streets are entirely convivial. See figure 7.4.2 for a car and a bus driving within a bicycle lane.

I also observed an arguably enviable bicycle infrastructure system. Almost every street, apart from the *hutongs*, which are narrow neighbourhood ways in traditionally compact areas, featured barrier protected bicycle lanes (see figure 7.4.1.1 for example). There were also bicycle parking facilities such as at train stations, on high streets and outside buildings. Some parts of the city also had public bicycle sharing stations (see figure 7.4.3). Significantly, some infrastructure appeared newly installed with the paint on some cycle lanes glistening in freshness. Respondents informed me that the infrastructure and other interventions were a recent product of municipal turnaround regarding cycling in the city (interviews with Innes Brunn, 5 November 2015 and Yin Zhifang, 9 November 2015).



Figure 7.4.3: Traditional bicycle sharing system in Beijing, 3 November 2015. Source: Author's collection

Respondents and researchers hold that it was about the middle of the first decade of the 21st century, when the municipality adopted a positive stance about everyday bicycle use (interview with Innes Brunn, 5 November 2015; Yang *et al.*, 2013; Wang, 2012, p. 34). The severity of air pollution and motor traffic congestion were cited as important rationales for renewed policy attention (interview with Innes Brunn, 5 November 2015; Yang *et al.*, 2015, p. 177; Rhoads, 2012, p. 144). Haixiao (2012, p. 172) holds that the first official signal of this turn was the Beijing City Master Plan for 2004–2020, which acknowledged that bicycle users, as well as pedestrians, would continue to be an important part of the city traffic. In 2015, it asked a Beijing-based transportation planning agency

38 See a video I took of such interactions at https://youtu.be/XwiBkoRdTqE.

and Dutch consultants to advise on relevant measures to restore bicycle use. The plan called for the bicycle mode share to rise to 20% of all traffic by 2020 (BUZA, 2015). Non-state actors in Beijing also emerged as transportation cycling proponents (interview with Claudio Rebuzzi, 7 November 2015 ; Horton, 2015) but state actors both local (municipality, national government and state sponsored organisations) and foreign (such as embassies), appeared to play a more prominent role (interview with Innes Brunn, 5 November 2015). Yet in spite of the renewed attention, as stated above, cycling was still a marginal mode of transportation against other more prominent ones.

7.4.1 Analysis

Why did cycling collapse after its peak in the mid -1980s? As I discuss below, one reason was a weakened cycling regime (associations with poverty) as suppressed desire (from previous historical period) was satisfied with ubiquitous ownership of bicycles. Such increased availability of bicycles was made possible due to market liberalisation reforms. Users and policy-makers turned to the car (as the new status symbol given costs, advertising and public narratives in the wake of heightened inequality) as well as public transport. Cycling was further weakened by rapid urban expansion.



Figure 7.4.1.1: Barrier protected cycle lane, 3 November 2015. (Source: Author's collection)

In the previous discussion, we saw that cycling collapsed just as it peaked. A key part of this trajectory was due to the weakened symbolic power of cycling as communicating wealth and thus distinction. We saw that in the prior historical period, especially in the 1960s and 1970s there was a high desire for bicycles for their symbolic and practical transportation values. This unsatisfied desire could not be met by a large proportion of the population given limited

production and rationing of access. The latent demand and desire for cycling was satisfied due to the effects of a landscape development discussed above: market liberalisation under Deng Xiaoping. Such reforms which we saw included preferential support to bicycle manufacturing industry, and opening up of domestic market to foreign bicycle manufactures, massively increased bicycle availability. The ability to acquire bicycles (as also we shall below for cars) was also enabled by the market liberalisation which led to increased incomes as the economy expanded particularly in urban areas (Wang, 2012, pp. 27–28). Thus, as almost everyone who wanted one could obtain a bicycle, the machine could no longer display distinction. Again here we see how processes unleashed in prior historical periods have consequences much later.

This desire for distinction would have been heightened with the transition to a capitalist market economy where a key process in order to stimulate consumption of new commodities is producers offering novel consumer goods as discussed in chapter 2. As Zhao (2014a, p. 5) notes, a consumer society has emerged in Beijing and in the rest of China:



Figure 7.4.1.2: Billboard depicting a consumer utopia with car at centre, November 5015. Source: Author's collection

> The values related to this consumer society are expressed in several slogans, such as ‘getting rich is glorious’, ‘spending rather than saving money’, and ‘living rather than merely existing’. Consumption is seen not only as a daily need but also a symbol of liberation, with people now more inclined to take part in social activities and less focused on finding fulfilment solely through work.

Processes of establishing difference as also argued in chapter 2, work well in unequal societies as occurred after market liberalisation (Piketty, 2014, p. 327). Crucially, a new object to establish difference is required. While the Communist Party had in the 1950s banned mass car ownership and disparaged in public narratives such use, with market liberalisation this stance change. From the 1980s the country started collaborating with foreign firms to produce automobiles (Beijing Auto

Museum 2015). In 1994, it set out a policy to make automobile manufacturing as one of the most important economic sectors for local and foreign consumption (Rhoads, 2012, pp. 110–111).

As with 1950s turn towards the bicycle, a range of narratives and visions were developed to support the turn to the car. At a visit to the National Museum of China, I saw a presentation of an official narrative that can be described as a 'rags to riches' account of Chinese historical development. Chinese people are depicted as being mired in poverty, under oppressive governance, and foreign occupation, before measures taken by the Chinese Communist Party from 1949 (National Museum of China 2015). In this story, the automobile is projected as having played an important role. For example a plaque at the Beijing Auto Museum argues "in the course of a century when China moved from poverty to revival, her car industry, starting from scratch, gradually became stronger" (3 November 2015). In an interview with reporters a then Chinese Ambassador encapsulated the view that car ownership and use was a symbol of progression in the overarching narrative of modernisation. The reporter paraphrases him as saying: "as China modernizes, he says, every Chinese citizen has the right to all of the modern industrial and transportation options enjoyed by, say, Americans – including the right to own a car"(Dreyfuss, 2009).

On the back of this switch to the car, there was significant growth. To give some indication, in 1949 there were 2, 300 cars in Beijing. In 2003, they had risen to two million (Lu Rucai, 2007, p. 30). By 2011 China had become the largest market worldwide for cars (Sartor, 2011). It was not only ownership that was growing, but also use as Zhao (2014a, p. 55)reports: "in Beijing, the total number of daily trips by private cars increased from 5.2 million to 10.7 million during the period 2000–2010, with the growth rate reaching an average of 12.6% annually." In part due to the high levels of car ownership and use, air pollution has emerged as a major problem (Zhao, 2014a).Yet even though this emergent externality at the time of research had led to policy-makers returning to the bicycle, there were no signs of a commensurate user return.

The switch to a market economy unleashed economic inequality. As Piketty (Piketty, 2014, pp. 326–327) notes, "in China, the top centile's share of national income rose rapidly... following the liberalization of the economy in the 1980s and accelerated growth in the period 1990–2000." This rising inequality helps explain the diminished status of everyday bicycling in Beijing, and the opposite rise of the car. The decline of cycling was compounded by other landscape developments. One was increased urban expansion (Zhao, 2014b). From the middle of the 1990s, the city

expanded dramatically along with population growth (Yang *et al.*, 2013, p. 500). As a consequence, bicycling distances increased in Beijing to an average of 9.3 kilometres in 2005 – up from eight kilometres in 2000, and further up from six kilometres in 1986 (Zhang, Shaheen and Chen, 2014). Nevertheless, while travel distances have increased, which makes biking a less obvious choice, survey data from 2005 shows that forty-four per cent of trips by car were for distances less than five kilometres (Wang, 2012).

A second factor was improvements in public transportation. We saw that in the period of high levels of cycling, public transport was very poor. The state then, did not have resources to make improvements. However, this changed in the wake of the market liberalisation era. A new urban train system line (a metro) was constructed between 2005-2010 (Zhao, 2014b). This " subway network ...[grew to] ...most parts of the city, with the total length increasing from 114 km in 2005 to 336 km in 2010, and the number of buses rising from 19,872 in 2005 to 21,716 in 2009" (Wang, 2012, p. 38). Public transport became not only extensive but affordable (Zhao, 2014b, p. 1034) as I discovered during fieldwork in November 2015.



Figure 7.4.1.3: Numerous passengers in metro, November 2015. Source: Author's collection.

Due to the confluence of these factors, at the time of research, everyday cycling appeared to be on a downward spiral. A study produced as part of a process in developing a new bicycle master plan for the city, even argued that "cycling has decreased substantially... [and]... continues to fall" (BUZA, 2015). Yet only about a year after the research visit, there were media reports alleging a renaissance. This section briefly describes this mixed character of developments.

7.5 Return? 2016 onwards

One characteristic of change in Beijing evident in the foregoing accounts, is the possibility of very rapid transformation. Only about just a year after my fieldwork, there were reports of a resurgence. News media wrote about "stylish" (Tatlow, 2017) bicycles that "have clearly made cycling cool again in China"(Mead, 2017). Higher cycling was attributed to the arrival of a type of bicycle sharing system without docking bays (Bland, 2017; Mead, 2017; Tatlow, 2017). That is unlike traditional bicycle sharing systems – which existed in Beijing as I saw during fieldwork, where a bicycle has to be returned to a particular station, users can on completion of their trip, leave them anywhere (Mead, 2017). Users could access a bicycle through a smartphone application on paid subscription. The costs were considered to be very low with users paying "as little as 7 cents a half-hour" (Tatlow, 2017). Numerous private companies were reported to have entered into the market creating frenzied competition with some going bankrupt almost as soon as they emerged (Tatlow, 2017). Some companies were even exporting the model around the world (Pham, 2017).

Demographically, "Most users appear[ed] to be in their 20s and 30s"(Mead, 2017)One observer argued that "It's seen as stylish and cool among younger people, and hip among the middle class because of the technology" David Wang quoted in (Poon, 2017). Some members of the public complained about these bicycles being deposited everywhere in public spaces. News media featured pictures of bicycles piled upon each other such as at park entrances, sidewalks, train stations and building entrances (Mead, 2017; Poon, 2017, 2017; Tatlow, 2017).

Some expressed concerns that the interest could simply be a fad linked to the ease of payments on the smartphone software and as such users would migrate to another application (Poon, 2017). There are some grounds for the novelty argument. Towards the end of the first decade of the 21st century, there was a sudden surge of interest amongst young people (primarily those in their twenties) into fixed-gear bicycles. These are colourful stream-lined bicycles with no gears. Sales were booming. However, less than a few years later, the 'fad' was reported to have dissipated (interview with Innes Brunn, 5 November 2015, Exposure Media Production, 2014).Therefore, it is possible that just as with the interest in fixed gear bicycles, the new boom associated with using the dockless bicycles may vanish.

In summary, since the middle of the first decade of the 21st century, a range of actor networks have

sought to encourage everyday cycling in Beijing. This reappraisal of the bicycle has been especially informed by negative externalities of car use such as air pollution and road congestion. The restored image of cycling amongst policy-makers and some grassroots groups has also been reinforced by landscape developments such as China's insertion into global initiatives to tackle climate change. In spite of bursts of user activity, it is not yet clear if Beijing is on a transition towards cycling. Future work should track the trajectory of change.

7.6 Conclusions

This chapter has presented a history and analysis of everyday cycling in Beijing. It demonstrates in sharp relief the agency-structure interrelationship and consequent impacts on practices and symbolic meanings. To put it differently, we have seen at several transition points, decisions of the Chinese Communist Party producing structural outcomes (such as transformations in political-economy) which then affected the image of cycling – sometimes unintentionally. It was then somewhat ironic that deliberate actor activities in the third historical period appeared to fail to produce a cycling renaissance. Due to the tight relationship between agency and structure as a function of strong political governance, the Beijing case demonstrates that under such frameworks transitions can also unfold very rapidly. Finally, Beijing is a useful case in the study for it helps demonstrates the changing status of everyday cycling associated with changes in levels of inequality, though as was discussed such changes were not the only determinants of the fortunes of the bicycle.

Chapter 8. Chicago

8.1 Introduction

This chapter describes and analyses Chicago's everyday cycling culture from the late 19th century to 2016 in five phases. In the first phase, occurring in the late 19th century, the practice occupied niche status in relation to other transport solutions. This was due to internal characteristics (expensive bicycles), within an unequal context albeit one offering other more viable (in cost and availability) transport solutions. Following this niche status, if trajectories in Amsterdam and as shall see, in Johannesburg, were anything to go by, cycling may have grown. Instead, it further diminished to the background becoming mainly seen as for and practised by children well into the 1970s. This waning fate of cycling as I call it, occurred because the weak symbolic meaning as signifier of distinction for adults was transferred to an insurgent in the context of ongoing inequality – the car. Cycling industry also helped to reposition and claim children as new market for bicycles. Thus, adults had robust alternatives – public transport and the car - into the 1920s and 1930s. Subsequently, landscape processes continued to weaken everyday cycling in favour of alternatives – especially car use.

A third phase occurred in the late 1960s and early 1970s. This was a brief resurgence induced by negative externalities of car use, supported by growing environmental awareness and underpinned by distinction imperatives as users sought out expensive European bicycles. These forces for a cycling resurgence however proved insufficient to sustain a renaissance. Following this brief spurt, everyday cycling diminished in actor and user interest. The system of automobility as before, remained dominant in social norms framing expectations of means of adult transportation. Furthermore, it remained resilient to landscape pressures.

In the final historic phase, cycling is on an upward trajectory. Internal weaknesses and externalities of system of automobility (such as satisfied distinction offering role among some population groups, congestion and air pollution) produced a reconsideration of the bicycle. Landscape processes – macro-economic restructuring and intercity competition for urban renewal – concentrated cycling niche proponents in particular geographies enabling proximal system building activities and municipal justifications for investing in cycling. These processes supported and empowered niche actor-networks. Data is drawn from document review especially Smith (1972),

Herlihy (2006), Longhurst (2015), Mayer and Wade (1969) and Pacyga (2011), interviews and ethnography.

8.2 Novelty: Late 19th century

Like other places around the world, bicycles appeared onto the Chicago streetscape sometime after the middle of the 19th century. Following technical developments in bicycle design, the initial bicycles were what were known as boneshakers since they had metal tires which produced a jarring riding experience (Hobbs, 2005). With technical improvements to the high wheeler[39] and then the safety bicycle, users increased. By 1895, it was reported that "the craze was on...In Chicago" (Smith, 1972, p. 27). In one sign of this popularity "in Chicago by 1895, as in December of that year, despite record sub-zero temperatures, the National Bicycle Show (a two million dollar exhibition of bicycles and accessories) drew so many visitors in Chicago[40] that it required over three hundred patrol men to maintain order" (McDaniel, 1999, p. 497). As in Johannesburg as we shall see later on bicycles featured in parades with "In 1895, one Fourth of July bicycle derby in Chicago, for example, dr[awing] 25,000 people" (Taylor, 2008, p. 220). In 1892 during an opening ceremony of the World's Columbian Exposition held in Chicago – a lavish event "celebrating the 400th anniversary of Christopher Columbus's landing in America," (Chicago Historical Society, 1999) – the "new bicycle, widely celebrated as one of the great inventions of the age, *figured prominently*" (Herlihy, 2006, p. 261 [emphasis mine]).

However, in Chicago and across the Unites States even as some people marvelled at the new technology form, others were not very sure of the new machine of the road. This was because an important street level characteristic at this point was the diversity in use. For instance, reflecting on Chicago, Duis (2005) notes that the uses of the street were as varied as could be thought of. The street scape was more than a means of mobility – it was also a place of inhabiting, of recreation, commerce, and of celebrations. It is therefore not difficult to accept the statement that "the first machine to panic horses, provoke pedestrians, and incur both urban and rural hatred was the

39 Across the United States, the owner of a bicycle manufacturing company that dominated the American market for some time, including the one for the high high-wheeler, learned of this machine from a friend of his from England (Herlihy, 2006, p. 190).

40 It was no accident that the bicycle show was held in Chicago. Chicago, given the presence of 88 bicycle building companies, had become the bicycle industry hub of the nation. In this period "two thirds of the nation's bikes" (WTTW, 2014) were manufactured in Chicago.

relatively quiet and outwardly inoffensive bicycle" (Smith, 1972, p. 183). People riding bicycles faced outright hostility involving shoving bicyclists over (Herlihy, 2006, p. 194). Part of the concern involved the ways the cyclists interacted with pedestrians and scared animals. They were seen as dangerous. As a result in some locations such as parks and even on some roads they were banned (Herlihy, 2006, p. 205; Longhurst, 2015, p. 32).

Due to this hostility and what proponents saw as ill conceptions, users producers and retailers organised themselves (Hobbs, 2005; Herlihy, 2006, p. 205). Smith (1972, pp. 1–9) argues that across the United States, one bicycle manufacturer named Albert A Pope played an outsized role in financing public relations campaigns, creating a network of bicycle shops across the country, supporting formation of clubs, and lobbying policy-makers. It is then perhaps not surprising that bicycle users became a political force[41] in Chicago. An aspiring mayoral candidate, Carter H. Harrison II, courted votes from what Taylor (2008) calls the bicycle bloc such as by riding long distances and publicising his feats (Bushnell, 1975, p. 175). His efforts paid off. He won on the back of political support from the cycling block. He returned the favour by building a cycling path in one area of the town (Hobbs, 2005). He also instructed city officials to pour water on either side of the city roads in order to settle dust. The dampened areas were to be used by bicycles (Reid, 2015, p. 175). Bicycle users also successfully pressured city officials to halt a street tram construction on one street. Instead, for a time, it was declared for the use of "cycles and pleasure vehicles"(Bushnell, 1975, p. 175). The municipality recognised the revenue potential of bicycle users and introduced a special bicycle tax whose revenue would be uses to improve roads and combat cycle theft. While there was some resistance, the tax was broadly accepted by cycling associations in Chicago (Smith, 1972, p. 225).

Who were these bicycle users and for what purposes did they use bicycles? In this period in Chicago, across the United States the cycling boom was mostly[42] an upper class affair. Data from a register of a national cycling association – the League of American Wheelmen – shows that "Virtually all League members had middle and upper class employment"(Tobin, 1974, p. 840). This is not surprising because at their peaks bicycles cost "$150 [each] – well beyond the means of the average worker who made only about $12 a week [to]$25" (Herlihy, 2006, p. 7).

41 See Taylor (2008) for a history of how cycling became entangled in politics elsewhere in the United States in this period.

42 Friss (2015, p. 43) in a history of urban cycling across the United States concurs with this assessment but notes that "some of the working class managed to [ride bicycles]."

Many users joined clubs from which they could not only lobby (as discussed above) but also if they did not know how to learn to ride bicycles, and participate in sociable rides. Club membership was expensive. Fees granted access to the clubhouse facilities and uniforms which were considered prestigious (Baer, 2014a). To promote the consumption of bicycles amongst the upper and middle classes, bicycle dealers in Europe and the United States developed visual imagery that positioned bicycle use as "elegant, chic and cool". These posters also depicted dapperly dressed men and women cycling in grace (Andersen, 2015). In as much as their expense allowed the elite to show their social distinction, the elite also took to the bicycle due to affinities with themes of progress:

> Many people...saw the bicycle as the personal transportation vehicle of the future. It did not pollute as the horse did, it allowed for exercise and personal fitness, which was important during a time when personal hygiene and strength were obsessing many in the nation (Scott, 2003, p. 38)

As suggested above by Carter H. Harrison II's cycling feats, competitive cycling was extremely popular. During one race, participants were so numerous and fast moving that pedestrians were told not to cross a street where the race would be passing through for fear of their safety. The competitive spirit was also apparently not very collegial since cyclists who had fallen down were simply run over. Thousands of spectators gathered to watch the race (Smith, 1972, p. 146). Longer races some of which took place over six continuous days also became popular. In such races, the winner would be one who travelled furthest within the allotted period. Concerned about the potential health impacts of such racing, the regional government within which Chicago is located, Illinois State legislature, passed a law limiting the number of hours a cyclist could participate in a race (Baer, 2014c).

Another form of cycling that was popular is what can be described as leisurely or recreational. Users would take to the city streets in the evenings after supper (Reid, 2015, p. 175), nearby parks (Longhurst, 2013, p. 562) and elsewhere especially over the weekends. Smith (Smith, 1972, p. 73) recounts that leisure cycling even became a source of concern for churches as they watched their congregations dwindling. Some sought compromise by encouraging their flock to instead cycle to church. As an incentive they offered safe parking in church basements. Observing developments in Chicago and elsewhere across the United States, as some scholars suggest part of the interest in recreational cycling (or touring) was to escape city centres that were polluted (Tobin, 1974; Bushnell, 1975).

Finally, there was commuter cycling. This has already been alluded to above given lobbying for better road conditions – even though the section of the road as above that was allocated to cycle users and other pleasures was certainly for recreational purposes. Other evidence for utility cycling lies as Friss (2015, p. 104) documents, an effort to create an "eight-mile elevated cycleway." This was to be a privately financed initiative with costs recuperated by paying users (Ibid). Students and professors at some universities also commuted to class by bicycle. Some businesses opened up in the central business district where bicycles could be parked (Friss, 2015, p. 150). These private initiatives for cycle infrastructure and parking were responding to a genuine demand for as Friss (2015, p. 154) notes during a traffic count in September 1898, "the total number of riders counted in the three hour span [was] 10, 522." However, this number of people of using bicycles was still proportionately very small when compared to other transportation solutions (Friss, 2015, p. 154).

8.2.1 Analysis

Everyday cycling in Chicago was a niche practice which offered status to its users within an unequal context. Describing Chicago in this period, Smith (2006, p. xvi) says, "a large number of working people lived amid marginal and sometimes desperate circumstances, so that eruptions of class antagonism and labor violence, though always unwelcome, were rarely unexpected." Chicago was an urban centre where some who arrived could make a quick fortune while others lived in deplorable conditions. The latter's lives were captured in a fictional account, aptly called *The Jungle*, where the book's "Lithuanian characters... [who] dreamt of returning to their homeland as successes with enough money to buy land... instead... found the horrors of American industrial capitalism and a social Darwinian reality on muddy streets" (Pacyga, 2011, p. 2).

There were other more accessible alternatives for the many who could not afford bicycles. This conclusion about the niche nature of commuter cycling accords with examinations of other accounts (Mayer and Wade, 1969) and street level photography such as in (Bronsky and Samors, 2007) and various digital images across multiple libraries in Chicago[43]. These photographs show numerous people walking, using trams (or street cars as they were called in the United States), urban trains, and animal-drawn transport such as horses. Therefore, "bicycles merely joined and did not replace other forms of transportation"(Friss, 2015, p. 156).

43 http://explore.chicagocollections.org/

In addition, as revealed above, the late 19th century turn to the bicycle was significantly a recreational and leisure phenomenon. Underlining this fact, as the cycling boom waned – which it did and is now what we turn to - Herlihy (2006, p. 317) notes that across the United States manufacturers responded by producing bicycles more suitable for utility. These were bicycles aimed at postal workers, police officers, messengers, firemen, police officers and related professions. These bikes were designed to be study and thus suitable for everyday use.

8.3 Waning: Early 20th century to late 1960s

While there had been a significant interest in cycling, for recreation, competition and some limited extent for transportation in the 19th century in Chicago, this momentum dissipated subsequently - especially with regard to commuter cycling. Some adult members of the working classes did continue to use bicycles for transport whether as commuting to work (Longhurst, 2015, p. 102) or as part of their jobs as for example as post office workers (Smith, 1972, p. 48). This was enabled by decreases in bicycle prices (Hobbs, 2005) spurred on by increased manufacturing[44] in the middle of the 1890s (Smith, 1972, p. 95). By the mid-1910s, the cost of bicycles had decreased enough to be affordable to most. They were even available for purchase through mail order companies in Chicago (Herlihy, 2006, p. 7). This diffusion elicited disdain by some in the upper classes for whom cycling had mainly been a recreational pursuit (Herlihy, 2006, p. 347).

Others who abandoned cycling were some bicycle manufacturing companies that switched to the emergent automobile industry in the 20th century (Wilson, 2005). Other cycling actor-networks also weakened. A prominent cycling association – the League of American Wheelmen (LAW) - that had members (both clubs and individuals) in Chicago diminished in lobbying power. Epperson (2014, pp. 75, 169) notes that after the turn to the 20th century the LAW repeatedly experienced cycles of closure, resurrection and closure well into the 1970s.

It was however not all a trajectory of complete abandonment. Children became the main new users of bicycles. This was a major shift since in the late 19th century, children were hardly represented in the practice. For example, "a survey of the morning commute in Chicago [revealed that] boys under

44 Chicago was a national bicycle manufacturing hub with "two thirds of the nation's bikes" produced therein (WTTW, 2014).

the age twelve amounted to less than 1 percent of the total riders" (Friss, 2015, p. 41). Manufacturers and retailers worked feverishly to cater to children (Hobbs, 2005; Herlihy, 2006, p. 325) – just as they also sought to recruit more utility cyclists described above. As Longhurst (2015, p. 110) observes across the United States, "Print advertising and press coverage of bicycling increasingly focused on boys, whether as telegraph messengers, scouts, or schoolboys." Consequently, Herlihy (2006, p. 8) argues that by the 1920s and 1930s, in the United States, the bicycle had become primarily a children's item. This continued to be the case for a long period. Dan Burden quoted in (Epperson, 2014, p. 74)reports that in the 1960s a prominent cycling advocate who operated from the Chicago area "was being paid to go around the country and get adults to stop thinking of bicycling as something that was just for children."

By the 1960s and into the 1970s then, utility cycling had come to be seen as abnormal if conducted by adults. In this context, it was not surprising that a newspaper ran an article marvelling about discovering a lawyer who commuted to his office by bicycle. This lawyer – the newspaper reported – had been called "some kind of nut" and "unconventional" by members of the public. Furthermore, he had been accused of putting his own life in danger by riding on the streets of Chicago next to heavy automobile traffic (Moser, 2012). Another personal account of a journalist riding his bike to work in Chicago in this period further shows the extent to which it was a rare sight to use a bicycle:

> The first time I rode my bicycle to work, I became a celebrity. That was about eight years ago [about 1964], and as far as I could discover at the time, no one in the history of the world had ever ridden a bicycle to work. My friends professed surprise, admiration, or amusement. The guard downstairs in the lobby stared at me as though I were insane, and indeed, to this day, he appears to retain some doubt (Ridgely, 1972).

The rarity of people using bicycles to travel were confirmed by a respondent who used to ride her bike to work in the 1970s:

> ...I used to bike to the Academy of Sciences. I used to bike down Chicago to Ogden. Ogden all the way to Clark Street. And at that time....you could glide almost a half mile down to Clark Street. It was a clean way to get to Lincoln Park. I got chased by kids who were throwing rocks. That made me think about why I am doing this...the downtown was full of parking lots. And I am sure if you would a put a modern overlay this would all be built up now. So it was hard to bicycle in the city. You were just really tiny compared to all these cars and all these empty space (interview with Nancy Fagin, 20 April 2015).

As a woman on a bicycle, my respondent would have been very unusual: respondents to a survey to commuters travelling into the loop via train and boat, when asked if they could use a bicycle, some women declined, stating that it would be "unladylike in a dress" (Bicycle Ecology, 1970)

8.3.1 Analysis

A principal reason for the decline of everyday cycling in Chicago was due to its original fragile symbolic meaning: as a means of communicating social status. Recall in the previous section, that for the social elite, bicycles were even seen more favourably to horses. When a more expensive item arrived, the automobile, within an unequal context (Pacyga, 2011), the social elite migrated over to the new gadget (McDaniel, 1999, p. 152). They became proponents efforts of car use. Some bicycle manufacturing companies began to produce components for automobiles (Wilson, 2005). A bicycle lobby group with a national footprint – the League of American Wheelmen – became increasingly weaker as its membership declined. By 1902, its membership declined to 8 629 from 102 636 in 1898 (Petersen, 2004, pp. 196–197). Tellingly, "many of the officials who founded and steered the AAA[45] [American Automobile Association], had earlier been officials in the League of American Wheelmen" (Reid, 2015, p. 232). Just prior to the turn of the 20th century, "wealthy drivers planned an automobile club to promote their interests" (Pacyga, 2011, p. 231). In addition to lobby groups, manufacturers also emerged in Chicago at the turn of the 20th century, with "entrepreneurs form[ing] twenty-eight companies that produced sixty-eight models of horseless carriages" (Pacyga, 2011, p. 231).

These actors developed visions and narratives with the car as a future transportation solution. For example, in 1909, a master plan for the city was developed. It foresaw a car future calling for "the creation of a system of highways outside the city" (Smith, 2007, p. 86). Inside the city the "1909 plan, with its wide boulevards and plans for the widening of [an important thoroughfare]... encouraged the new form of transportation" [automobile] (Pacyga, 2011, p. 234). Over time, other proponents, such as newspaper columnists, urban planners, industrialists and users appeared (Pacyga, 2011, pp. 232–237). In addition to developing visions of a future in which automobiles were the transport solution, these proponents also worked to re-frame safety concerns (see, for example, Norton, 2011, pp. 2017–213) and proclaim their benefits (Pacyga, 2011, p. 234) amidst a severe backlash (McDaniel, 1999, p. 506). The streets then were being transformed for the automobile. Bicycles were symbolically, and in law, shunted to the margins of roads. For example, Longhurst (2015, p. 99) shows that in 1938 a national regulation was issued, stating that "persons riding bicycles upon a roadway shall not ride more than two abreast... [and that they] shall not impede the normal and reasonable movement of traffic." In support of these developments, with

45 The AAA was created "at a meeting in Chicago on March 4th, 1902, the American Automobile Association" (Reid, 2015, p. 232).

introductions in mass automobile production methods in the United States, entry level cars were greatly affordable by the 1920s (Jordan, 2013, p. 100). Thus, car ownership increased beyond the social elite.

By the 1920s and 1930s then, the system of automobility had developed to robust status. This provided adults a new viable ground transportation, in addition to public transport (such as street cars or trams and trains) which remained not only affordable but also extensive in geography (Epperson, 2014, p. 47; Gunderson, 2016; Grossman, 2017).As these processes unfolded, cycling came to be seen, represented by cycling industry, and practised as a children's solution. Henceforth, as I illustrate below, landscape processes continued to weaken cycling.

8.3.1.1 Landscape processes weakening cycling

Other landscape developments further weakened the already fragile symbolic meanings of everyday cycling. Some of these were associated with austerity such as the Great Depression. Herlihy (2006, p. 8) observes that there was an increase in bicycle use across the United States, since people could not afford to use cars. In Chicago "in 1935, a petition demanding more bicycle paths in Chicago collected 165,000 signatures [and] In response, the City created 40 miles of trails in forest preserves" (Herlihy, 2006, p. 360). While these demands for more bicycle paths was situated within the context of the great depression, it is also important to note that as Smith (1972, pp. 246–247)suggests, proponents were also seeking alternatives in the context of the 1920s pronounced turn towards automobility. In effect, the great depression while stimulating some cycling in the period, only underlined negative association – cycling as a marker of poverty.

The two world wars had a similar effect on cycling. In both wars, national government, municipal authorities, and others encouraged Americans to cycle in order to save fuel and materials for the war effort. During World War II vehicle manufacturing was even suspended in order to reallocate resources for the battlefront (Herlihy, 2006, pp. 323, 355–361; Longhurst, 2015, pp. 141–144). Bicycle dealers in Chicago bicycle dealers took advantage of the interest in cycling and increased bicycle prices to up to four times the usual rates (Herlihy, 2006, p. 330). Many others however turned to public transport creating severe pressure on systems (Mayer and Wade, 1969, p. 289).

However, once wars ended, cycling amongst adults for transportation in the United States declined.

The market was once again dominated by children with some adult recreational bicycle use (Herlihy, 2006, p. 336; Longhurst, 2015, pp. 150–151). In addition to having short-lived effects in encouraging cycling during the conflicts, both actually then paved the way for automobility. This was because the austere conditions such as in World War II where automobile use was severely restricted and bicycles promoted instead, associations emerged between deprivation and bicycle use. As Mayer and Wade (1969, p. 375) write, "the end of the conflict [brought] back memories of the pre-war depression with its unemployment and want." As such, after the end of World War II, in the absence of rationing policies limiting car use and greater availability of materials, car use boomed (Longhurst, 2015, p. 150). Thus, as Mayer and Wade (1969, pp. 417–418) note, "by the mid-fifties almost everyone owned one; in fact outside the city there were more cars than families as early as the mid-fifties." Post-war consumption extended beyond cars: "Americans abandoned their salvaging ways and embarked upon the most conspicuous period of consumption the nation had ever seen" (Carl Zimring quoted in Longhurst, 2015, pp. 149–150).

This post- war consumption was however unevenly distributed in society for as Mayer & Wade (1969, p. 375) note "not all shared equally in new affluence." For example, African-Americans who had immigrated northwards from the south of the United States found themselves living in squalor where "a long list of social ills that afflict blighted areas – poor health, inferior education, unskilled jobs or none at all, fragile family life, delinquency and much more" (Mayer and Wade, 1969, p. 406) faced them. Underlining the ways in which inequality shapes consumer decisions for suppressed populations, in a famous analysis Gilroy (2001, p. 95) argued "For African-American populations seeking ways out of the lingering shadows of slavery, owning and using automobiles supplied one significant means to measure the distance travelled toward political freedoms and public respect."

Another landscape development that suppressed cycling in favour of car use was the Cold War. For Seiler (2008), federal government investment, which transformed America decisively towards automobility has to be understood as an expression of Cold War politics between the United States and the then Soviet Union. Investing in highways was a counter chess move against the Soviet Union that would allow Americans to affirm and experience the values of individualism and freedom, as they could travel in isolation and wherever they wished. In a sense here to drive was to be American. In Seiler's words;

> ... the act of driving... in this historical context... proved... to those antagonists, to allied nations,

> to those cultures the United States sought to annex ideologically, and, most important, to Americans themselves – the continuing vitality of the essential individual freedom enjoyed under liberalism and capitalism (Seiler, 2008, p. 72).

More pragmatically, the highways were also seen from a national security perspective as a way of "evacuat[ing] cities if an atomic bomb were on the way" (USDOT, 2015). These rationales for highway construction found expression in the Interstate Highway Act of 1956 which relieved municipal authorities from bearing financial burden as ninety per cent of the costs were borne at federal (national) government level (Young, 2005). As a result, an intensive programme of highway construction was conducted at significant financial expense (McClendon, 2005). The scale of construction transformed Chicago for automobility in decisive fashion:

> Schools, churches, shopping strips, and entire neighbourhoods disappeared in Chicago and other metropolitan areas. Passengers abandoned the railroads, and trucks competed with freight trains for moving goods across the country (Pacyga, 2011, p. 336).

The neighbourhoods that were most affected by highway construction in Chicago were those inhabited by the poor (ibid). Demonstrating the import of the Act, Seiler (2008, p. 71) argues that it authorised "the largest public works project in human history…with over 425 000 miles of the continental U.S... [being] paved." Some images and personal stories of the transformation processes associated with the building of one highway are presented by Loerzel (2016).

Further weakening cycling was spatial expansion. After the turn of the 20th century, Chicago was characterised by two major phases of spatial and population growth. The first occurred in the first decade of the 20th century, and the second occurred in the 1920s, halting in 1929 with the onset of the Great Depression. In both instances there was a pronounced population increase, but also spatial expansion within and across the municipal boundary. In the second phase, the rate of population growth was highest in the suburban areas (Mayer and Wade, 1969, pp. 271–316). These processes were accentuated in the post World War II when another wave of suburbanisation emerged in areas with limited public transportation, further promoting car purchases and dependence (Bronsky and Samors, 2007, p. 102).

8.3.1.2 Resilience to shocks

Against this background, the system of automobility became increasingly robust at the expense of all others and resilient to shocks. A landscape development in the 1950s - increased health awareness (Kingbay, 1976) crystallised by the heart attack of then President Eisenhower - initiated

a reconsideration of the bicycle, albeit as a fitness solution. President Eisenhower was advised by his doctor – Dr Paul Dudley White – to cycle as a way of maintaining his physical fitness (Herlihy, 2006, p. 361). Dr White became a national advocate for cycling (Smith, 1972, p. 248; Reid, 2017, p. 55) even travelling to Chicago where rode a bicycle in tandem with then mayor Richard J. Daley in the opening of cycle paths in a park (Unknown, 1956). The paths were part of a "pioneer network consisted of over 15 miles of paths along the lakefront, plus additional facilities located in some 25 inland parks and along the more scenic parts of the Chicago River" (LaPlante *et al.*, 1993, p. 101). As such, a main effect of this growing health awareness was to promote recreational cycling. This recreational mode of cycling persisted for a while. It even merited its own day long symposium in 1971 in Chicago to discuss infrastructure requirements (Epperson, 2014, p. 78).

A 'loud' signal of cycling potentially becoming an important transport solution, occurred in the late 1960s and early 1970s. It is to this, that we turn.

8.4 Brief emergence: Late 1960s to early 1970s

After a period of gradual and almost complete disappearance of everyday cycling, in the late 1960s and early 1970s, there was a brief resurgence[46]. A journalist reporting in 1968 stated that "Chicago's bicycle wholesalers and manufacturers are selling 30 to 75 per cent more bicycles this year than they did last year" (Edwards, 1968). Two years later, in the summer of 1970, a bicycle shop reported that it had sold 25 more bicycles than the same time in the previous year (Bicycle Ecology, 1970). A research respondent whose family-owned bicycle shop has existed since just after World War II called the 1970s a "game changer" (interview with Paul Kozy, 9 July 2014) for the business. At this time, their shop was flooded by new customers who sought to repair their bicycles – many of which had been standing idle. The demand for their services was so high that they had to on occasion turn away customers for sometime while they first finished existing backlogs. This eventually led them to open a second shop in a different part of the city.

While in the previous phase, the majority of bicyclists across the nation were children, this growth recruited people sixteen years and older. Those who took an interest in bicycling did it for both

46 The resurgence in cycling in Chicago was also a national phenomenon. A newspaper in Chicago wrote about "six million bikes [being] added to the booming fleet" in 1965 (The Chicago Defender, 1966). Furness (2010) reports that in 1973 the number of bicycles sold outnumbered vehicle sales for the first time since World War I.

recreational and transportation purposes. Capturing the utility dimension of cycling, in a newsletter, one of the active lobby groups that emerged, the Association of Bicycle Commuters, said that the number of bicyclists entering the central business district had increased from 130 in May 1970 to 1 000 at the end of July of the same year (Bicycle Ecology, 1970). One committed person cycled for a distance of about 25 kilometres each way to and from the central business district (Wolfe, 1970).

However, the most popular form of bicycling was nevertheless recreational (Northeastern Illinois Planning Commission, 1983, p. 16; Epperson, 2014, p. 78). Illuminating the recreational side of cycling a journalist reported:

> Chicagoans are trampling over each other...You see them swarming in Lincoln Park on a Sunday afternoon, ringing their bells madly and wobbling about in imminent danger of collision with each other and nearby pedestrians (Ridgely, 1972).

The bicycles in vogue were expensive and mostly European in origin. European bicycles were reportedly very popular because they were seen to be better quality machines than American made ones but also conferred distinction to users because of their high price (Ridgely, 1972). Longhurst (2015, p. 189) supports this argument stating that the new European style bicycles which were "lightweight, multi-speed adult bikes ...[as opposed to the]... heavy, single-speed style... [American bikes came with]...associations of high technology and class status that made it an appropriate possession for adults." Underscoring the status conferring benefits of these bicycles one of my research respondents who opened up a bicycle shop in 1973 that is still running at the time of research said:

> In cities like Chicago it was a required accessory if you wanted to be socially active. If you wanted to go on a date with someone new, a bicycle was a sure fire way to make it work. While if you went ten years before that, if you were a young adult asking another adult to go on a date on a bicycle, they'd probably look at you crossed eyed and think you are too strange for me to deal with (interview with Mark Mattei, 9 July 2014).

In this period, the City of Chicago under the leadership of Mayor Richard J. Daley emerged as a cycling proponent. In 1971, it demarcated cycling lanes in the central business district for use during the rush hours (Moser, 2012; Baer, 2014b). They were described as follows:

> The lanes will vary in width from five to seven feet. Markings will include six-inch yellow stripes, the words "Bike Lane" stenciled in white at the beginning of each block, and green and white route signs (Unknown, 1972).

On street cycle routes – for a total of 35 miles - were also built in other parts of the city. These routes connected users to the existing lake-front path built in the 1950s discussed earlier, and other

parts of the city within the central business district and surrounding residential neighbourhoods in the south and north (LaPlante *et al.*, 1993). Bicycle parking, available on payment, was also built by the municipality as well as by private entrepreneurs (Zahour, 1971). At an inaugural ceremony, the mayor rode a tandem bicycle with a chairman of the national bicycle association – League of American Wheelmen – along with other participants including other city officials (Goodyear, 1971). Motivating the intervention, after the ride, the mayor said "bicycle commuting would be a great relief for traffic, and it would be great for helping people keep their good health" (Goodyear, 1971). Here we see the negative 'externalities' of automobility as one reason for the turn towards the bicycle. This was also well captured in some snap interviews by a journalist to bicycle commuters who reportedly found it easier to navigate amidst the very slow moving motor vehicles (Zahour, 1970).

Grassroots organisations emerged to promote everyday cycling. Two that were highly visible such as in newspaper records were the Association of Bicycle Commuters and the Bicycle Ecology Group. The two organisations shared similar approaches albeit with some tactical differences revolving on the extent to which bicycle promotion required strong measures against car use. However, they were able to collaborate to the extent that there were overlaps of steering committee members. Amongst others, they campaigned for cycling infrastructure, restrictions on car use especially in the central business district, and for measures to combat bicycle theft. They also launched own interventions such as cycle to work days and public relations efforts such as a competition on which mode of transport was the most efficient for travelling into the central business district (Bicycle Ecology, 1970). The person on bicycle came out ahead of all the other modes arriving in "19 minutes; the elevated [train] in 28 minutes; the car in 31 minutes; and the bus in 54 minutes" (Schultz, 1970).

In addition to the niche characteristics of bicycles as fashionable consumer goods and negative externalities of cars (congestion), another important landscape factor was growing environmental awareness. This was already alluded to given the name of a cycling proponent – the Bicycle Ecology Group (BEG). In a pamphlet, the BEG argued:

> Transportation reforms are needed. At present, the cities are struggling to provide facilities for increasing number of automobiles at the same time that automobiles are depleting natural resources, destroying the natural landscape, producing air pollution and causing urban congestion in general...In the city, the bicycle is an efficient, practical and healthful alternative to the automobile. The bicycle can serve as a stimulus to the ecological reform of the urban environment (Bicycle Ecology, 1970).

The role of environmental awareness as a trigger for bicycling in Chicago is underlined by the fact that in 1967, Chicago was rated as the second most polluted city [air] second to New York in the United States (Grossman, Keating and Reiff, 2004, p. B18). Due to these high levels of air pollution, aggrieved residents petitioned the city authorities about the matter. The City of Chicago "received more than six thousand citizen air pollution complaints per year" (Moser, 2012). The ABC also saw the bicycle as a solution to environmental problems – in particular air pollution. A fact sheet that it produced to be used by its members in advocacy information compared the pollution emitted between automobiles and bicycles. The bicycle, they claimed did not emit any pollution other than negligible particulate matters in the manufacturing process (Bicycle Ecology, 1970). Most respondents to a survey administered by the ABC in May 1972 May cited air quality benefit as reason to potentially switch to cycling (Ruksza, 1972). This thus mirrors national developments where the association between cycling and protecting the environment occurred "following the first Earth Day in 1970" (Longhurst, 2015, p. 192).

Caution is in order. While this narrative was decidedly different from the previous era, suggesting of an emergent cycling niche, user uptake was actually very limited. At its peak, in one survey, the ABC counted 1800 bicycle commuters in 1972 (Stoffey, 1973). This was much like elsewhere in the United States where "most people did not abandon their cars for bicycles" (Furness, 2010, p. 65). Most critically, just as quickly as the interest had emerged, so did it fade away. To this latter state of affairs, we now turn to.

8.5 Back to invisibility

The late 1960s and early 1970s cycling surge was very short-lived. Towards the end of 1972, the interest in bicycling for transportation in Chicago was reportedly diminishing. In a Progress Report issued by the Association of Bicycle Commuters (ABC) to its members announcing its closure (on the 17th of May 1973), the organisation noted that the rate of growth in bicycle commuting, which had been quite high based on bicycle counts conducted in the central business district between 1970 and 1971 had already started to plateau growing to only 1 800 in 1972 – up from 1 500 in 1971 and 50 in 1970. This Report had an air of defeat about it, regretting that rush hour bicycle lanes installed on Clark and Dearborn Streets had only 90 users on them (Stoffey, 1973). City resources previously allocated to cycling were instead shifted to the needs of people running for exercise. The bike way

system that had been developed was also largely neglected save for the recreational off-street paths situated along Lake Chicago and in forest preserves. The policy focus in so far as it was concerned with bicycling only paid attention to recreational/exercise purposes (LaPlante *et al.*, 1993, p. 102).

The decline in the interest in cycling in Chicago predated the 1970s oil related crises. Some researchers argue that the double oil crisis of the 1970s – first the 1973 OPEC oil embargo and the 1979 energy crisis prompted by political revolution in Iran - increased bicycle use across the United States (Herlihy, 2006; Longhurst, 2015). However, it is not clear this happened in Chicago with sufficient volume as it had in the first few years of the 1970s in Chicago. The OPEC oil crisis did put pressure on automobility in Chicago. There were "long lines at gas stations"(Pacyga, 2011, p. 361) and the price of fuel[47] for cars increased (Cavanagh, 1976; Knittel, 2013). Car users responded largely by sharing cars, purchasing smaller more fuel efficient cars, and switching to public transport (Van, 1973; Oppenheim, 1975; Walsh, 1981). Some did reportedly take to the bicycle (Van, 1974). The 1979 Iran oil shock had similar upward effects on fuel prices (Knittel, 2013) and shortages in fuel, which precipitated long lines at petrol stations (Verleger JR., 1979). The crisis was also reported to lead to search for more fuel efficient automobiles (McCabe, 1979a; Walsh, 1981). However, as soon as both crisis dissipated, people returned to automobility (Oppenheim, 1975; McCabe, 1979b). Thus, a landscape pressure that might have weakened the system of automobility failed to do so.

Into the 1980s cycling, as before, cycling for transportation remained marginal. Leisure and competitive cycling persisted. Many of the paths that had been created along the lake-front, rivers and parks were heavily used especially over the weekends (Dale, 1985; Phillips, 1987) were ideal for these purposes. This popularity in bicycling for exercise or relaxation was a national trend with a national survey revealing that cycling "second most popular sporting activity (behind swimming)" (Donahue, 1987).

In the 1990s cycling continued to be seen as a dangerous practice since people would have to ride next to moving vehicles (Mayor's Bicycle Advisory Council, 1992; Sammons, 1992). Capturing the notion of cycling in Chicago as an overall difficult and dangerous practice a journalist argued:

47 Across the United States, "the embargo led to gas lines, shortages, and a substantial increase in prices... the price of a gallon of gasoline rose in nominal amounts from 36¢ in 1972 to 62¢ in 1977" (Ostrander and Lowry, 2012, p. 390).

> Urban bicycle commuters must be a hardy lot. They drive in heavy traffic, skirting potholes and broken glass. They experience exhaust fumes up close and personal. They are endangered by drivers who do not signal for turns or who suddenly open their car doors in a bicyclist's path. They are occasionally insulted by drivers who feel offended by bicyclists' existence (Brotman, 1990).

Furthermore, people cycling experienced social pressure against the practice. In the late 1990s some respondents speaking to a journalist about their choices in shunning the car for public transport, walking and bicycling said that their decisions were often greeted with derision:

> I take the bus...I take the `L.' I walk a lot. You'd be surprised how often people say, `You took the bus??!! They don't believe you can get around without a car. It's like you're from outer space...[after her husband died who used to drive them she learned how to drive]...I passed the driving test, but I was not happy driving...I wasn't using the car, and I got rid of it. Seligman Goldie quoted in (Lauerman, 1999).

Another one who had chosen not to own a car for political and environmental reasons said "my whole family acts like I'm from Mars because I don't own a car" (Lauerman, 1999). At the same time there was widespread stereotyping about people cycling: "almost any discussion of bike issues will elicit comments on the fact that cyclists rarely obey traffic laws, are rude, endanger pedestrians and, in general, aren't 'good citizens'" (Petersen, 2004, p. 217). In addition, some associated cycling with criminality and poverty. During a public hearing about the possibility of developing bicycle lanes in a wealthy suburb, some residents resisted them on the supposed grounds that they would attract drug dealers (Petersen, 2004, p. 220).

By the end of this phase then, everyday bicycle users, to use Koeppel's (2006) term, became invisible. Koeppel (2006) coined the term "invisible riders" to refer to low-income people in the United States who use the bicycle for utilitarian purposes out of necessity. As he put it succinctly, for this demographic "bicycling isn't exercise, a hobby, or a statement" (ibid). He termed them invisible because they are often unseen by people driving. Sometimes, given their illegal immigrant status, they actually prefer not to be noticed, and are often not noticed by other people who use bicycles by choice (whether for recreation of transportation).

8.6 Growth: Late 1980s to 2016

After the aforementioned period of downward spiralling, everyday cycling begun to grow. A prominent cycling activist, suggests that the upward swing commenced sometime in the late 1980s

(Neufeld, 1989). An advocacy group called the Chicagoland Bicycle Federation[48] – then headed by the aforementioned advocate called Randy Neufeld - estimated that in 1990 there were about 2,000 people each day commuting by bicycle into the central business district (Brotman, 1990). This is a higher number than that recorded by the Association of Bicycle Commuters in 1971 as per the previous section.

By 2001 people observing bicycling trends in Chicago, were marvelling at the increasing biking even in the depths of winter: "winter biking is growing in popularity...people in the industry will tell you so, but so will careful observation; even on the coldest, snowiest days, the bikers are about in high numbers" (Kogan and Osgood, 2006, p. 28). Research respondents suggested that the noticeable surge in cycling – where the presence of transportation cyclists could not be ignored on the streets – occurred in the middle of the first decade of the 2000s (interviews with John Greenfield, 21 April 2015 and Steven Lane, 1 May 2015).

48 Later changed its name to the Active Transportation Alliance.

What do quantitative studies of bicycling modal split reveal? According to the 2000 Census, 0.5% of the population bicycled to work. This percentage increased to 1.3% between 2008 and 2012 (McKenzie, 2014, p. 8). This shift represented more than a doubling of the rate of cycling[49]. However, if assessed on a longer time scale (from 1990 to 2012), the rate of growth is the second highest (just behind Detroit) in the United States (League of American Bicyclists, 2013). Surveys from 2014 revealed continued growth with "about 1.7 percent of Chicagoans 16 and older [riding] a bike to work" (Vance, 2015). The latest data at the time of writing revealed continued growth with the mode share at 1.8% in 2015 (League of American Bicyclists, 2016)



Figure 8.6.1: Bicycle traffic in Chicago 11 July 2014. (Source: Author's collection)

Demographically, across the greater Chicagoland area (beyond the City of Chicago municipal area), in the early 1990s, the majority of bicycle commuters across Chicagoland had moderate incomes. The highest proportion of users (35.9%) earned between $25 000 and $49 999 (Petersen, 2004, p. 213). This distribution begun to transform from the 2000 growth in commuter cycling. New users were predominantly higher earners and spatially concentrated in neighbourhoods undergoing processes of gentrification (Page *et al.*, 2009, p. 33; Allen and Dits, 2012; Schneider and Stefanich, 2014). These neighbourhoods include Pilsen (more recently), Wicker Park, Logan, Square, Humboldt Park and Ukrainian Village (Soles and Spokes Plan Steering Group, Chicago Area Transportation Study. Plan Development Division and Edwards and Kelcey, 2004; Moser, 2014).

49 Nevertheless, this is still a very low rate of cycling for transportation, when compared to other American cities. For example, while Davis, California is a very small city, it has a 24.5% bicycle mode share (the highest in the US) (League of American Bicyclists, 2014).

Intercept surveys of bicycle users along one of the highest trafficked bicycle corridors in Chicago - Milwaukee Avenue - found that 30% of users lived in households earning between USD100 000–200 000 per year, with 83% of respondents possessing at least an undergraduate degree. Ninety-one per cent identified themselves as white/Caucasian (Monsere *et al.*, 2014, p. 96). Milwaukee Avenue was also known as the "Hipster Highway" (Page *et al.*, 2009, p. 30) to refer to the identity of commuter cyclists travelling on this corridor. My own field observations confirmed these areas to be rife with everyday cycling practices and related social institutions, such as bike-themed coffee shops and bars. Bicycling in these neighbourhoods was relatively pleasant and I did not feel out of place on a bicycle. I qualify this statement because, from a road-safety perspective, traffic calming measures and separated bicycle facilities were available unevenly across these spaces as was motorist awareness.

In contrast, in some neighbourhoods characterised by high levels of poverty, there are very low levels of bicycle use (interview with Olatunji Oboi Reed, 23 April 2015). Almost summarising Veblen's (2009) arguments about the coercive and unconscious ways in which conspicuous consumption is an important device for communicating social status (respectability) in a highly differentiated society, a respondent described the social-psychology in poorer neighbourhoods in Chicago:

> One thing is that the reality that black and brown and low to moderate people are marginalised, disenfranchised and that sometimes ... [it] causes us...to want more. To want to express ourselves as more than what society paints us to be. One of the ways we express ourselves is through our material selves. The shoes that we wear. The clothes that we wear. And as regards to biking, the car that we drive. The car that we drive means a lot. And to be seen to be on a bike can mean that you can't afford a car. Even when it's true [that you cannot afford a car] you don't want people to know. This is sometimes unconscious. It's not like you can talk to a young brother or young sister in high school, and say, *why aren't you riding a bike?*... it's just something that they may not be able to articulate and there is this feeling that when I am ready to express how I move around the city, I want it to be in a car not a bike (interview with Olatunji Oboi Reed, 23 April 2015).

Cycling in neighbourhoods with lower levels of bicycle users increased my sense of "otherness" and heightened my awareness to the potential risk from automobiles. During my fieldwork, these were the only neighbourhoods where I encountered hostile motorist conduct. For reasons unclear, a passing motorist yelled obscenities at me.

The way in which cycling in Chicago has emerged amongst higher earning income groups is arguably a global phenomenon. Examining this trend across the world, Horton and Parkin (2012, p.

305) argue that "where the [bicycle] revolution might have already begun, we argue that it has begun amongst an 'elite'." Which is also to say, amongst population groups also not under pressure to display their material status.

However, there were indications that the demographic of bicycle users is expanding as a respondents reported (interview with Alex Wilson, 15 July 2014). This is also reflected in the composition of the Critical Mass ride. In the early days most were white males in their twenties to forties (Winkle, 2015). However, that has since changed. One respondent noted that there was a wider range of participants from all over the city with diverse backgrounds (interview with Michael Burton, 21 April 2015).



Figure 8.6.2: Divvy bicycle sharing system, Chicago, June 2014. (Source: Author's collection)

As in the 1960s/1970s brief cycling renaissance, the city council has embraced cycling. Municipal focus on cycling was rekindled from the late 1980s by then Mayor of Chicago – Richard M. Daley (Neufeld, 2009) – a son of Mayor Richard J. Daley who in the 1960s and 1970s had pushed his administration onto the cycling agenda. While Mayor Richard J. Daley is credited with providing bicycle policy leadership in the City of Chicago after a long period of stagnation, towards the end of his administration in the late 2000s, the momentum initiated almost twenty years earlier had deflated. The policy energy turned under a new[50] mayor – Rahm Emanuel (interview with John Greenfield, 21 April 2015). The municipality has unveiled a diverse range of initiatives to encourage cycling, such as infrastructure (bicycle paths with significant focus on a network of protected paths, a bicycle sharing system, and parking facilities as examples), information (such as

50 Emanuel officially replaced Mayor Daley on the 16th of May 2011.

maps), social marketing campaigns such as bicycle to work days, integration of cycling with public transport, campaigns to educate people driving and those using bicycles, and new laws protecting people cycling (Wagner, 1992; Mayor's Bicycle Advisory Council, 2006; Department of Transport, 2012).

Municipal attention has been supplemented by a diverse array of non-state actors. These include bicycle shops, bicycle manufacturers, numerous grass roots initiatives,[51] such as Critical Mass[52], and formal non-governmental organisations, such as the Chicagoland Bicycle Federation now known as the Active Transportation Alliance[53].



Figure 8.6.3: Critical Mass Chicago, June 2014. (Source: Author's collection)

The growth in everyday cycling in Chicago may then have entered into a positive feedback

51 These are too many to list but many can be found at http://www.thechainlink.org/ or http://breakthegridlock.org/about.

52 It started in 1994 in an ad hoc fashion, but only became a regular predictable phenomenon from 1997.

53 In 1985, what later became a very influential transportation advocacy group emerged. This was the Chicagoland Bicycle Federation, nowadays called the Active Transportation Alliance. It was created by one of the members of the Northeastern Illinois Planning Commission – Susan Pinsof – along with a public health professor, Dr Lyndon Babcock, together with a few other individuals (interview with Dr Lyndon Babcock, 19 June 2014; Petersen, 2004, p. 205). For a while it operated on an ad-hoc basis until 1987, when Randy Neufeld "a former political organizer approached the fledgling organization with an unusual proposal: he would work as the group's first staff member for free until he could raise funds to pay himself" (Greenfield, 2011).

loop phase. This was remarked on by one respondent:

> Things have snowballed in the City with people seeing people biking on the streets. The more they are going to do it...the safer people feel...people biking on the streets is an advertisement for cycling (interview with John Greenfield, 21 April 2015).

Here the respondent was pointing out the role of social influence in the decision to cycle as has been investigated in some studies (see, for example, Sherwin, Chatterjee and Jain, 2014). An important dimension highlighted by the previous respondent about increasing perceptions of safety was emphasised by another:

> When we started out, people often talked about fearing for their safety. People were not used to us being around. You would be yelled at. There would be people like what the hell are you doing? So in 12 years I have seen amazing turning around in public opinion. In terms of being yelled, feeling terribly scared on the streets. And now I am in a pack of cyclists. And I see motorists acknowledging you have that right of way. As I see it we are all taking turns. I am finding it a little easier to get your place in line and be acknowledged at an intersection on a bike than it used to be. Or instead of being ignored (interview with Steve Lane, 1 May 2015).

Therefore, for a period of 25 years, the mode share of cycling in Chicago has been increasing at the same time as it has gained a positive image. While cycling has not yet become a dominant mode of ground transport, it is useful to explore this growth with associated change in symbolic meaning. As we shall see below, this growth of cycling is related to processes at the niche, regime and landscape levels which are intricately connected.

8.6.1 Analysis

An important reason for the growth of cycling in Chicago is the diversity and power of actor-networks. With regard to diversity, recall the extensive list of grassroots organisations described above. One of these, a cycling advocacy group – the Active Transportation Alliance – was initially voluntary in nature (personal communication with Dr Lyndon Babcock, 19 June 2014 and Interview with Randy Neufeld, 1 July 2014), it evolved into a professional organisation with full-time staff commanding a large budget. For example, in 2015 the total income of the Active Transportation Alliance exceeded USD3.5 million (Active Transportation Alliance, 2015, p. 17). This has enabled the organisation to exert considerable influence on the everyday cycling agenda in Chicago. For example, it has acted as lead author or otherwise provided significant input into various municipal bicycling strategies. A significant impact was persuading a new incoming mayor to place shift municipal focus and build barrier protected bicycle paths (Active Transportation Alliance, 2017; interview with John Greenfield, 21 April 2015).

Municipal leadership has also been in favour of the everyday cycling. Since 1989 (when Mayor Richard M Daley came to office, followed by Rahm Emanuel), Chicago has enjoyed political support for the everyday bicycling agenda. The longevity of municipal support towards the cycling agenda enabled organisational learning as one respondent reported based on his observations in interacting with City of Chicago officials (Interview with Randy Neufeld, 1 July 2014). This, compounded by federal government support allowed municipality to develop key components of a bicycle socio-technical system such as infrastructure, regulations and policies (City of Chicago, 2017).

A key problem that these robust actor-networks have been address is the notion that utility cycling is a practice for children. New symbolic meaning(s) then needed to emerge to recruit users. For particular social groups, cycling would become seen as a fashionable. One example[54] of a bicycle form used successfully towards this end is the fixed gear bicycle. Furness (2010) describes in detail how across the United States bike messenger aesthetic (such as tattoos and bags) as well as the bikes themselves have been seized upon by major shoe, fashion and automobile companies to promote the consumption of their own products and fixed gear bike and related accessories.

To observers, users are attracted to fixed gear bicycles for a wide range of reasons. One of these is their aesthetic form. In particular their lack of many components such as dérailleur, brakes, fenders, produces a "streamlined" (Twohey, 2008) aesthetic that make the "bikes look sleek and cool" (ibid). As a bicycle shop owner asked to explain their popularity said: "they're the prettiest bikes out there" Gina Scardino quoted in (Weyland, 2007). Similarly, responding to the queries of a newspaper reporter, an employee of bicycle outreach programme ran by the City of Chicago said: "A lot of people get fixies because they think they're cool" Paul Doerr quoted in (Brotman, 2010). This is captured in the public discourse as newspaper accounts describe interest in these bicycles as

54 While I focus here only on fixed gear bicycles, similar processes of associating cycling with fashion also occurred with other bicycle designs. For example, a research respondent who has initiated a successful bicycle manufacturing and coffee business in Chicago took proactive steps to link bicycling with the fashion industry by entering into a collaboration with New York Fashion Week in 2011. He had very reputable designers create bicycles which were then showcased. These bicycles which were very expensive were auctioned off for charity. Once the shop moved to Chicago, he continued to deploy such strategies (interview with Michael Salvatore, 9 July 2014). See for example the video here http://www.heritagebicycles.com/blogs/news/15637173-customize-your-joy-ride representing a particular form of urban lifestyle possible on a bike.

a “fad” (Balzar, 2004), “trendy” (Kampert, 2006).

One social group that found the aesthetics of such bicycles appealing are known as ‘hipsters’. Schiermer (2013, p. 170)defines hipsters as follows:



Figure 8.6.1.1: Colourful fixed-gear at bottom left in Chicago on Milwaukee Avenue, left, 27 April 2015. (Source: Author’s collection)

> Hipsters are young, white and middle class, typically between 20 and 35 years old. They contribute to the ‘gentrification’ of former ‘popular’, working-class, ethnic or ‘exotic’ neighbourhoods in the big Western cities...Hipsters generally vote to the left, typically study at the humanities or work in the ‘creative industry’ or in cafés or bars or music or fashion stores.

Concurring with this conception, a journalist ventures a description relevant to Chicago:

> The hipster subculture comprises a growing number of young bohemian types who value independence, progressive politics and creativity. The movement -- which has become increasingly mocked as it has become more widespread -- manifests itself in vintage and thrift-store-inspired fashions (think Urban Outfitters), fixed-gear bicycles and affection for strong coffee, craft beers and local food. Hipsters can be found en masse in gritty, up-and-coming neighborhoods, such as Logan Square in Chicago, with relatively low rents and a large supply of cafes, bars, and art and performance spaces (Allen and Dits, 2012).

Allen and Dits (2012) help us spatially locate the habitat of the hipster in Chicago. In this context it is possible to understand why Milwaukee Avenue which also connects one of the neighbourhoods mentioned above, and was a major cycling thoroughfare in Chicago and elsewhere[55] at time of research, became known colloquially as the “Hipster Highway”(Page *et al.*, 2009, p. 30) to refer to

55 Interestingly, the rate of ridership on Milwaukee Avenue was compared to other streets in a cross city comparison (Austin, Texas; Chicago, Illinois; Portland, Oregon; San Francisco, California; and, Washington, District of Columbia) in the United States. It was found to be the highest “with 2-10 times as many bicycles” (Monsere *et al.*, 2014, p. 63).

the identity of commuter cyclists travelling on this corridor. For this group then, the bicycle is more than a utilitarian mode of transport. As interview respondents noted with respect to some users in Chicago[56], fixed gear bicycle bicycles were seen as fashionable consumer commodities attached to a particular form of urban lifestyle (interviews with Jim Merrell and Melodi Geraci, 22 April 2015).

While desires to be fashionable explain some acquisition and use of bicycles, there were other niche processes unfolding that also helped to increase social acceptability and use of bicycles. From a practical perspective some grassroots groups described above helped to provide useful skills such as riding bicycles in the winter. The Bike Winter initiative which aims to encourage bicycling even in winter (Bike Winter, 2015) is credited with providing skills to enable all year biking. For example, it enabled one such user to understand that it was possible to ride her bike in winter with the right accessories (Anderson, 2000). I could not locate any research that had surveyed Critical Mass participants on the influence of the initiative in encouraging or initiating the decision to start cycling. However, there were self reports and respondent accounts that the Critical Mass rides helped to at least encourage continuing use of the bicycle for transportation (Ginny, 1998; Digital, 2002; Redd, 1997; Dan, 1999; interview with Steve Lane, 1 May 2015). One can infer that such psycho-social support would have been especially important since these reports pertain to periods (late 1990s) when utility cycling according to the respondents' account above, had not yet significantly grown.

Finally, it is likely that grassroots initiatives helped some to reconsider using the incumbent system of automobility. Studies into the development of niches have hypothesised and found that an innovation is more likely to grow if learning processes help users reconsider dominant alternatives (Schot and Geels, 2008; Seyfang and Longhurst, 2013). Such learning allows "people [to] question the assumptions and constraints of mainstream systems altogether" (Seyfang and Longhurst, 2013, p. 882). Interview respondents reported that in the early history of grass-roots actions, some advocates and initiatives such as Critical Mass adopted a very strident stance against car use (interviews with Alex Wilson, 15 July 2014; Michael Burton, 21 April 2015 and Steve Lane, 1 May 2015). In such efforts, actors developed and circulated narratives attacking cars in very graphic terms such as on their safety and environmental impacts, their fuel supply system, and the political-

56 Pucher et al. (2011, p. 461)observe that cross the United States "Cycling rates tend to be higher in older, gentrifying neighborhoods near the city center [.] Such bike-friendly neighborhoods are usually located within close cycling distance of university campuses and downtown jobs and feature a mixture of residential and commercial land uses."

economic system within which cars were embedded (Unknown, Undatedb)(Unknown, Unavailable)They also launched campaigns and demonstrations against what would have been considered key planks of automobility such as a lakeside highway (CFCL, 2003) and an annual car show (Unknown, Undateda).Cars then, were being framed as symbols of an undesirable society with the bicycle as the better alternative. The testimony then by a participant of one Critical Mass ride can be seen as reflecting these interventions and also a justification for cycling:

> Everytime I ride the mass, I am further energized to keep riding my bicycle, to push my limits in endurance and tolerance for weather. With me are the other massers--cyclists of varying abilities and dedication--who encourage my biking and validate my refusal to be a 'cager' like society expects me to be (Dan, 1999).

Notice the use of the term 'cager' to depict the prison-like environment within which car users were being framed.

Turning to regime level processes, weaknesses within the system of automobility is one reason for the growth of everyday cycling. Negative externalities of car use particularly prompted policy-makers to reconsider the bicycle. This is evident for example in Chicago's first plan to promote everyday cycling (c.1992) foregrounded externalities of car use as its *raison d'etre*. It argued that bicycling provides "better air quality, reduced energy use, reduced traffic congestion and reduced road maintenance costs"(Mayor's Bicycle Advisory Council, 1992, p. 1). The imperative to reduce vehicle emissions was especially high, since as per national government regulations "the Chicago area, whose existing air quality condition [was at the time] rated as '*severe*,'... [was] required to reduce its emissions by 15% by the year 1996" (Mayor's Bicycle Advisory Council 1992, p.1) [emphasis mine]. Chicago's municipal efforts were given impetus by the federal government, which focused on the need to reduce auto-related air pollution. National legislation passed in 1990 (the Clean Air Act of 1990) not only required municipal action to reduce air pollution from automobiles, it also provided financial resources to fund projects (Petersen 2004; Mayor's Bicycle Advisory Council 1992).

Resources from federal government were provided through the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). The "ISTEA" "change[d] the automatic dismissal of cycling on the part of planners by mandating federal funds were to go to non-motorized transportation due to their positive impact on air quality"(Petersen, 2004, p. 190).This federal government move mandating local level actions as well as providing fiscal resources is an important reason why the

City of Chicago has been able to undertake its bicycle friendly agenda. Much of the infrastructure developed - bicycle paths, parking facilities, the bike share system and others – have been possible due to federal government support (interviews with John LaPlante, 11 July 2014 and Ben Gomberg, 30 June 2014, and Randy Neufeld, 1 July 2014). An ongoing challenge for the City however is that given this dependence on federal government money for new projects, there are problems with maintenance since these resources have to come out of city budget (interview with Rebecca Resman, 26 June 2014) which are scarce.

In addition to the overt consequences of automobility, there are strong grounds to propose that the symbolic values of cars amongst particular population groups have been satisfied. It was discussed above that in the post-World War II, part of the impetus of car acquisition was to obtain prestige through differentiation. Scholars have noted that from about the mid-2000s, levels of private car use in the whole of the United States appeared to stop growing (Newman and Kenworthy, 2011; Sivak, 2014; Zhao, 2014a). This is known as the peak car hypothesis. Studying developments in eight countries[57] in Western Europe, North America (including the United States), and Asia Millard-Ball & Schipper (2010, p. 358) find that "since 2003, motorized travel demand by all modes has levelled out or even declined...and that travel in private vehicles has declined." Further, that while "car ownership has continued to rise in most instances...[it has done so] at a slower rate, and these cars are being driven less"(Millard-Ball and Schipper, 2010, pp. 358–359). Such limited car use has been especially observed to affect younger population groups (Kuhnimhof, Zumkeller and Chlond, 2013; Wee, 2015)

These niche and regime level developments were driven and reinforced by landscape developments. Foremost was a series of macroeconomic transformations over time. One dynamic in this economic change was a restructuring over the economy as manufacturing declined in the 1970s and 1980s (Pacyga, 2011, pp. 362–365, 389). The north-west neighbourhoods described above as ground zero of Chicago's cycling culture had as Lloyd (2002, p. 37) shows were important for light manufacturing as well as residential areas. As factories shuttered, jobs were lost and poverty rose. These neighbourhoods then became attractive to those seeking cheap rents such as artists and recent college graduates (Huebner, 1994; Page *et al.*, 2009; interview with Paul Kozy, 9 July 2014). Some of these new residents would become key proponents and early adopters of cycling in the 1990s. As one respondent noted:

57 Australia, Canada, France, Germany, Japan, Sweden, the UK and the USA.

> In the early 90s we were all conscious of the fact that we like all lived in the same area...Logan Square has always been a big location for folks in the bike community. Especially for that early group of very active who were organisers. Also Wicker Park though. So a lot of our gatherings were in Logan Square and Wicker Park. Most of the meetings I did were in Logan Square...There's a street called Albany (Avenue)[58] - very progressive street. They have traffic curbing devices put into their block because all of them were on the same page - they could vote on this. While it would be harder in other neighbourhoods (interview with Steven Lane, 1 May 2015).

As de-industrialisation occurred across Chicagoland so did new macroeconomic sectors such as information communications, services (such as arts, leisure, and entertainment) (Lloyd, 2002, pp. 37–38). The north-west neighbourhoods became a hub for some of these new increasingly important economic sectors such as arts, entertainment and internet based activities. As Lloyd (2002, p. 42)notes one of these neighborhoods – Wicker Park - "enjoye[d] its ascendant profile in cultural production and arts design." Here recall the quotation above from a journalist about the concentration of 'hipsters' in the north-west neighbourhoods as they sought out and participated in leisure and entertainment activities, bicycles in tow.

As these were city-wide transformations, the central business district (also known as the loop) enjoyed a renaissance as many companies located in the new post-industrial economy relocated there bringing jobs (Pacyga, 2011, pp. 387–388). Incentives such as "public subsidies"(Pacyga, 2011, p. 386) were one of the means that municipal and state authorities employed to attract companies. Later[59] under Mayor



Figure 8.6.1.2: Example of a bright bicycle parking facility placed by a neighborhood association, July 2014. Source: Author's collection.

58 http://albanyhomezone.org/. This initiative is located in Logan Square.

59 There was also an economic imperative to Chicago's first cycling plan. However, in that plan, cycling was mainly seen as a solution to endogenous economic potential such as i) relieving congestion understood as a drag on local economy, ii) an affordable mode of transport and itself iii), as an employment sector (Mayor's Bicycle Advisory Council, 1992, p. 2)

Rahm Emanuel, cycling infrastructure such as bike paths also became an incentive to attract[60] inward investments and in particular high skilled professionals who were believed to value cycling (Davies, 2012; Fucoloro, 2013). The notion that cycling could help in municipal economic vibrancy has found purchase at neighbourhood level. A respondent reported how property developers, commercial and residential associations were acting to make their regions more cycling friendly in order to attract customers and residents. For example, because of this logic a neighbourhood association has expended own resources to purchase and install bicycle parking facilities which are very bright in colour in order to attract immediate attention (interview with Lee Crandell, 27 June 2014).

Yet the economic growth and restructuring has also been unevenly distributed – which is to say that inequality persists. While some spaces and sectors of the local economy boomed, others were in dire straits, with Chicago in the 2010s described as "two cities" (see, for example, Coval, 2014; Luce, 2015). This helps explain the still stigmatised connotation of cycling in low income communities.

8.7 Conclusions

Everyday cycling in Chicago has remained as a small proportion of overall ground transportation options. If trends in the last historical period continue, it is likely then that historical arc maybe disrupted. It was evident that a key reason for the historical subaltern status for utility cycling is that in the context of enduring inequality albeit more muted than Johannesburg's, and presence of alternatives to display distinction, demographically inclusive symbolic meanings have yet to be constructed – though such a process maybe underway in the last historical period described. Put another way, other than possibly the last historical period, everyday cycling has historically been constructed in appeal to particular social groups and not in an inclusive way. At the same time, alternatives (public transport – and particularly car use) have been developed to robustness. Future work should monitor the last historical period. Finally, Chicago is a useful case in the study for it demonstrates the possible fortunes of everyday cycling within a context characterised by enduring but modest levels of inequalities (compared to Johannesburg).

60 See also Hoffman & Lugo (2014)who chart how this idea has found resonance in urban economic renewal in Minneapolis and Los Angeles with potentially counterproductive results.

Chapter 9. Johannesburg, a story of everyday bicycle use

> No account of the development of transport in Johannesburg would be complete without mention of the tremendous part played by the pedal cycle, of which many thousands were sold all over Johannesburg and the Reef, and, in fact, they did the work then which is now being done by the motor car (Connock, 1936, p. 35).

9.1 Introduction

This chapter describes and analyses the history of bicycle use for transport from the emergence of Johannesburg as an urban centre in the late 1880s, to 2016. As the quotation above suggests there was a time in Johannesburg when bicycles were an important mode of transport. Even when bicycles were usurped by other private transport technologies (principally by the car), they did not disappear completely from the urban fabric. Since the late 1990s there have been active attempts to promote utilitarian cycling.

This story of the changing fortunes of bicycles for mobility is not well-known. Instead, the use of bicycles for recreation, and especially for sporting purposes, is documented (see, for example, Jowett, 1980; Learmont, 1990). The paucity of information about utilitarian bicycle use in Johannesburg has therefore required a great deal of detective work. The information from this chapter is drawn from a wide variety of data sources including archives, examination of historical street-level photography, media accounts, and tangential information contained in books about the history of Johannesburg.

The chapter is organised into four sections of historical periodisation. These are distinct from each other in terms of actor and user interest and participation in everyday bicycling. In the first period from the late 1880s, into the middle of the first decade of the 1900s, bicycles commanded public attention at races, on the streets and in tours out of the town. Yet as they did so, they constituted a small part of the transportation mix amidst others such as animal-drawn transport given their high costs. Everyday cycling was therefore a niche practice which connoted the apogee of race and class.

A second phase unfolding principally after the turn of the 20th century to about 1935 saw cycling growth. Landscape characteristics and developments (urban form, war, diseases, droughts and pests) provided an early boost to cycling while weakening incumbent – animal drawn

transportation. In addition to internal improvements (technical change and price declines), bicycle use diffused due to emulation processes as the working class sought to 'catch up' with the social elite who had been pioneers of cycling. Weakness with alternatives (automobiles and public transport) such as high costs and poor spatial distribution - as most sensitive to the working classes – also enabled cycling growth.

The third phase narrates the decline of everyday cycling. While I situate the historical moment in 1936, I argue that some developments prior were responsible. These included fraying of the symbolic meaning about cycling as signifier of race and class superiority coupled with car niche activities in addressing early problems with the innovation. Landscape developments subsequently (waves of economic growth whose benefits were unequally distributed, and urban expansion) provided the final catalyst to cycling decline.

The final phase covers the period from the late 1990s into 2016, when a variety of state and non-state actors have rediscovered the value of utilitarian cycling. In spite of their efforts, there are limited signs of mode shifts. I argue that this resistance to a transition can be understood due to a weak cycling niche, a strong and resilient system of automobility and landscape developments that have reinforced this status quo.

9.2 Novelty: Late 19th century

It is unclear when the first bicycle arrived in Johannesburg – an urban area that "came into existence in 1886" (Maud, 1938, p. 10) – following the discovery of gold deposits. However, in South Africa, the earliest form of the bicycle known as the velocipede, Draisine[61], or boneshaker was seen in 1869 in a town called Grahamstown – located some 980 kilometres away from Johannesburg (Learmont, 1990, p. 30). Following technological developments like other contexts, then the 'high wheeler'[62] became more ubiquitous (Shorten, 1970, p. 1089). See figure 9.2.1 where

61 Karl von Drais invented the Draisine in response to landscape pressures upon a dominant socio-technical system: in the 1810s there were repeated problems with supplying food to horses. These peaked in 1815 when a volcanic eruption emitted so much ash into the atmosphere that the following year saw serious crop failures all over Europe (ADFC, 2006, p. 2).

62 Britain developed a successful "high wheeler" manufacturing industry (Epperson, 2010, p. 24). British users helped to showcase the bicycle in Europe and many other parts of the world linked to the British Empire (Herlihy, 2006, pp. 170–174) – including South Africa.

some high wheelers lie in the foreground.

Figure 9.2.1: Members of the Johannesburg Amateur Cycling Club, 1892. (Source: Barnett & Barnett 1913). Copyright permission not obtained see thesis hardcopy.

Technologically, the form of the bicycle in most popular use from 1897 onwards was what was then known as the "safety" bicycle (Learmont, 1990, p. 36). The "safety" bicycle – the popular modern form of the bicycle featuring two wheels of equal size which reduced the chances of falling off – had been visible in Johannesburg from 1891. This is why its successor was dubbed the "safety." Here we see internal technical improvement of a technology promoting societal acceptance. However, the transition to the safety bicycle in Johannesburg was not flawless. When a safety was first used by a racer at a competitive event in the city, there was reportedly bemused scepticism in the watching crowd (Neame, 1960, p. 83).

Bicycles in this early period were used for multiple purposes, including sporting, recreation and everyday transport. Gutsche (no date, pp. 6–10) argues that the white population was gripped by a kind of madness for cycle racing. In this light, Gutsche (no date, p. 15) contends that "in the middle nineties, there were only two popular idols – the Queen[63] whose birthday was always wildly celebrated, and the racing cyclists."

63 Queen Victoria.

The centre of this "mania" was the Wanderers Club. The Wanderers Club was a prestigious place, where the elite would gather for sports and relaxation. The building itself is described at the time by Rosenthal (1974, p. 133) as "one of the most luxurious structures in South Africa." Crowds would gather to watch young men and women (though men primarily) embark on all kinds of races in circular fashion around the club (Neame, 1960, p. 83). The women racing inside (and outside) the club had to comport themselves with all the attendant requirements for displays of physical triumph and determination, such as persevering in the race even after sustaining injury-producing falls (Neame, 1960, p. 84). Such races, where participants would circle the track repeatedly to established distances of up to 80 kilometres, for a time displaced other athletic activities due to low barriers of entry (Learmont, 1990, p. 34). Given this interest in racing bicycles, it is no surprise then that the city council reportedly monitored cyclists who were cycling too fast on the city streets (Shorten, 1970, p. 174).

Figure 9.2.2: Crowds gather to watch a bicycle race at the Wanderers Club, 1898. Source: (Barnett & Barnett 1913)

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As is alluded to above, there was significant fixation on Queen Victoria's birthday, and so a large section of the population in Johannesburg often drew their social registers from elsewhere[64], particularly the United Kingdom but also other parts of Europe and America (including cycling practices). For instance, mimicking elite practices in the United Kingdom, the club built a cycling track for women:

Figure 9.2.3: Women (and men) riding bicycles at the Wanderers Club, 1890s. Source: (Barnett and Barnett, 1913).Copyright permission not obtained see thesis hardcopy.

> [Since]... society women in London were cycling in Battersea Park... the Wanderers Club decided to lay out a 'ladies mile' in their Western ground. The track was described as an ideal one as it was bordered with trees all round and the club intended planting another avenue of firs, etc. so that the ground would be cool and shady (Neame, 1960, p. 84).

In this early period, the elite in Johannesburg regularly circulated around Europe, America and Johannesburg. A popular sports racer – Lourens Meintjies – had skills of such a high calibre that he participated (sponsored by the Wanderers Club) in a world-famous race in Chicago in 1893, where he triumphed (Learmont, 1990, p. 35).

Figure 9.2.4: Members of the Johannesburg Amateur Cycling Club, 1895. Source: (Barnett and Barnett, 1913)

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64 It is also important to mention that there was no domestic bicycle manufacturing so bicycles were imported from elsewhere, such as the United States and Europe (Stark, 1956, p. 399; Johnston, 1976, p. 9).

Johannesburg residents also practised recreational cycling. Over the weekends some would ride bicycles as a form of relaxation and perhaps also to exercise (see figure 9.2.5). I suggest exercise here because some destinations undertaken were rather distant from the city centre. For example, on one occasion a ride set out to an area twenty-seven kilometres from the city centre. After they

Figure 9.2.5: Resting on a hill during a recreational cycling outing, 1899. Source: (Museum Africa, 2016)

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returned, participants agreed it was too far. In the next outing the distance was reduced (Neame, 1960, pp. 83–84). These rides were facilitated by clubs. A picture of members of one of these clubs – the Rand Cycling Club – which was taken in 1894, shows about thirty-five white men with their bicycles. The men are dressed formally in suits, ties and hats. The bicycles they hold onto vary technologically. Some are high wheelers, while others are "safety's" (James Hall Transport Museum 2015). Signalling that such clubs were for the social elite, another club, the Cyclists Touring Club (created in 1895 to facilitate social rides in and around Johannesburg) (Learmont, 1990, p. 36), was chaired by a wealthy industrialist known as Lionel Philipps (Neame, 1960, pp. 83–84).

While bicycles were used for sports and recreation, they were also used for other applications. In

the late 19th century, the bicycle was an efficient mode of transport. It was thought to be the best tool to deliver, to a President located in a town (Pretoria) more than 60 kilometres from Johannesburg, a petition to commute the death sentences of some people:

> ... four leaders – Lionel Phillips, Farrar, Frank Rhodes and Hays Hammond – had been sentenced to death. At top speed 3 000 signatures were obtained to a plea for mercy, and it was rushed to the President by the fastest possible means – a bicycle ridden by Franck Connock, the champion cyclist (Villiers and Brooke-Norris, 1976, p. 56).

The four had been charged with treason in their collusion in a plot to overthrow the Zuid-Afrikaansche Republiek – the then government of the region within which Johannesburg emerged. Thus part of the bicycle's appeal was in its technical capability in relation to other transport technologies. Another instance of unusual use of bicycles was in a war known by some as the South African War (for example, Thompson, 1990) and by others as the Anglo-Boer War (for example, Davidson, Davidson and Filatova, 1998). During this war, which lasted from 1899 to 1902, bicycles were used to convey messages and run errands for the troops. Given the military applications of bicycles, riders in Johannesburg were required to register their machines and display the registration certificate. Further, when cyclists were passing military personnel they were required to slow down and comply with any orders issued to them. At night, they were ordered to use a light for illumination (Maree, 1977).

At the beginning of the war, commerce and other social life in Johannesburg clung to normality. One bicycle dealership still managed to extract "a fair success" (Whalley, 1953, p. 14). However, as it ground on, it negatively affected all commercial activities including bicycle businesses, with some being forced to shut down (Stark, 1956, p. 121; Kavanagh, 1958). In 1900, British forces occupied a range of towns, including Johannesburg, from the Afrikaner forces. This occupation marked a decisive shift in the war with Afrikaner forces henceforth having to resort to guerrilla attacks against the British (Thompson, 1990, pp. 142–143). Johannesburg then, from 1900 onwards as not an intense theatre of conflict, would have begun to return to some degree of normalisation. This "normalisation" explains why, as we shall see later in 1901, town council making decisions to support bicycle usage.

Figure 9.2.6: An early shop of Shimwell Brothers Cycles. Source: (Barnett and Barnett, 1913)

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While the town was enthralled by the sports racing and leisure cycling possibly as a form of escape from the dusty and sodden town over the weekends, bicycles were also used as a means of transportation (Gutsche, no date, p. 6). In this light in 1892 a bicycling association – the South African Cyclists Union – was formed in Johannesburg, but it also drew members from other towns. While the association comprised racing clubs, it also set its eyes on looking out for the interests of everyday bicycle use (Jowett, 1980, p. 21). For instance, it sought:

> ... fair and equitable administration of justice as regards the rights of cyclists on public roads... to consider the relations between cyclists and railway companies to ensure some modification of the present tariff for the carriage of bicycles and tricycles and greater security in their conveyance... to watch the course of any legislative proposals... affecting the interests of the cycling public and make representations on the subject as the occasion demanded (Jowett, 1980, p. 21).

Bicycles were therefore penetrating Johannesburg streets. Pictures of public events (such as a celebration of Queen Victoria's Diamond Jubilee) in the 1890s show some observers watching proceedings, bike in hands. Bicycles can be seen leaning onto buildings and against pavements. They are visible at public open-air markets where shoppers hold onto them as they move from stall to stall (The Star, 1966b; Rosenthal, 1974, p. 134). One can see women and policemen riding bikes – though in all the images, men outnumber women. The gendered nature of cycling is important to stop and observe. Learmont (1990, pp. 36–37) notes that across South Africa, for some, it was a matter of some social discomfort to see women cycling.

At this time, the social, political and economic elite did not shy away from riding their bicycles to work or to social clubs (Neame, 1960, p. 83; The Star, 1966a; Van Rensburg, 1986, p. 263). A founder of a news agency in the city was reported to do just that (Van Rensburg, 1986, p. 263). The

Rand Club – a social club for the town's economic elite – had a bicycle rack installed for member use (Neame, 1960, p. 83). In a sign of the importance of bicycles for transport, in the early 1900s a new building for a company was reportedly well regarded by its employees, since it had a basement parking space for bicycles. This allowed them to keep their bicycles out of street level (Shorten, 1970, p. 238) presumably away from dusty[65] conditions and possible theft.

In this period, bicycles were not only seen as but were in fact luxury items. As Learmont (1990) argues, in the 1890s bicycles were expensive items with some selling for up to 20 pounds each. They were expensive consumer goods (Learmont, 1990, p. 2) "with everybody who could afford... [one] riding..." (Kavanagh, 1958, p. 48). Because of this cost, most of the users of bicycles were wealthy members of the white population. This is evident in available photographs of bicycle users in this period (for example, Clarke, 1987, p. 12) – though the class nature is not easy to determine. Income data for the working class in the 1890s and early 1900s helps to support the argument for bicycle users being high earners. Van Onselen (1982, p. 20) has mapped out the wages of people working in the homes of the white middle class between 1890 and 1914. He finds that in this period the highest wages each month was just over 10 pounds a month. Such wages were only available to white working class employees who served as general managers overseeing other domestic workers in a household. In contrast, the highest income that black men received (wages peaked about 1905) was less than five pounds a month. Black working-class women who washed clothes in laundry service could earn slightly higher than the aforementioned rates averaging 12 pounds a month (between 1897 and 1906) (Van Onselen, 1982, p. 83). Shorten (1970) lends further insight into the earning patterns of other members of the working class in the late 19th century. In 1898 so-called non-white workers employed by the town council earned 18 shillings a week. White workers who had come into Johannesburg from the countryside (due to a rinderpest plague that had decimated cattle) went on strike, demanding between 35 shillings to two pounds a week from the town council. Their demands were not met (Shorten, 1970, p. 570).

As the evidence from Shorten (1970) and Van Onselen (1982) shows, after incurring other living costs, the working class in Johannesburg would have been hard-pressed to purchase bicycles. Indeed, it was partly for this reason that in 1901 the Johannesburg town council offered financial support to its employees in acquiring bicycles. A committee of the council in arriving at this

65 Because of the extensive gold mining, lack of trees and relatively arid climate, Johannesburg in the late 19th century was a dusty city (The Star, 1966b).

decision argued:

> This committee is of [the] opinion that a considerable number of the Council's employees could with advantage perform their duties on bicycles, and think the best plan will be for the Council to grant these officials a fixed allowance and allow them to find their own machines (City of Johannesburg, 1901, p. 130).

Bicycles in other words could offer social prestige to users who were mainly white in this period. The status conferring role of bicycles is evident in the figure opposite where a Mr Albert Shimwell (one of the founders of a successful bicycle business) strikes a pose with partner during wedding in 1897. He and his bride rode away from the Church (St Augustine's in Doornfontein) on a special bicycle, sitting side by side. The bicycle had one set of handlebars but they could both pedal (Johnston, 1976). A group composed of mining magnates – called the Rand Pioneers – even sought to actively 'protect[66]' this symbolic value of bicycles. They campaigned for a law restricting use of bicycles by "natives". As the town council noted on the 25th of January 1905"

Figure 9.2.7: Albert Shimwell and partner leaving their wedding 1890s. Source: (Museum Africa, 2016)

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> ...representations have been received from the Committee of the Rand Pioneers (i) as to the desirability of exercising some special control over native cyclists in order

66 The Rand Pioneers also lobbied for travel modes to be separated by race. In 1904, they lobbied for separate cars for "natives" on trains (The Star, 1904). Sidewalks were also for a time for the sole preserve of white people. As the town grew, there was increased congestion on the streets. In response to this – ostensibly as a way of relieving pressure on sidewalks – in 1894 the town council issued a regulation banning members of the black population from walking on sidewalks. Should they be caught walking on the sidewalks they would be fined two pounds each or whipped ten times if they could not afford the fines. Given the extreme poverty amongst the black population those infringing the new regulation were mostly beaten. This apparently caused many black people to leave the town (Neame, 1960, p. 75).

> to check cycle thefts, and (ii) as to nuisance caused in the streets by the reckless riding of native cyclists (City of Johannesburg, 1905a, p. 130).

Their efforts prevailed for some time. A draft by law was passed, which required so-called "natives" riding a bicycle to wear a badge on their left arm. The purpose of the badge was to communicate to everyone that the "native" had acquired formal permission from the council to do so, which was to be obtained at a deposit fee of two shillings and six pence. The permit would last for six months and was not transferable (City of Johannesburg, 1904, p. 210).

The law was opposed by some including Mahatma Gandhi who was then resident in Johannesburg (Vashi, 2008), several organisations[67] representing the interests of black people (Gunuza *et al.*, 1905) and church groups such as the Witwatersrand Church Council (City of Johannesburg, 1904, p. 271). The by law was not legally enforced since it was overturned by the government of the Transvaal – then under British control following the war discussed above – on the grounds that that council had overstepped its formal authority. The Rand Pioneers Association, which had lobbied for the by law was disappointed (Rand Pioneers, 1905, p. 13). In this case, we see some fragility with the symbolic meaning associated with cycling in Johannesburg. Members of the 'white' community felt that they had to act to protect it, or it would fray. Later, I will discuss the implications of the failure to limit cycling within the "native" population – suggesting that ironically, it led to diminished investments.

9.2.1 Analysis

What does this narrative then tell us about cycling in Johannesburg in the late 19th century into the first few years of the following century? Foremost is that it was an elite practice given costs of bicycle ownership within an unequal context. In a personal recollection contained in a book profiling memories of life in early Johannesburg, the late 1890s are described as follows:

> In the '90s [1890s] Johannesburg was a gay and growing town with many people from Britain and Europe. The gold mines were flourishing and money was plentiful. You could become a millionaire overnight and lose it just as suddenly (Robertson, 1986, p. 27).

It was a precarious town. It was possible to become fabulously wealthy, as some did, while others lived in squalor. The wealthy, such as mining magnates, used their homes as centre pieces for displaying material wealth. Pictures taken of the interior of the houses of the mining elite show

67 Iliso, Lomzi, Basuto Committee, Transvaal Native Congress

elaborate arrangements of expensive household items, many of which were imported (The Star, 1966a). Illustrating how different classes competed and collided with each other;

> ...the wives of the Randlords [mining magnates] lived like duchesses in fine houses... [they] always showed themselves at their smartest in silks, satins, jewels, hats and bonnets to the lesser people who gaped and went home exhilarated (The Star, 1966a).

This was a bifurcated society – one where working class white women recruited from the United Kingdom to work as domestic workers for the middle class population on arrival, "soon absorbed the values of a colonial society and refused to undertake menial, dirty or hard labour" (Onselen, 2001, p. 39).

Social difference was also manifest in race relations. Maud (1938, p. 30) argues "the political structure of the Transvaal [out of which Johannesburg was built] had been built on a basis of caste." This caste was an established hierarchy where white resident Afrikaner men were foremost, then followed by the "Uitlanders", and finally other racial groups (Maud, 1938, pp. 30–31). Race relations were poor with the rights and privilege of the white population above everyone else. However, this should not be overstated in a manner that suggests that there was absolutely no tolerance. This did emerge. Indeed, Onselen (2001, pp. 44–46) argues that for a time there was an emergent understanding amongst different working class social groups borne out of living in the same areas.

Against this background, it is therefore not surprising that bicycles would also become mired in these dynamics as consumer theory discussed in chapter 3 holds. Here recall the discussion above of the association of mining magnates – called the Rand Pioneers – campaigned for a law restricting use of bicycles by so-called natives. In the example of the activities of the Rand Pioneers, we can see actors within structured contexts working to frame technology in a particular way. Thus, it was not simply the social inequality, which by limiting the ability of members of the black population to own bicycles might have generated the perception amongst Johannesburg residents at the time – that bicycles were for the "white" population given their predominance. Here we arrive at the role of the practice of bicycling in communicating distinction. Because it was the middle and upper classes who could afford to use bicycles, the very act of bicycling in the streets was a performance – an expression of difference. A way of communicating high social status. We can, for example, read the use of a bicycle at a wedding ceremony in 1897 by a couple as a performance of status. Recall also the case of a bicycle manufacturer and his bride riding away from their wedding ceremony on a

special bicycle that allowed them to pedal side by side. We can imagine bicycle users in this period being looked at with envy by the lower classes. I emphasise being looked at to underline the communicative dimension going on here, which is central to the logic of conspicuous consumption (Veblen, 2009).

Cycling then as a mode of transportation was not very significant. There were other means of locomotion available to the working classes. Street level images of the late 19th century feature horse-drawn trams[68], horse-drawn carriages, and many pedestrians[69] (Rosenthal, 1974; Clarke, 1987, p. 22; Museum Africa, 2016). Ox wagons also appear in some images, but these were used mainly by farmers to bring produce into the city (Clarke, 1987). Motor cars were at this time, as we shall see later, technically inferior and financially beyond the means of many.

Figure 9.2.1.1: Horse-drawn tram, 1890s. Source: (Barnett and Barnett, 1913)

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From this niche status, bicycles would in the next century grow to become an important mode of private ground transportation. The next section then turns to describe and analyse this transformation.

68 The horse drawn tram service was introduced in 1891. This was later converted to electric service in 1906 (Beavon, 2001).

69 With respect to walking, an author in a book on this early history reflecting on a painting of street life in one of the important thoroughfares, describes it as a "jaywalker's joy" (Rosenthal, 1974, p. 54).

9.3 Growth: Early 20th century to mid-1930s

This section describes the growth of everyday cycling in Johannesburg from its niche status in the 19th century. In addition to numerical growth, there were also changes in the demographic composition of users. The working classes who as described above would have found it difficult to own bicycles, overtime became predominant users. Racially by the end of this period, it would be mainly members of the 'black' population seen pedalling on Johannesburg streets.

The growth in ownership was visible at the turn of the 20th century when there was a large jump in the number of licences issued. This is evident in figure 9.3.1.

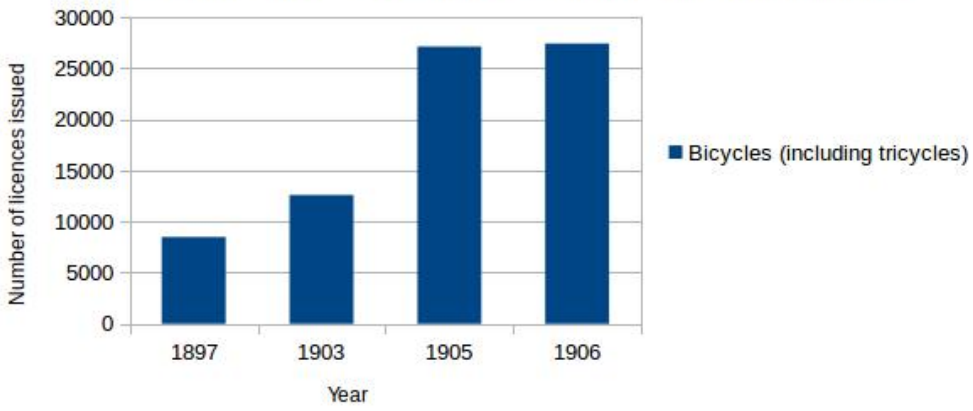


Figure 9.3.1: Growth in cycling at turn of 20th century

With increasing bicycle use, theft emerged as a problem. In 1904, in response to this problem, the council discussed a new design of bicycle registrations. Such a design would be tamper-proof so once a stolen bicycle was recovered by the police it could easily be traced back to the owner (City of Johannesburg, 1904). Council also supported bicycling by providing bicycle parking infrastructures. On October 24 of 1905 the council voted and agreed to fund the construction of bicycle parking at the town cemetery. It was argued that:

> It is considered necessary to provide some place where visitors to the cemetery can leave their cycles, and we propose that a cycle rack should be erected near the main entrance at a cost of £20 (City of Johannesburg, 1905b, p. 1127).

Figure 9.3.2: An oversized bicycle lock in Johannesburg, 1890s–1913. Source: (Barnett and Barnett, 1913)

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Members of the black population were also increasingly able to use bicycles. This was already something to be remarked on in 1905 when an upper class couple – Lionel Phillips and spouse Florence Phillips – returned to Johannesburg after an eight-year absence in Europe:

> The Phillips had never before seen a native on a bicycle but now they saw many. It came as a shock but it gladdened Lionel's heart. It meant that the 'Kaffirs' [sic] were developing a taste for consumer goods and might be influenced to return to the mines to earn money to purchase them (Gutsche, 1966, p. 182).

One important transformation in this phase was the decline in bicycles prices. By "1908 the cheapest model could be had for £6"(Learmont, 1990, p. 71). Reduction in prices and technological improvement - as we shall see later - enabled diffusion in class and race. In a newspaper advertisement in 1912, a bicycle and motor-cycle sales company emphasized the class position of different modes of transport, placing the bicycle as a mode for low-income earners. The ad said:

Figure 9.3.3: Street scene early 1900s in Johannesburg. Source: (Barnett and Barnett, 1913)

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> ... for the man with limited spending power, a Pedal-Cycle will prove a money-saver, in addition to giving pleasurable exercise. It will more than pay for itself with the money it saves. For the man who has distances to cover, or who desires to get the most pleasure out of life, a Motor-Cycle is an absolute necessity. It is the most convenient of all methods of transportation (Shimwell Bros., the Old Firm, 1912).

Miners were one of the social groups who took advantage of price reductions to acquire bicycles (Chipkin, 1993, p. 25). Based on a photograph of mine workers holding a meeting on an undisclosed issue, this group was, as early as May 1907, purchasing bicycles. Almost every other worker – who is white in race – is holding a bicycle (Kallaway and Pearson, 1987). Bicycle dealers were attuned to this market. In an advert, a company touted the benefits of a particular bicycle. The bicycle, the advert argued, had intrinsic qualities not immediately observable that were suitable to the rugged conditions of Johannesburg, and as such could be relied upon to transport the working man to the mines:

> Not all the quality [of the Aston Cycle] can be SEEN (capital theirs) in a cycle but it proves itself in the cycle's reliability and durability. It is a quality that has seen the Aston through the hard test of carrying a man to and from his work on the mines, cutting off corners, going the nearest way by crossing the veld with its bumpy, lumpy, pathless track in the making (Shimwell Bros., the Old Firm, 1911).

In the 1910s, bicycle use continued to grow. They were affordable transport modes, technically

superior to motor cars, and suited the urban form and poor roads of the time, as captured in the following quotation:

> While my two ambitious brothers were struggling to discover some form of motor transport able to stand up to the atrocious roads of that period, I concentrated my efforts on the bicycle – the type of transport which kept our business in operation and enabled me and many thousands of others to get where we wanted to go with only the expenditure of a little muscle and lung power - Ernest Hunt as quoted in Whalley (1953, p. 19)

Further evidence of cycling diffusing in class is contained in a letter by officials of the Transvaal Cyclists' Union to the government of the Transvaal. The Transvaal Cyclists' Union also represented users in Johannesburg. In the letter, the organisation requested actions to stem bicycle thefts in Johannesburg and rest of the Transvaal. The organisation argued;

> We recommend heavier terms of imprisonment, that cycle stealing like gold stealing or infringements of the liquor law should be made a special crime for the reason that it inflicts in many instances very great hardship on the victim. In the case of working men such as carpenters, bricklayers and the like, whose occupation at the best of times is precarious it frequently makes it impossible for them to follow their trade at a distance from home, and their families suffer in consequence. Again boys who have just left school are employed as errand lads on condition they provide their own bicycles. They get machines on the hire system only to have them stolen before half their deposits have been paid. There are some youngsters in Johannesburg still paying instalments on three machines two of which have been stolen (Greenwood and Hoffman, 1911, p. 2).

While there was increasing working class adoption of cycling, the social elite did not abandon bicycles abruptly. It was reported that in "(1910) nearly everyone in Johannesburg owned a bicycle, and at week-ends even some of the mining magnates and their wives were seen cycling to the Wanderers Ground" (Hart, 1974, p. 150). Here the social elite still hang onto their bicycles for sometime as a mode of transportation.

A newspaper reported that as of April 1912, 17 809 licences for bicycles had been provided by the city council. This represented a growth of 400 new licences from March of the previous year. To the newspaper, this was an interesting development because with the expansion of tram services, they might have expected more people to use the tram. In contrast, 729 licences for cars and 833 licences for motorcycles had been issued (Rand Daily Mail, 1912). In a court case underlying the everyday use of bicycles, an accused pleaded his innocence in pushing a man from a tram to his death. He argued that he was actually not on the tram at the time of the incident. Instead, "he had his evening meal about 5:30 or 5:45... [he then went] to the livestock market with Van der Linde [a friend]. Both were on bicycles. Subsequently, they came home on bicycles" (Indian Opinion, 1917).

This growth curve was interrupted by the outbreak of World War I. This is evident in the pattern of bicycle licensing in figure 9.3.4. As can be seen, there was a steady decline in the bicycle licences issued from 1914 until 1921. In early 1918 the city council issued a call for tenders for bicycle supply. Reflecting the war conditions when supply of bicycles from Great Britain would be uncertain, a bicycle retail company that often bid on such tenders – Shimwell Bros. – wrote a letter to council saying that while they would be interested in the bid, they did not wish to tender unless council was willing to accept uncertainty in supply. Council chose other companies[70] that did not attach this condition (City of Johannesburg, 1918, p. 159). Even after the end of the war, uncertainty of bicycle supplies from Britain continued to dog council. On the 26th of March 1919, the council reviewed tenders from Shimwell Bros., Diamond Cycle Co. and the Raleigh Cycle Agency. While it made decisions on which particular bicycle brands[71] could be procured based on employee feedback, the supply situation was so uncertain that council was willing to consider deviations from this decision, saying that "in the event, at any time during period 19th April 1919, to 30th June 1920, of any employees wishing to purchase bicycles other than those tendered for, the Controller of Stores and Buyer be authorised to place orders accordingly"(City of Johannesburg, 1919, p. 120).

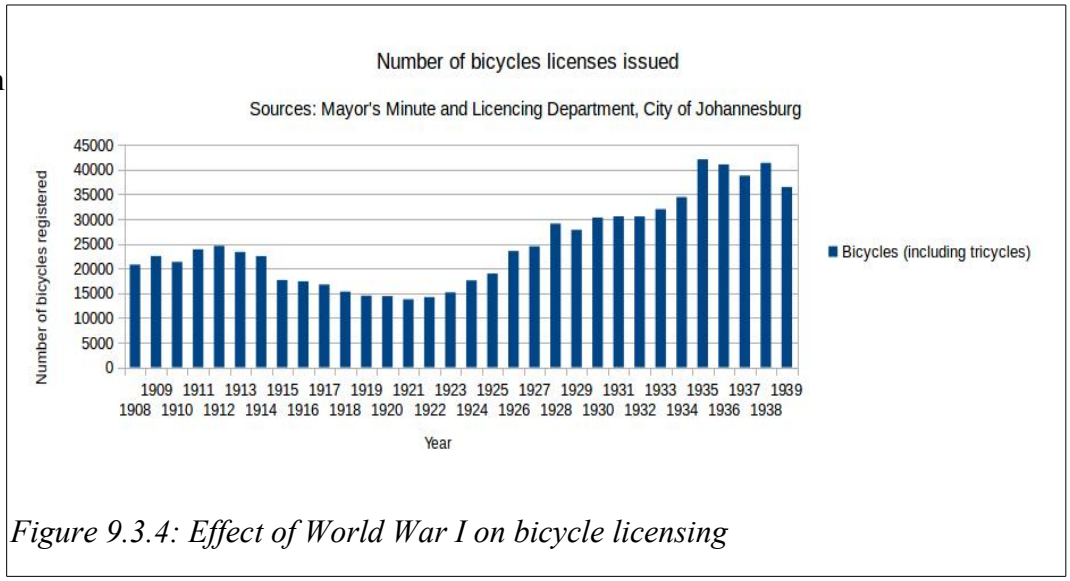


Figure 9.3.4: Effect of World War I on bicycle licensing

The decline in bicycle use caused by World War I reversed from 1922, growing steadily. The extent of growth is again evident in council decisions. On the 14th of December 1926 council granted general purchasing authority to various municipal departments without requiring deliberation at council level. This was because of the many requests being received and, as such, a

70 These were the Raleigh Cycle Agency and the Diamond Cycle Co. for the supply of bicycle brands – the Raleigh Roadster at £13 10s. each and the B.S.A. Light Roadster for £16 16s. each.

71 Diamond B.S.A, 1, Diamond, Popular Raleigh and Raleigh.

devolution of decision-making (albeit within an agreed principal) was thought most efficient. Therefore, the General Manager of the Gas and Electric Supply Department, and the Manager of the Tramways Department were given this authority in relation to workers in their departments with the allowance limit set at 19s. 6d. per month (City of Johannesburg, 1926, p. 845). Council said:

> In view of the numerous applications for the purchase of bicycles on the usual terms for officials in the Council's service, we consider that a general authority should be given for the purchase of bicycles without necessitating continual reports to the Committee (City of Johannesburg, 1926, p. 845).

Children in the 1920s appear to have felt comfortable and were given permission by their parents to travel by bike. We can see this in historical photos from 1928, which show groups of white children of teenage age outside a centre in the central business district, waiting to hear the results of a cricket match (see figure 9.3.5). As was the legal requirement at the time, the bicycles have their registration numbers affixed to the mudguard of the front wheel. Underlining the utilitarian purposes of the bicycles, the boys have trouser clips to prevent trouser entanglement with bicycle chains.

Figure 9.3.5: Awaiting results of a cricket match.
Source: (Museum Africa, 2016)
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Film footage of traffic scenes from the 1930s in the city centre show adults riding bicycles on a busy street. There are also electric-driven trams, cars, motorcycles, and pedestrians, all jostling for the same space (thekinolibrary, 2014). A photograph taken in 1935 outside of a post office in central Johannesburg shows numerous bicycles parked next to cars. In the middle of the street, three people cycling can be seen. One appears to be riding on a delivery bicycle[72] (Museum Africa, 2016). Other photographs of the 1930s show some bicycle presence on the roads[73] (Museum Africa, 2016). Another film footage from 1934 of unnamed streets shows a preponderance of cars and some bicycles going around a roundabout altogether. Later in the footage, we see a trolley bus, and many

72 916.82, Bree, c.1935.

73 916.82, Streets, Main, c.1938.

cars parked on either side of the road. In the centre of the street, cars are in motion. Occasionally, we spot some people cycling – they are "black" men. Pedestrians, including a woman pushing a baby in a pram, cross the street when traffic has been stopped by a policeman. We also briefly see a horse-drawn carriage (British Pathé, 2014a). In the 1930s and 1940s a resident recalls that she would see "black cyclists riding to work each day" (Durlacher, 2007). Everyday cycling was therefore transforming into a practice conducted primarily by black males as Maud (1938, p. 123) observed in the process of writing a book for the Johannesburg town council.

In the 1930s therefore bicycling was an important way of getting about the city. So important that in a letter to the editor, a car driver asked for something to be done about the reckless bicyclists who allegedly "in the early mornings, when cyclists proceeding to work [would] ride three and four abreast and straggle half-way across the road" (Harassed Driver, 1936). One of the corridors with the highest number of bicycle users was a road called Louis Botha Avenue. Due to this, on the 21st of August 1935, bicycle lanes were installed on Louis Botha Avenue, travelling due north from the city centre (Rand Daily Mail, 1935). At the time, Louis Botha Avenue was one of the main corridors connecting Johannesburg to the northern reaches including the nearby capitol – Pretoria. They were described "as the city's first experimental cycle track, a white line a few feet from, and parallel to, the left hand kerb, cutting off a strip of the road for the use of pedal cyclists"(Rand Daily Mail, 1935). The introduction of this cycle lane was even noticed in the United States where a newspaper noted that the "bicycling boys and girls of far-off Johannesburg, Union of South Africa...now…have a special track laid out for their exclusive use on one of the city's principal streets" (Unknown, 1935).

Yet 1935 was also arguably the beginning of the end of the ubiquity of everyday cycling. As we shall see in the next section, henceforth cycling was overtaken by private motor car use. But over a period of about fourty years, bicycles had been an important private mode of transportation in Johannesburg for the working classes. This is represented in figure 9.3.6 where numbers of licences issued by the municipal council for other private alternatives is lower than that of bicycles. Understanding this evolution after simply w being a niche technology in the early history of Johannesburg is the task of the next section.

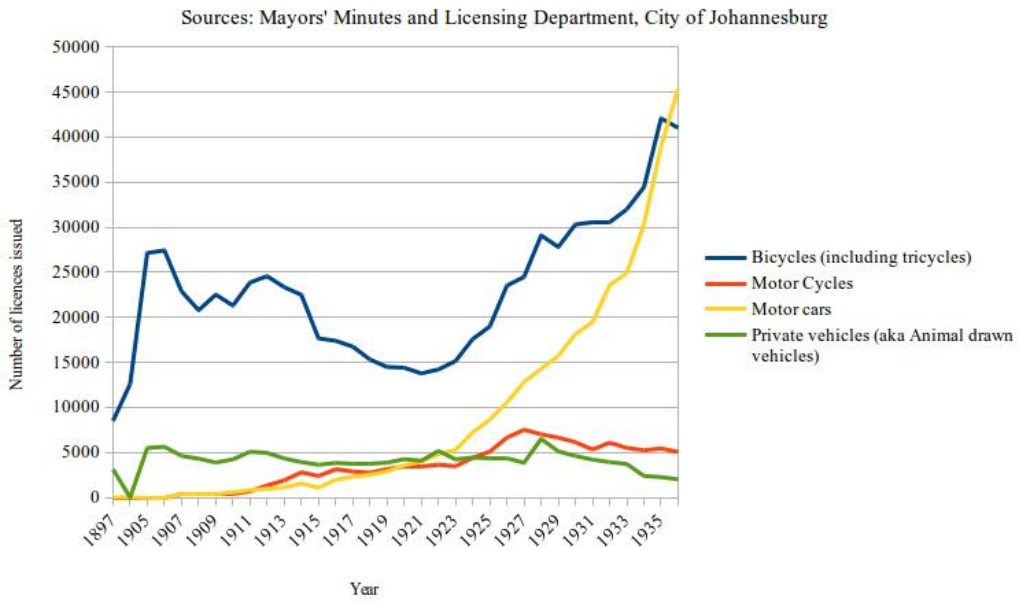


Figure 9.3.6: Period of bicycling dominance in Johannesburg

9.3.1 Analysis

The growth of everyday cycling in this period occurred due to a confluence of different processes.

9.3.1.1 Landscape factors

Commencing with landscape level processes, bicycles were supported by contextual characteristics and developments. Spatially the town was located in a relatively small area with "the distance separating residence and workplace [being] small" (Hart, 1974, p. 195), which was contained between two ridges (Beavon, 2004, p. 79). Van Onselen (2001, p. 58) shows that up to at least 1914 most of the town, as well as its suburbs, was located within a five-mile (just over eight kilometres) radius from the centre. As such, it would have been easy to use a bicycle for *some* of the population.

Yet some urban expansion did occur in this period and did complicate cycling. From as early as 1909 municipal council records show for example that employees did motivate for increased allowances to purchase motorcycles and cars on the grounds that they were having to travel greater distances (City of Johannesburg, 1909, p. 551). In subsequent years, other council employees especially those whose jobs involved multiple trips in a day such as surveyors or town engineers made similar motivations for increased allowances (City of Johannesburg, 1911, p. 1814, 1924, p. 200). Members of the black, Indian and so-called coloured populations had even been in this period forcibly relocated to spaces distant from work, commercial and recreational spaces. One of the most distant areas – Klipspruit – was created by the council to accommodate (by force) members of the black, Indian and so-called coloured populations. On alleged health grounds (after it was discovered that the bubonic plague had broken out in an area just a few kilometres downtown from where they lived), about 3 000 people were forcibly moved 16 kilometres south-west of the central business district (Beavon, 2004, pp. 77–78). Certainly this distance would have reduced cycling in favour of public transport[74]. One moderating variable however was that in this period unlike we will see in the next, there was not always very strict controls of spatial movement so some people did move back to more central areas (Beavon, 2004). The overall point is that the urban expansion at this time did not act as an absolute barrier to everyday cycling

Bicycles also received an early boost in the late 19th century and a few years into the next from sudden events. Significant environmental events put great pressure upon the prevailing dominant socio-technical system – i.e. animal-based transport. In the late 19th century, it was said that Johannesburg suffered from "chronic droughts" (Clarke, 1987, p. 19). For instance Marks (2011, p. 134) writes that "in 1896 [there occurred]... the worst drought in living memory." To compound the drought, a rinderpest plague - mentioned earlier as it led to mass migrations into Johannesburg – occurred. Phoofolo (1993, p. 112) argues that the rinderpest plague was "the most devastating epidemic to hit southern Africa in the late nineteenth century." More specifically, Van Onselen (1972, p. 488) contends that across Southern Africa, "the transport system was paralysed" in communities that relied on cattle for transport. In a study of food supply in Johannesburg between 1886 and 1906, Cripps (2012) argues that in addition to the droughts and rinderpest plague, locusts stripped fields bare and a disease called the East Coast Fever attacked livestock. The onslaught on animal-based transportation by disease and drought was compounded by a war running between

74 The town council collaborated with the then railway agency in providing discounted fares to this population group. For some, even the reduced fares were unaffordable (Pirie, 1986, p. 42).

1899 and 1902. This war led to the "widespread destruction of farms and livestock" (Cripps, 2012, p. 10). During the war Johannesburg's "public transport horses were commandeered" (Clarke, 1987, p. 29).

As a result, due to these landscape events, by "1902 almost all food had to be imported" (Cripps, 2012, p. ii). These pressures, raining down on the dominant animal-based transportation regime, would have initiated a search for new solutions. The viability of animals as enablers of urban transport in Johannesburg would have come under question. We can see this emergent reappraisal in an advertisement for the first car in South Africa, placed in the middle[75] of the rinderpest plague's spread in 1897. Punting the benefits of the "horseless carriage", the advertisement argued:

> The motor or horseless carriage is destined to work a revolution in Locomotion Carriages, Cabs, Hotel Busses (sic) and heavy Delivery Vans have been fitted up with the **Motor** (bold theirs), the ox wagon will be propelled by this machinery in time, and then *farewell to Rinderpest – as shortly we will bid farewell to horse sickness, expensive forage, broken harness, lazy grooms, and run away horses*... the utility of this marvellous contrivance has not yet been completely grasped (Johnston, 1976, p. 14 [emphasis mine]).

In the advertisement, they were drawing attention not only to problems feeding animals used in transportation, but also to the travails of everyday management. In an 1897 newspaper column another proponent argued that "the motor car has a great future before it, especially in a country troubled with such specialities as horse sickness and Rinderpest" (Clarke, 1987, p. 14). This statement is also noteworthy since it resonates with findings from transition studies on the role of visions or imaginaries in creating a pathway for societal acceptance of a niche technology (Sengers, 2016).

This avalanche of landscape events, weakened the dominant animal-based transportation regime in favour of bicycles. This is evident in municipal council licensing data which shows declines from the late 19th century to 1903, in the number of licences issued for animal-drawn vehicles (see figure 9.3.1).

9.3.1.2 Weaknesses with alternatives

While the proponents of the early automobile worked to frame the public image of the "horseless carriage" in a positive light in relation to animal-drawn transport, their efforts would not have

75 Rinderpest "ravaged the entire African subcontinent between 1896 and 1898" (Phoofolo, 1993, p. 113).

yielded bountiful results. The first car in Johannesburg which was shown at the Wanderers Club on the 13th of January 1897 (Johnston, 1976) experienced great difficulties ascending some streets, thus requiring the driver to walk (Shorten, 1970, p. 985), since it presumably could not carry them. The technical inferiority of cars remained at least into the early 1910s. For example, a car owned by a former champion cycle racer - Frank Connock - "... [had] a [top] speed of fifteen miles an hour and a single plug that called for repeated cleaning" (Kavanagh, 1958, p. 115).

Cars faced other problems suppressing their use. While landscape pressures as above did indeed put pressure on animal drawn transport allowing greater diffusion of bicycles, once the pressures went away, there was some return to the 'old' mode. This is visible in licensing data (see figure 9.3.1). For the very wealthy, it was the horse-drawn carriage that was the pinnacle tool for social distinction. A colloquial term even arose to describe such users – the "carriage folk" (The Star, 1966b). To put it another way, the car could not yet satisfy the distinction granting role that elegant horse-drawn carriages could. In addition to the speed and power deficits of early cars discussed above, this probably also had to do with the noise that they generated. Such noise led the municipal council to promulgate legislation requiring that they be fitted with silencers in order to reduce their noise (City of Johannesburg, 1907, p. 48). Already here we see the co-evolution of the technical dimensions of the system of automobility with social rules.

Even if their noise was moderated, arguably promoting societal acceptance, cars remained expensive for sometime. Underlining the luxurious nature of car use during World War I, there was a public debate in the context of difficulties in importing goods, whether motor vehicles should continue to be imported. Some characterised cars as luxury goods falling in the same category as pianos and whisky (Unknown, 1918). Based on an advert issued by a bicycle and motor-cycle sales company in 1912, cars were still too expensive for general consumption. In encouraging customers to come into its shop to buy motorcycles, the company said in the advert "... motor-cars have their limitations; they are beyond the means of the average man; they cannot go where a motor-cycle can, and they are not so handy" (Shimwell Bros., the Old Firm, 1912). It was only in 1925 that the national government reclassified cars as, "a national necessity and not a luxury," (Kavanagh, 1958, p. 147), within tax rules. This expense prevented them from being a mass transportation solution, and as we shall see below, later also partly enabled automobile proponents to recruit the very wealthy who preferred carriages drawn by horses.

Perhaps more significant were concerns about their safety record. Reflecting growing concerns about car-caused injuries and fatalities upon cyclists, people on horseback, pedestrians and other road users, a newspaper ran a column called the Motor Peril, which highlighted such incidents. This column ran from about 1907 (Unknown, 1907). One column said that "numerous complaints continue to reach us to what is called the 'motor peril' in the Johannesburg streets, and there is no doubt that many of them are well-founded" (Rand Daily Mail, 1909a). The column, as its name suggests, clearly saw the motor car as the problem. As one column reported;

> ...yet another serious accident has to be added to the already long list of casualties caused by the carelessness and recklessness of motor-car drivers in and around Johannesburg (Rand Daily Mail, 1909b).

The *Rand Daily Mail* was not alone in highlighting car created road mayhem. In an editorial also entitled the Motor Peril, a newspaper – the *Sunday Times* – called for licensing of car drivers. It argued that;

> ...people are getting tired of breaking sprint and long-jump records in avoiding maniacs in motor cars and of burying dogs which have fallen victim to the modern juggernauts of the Rand. Some test is necessary (Sunday Times, 1909, p. 15).

In a book published in 1912 the author described street conduct as follows:

> Street accidents have become so common [in] Johannesburg they are regarded as mere unimportant detail. The motor ambulance conveying some mutilated victim to hospital, may be frequently met – quoted in Van Rensburg (1986, p. 264).

Road safety concerns in the public continued for some time. In the 1930s a newspaper headlined "Motor Menace to City" claimed that given the injury rates "Johannesburg's streets are more dangerous than the Metropolitan area of London" (Rand Daily Mail, 1930). Road fatalities and injuries were reported to be producing pressure in hospitals. In 1938, the Mayor of Johannesburg (J.S. Fotheringham) complained of bad driving, saying in his annual report that "it has also been my duty to draw attention to the indifferent driving and lack or road courtesy which is far too prevalent in our city highways" (City of Johannesburg, 1939, p. xii). In the following year, the then deputy mayor was quoted as saying the city "verges on being the most discourteous city of motor drivers" (Unknown, 1939).

If cars for some time had a poor public image and were beyond the means of the ordinary person, another option would have been public transport. However, this option in the form of trams, trains

and buses for the working classes especially the 'black' population was substandard[76]. To start with, services were segregated with the 'native' population only allowed to use marginal sections (Beavon, 2001). Even after allocations of subsidies, fares were very high in relation to incomes. They were also overcrowded, in poor condition, and ran on poor schedules (Pirie, 1986, p. 42). These and other problems of public transport available to the 'black' population was captured in a 1930s official commission of inquiry. The report by the commission argued:

> A considerable amount of evidence has been tendered on the present lack of transport facilities for the Native population of the City. The Commission, after a detailed examination of the problem, is of the opinion that the present transport facilities for Natives are inadequate. It knows of no city the world where so large part of the working population is so badly served with transport facilities (Transvaal (South Africa) and Spencer, 1935, p. 47).

Thus, alternatives to the bicycle were weakened by landscape developments and also faced internal challenges.

9.3.1.3 Niche improvements

Weaknesses with alternatives presented an opportunity for cycling which itself underwent transformations that accentuated growth. One such development was a reduction in bicycle prices. By the late 1900s the price of bicycles reduced to the point where a lowest-cost model could be sold for six pounds each. This was down from highs of 20 pounds each in the 1890s (Learmont, 1990).

Secondly, the free-wheel that de-linked rear bicycle wheel revolution from the pedals was invented (Stark, 1956, p. 121). We can see this evolution in city council bicycle tendering practices. A tender from 1905 revealed technical detail about the bicycles on offer from various companies. It showed that while some bicycles were not made available by their sales agents to be inspected by council, those that were – the majority – were fixed gears (City of Johannesburg, 1905a, p. 326). It is not clear when free-wheel technologies would have been introduced into South Africa and the ubiquity of the technology later on. Some bicycles with free wheels were available as early as 1880 (Unknown, 2011). In 1904, free-wheel technology had been available in Johannesburg to some extent. An advertisement in a newspaper invited customers to an auction where the "best English

76 Trams especially for the white population were efficient "running at 5 to 10 minute intervals"(Beavon, 2001, p. 7). They also served a wide geography of the city radiating outwards in all directions from the central business district (Beavon, 2001, p. 8). Underling the importance of the electric tram in shaping housing developments, Hart (1974, p. 103) argues that for the white population it was "The most important single factor which permitted the expansion of the Johannesburg housing market in the first decade of the twentieth century."

free-wheel bicycles, comprising B.S.A., Coventry, Kitchener and other well-known maker (sic)" (Haymanson, 1904, p. 1904) would be sold. Nevertheless, evidence suggests that in March 1909, the council first ordered bicycles for its employees that were not fixed-gear in design (City of Johannesburg, 1909, p. 180). These bicycles "were fitted with either coaster hub or free wheel and two rim brakes" (City of Johannesburg, 1909, p. 181). This is important because it made bicycle riding easier, especially in the context of a hilly city such as Johannesburg. A free-wheel mechanism allows the rider to rest, especially when coasting down a hill instead of fighting the ever-growing revolution of the wheel as the bicycle gains momentum. Easier riding would have made bicycle riding more attractive to a great number of people.

I discussed previously that in the previous historical phase, bicycles could offer some prestige to social elite. This benefit as well as practical transportation advantage attracted proponents who acted in favour. We saw some of these included media and mining barons, town council (in monitoring thefts and providing subsidies to employees bicycle and parking infrastructures), real estate developers, and the then "national" government (as mass consumer in purchasing bicycles for postal workers).

The town council joined the coalition of actors as we saw above. Such support to employees continued for some time (City of Johannesburg, 1907, p. 487). Over time, the level of allowance diminished from one pound per month (City of Johannesburg, 1907, p. 233) to 15 shillings per month (City of Johannesburg, 1917, p. 784). In addition to financial assistance to employees, on the 14th of August 1917, the town council also discussed and agreed to henceforth pay bicycle licences for employees (City of Johannesburg, 1917, p. 529). Subsidies to employees continued at least until 1926, when the council decided to decentralise applications for such support to a department of the council administration. What is important to note is that by way of example an institution (providing financial allowances to council employees) was established much earlier on. This institution continued to exist for some time, even after the early excitement about bicycles amongst the social elite had dissipated, helping to sustain everyday bicycling.

Other social networks included bicycle clubs and associations, which could train potential users and also lobby for the rights of everyday cycling. These influential actors had undoubtedly accepted the promise offered by bicycles. What is also important to observe about the composition of the bicycling social networks in Johannesburg was their connection to places that also had cultures of

bicycling. As Johannesburg grew rapidly[77], a substantial number of immigrants were British in origin (Beavon, 2004, pp. 23–33). Underlining the large number of recent immigrants into the city, Johannesburg residents were at the time referred to as "Uitlanders" (Rosenthal, 1974). Uitlanders in Afrikaans means, "foreigners" (Warwick, 1980, p. 14). It was a term that the Afrikaner community used to refer to the new arrivals, "many of [whom in] membership were British" (Warwick, 1980, p. 14).

Following insights in consumer studies as discussed in chapter 3, the early status conferring role of bicycles would have been sought out by the working classes in emulation processes. Indeed, we see in the historical record, such developments. As discussed above, as bicycles became cheaper, members of the white working classes such as miners took to the bicycle. As they did so, they would have desired to maintain social distance from 'black' people. This was well demonstrated at a meeting consisting of white working-class residents who were discussing a town council plan to relocate black and Indian people next to them (The Indian Opinion, 1904; Beavon, 2004, p. 77). There was much hand-wringing against this plan. Many expressed deeply prejudiced views, including the fact that were it to go ahead, it would expose the white community to disease, robbery, wayward morality, and so on (The Indian Opinion, 1904). They could not accept such a situation because it would tarnish their values. This in their estimation was already beginning to happen, as exemplified by the fact that "kaffirs [sic] were now riding bicycles; the next thing they would have would be the motor-car" (The Indian Opinion, 1904). The argument here was in a sense that by black people using bicycle, they were "contaminating" whiteness.

In summary, from the late 19th century, landscape characteristics and developments supported everyday cycling by weakening alternatives. Alternatives had their own internal weaknesses such as price, performance and availability that limited wider use. Internal developments to cycling further enabled everyday growth. For example, early symbolic meaning as a practice offering social distinction mobilised proponents and then the working classes in emulation processes. Price and technical improvements also enabled wider useage. But as has been the case in other contexts, just as cycling gained many followers so was it set to diminish. To this narrative, we now turn.

77 In 1887, a year after Johannesburg became an urban space (Maud, 1938, p. 10), there were about 7 000 residents. By 1895 this number had risen to 102 000 (Frescura and Radford, 1982, pp. 6–7). In 1904, a census revealed that the population of Johannesburg had swollen to 155 642 (Shorten, 1970, p. 238).

9.4 Decline: Mid 1930s-1990s

After dominating the private transport mode category for a period of about 40 years, motor cars overtook bicycles. As we shall see, this was not a sudden transformation. It unfolded over many decades with users and proponents gradually becoming absent. This pattern of developments continued until sometime in the 1990s. The purpose of this section is to describe and analyse this historical trajectory.

From 1939, when World War II broke out, levels of cycling declined. This is evident in bicycle licensing data. See figure 9.4.1. The decline in bicycle use in World War II[78] was in part due to limited parts available from overseas from manufacturers located abroad such as the United Kingdom which was a major theatre of war. In response to this situation, the national government placed restrictions on general consumption of tyres, fuel and other components (City of Johannesburg 1945, p.43). It then became very difficult to procure bicycle components such as bells and reflective lights. A newspaper observed that because of such scarcities, bicycle users had no choice but to fall afoul of municipal by-laws requiring them to affix reflective devices and bells on

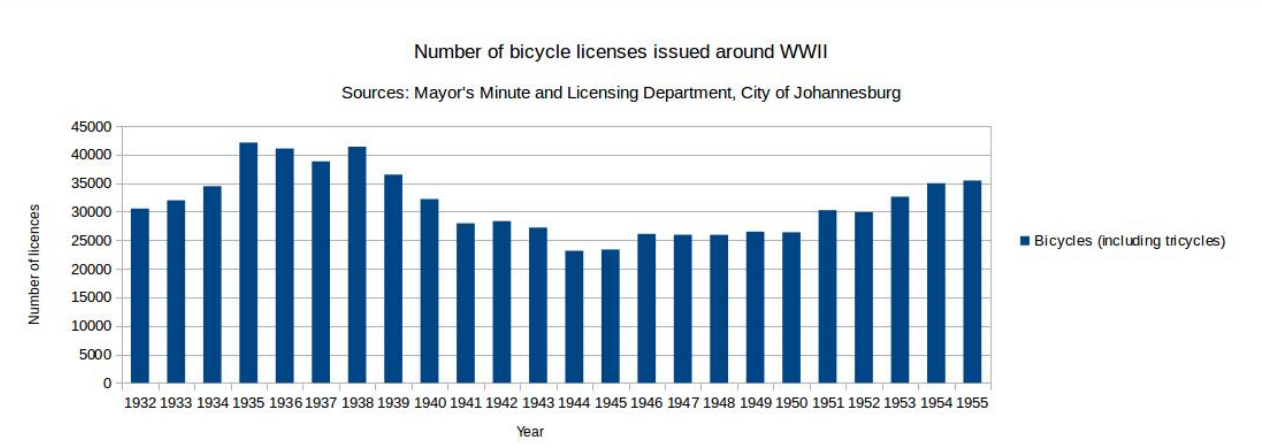


Figure 9.4.1: Effect of World War II on bicycle use

78 The restrictions also affected other forms of transport. The operations of public transport were also curtailed "in order to conserve public transport vehicles, [and] evening services [were] ended at 10 pm on weekdays and 9 pm on Sundays" (Shorten, 1970, p. 379). This also affected motorised transport negatively with "the number of motor car licenses dropp[ing] from 55 013 to 51 652... [and], motor cycles from 2 746 to 2 575" (City of Johannesburg, 1945, p. 43). With motorised transport difficult, many Johannesburg residents switched to public transport – buses and the tram system. As the City of Johannesburg (1945, p. 44) reported, "all sections of the passenger services showed increased traffic, which caused considerable strain on our rolling stock owing to no additional vehicles being available." The level of public transport use was starkly high, with "the number of passengers conveyed increas[ing] from 82 million in 1940 to 118 million in 1945, and no fewer than 146 million in 1946" (Van Rensburg, 1986, p. 102).

their machines (Unknown, 1944).

After the end of World War II, bicycle use surged once again (see figure 9.4.2). This increase was aided by state distribution of bicycles to returning black soldiers, as Callinicos (1995, p. 112) notes, "black soldiers were rewarded with a bicycle and a letter of thanks, [while] white ex-servicemen were promised jobs and free further education."

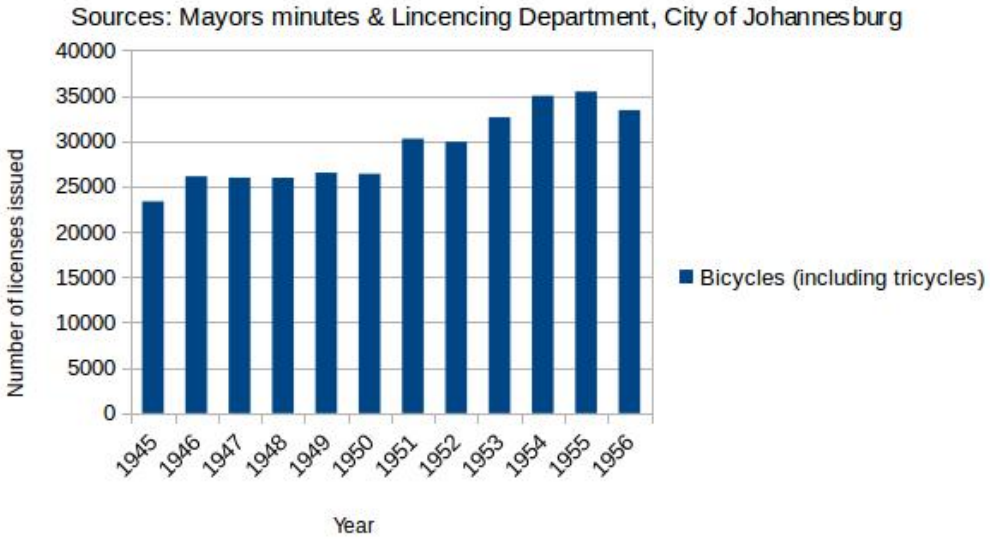


Figure 9.4.2: Bicycling growth in Johannesburg between 1946 and 1955

Street level photography of the post-WWII era (where available), mostly reveals black people travelling on bicycles. For instance in 1946, a photographer for a newspaper took pictures of a group of at least 10 black men on bicycles travelling somewhere. They are dressed in a mix of business attire and casual clothes. One of them rides a bicycle with a basket in the front that may be used for deliveries[79] (Museum Africa, 2016).

Louis Botha Avenue which was shown earlier as an important cycling corridor, continued to be so for sometime after World War II. See figure 9.4.3.

79 326.796.6 cycling, JHB, c.1946.

Figure 9.4.3: Bicycle users on Louis Botha Avenue, 1946. (Source: Museum Africa 2016)

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From the middle of the 1950s levels of everyday bicycle use plummeted. The steady decline is represented in figure 9.4.4. Moreover, the pattern that been evolving of everyday cycling being conducted primarily by black men continued. This is evident in a series of street level photography.

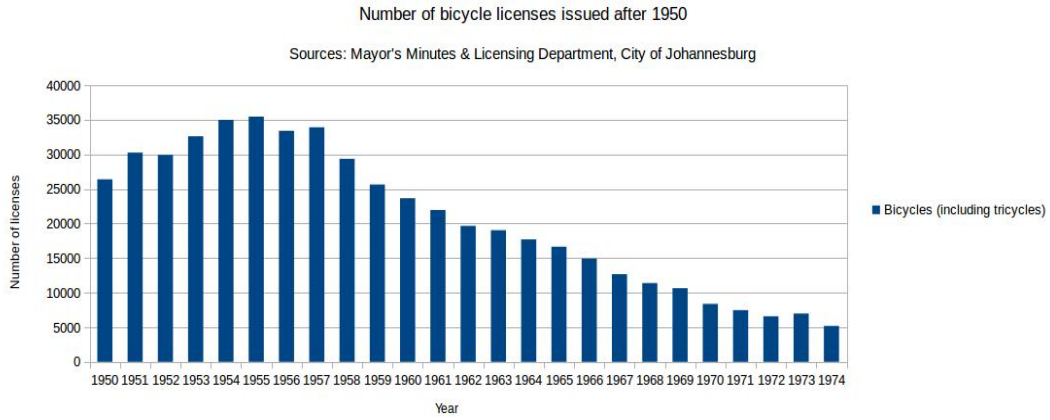


Figure 9.4.4: Decline in bicycle licensing after mid- to late 1950s in Johannesburg

An image taken of a mass meeting about a bus boycott in Alexandra Township on the 27th of February 1957 – one of the distant townships where black people had been segregated –shows many black men holding onto bicycles (Museum Africa, 2016). The boycott occurred in protest to "a 25 per cent increase in bus fare" (Hooper, 1957, p. 13). The fare increase was seen as unjust given the high levels of poverty in the community. As a result, people living in the township decided to stop using the bus service for their transport (ibid). This was a significant decision since the township is located about 20 kilometres due north-east of central Johannesburg.

Figure 9.4.5: Numerous bicycles in Alexandra Township, during a public meeting over a bus boycott, 1950s. Source: (Museum Africa, 2016)

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In the cycling literature there is consensus that lengthy travel distances discourage everyday bicycle use (Heinen, van Wee and Maat, 2010, p. 65). Therefore, it is something to be remarked upon that some people walked about 20 kilometres each way with some receiving lifts from sympathetic drivers (Hooper, 1957, p. 13). Others, however, as documented in a series of pictures[80] taken of the protest action on the streets, chose to bicycle in all conditions even when it was raining (Museum Africa, 2016).

Figure 9.4.6: Cycling in the rain during bus boycotts, 1957. Source: (Museum Africa, 2016)

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In a striking image[81], a small car is loaded to the maximum with black passengers. The driver who is white – presumably a sympathetic driver – is being issued a ticket by a police officer. On top of the car is a delivery bicycle, which may belong to one of the black passengers (Museum Africa, 2016). As Hooper (1957, p. 13) notes "hundreds of motorists gave daily 'lifts' to weary boycotters; for many Johannesburg 'Whites' it was their first 'human' contact with Africans, outside of the master–servant relation." Other video and photographic images of streets in the late 1950s show increasingly fewer bicycles on the streets. The practitioners are black (British Pathé, 2014b; Museum Africa, 2016). One particularly clear film footage from the late 1950s shows numerous vehicles on the street, trolley buses and very occasionally, dapperly dressed black men riding bicycles in groups of two, three, or alone. The sidewalks are full of pedestrians (British Movietone, 2015a).

It is unlikely that everyday bicycle use among children persisted much beyond the 1950s, since by then cycling conditions had diminished greatly. One reason for making this claim is that school-going children in the 1950s were reported to be using the then existing tram network intensively.

80 341.65, PH2012-58; PH2012-103; PH2012-105; PH2012-106; PH2012-108; PH2012-109.

81 Alexandra Bus Boycott 341.65 PH2012-117.

The numbers of children using the system were so high that the Tramways Department of the City of Johannesburg lobbied national education authorities to consider staggering school hours in order to relieve system burden (City of Johannesburg, 1954, p. 100). Since school-going children would not have been able to legally drive to school, they are at least one of the social groups likely to have used bicycles for functional purposes.

Into the 1960s, road conditions further deteriorated affecting bicycle use. The Licence Department in the City of Johannesburg recognised this situation reversing a policy requirement that the issuing of bicycle licences be contingent on inspection. The purpose of the inspection was to "enable officials to see that it [bicycle] was in a roadworthy condition and was equipped with efficient brakes, reflectors and warning device" (City of Johannesburg, 1964, p. 1). The Department argued that it would be risking the lives of cyclists – children in particular – to ask them to travel to the inspection depot located close to the central business district. It therefore concluded the following requests from members of the public that "in the interests of road safety it is undesirable for children to ride their bicycles through heavy traffic to produce them at the Licensing Department Offices for registration and licensing" (City of Johannesburg, 1964, pp. 1–2). This decision also makes sense in the context of deteriorating road interactions. As the novelist and Nobel Prize laureate JM Coetzee recalls:

> ... during my childhood, in the mid-20th century, it was not regarded as particularly culpable for a motorist to ride a cyclist off the road, particularly if the cyclist was black. It was even, in some quarters, regarded as a sport (Coetzee, 2012).

While children were disappearing off the streets as everyday bicycle users, so were other types of bicycle users. Available street level images and film footage from the 1960s document almost the complete absence of bicycles. When they appear in pictures it is more often in the hands of a lonely black male amidst many other vehicles (British Pathé, 1960, 1961; Johnson, 2009).

Another image similar to the opposite shows a man on a cargo bicycle presumably transporting goods somewhere. He is the sole bicycle user present in the image[82] (Museum Africa, 2016). While photographs and videos of the city centre show small numbers of bicycle users, other images taken during moments of assembly, especially those that take place in residential locations – which over time due to apartheid spatial policies were located far from the centre – there are numerous bicycles visible.

Figure 9.4.7: A collector of cardboard boxes for recycling, 1965. Source: (Pearson, 1886)

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This suggests a high level of bicycle ownership in the black community. In one moment of assembly in 1960 – this time very tragic – a series of images depicting processes leading up to and after a massacre (the Sharpeville Massacre[83]) in a black community, show many black participants with bicycles. One image taken in the aftermath shows amongst the many dead bodies, numerous bicycles staggered on the ground (see other film footage of this tragic event, British Movietone, 2015b).

82 916.82 JHB Streets, Commissioner, c.1968.

83 Sixty-nine people were killed and many others injured at a demonstration to protest the use of pass laws to restrict movement of black South Africans (SAHO, 2011). .

As per bicycle licensing data, in the 1970s numbers were increasingly headed to all-time lows. In 1974 there were 5 182 bicycles licensed and 341 813 cars. This was a ratio of about 66 cars to every bicycle. Perhaps due to this trend, the municipal council stopped issuing licences to bicycles in 1975, since it may not have been administratively cost effective. The Annual Report of the Licensing Department, which each year contained statistical information on licensing on a wide variety of private vehicles (amongst other information), from the 1975 Annual Report henceforth did not contain any data regarding bicycles. While it recorded that in the previous year 5 182 licences for bicycles (including tricycles) had been issued, for the next year, the column is blank (City of Johannesburg, 1976). Subsequent reports did not contain any information about bicycles (and tricycles) (for example, City of Johannesburg, 1978). While there was no recorded data after 1975, it was reported by a product standards monitoring body that for one population, which we have seen did use bicycles for everyday purposes, "the black market which [had] showed a steady growth annually, dropped off sharply after the 1976 riots" (Masilela, 1979).

Figure 9.4.8: Dancing ice cream sellers, June 1970. Source: (Pearson, 1886)

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It was expected by a national government agency responsible for road safety – the National Road Safety Council – that any bicycle users would be members of the black working class population or children. This claim is based on observing the campaigns that it launched (for example, National Road Safety Council, 1977, 1988). As stated above, it is unlikely that children were using bicycles in any meaningful levels in the wake of diminished cycling conditions. In 1978 this was brought to sharp relief when the head of the National Road Safety Council sought to ban joggers from running on roads for their safety. In response a member of the public wrote a letter to the editor in a

newspaper pointing out that joggers and indeed cyclists used roads because of the poor state of sidewalks, or the complete absence of separate facilities (Oudtshoorn, 1978).

In this dangerous road environment then, children would have been more likely to use bicycles at neighbourhood levels in the suburbs, for example where the road environments may not have been as congested. Indeed, bicycle market data from the 1970s and 1980s suggests that children did use bicycles (Board of Trade Industries, 1984; Learmont, 1990, p. 12). However, such data does not point to for what purposes bicycles were used. But based on the kinds of bicycles that were being sold, one can speculate that this was for recreational purposes. In the 1970s mirroring global trends "the Raleigh *Chopper* (italics theirs)... sold a quarter of a million units in a couple years here in South Africa... the *Chopper* was an imitation motorcycle with 'ape-hanger bars,' a 'banana' saddle and an automatic stick-shift on the crossbar. It was heavy and sluggish" (Learmont, 1990, p. 12). The bicycle design itself shows that it was not intended to dethrone the car. The stick-shift in the middle could only but evoke a proto-car. In the 1980s, it was the BMX bicycle that caught children's imaginations (Learmont, 1990, p. 12). While the BMX bicycle can be used for journeys, it is designed for play.

Recreational bicycle use patterns among children in the 1970s and 1980s coincided with broader practices amongst adults. That is, there were reports of surging interest in recreational and sporting cycling in South Africa (Learmont, 1990; Coetzee, 2012).The growth in



Figure 9.4.9: A barrier separated cycle and pedestrian lane built in the 1980s in Randburg municipality, July 2017. Source: Author's collection

recreational or sports cycling had been anticipated in the late 1970s by a product standards body, which monitored bicycle use. It thought that "rising fitness awareness, the rise in petrol prices and the threat of petrol rationing" (Masilela, 1979) might simulate more bicycle purchases. In this wake it was reported that the "Johannesburg City Council [was] thinking of bike-ways through some city suburbs and parks, but, as yet, nothing [had] been planned" (Nicol, 1978). This news article did not indicate for what purposes these bike-ways would be created, i.e. for the recreational market or transportation purposes but given their location, they were probably intended to support cycling for exercise. In the early 1980s, the National Department of Transport supported the construction of cycling lanes in a municipality nearby Johannesburg (Randburg – now incorporated into the Johannesburg municipality – see figure 9.4.9 and other urban areas (Pretoria and Cape Town) in the country. These were primarily intended for school children and university students – though in Cape Town it was recognised that there were some existing adult bicycle commuters and recreational users who could take advantage (Vorster, 1984).

While there was recreational and sporting cycling, some degree of utilitarian bicycle use continued, as was evident in street-level images. Some bicycle users were using the machines for trade, such as tools for newspaper sales agents (Vladislavic and Goldblatt, 2010) or as transporters of goods[84] (Hughes, 1978; Museum Africa, 2016). In many of these images found, the photographer(s) often do not have the bicycles in mind when taking the pictures but are instead focusing on some other subject matter. On a rare occasion, a photographer actually notices a bicycle user but in relation to their unusualness, remarks when describing the picture "amid city sophistication, bicycles still play their part" (Hughes, 1978, p. 216).

Signalling the further declines in bicycle use, in the late 1980s, the national bicycle manufacturing industry (also including Johannesburg) was reported to be "negligible in world terms [since] it makes 160 000 units a year, which is only half the local market" (Unknown, 1991). In sum, quantitatively, utilitarian cycling was increasingly tiny when compared to prior historical periods, but also in relation to broader transportation practices. A study into the transportation patterns in the central business district revealed that most people were arriving from different destinations using cars, buses, and rail as their main modes of transport. Each carried 30.4%, 30.4% and 30% respectively, while other modes including cycling presumably[85] carried only 9.2% of people

84 916.82 JHB Streets, Commissioner, 1971.

85 The study did not define what other modes were.

(Johannesburg (South Africa) *et al.*, 1992, p. 17). Available street level photography or film footage into the late 1980s and 1990s shows – very occasionally – one or two people cycling surrounded by a sea of vehicles (see for example, thekinolibrary, 2013).

Over a period of about 90 years then, everyday cycling gradually withered in Johannesburg. Yet it did so from a high base. What happened? The next section turns to this question.

9.4.1 Analysis

The unravelling of everyday cycling as visible in licensing data from 1936 onwards until the 1990s is complex. As we shall see below, one reason was that the symbolic meaning associated with everyday collapsed under its own inherent internal weaknesses. This deprived cycling of powerful proponents and users who fled to the automobile as the new status symbol. Niche proponents however of automobiles not only addressed pragmatic questions but also worked to foster notions of prestige about car use and reframed associated problems. These trends were heightened by landscape developments – principally economic growth whose benefits accrued primarily to white population and apartheid geography. In this phase reproductive processes also unfolded to strengthen the system of automobility foreclosing the possibility of cycling emergence.

9.4.1.1 Regime weaknesses

A forerunner reason for the decline of everyday cycling from 1935 onwards was the weakened symbolic meaning of everyday cycling which had mobilised users and proponents. This process did not commence suddenly in 1935. It started earlier firstly with the failure to limit the use of cycling amongst the 'native' population as discussed earlier. Recall I argued that a rationale for the campaign by the Rand Pioneers was to preserve the differentiation valued that bicycles offered. Once this campaign failed with the draft by-law overturned by the then regional government, the 'native' population was free to ride bicycles without restrictions. As discussed in chapter 2, a key mechanism in the formation of significance about objects is observation. With the growth in cycling amongst the 'native' population, residents would have come to believe that cycling was no longer a white preserve. Critically, bicycles could no longer provide the desired differentiation. This is one reason why we saw overtime, members of the 'white' population gradually drifting away from using bicycles.

Secondly, in addition to shaping user decisions, the frayed significance of riding bicycles, also guided those who were formerly proponents. Actor-networks in positions of power who had previously been proponents of cycling weakened and/or migrated over to the system of automobility. A cycling association formed in 1892 in Johannesburg – the South African Cyclists Union – with the intent to safeguard the interests of bicycle use, henceforth did not register in my empirical searches of bicycle lobbying. It is likely that given the preponderance of foundational members being bicycle racing clubs (Jowett, 1980), it focused on sporting interests. My speculation might be justified, for this was a trajectory of one of the founders of a bicycle sales company: Ernest Hunt of the Williams, Hunt & Co. – a bicycle dealership located in the central business district in Johannesburg. He was one of the founders of the Rand Roads Cycling Club (a racing club). In 1912 the club organised its second[86] long-distance road race 100 miles in length. The race started in Johannesburg (Editor, 1912).

One place where the South African Cyclists Union and later the Transvaal Cyclist's Union as the white working class representative of everyday cycling might have been found was in a town council advisory group on traffic matters. On the 30th of June 1921, council decided in the context of increasing congestion with more motor vehicles on the road to create a traffic advisory committee[87]. It drew representatives from the Transvaal Automobile Club, the Rand Motor Cycle Club, the Association of Cartage Contractors, the Cab Owners' and Drivers' Association, the Railway Administration, the Horse-drawn Public Vehicle Owners and the Association of Insurance Companies. Police and Council Licence representatives were given the right to attend these meetings (City of Johannesburg, 1921, p. 403). There was no representation of cyclists.

In subsequent decisions to enrol new members into the advisory group, no representatives from cycling groups were included (City of Johannesburg, 1924, pp. 200–201, 1929, p. 1044, 1932, p. 424). This is striking because the Johannesburg council was aware of the need to be inclusive in order to improve road safety. For example, in 1923 it argued that "...the composition of such a Committee … requires careful consideration. To do justice to all sections of the community it is

86 The first race had been held in 1911, with the winning trophy provided by a bicycle-manufacturing company based in England (the Birmingham Small Arms Co.) (Editor, 1911).

87 Such a committee was also created in Amsterdam. It "was established in 1922 at the request of the city council for the purposes of improving the traffic situation and traffic safety" (Ministry of Transport, Public Works and Water Management, The Netherlands, 1999, p. 23).

necessary that such a Board should be thoroughly representative...This will prevent sectional interests predominating" (Licence Officer, 1923).

The historical evidence also shows that a number of important actors involved in the bicycle industry moved over to automobiles. One of these was Frank Connock, who was initially a very popular cycle racer in the late 19th century (Gutsche, no date). On the heels of his success in cycling, he was recruited into a partnership of bicycle sales (Kavanagh, 1958). In 1902, he expanded his business to car sales[88] and as the success of vehicle sales grew, he abandoned bicycle retailing (Johnston, 1976, p. 22). He then went on to become one of the key proponents of a successful road building campaign. The campaign whose slogan was "we want good roads", was inspired by the efforts of American Automobile Association in America, following a visit after World War I (Johnston, 1976, p. 157). Frank also helped to initiate the "Rand Motor Show that was to be held annually for twenty-eight years until 1940" (Kavanagh, 1958, p. 119). A similar story can be told of another cycle dealership in Johannesburg – Williams & Hunt Co[89], founded in 1903 (Whalley, 1953). It evolved into a successful car dealership (while also selling motorcycles) (Shorten, 1970, pp. 1088–1089). B.R. Hunt – one of the brothers who founded the Williams & Hunt Co. was also a pioneering member of the road building campaign (Johnston, 1976, p. 157). This company still existed in November 2015 (Williams, Hunt South Africa Ltd, 2015).

A similar transformation occurred within the municipal council. We saw that the council had once been a proponent of everyday cycling providing for example financial and infrastructure incentives. Such investments had been delivered on the intrinsic rationales of cycling such as transporting council workers. Over time, however, cycling was viewed within the framework set by the automobile. As is the case with other accounts of change, this was not sudden. As late as 1928, council representatives were defending bicycle users against requests by The Transvaal Automobile Club to discipline people cycling into riding in single file. In doing so they would 'get out of the way' of cars. However, the Chairman of the Traffic Advisory Committee (TAC) argued that "two cyclists riding side by side did not create a greater, or as great a danger, as two other motor vehicles travelling abreast or one overtaking and passing another" ('Minutes of Special Meeting', 1928, p.

88 Called the Johannesburg Motor Car Company (The Star, 1966a).

89 Williams Hunt regularly bid for council tenders to supply bicycles to employees until at least 1910. See City of Johannesburg (1910).

9). This view was supported by other members of the Committee (ibid).

However by the 1930s, the TAC had changed tack. In 1930, the TAC rejected a suggestion to build bicycle racks on "pavements or in the streets between verandah poles" (TAC, 1930, p. 2) since "such a proposition, if put into effect, would cause cycles to project into the carriageway and cause obstruction" (TAC, 1930, p. 2). A member of the public had written to the town council in search of a solution to "obviate placing cycles against the curb where they were generally knocked over and left lying in the gutter till picked up by the owner" (TAC, 1930, p. 2). Here, a council group saw cycling through the frame of the car.



Figure 9.4.1.1.1: A former mayoral car parked at the James Hall Transport Museum, 22 June 2016. (Source: Author's collection)

Another illustrative example of cycling being viewed through the prism of the automobile is the case of the cycle lanes developed along Louis Botha Avenue in 1935. While the cycle lanes ostensibly offered safety to the bicycle users, they were also a means of disciplining them. The Chief Traffic Inspector at the time, in describing the design of the bicycle lane argued that, "the line placed about a yard from the kerb is designed to stop cyclists riding abreast, which is a common cause of accidents" (Rand Daily Mail, 1935). Here, bicycle users were seen as a cause of their own fates and therefore the lane was a means of controlling wayward bicycle users. It was expected that bicycle users would only keep inside the cycle lanes, apart from overtaking, when they could exit the lane and then return to it on passing a slower moving bicycle user (Rand Daily Mail, 1935).

The intention that bicycle users should stay within the demarcated bicycle lanes, and more generally on the margins of roads, found legal expression in the next year. On the 24th of November 1936 council proposed a by law prohibiting people cycling from doing so side-by-side. It argued:

> We consider it necessary in order to control cyclists who are in the habit of riding several abreast and thus obstructing traffic, that a new sub-section to Section 29 of the Traffic By-laws should be promulgated prohibiting cyclists from cycling more than two abreast (City of Johannesburg, 1936, p. 1412).

On the 8th of January 1937 council went further, proposing a new regulation for approval by the government of the Transvaal:

> ...it shall be unlawful for two or more cyclists to travel abreast at any time upon any street, road, thoroughfare or public space, unless the cyclist occupying the outside position from the kerb line of the street, road, thoroughfare or public place shall by overtaking or passing another cyclist (City of Johannesburg, 1938, p. 33).

This by law was approved on the 22nd of November 1938 (City of Johannesburg, 1939, p. 1475). Relegating bicycle users to the margins of the road was a historically unique act. This is part of the overall transformation of roads and streets into automobile thoroughfares, as discussed before. In these efforts the city was parting ways decidedly with prior practices where it was acceptable for bicycle users to ride in the middle of the road (as photographic evidence shows of the late 19th century and early 20th century, where cyclists are riding in the middle of roads (The Star, 1966a).

The law in Johannesburg limited bicycle users of sociable conversation – normal conduct that public transport users or people in automobiles might engage in should they choose. Moreover, the design of the bicycle lane could ill protect users from motor vehicles. The Chief Traffic Officer of the City of Johannesburg in 1938 appeared frustrated by car users driving on the bicycle lanes – this not only endangered bicycle users but it also wore down the white paint necessitating costly repainting (Unknown, 1938a). There had been the possibility of designing bicycle lanes that fully separated bicycle users from motor vehicle traffic (The Star, 1937b), since the cycle tracks would be "separated from the carriageway by kerbing" (The Star, 1937a). However, this from the historical record appears to have remained as an intention scuppered by arguments over expensive road engineering requirements (The Star, 1938).

Bicycle users were increasingly then seen through the eyes of the automobile and others. For

example, acknowledging the high number of bicycle users on Louis Botha Avenue, a head of the Transvaal Automobile Association complained that "... it was impossible to keep cyclists in single file... this narrowed down the room for ordinary traffic" (The Star, 1941). Here bicycle users were seen as not part of "ordinary" traffic'. In many letters to the editor, members of the public wrote in complaining against reckless, rule-breaking "natives". In these letters, bicycle users who were often identified as so-called natives were accused of running lights, blocking automobile traffic, not stopping while trams were disgorging passengers, of possessing death wishes, running pedestrians down and committing all manner of other traffic fouls (see, for example, E.B.B., 1934; C., 1941; Eight-Cylinder, 1935; Hoots, 1939; Page, 1936; Ratepayer, 1938; Viator, 1935).

In Johannesburg therefore, after the turn of the 20th century, social networks, particularly influential actors migrated from bicycling to automobility. This contributed to the weakening of everyday cycling as opponents worked to marginalise bicycling in discursive, legal, road engineering and legal measures. A final example is the national government that had once purchased bicycles for post office workers granted support to automobile industry. In the 1920s the national government helped American car manufacturers (Ford and General Motors) to gain a local foothold. The companies were allowed to import into the country car components for domestic assembly without facing high taxes. In exchange, they would provide employment to white workers (Duncan, 1992, p. 55). Tax revenues from these operations helped sustain the Union government (Johnston, 1976, p. 185).

9.4.1.2 Niche development

As I discussed in chapter 3, an important outcome in the development of a niche technology is societal acceptance that a particular technology can provide for a need or function. From the turn of the 20th century, automobile proponents in Johannesburg worked towards this objective. This was particularly important for as we saw earlier, there were concerns about the safety and performance of cars. Recall also that for the very wealthy, it was elegant horse-drawn carriages that were the status symbol. Also, users had to be taught how to use cars as a new technology. On the back of these pragmatic considerations and questions about the use of the car, proponents unrolled a variety of efforts.

A series of these involved providing practical information to users and generating excitement about

cars. As had been the case with cycling clubs, early motoring clubs organised training sessions, developed information, such as maps, directional signs, social drives, and competitive events (Johnston, 1976, p. 110). For example, on the 3rd of December 1906, it was reported that the Transvaal Automobile Club[90] was organising a competition involving climbing hills (Editor, 1906). Other races were designed to showcase the technical prowess of cars (in speed and fuel efficiency), directly in comparison to alternative transport solutions, such as ox wagons and trains. The progress of such races was regularly reported in the media and members of the public were invited to watch (Whalley, 1953, p. 19; Johnston, 1976, pp. 194–195). In 1936, celebrations were held to mark Johannesburg's 50th anniversary. Two transport-related events were organised. These were an aeroplane race from England to Johannesburg, and a car race from Nairobi to Johannesburg (City of Johannesburg, 1937, p. xv). These events symbolically communicated the important role of cars in the public imagination. It is noteworthy that it was the year in which the number of licensed cars exceeded bicycle licences.

To counter the public outrage against motor-related injuries and fatalities, automobile proponents reframed the conversation such that cars and car users stopped being seen as the villains. Instead, the problem was repositioned as a collective one, if not one where those not in automobiles bore primary responsibility. This manoeuvre was achieved through discursive measures. For example, it was argued "as the chief executive officer of the Royal Automobile Club is in a position to know, in all but a small percentage of cases the direct cause is the negligence of the pedestrian, cyclist or animal-drawn vehicle" (Editor, 1917, p. 7). At its foundational meeting in 1922, the Automobile Association of South Africa argued that "in some parts of the Union there still exists prejudice against drivers of motor vehicles, despite the fact of over twenty-one year's use, and efforts to break down such ancient notions by tactful propaganda will be continuously maintained" (Hart, 1922, p. 18).

Other solutions were to discipline non-motoring road users such as placing fences at street intersections in order to prevent pedestrians from crossing roads diagonally. The fences were a direct response to rising pedestrian fatalities. Such an initiative was notable because prior to then (up to mid-1930s), pedestrians could cross in any direction they wished without sanction (The Star, 1999, p. 68). Also, recall the discussion about the erection of bicycle lanes and a law to discipline

90 The Transvaal Automobile Club was formed either in 1903 (Johnston, 1976, p. 109) or 1908 (Van Rensburg, 1986, p. 263). In 1930, the Transvaal Automobile Club decided to hand over lobbying activities to the Automobile Association of South Africa since this was a task that had become "too onerous for the Club" (Goot, 2004, p. 2).

bicycle users to the margins of the road.

An important campaign that contributed to reframing public perceptions of safety was called the Safety First Campaign. At a conference held between the 19th and the 21st of January 1921 in Cape Town, involving a number of South African urban automobile clubs, the Transvaal Automobile Club passed a resolution calling for a "Safety First" campaign. Such a campaign had allegedly been successfully carried out in "America and England [with] an unqualified success" (Editor, 1921c, p. 19). Elements of the campaigns included showing films about traffic safety (City of Johannesburg, 1933, p. 224) lectures to children on how to cross roads (Pathé, 1939), and physical demonstrations of appropriate street conduct, such as lectures at "model intersections" (City of Johannesburg, 1947, p. 97). In an effort to drum up appropriate pedestrian conduct, campaigns against jaywalking were conducted. In anticipation of such a campaign in the 1930s, one newspaper declared that "the jay-walker's period of grace ends today" (Unknown, 1938b). In late 1941, it was reported that "more than 1 000 jay-walkers and drivers may be tried in one day" (Unknown, 1941). While these campaigns also sought to improve the road etiquette of the motoring public (Editor, 1922a, p. 37), they also developed the notion that other road users were as responsible for road safety. Thus, while safety concerns persisted[91] the key transformation was that the automobile stopped being ceased as the chief villain as it had originally been the case. In Chicago and across the United States, a range of historians of technology also observe the role of automobile proponents in suppressing safety concerns about the car and thereby promoting car use (McDaniel, 1999; Norton, 2011; Miller, 2012).

An additional important task was to create the notion that car use was prestigious. The association between car use and prestige was deliberately cultivated. A magazine for the automobile industry[92] overtime ran profiles featuring many famous politicians, artists, industrialists, senior military personnel and others in their chosen cars (Johnston, 1976, p. 76). These profiles, which ran under the title "Men Who Motor", showcased the social, political, economic elite in dapper dress standing next to their preferred automobile. The profiles would describe in glowing terms the contributions that they made to society (see, for example, Catlin, 1917; Playford, 1917, 1918).

91 For example, into the 1950s the city council continued to express concerns about road safety even in the face of public campaigns. It said "since the campaign [a traffic safety campaign] there has been a reduction in the number of accidents and the number of casualties, but unfortunately the number of deaths has not decreased" (City of Johannesburg, 1957, p. 175).

92 Motoring in South Africa.

Mirroring these discursive and representational manoeuvres, several books published by the City of Johannesburg over time evoke themes of progress and modernity (see, for example, City of Johannesburg, 1926). In these, the automobile was presented as the symbol of progress. For example, one image produced by a tyre manufacturer shows in sequential form (from 1896 an ox-wagon, and then lastly in 1946, an automobile (Merry, Unknown, p. 70). In this narrative, the car was cast as inevitable. For the very wealthy families, cars with chauffeurs behind the wheels increasingly became the status symbol replacing horse-drawn carriages in the 1920s (Benjamin *et al.*, 1972, p. 27; Hart, 1974, p. 194).

An automobile association – the Royal Automobile Club – fought vigorously against efforts to halt car imports in the wake of World War I arguing that while of course cars provided "pleasure" to their users, they were also just like the telephone "necessary, time-saving, labour-saving, life-lengthening device[s]" (Editor, 1918, p. 54). Even after the war had ended, this debate persisted, requiring the Royal Automobile Club to reprint an American article making a spirited defence of the utilitarian value of cars (Editor, 1921a).

Cars were also constructed as tools comporting with and enabling local, regional and national governance goals. In an editorial, a newspaper described the car in South Africa as having been a tool for economic development and freedom (Editor, 1920). The emerging automobile industry and users took advantage of crises situations to illustrate the superiority or importance of motoring in supporting the emerging town. For example, it was reported in glowing terms that motor vehicles had rescued the public from immobility in the context of a strike by tram personnel (Edward, 1920). During the two-week strike by tram drivers, industry and car owners volunteered to drive members of the public – at no charge – to destinations of their choice (Kavanagh, 1958, pp. 142–143). This helped to improve the public image of motorists. As one young passenger reported to the famous racing cyclist turned automobile enthusiast, lobbyist and industrialist, Frank Connock:

> ... never had much time for you motoring johnnies before charging around like a lot of lunatics but... I'm beginning to change my mind a little. Perhaps you are not such a lot of blasted road-hogs after all (quoted in Kavanagh, 1958, p. 143).

In 1922, in the wake of mine worker protests – a time when the incumbent political-economy was at threat – the South African Society of Motor Traders, "private car-owners, motor cyclists, and the motor industry came forward to assist the authorities" (Editor, 1922b, p. 37). After the revolution

had been quelled, the government thanked the association:

> Speaking on behalf of General Smuts who regretted that he could not be present, General Bevs expressed the thanks of the Government to the South African Motor Trade Association and said that motor transport, from all quarters, had enabled the Government forces to hold the situation (Kavanagh, 1958, p. 151).

Similar efforts to aid the military in time of war (WWI) had been undertaken by the SA Motor Traders Association. At the time, the Association sent a delegation to the national government to offer their assistance by availing their motor vehicles (Kavanagh, 1958, p. 151). This was a particularly important move because at the time the military mainly relied on animal-drawn transport. As such it was difficult to persuade them of the usefulness of motorised transport (Kavanagh, 1958, p. 132).

Through these efforts automobile use became increasingly acceptable. Moreover, cars replaced bicycles as symbols of wealth but also of white racial superiority. Consequently, a range of actors in the same way as some had tried as discussed in section 9.2 to protect their technology from being tainted as a symbol of power by limiting black people from using them, did the same for the car. For example, an association representing commercial automobile operators – the Witwatersrand Taxi Owners' and Drivers' Association – at a conference addressing proposed by laws governing motoring, put forward a resolution that would prohibit so called "native" people from being provided with car licences (Jay 1919, p.53). However, this motion failed to muster the necessary votes. The objections were political, moral and commercial in nature. The commercial objection was that such a measure would in effect dampen the market:

> Major Wilkinson [of the society of Motor Traders] stated the objection of the motor trade, which is that the development of commercial motoring is being hampered because of the prejudice which has been created against the coloured driver and consequent necessity of employing highly-paid Europeans. This is a form of artificial restriction of commercial enterprise (Editor, 1919, p. 11).

While efforts to prevent so-called natives from car use within the organised motorised industry, political parties[93] and user associations had failed, some public sentiments in this direction persisted. In late 1921, there was talk of restricting so-called "natives" from being granted driver's licences. This was provoked by a tragic accident where a so-called "native" driver was involved (Editor, 1921b). In 1926, the editors of a newspaper argued that black people should be prohibited from car

93 For example, in 1934 General Hertzog – South Africa's then Prime Minister and leader of the political party – the Free State Congress of the United Party proposed that black people should not be allowed to drive cars. His proposals were opposed by some such group called the Joint Council of Europeans and Africans (Schreiner, 1934).

driving altogether on the grounds that they were responsible for traffic accidents besetting Johannesburg. It argued that "the safety of the community is at stake [therefore] *the advisability of prohibiting natives from driving altogether should be seriously considered* (italics theirs)" (Sunday Times, 1926, p. 14). A car-licensing officer in Pretoria at the time, was explicit that car use was a status symbol for the white population. He argued that in his opinion the reason why "natives" were such bad drivers was that:

> As soon as a native sits in a car, he thinks he has the same rights and privileges, and that he must be treated as a white man. The whole road belongs to him, and everyone else must either stop, or hop out of his way, and if you don't, you must either risk either being run over or covered up in the dust of his car (Ueckermann, 1928, p. 17).

If we replace the car with the bicycle in the above quotation, it might be an identical statement as expressed in 1908 about the way that "natives" rode bicycles – a way that was seen to be usurping white privilege. These public views about black people not being permitted to drive persisted for some time, for example in 1937 (Dryer, 2006).

In summary, niche proponents of the system of automobility undertook a range of measures that made car use possible, acceptable, and even a symbol of prestige and particular forms of citizenship. These niche level processes effectively led to the successful development of the car socio-technical system by the 1930s. Here recall, that such a system is comprised of many elements such as symbolic meaning, technology, infrastructure, and policy. From this position of robustness, as we shall see below a series of landscape developments unfolded that strengthened car use while in the opposite direction further weakening cycling. At the same time, regime initiatives occurred to further reproduce the system of automobility. First to landscape developments.

9.4.1.3 Inequality

While car proponents had successfully addressed some initial problems facing driving, a large section of users were not yet able to acquire automobiles. As we saw above, up to the 1920s, cars were a luxury commodity. This final hurdle was surmounted in the 1930s with economic expansion unfolding after the great depression "from the last quarter of 1929 to the second half of 1932" (Hart, 1974, p. 147). At the end of 1932 South Africa went "off the gold standard" (Freund, 2011, p. 247). The country's currency – then the pound – had been pegged to gold (Freund, 2011, p. 215). This led to an "unprecedented period of prosperity" (Freund, 2011, p. 215) as the price of gold shot up (Freund, 2011, p. 247) "by more than 50 per cent over the currency" (Freund, 2011, p. 219). The

rise in the gold price triggered massive financial speculation, enabling "massive private profit-taking" (Harrison and Zack, 2012, p. 556). At the same time it stimulated new rounds of investments into gold mining (Hart, 1974, p. 199), with one of the mines in Johannesburg – Crown Mines – becoming the most profit making in the world (Palestrant, 1986, pp. 108–109).

This boom stimulated growth in other sectors "including banking and manufacturing" (Rosenthal, 1970, p. 349) and "yielded massive taxes to the government" (Callinicos, 1995, p. 76). Furthermore, it stimulated a building boom, and large population inflows from other countries and elsewhere in South Africa (Hart, 1974, p. 199). In this context, a wealthier population (mostly the white population[94]) could afford cars (Palestrant, 1986, pp. 108–109). As such a newspaper review of the 1930s, described that period as "motoring's golden age" (Clarke, 1987, p. 102). The impact of this economic boom on car ownership is evident in figure 9.4.1.3.1. While the 1930s economic boom was crucial to expanding car ownership amongst the white population, there were other subsequent rounds that entrenched this dynamic. A dynamic of material improvement whose fruits given South Africa's racialised economy, flowed to the white population.

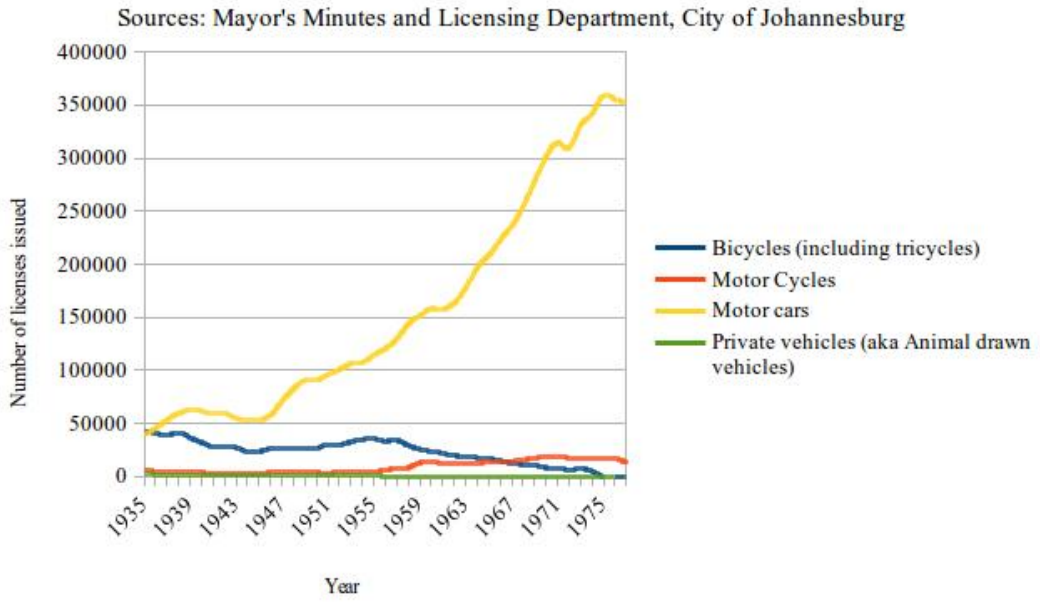


Figure 9.4.1.3.1: Replacement of everyday bicycling by automobiles in Johannesburg

The 1960s were another key period of unequal economic growth. It was when "the economy picked

94 Observing this situation, Beavon (2004, pp. 94–95) argues that "Johannesburg in the period up to 1939... was a city where there was plenty of money for projects, buildings, and public works... yet the indigenous population, and other dark-skinned people huddled in the slums."

up very rapidly, outpacing nearly all Western countries by registering an average growth rate of 6% during the rest of the 1960s" (Grundlingh, 2008, p. 144). This economic expansion led to improved "living standards and incomes" (Van Rensburg, 1986, p. 108). The benefits of this growth were however unevenly distributed. Not only did this prosperity flow primarily to members of the 'white' population, there were also explicit policies, including a poor education system and regulations on economic activities in townships put in place to suppress the ability of black people from increasing their material conditions under apartheid policies[95] (Posel, 2010, pp. 169–170). Underlining this disparity in wealth across South Africa, Lamont & Lee (2015, p. 473) note that "of the 1.1 million registered motor vehicles on record in 1960, only 100,000 were owned by non-whites."

The booming wealth was so pronounced amongst the 'white' community that one section of the population was unsettled – the Afrikaaner community. Grundlingh (2008) argues that this community has a history of Calvinist inspired modesty in material display (that probably links back to the Dutch colonial heritage). In the 1960s there was growing disquiet over growing materialism in sections of the community in the wake of a booming economy. However, these concerns did not moderate the increasing turn towards things. Instead, "a consumer mentality [eventually] became entrenched which, over time, brought a new set of subjectivities into play" (Grundlingh, 2008, p. 158). Here the highly unequal economic and political context following Veblen (2009) at a subconscious level heightened the need for conspicuous consumption with the automobile as the preferred tool for differentiation. The desire for consumption was heightened in the black population, but could not be well realised. Thus, those who had earlier sought to limit car use amongst the black population through legal measures may have been satisfied by this turn of events.

Thus waves of economic growth enabled car ownership amongst the white population. Cycling then as we saw previously became a preserve for the 'native' population – who we can imagine may have preferred to use cars given their power and dignity signifying advantages. But as we saw above, only a fraction of the 'native' population owned automobiles. While the bicycle would have been a practical transportation tool given still moderately sized urban morphology, it may not have been a tool of choice given the aforementioned aura of stigma and increasingly difficult road environment. Yet users persisted as we saw. Landscape development towards the end of the 1930s and onwards would occur to significantly curtail ongoing 'stoic' cycling: urban expansion.

95 Johannesburg, as with the rest of the country, became even more polarised along class and racial lines under apartheid (Thompson, 1990, pp. 189–203).

9.4.1.4 Urban expansion

While urban expansion due to racist policies had occurred prior to 1935, these intensified subsequently. A notable instance occurred in 1939 when 7 000 black people were relocated to a township (Orlando) situated about 15 kilometres due south-west of the city centre (Beavon, 2004, p. 115). With the advent of apartheid, the "commitment" to racial spatial segregation[96] became official policy. Thompson (1990, p. 189) argues that under the leadership of Hendrik Frensch Verwoed (as Prime Minister of South Africa from 1958 to 1966) "apartheid became the most notorious form of racial domination that the post-war world has known." For Clarke this occurred after a general election produced favourable results for the National Party, which was seen as a "mandate to push apartheid to the limit" (Clarke, 1987, p. 174). Due to this agenda, members of the black, Indian and so-called coloured populations were systematically, over time, forcibly relocated to spaces distant from work, commercial and recreational spaces due to official policy.

A key piece of legislation that facilitated the racial geography was the Group Areas Act promulgated on the 7th of July 1950. The Group Areas Act spatially demarcated areas of commerce and residence based on racial categorisation. Under its provisions, in the 1950s over a period of seven years, about 60 000 black people were moved from an area called Sophiatown [located about 10 kilometres from the city centre] to a distant township [located about 22 kilometres from the city centre]. At the same time Indian people were moved to an even more distant township called Lenasia. So-called coloured people were moved due south-west of the city centre to a place called Eldorado Park (Beavon, 2004, p. 133). Respectively both are located 35 kilometres and over 21 kilometres from the central business district. Declines in bicycle use among the black population were further encouraged by a piece legislation passed in 1955 – [the Natives (Urban Areas) Amendment Act]. This legislation authorised the removal of black people living in the central cores as servants to "white employers" (Beavon, 2004, p. 134). Johannesburg, in short, acquired a low-density sprawling character (Beavon, 2004, pp. 163–196). These measures led to significant declines in bicycle use amongst the black population (White, 1999).

Given relocation to the peripheries of the town, public transport (trams, buses and trains) became an important mode for the black population, for getting to work. In 1957, in a sign of the importance of

96 Racial segregation was also manifest in use of public infrastructures (such as benches), transportation, sports and other areas of social life (Thompson, 1990, p. 194).

public transit, when a bus operator serving the black population announced that it would increase fares, those living in one of the distant townships (Alexandra Township located about 20 kilometres from the city centre) decided to boycott the service altogether. Some instead walked, while others were given lifts by private passenger car owners (Clarke, 1987). Street level images also suggest that some resorted to animal-drawn transportation (donkey and cart) and bicycling (Museum Africa, 2016).

The use of public transport was enabled by state subsidies to operators, which allowed them to charge fares affordable to the impoverished black population (Beavon, 2001, p. 14). At the same time, after 1976, a minibus taxi industry appeared as a complement to the existing public transport system. This "filled a desperate need for a reasonably inexpensive and rapid commuter service with more route flexibility than buses could provide" (Beavon, 2001, p. 15). As Pirie (1986, p. 42) puts it, the black population became "captive public transport patrons by virtue of low wages, and being too distantly located from workplaces to make walking and cycling feasible long-term options." Due to their poor economic position, they were social groups for whom the use of bicycles would have been a viable transport option but perhaps moderated by the developing stigma.

9.4.1.5 Collapse of bicycling or how the system of automobility reinforced and defended itself

The previous account provides a primary reason for the decline of cycling after 1936. In effect, from the turn of the 20th century onward – the private-car based socio-technical system developed, leading to the unravelling of the bicycle socio-technical system. Landscape developments (economic growth and urban expansion) occurred that strengthened car use and public transport, and weakened cycling.

With respect to the continued robustness of car use into the 1990s, an additional explanation rests with agency and reproduction. A critical observation in chapter 3 was that the "elements and linkages of socio-technical systems do not exist autonomously, but are created, (re)produced and refined by social groups" (Geels, 2005b, p. 449). In this sense, a socio-technical system is very much a living thing existing in time. It has to be performed and even fixed if need be in order to exist. In the following discussion, I will show how an emerging externality of the car based socio-technical system was moderated and one element was reinforced at the expense of everyday

bicycling.

9.4.1.5.1 Apartheid-era survival strategies reinforcing automobile fuel supplies

One example of how the system of automobility in Johannesburg strengthened is with regard to the fuel supply system. As Sparks (2012, p. 33) notes, "South Africa… [is] a country rich in coal deposits but possessing little natural petroleum." As a result for a long time, the country "imported its entire fuel needs" (Sparks, 2012, p. 33). Even though there had been earlier concerns on the country's dependence on imported petroleum, "South Africa's role in supporting the Allied campaigns in World War II gave concerns about the country's fuel sovereignty renewed urgency" (Sparks, 2012, p. 36). Consequently, considerable state resources were expended to develop the company – known as Sasol[97]. The firm's first output occurred in 1955 (Sparks, 2012). Parallel to this, fearing international sanctions, the apartheid government had been stockpiling large reserves of petroleum (Senekal, 2014) and developing "in the 1970s, close economic and military ties" (Chehabi, 2016, p. 687) with Iran prior to the revolution in 1979 (Thompson, 1990, p. 218). The relationship with Iran was extremely productive with, "by 1978, Iran provid[ing] over 90 per cent of South Africa's oil" (Chehabi, 2016, p. 687).

Due to these developments, the system of automobility became extremely robust from a fuel supply perspective. International fuel shortages that occurred in the 1970s did not therefore seriously affect car use[98]. Under the dictates of the OPEC oil embargo, South Africa along with the United States, Netherlands, Portugal, and Rhodesia (now Zimbabwe) were not to receive any oil (Mabro, 2007), because they were seen to be friendly to the Israeli regime by the Arab oil exporting nations. In response to the embargo, national government reduced speed limits within urban areas to a maximum of 50 km/hr, racing was banned and fuel stations were ordered to remain closed from 18h00 in the evening on Saturdays to Monday mornings at 06h00. While in Johannesburg it was reported that motorists who did not comply with the speed limit reductions were given stiff fines, efforts at encouraging car-pooling failed (Clarke, 1987, p. 219). Part of the failure in car-pooling was related to the fact that there were no severe fuel shortages as OPEC "was unable to enforce it [the embargo], and most of South Africa's oil came from Iran, until the fall of Reza Shah Pahlavi in 1979" (Thompson, 1990, p. 218). Therefore, it makes sense that in reflecting on the previous year,

97 Sparks (2012) traces the origins of Sasol – a company that extracts oil from coal – from the 1930s.

98 The two oil crises – the 1973 OPEC oil crisis and then the 1979 Iranian oil crisis – stimulated the South African government to increase the production capacity of Sasol (Sparks, 2012, p. 93).

the President of Automobile Association of South Africa did not refer to any severe hardships associated with the embargo other than reductions in speed limits and constraints on fuel use (Nupen, 1974).

Similarly, the 1979 Iran oil crisis barely perturbed car use. A newspaper article suggested that one council response was to improve public transport services including providing priority bus lanes (Baxter, 1979). In both[99] instances, the hardship was muted because the country had developed alternative fuel supplies (Thompson, 1990, p. 218) and "by 1978 it was producing more than 10 percent of South Africa's domestic consumption of gasoline in two large oil-from-coal plants created by a state corporation" (Thompson, 1990, p. 218). The state corporation was Sasol.

9.4.1.5.2 Defending externality of automobility expands car infrastructures

In the post-World War II era, there were significant investments into roads, expressways, traffic management technology, on-street and off-street parking facilities and bridges (City of Johannesburg, 1950; Shorten, 1970, p. 577; Beavon, 2001). This infrastructure expansion was seen as a way of ameliorating growing road congestion. It was not however, given that this would be the preferred solution. Some, such as a group of councillors in the city council, favoured banning motor cars from some parts of the central business district in favour of public transport (Pretorius, 1960).

Others, such as the Automobile Association of South Africa, contended that the solution was not to restrict car use but instead to provide additional infrastructures of automobility, such as expressways and parking facilities. In addition, they advocated for decentralisation of land-use to redirect motor traffic away from the central business district (see, for example Pretorius, 1961, 1962). These ideas gained traction, initiating infrastructure allocation for car use. An example was a major highway system, which was planned in the 1960s and built in the following two decades. This consisted of two highways travelling north–south and east–west through and next to the city centre. It was argued that these would lead to de-congestion of the centre since vehicles not travelling into downtown could now bypass it altogether (Clarke, 1987, p. 194). Here proponents of the system of automobility were able to correct an "externality" associated with the car-based

99 Later in 1986, the United States, Great Britain and the European Community, imposed a ban on exports of petroleum to South Africa as part of an anti-apartheid campaign (Becker, 1988). These sanctions did not disrupt automobility to any significant degree. Motorists still had access to vehicle fuels as was reported by the Automobile Association of South Africa (President, 1987).

private socio-technical system. We saw in chapter 3 that such "externalities" can be the seed source of transformation.

Such infrastructure allocation, which facilitated car use, made bicycling more dangerous. Recall, for example, in 1964, the city council conceded that the road environment – especially on important routes and in the downturn – was too dangerous for children to travel by bicycle thereby waiving the inspection requirement before licences could be issued. Road safety had also deteriorated for other road users, including those in automobiles. In 1960, the Vice-President of the Automobile Association of South Africa, delivered an address in which he argued that "the most pressing problem confronting motorists today... is 'road safety'" (Pretorius, 1960, p. 4). In the following years he made similar observations, but in much more strident terms arguing, for example, that "crisis conditions have been reached on our roads and South Africa has, for various reasons, become one of the most dangerous countries in the world in which to drive a motor-car" (Pretorius, 1962).

In summary, the decline of everyday cycling from 1936 into the 1990s occurred due to a complex interlocking sequence of developments in context, within the cycling regime, and car use as insurgent alternative. If the downward trend depicted in history of bicycle licenses issued (see figure 9.4.1.3.1) are any indication, cycling was bound for complete disappearance in user and actor attention. Yet from the late 1990s, a variety of actors emerged to promote everyday cycling. The next section turns to this development.

9.5 Actors rediscover the bicycle: Late 1990s to 2016

The final historical phase presented below, potentially represents a break from the downward spiral trajectory described and analysed previously. From the late 1990s, a variety of different state and non-state actors emerged to encourage the everyday use of bicycles. Indeed, the degree of *actor interest* in promoting utilitarian bicycle use is the most pronounced feature about this period. As we shall see, there is scant evidence of mode shifts towards cycling.

Towards the end of 1998, it was reported that "a group of cyclists yesterday rode from the FNB Stadium to the Johannesburg city centre to raise awareness about the lack of safety on Johannesburg

roads" (Unknown, 1998). The activists sought to change the perception amongst motorists that roads were theirs alone and desired dedicated bicycle lanes across the city. A representative from the city council, when interviewed for the article, was amenable to such ideas but cautioned that such an agenda would need to be approved by council (ibid).

In 1999, members of international organisations, the National Department of Transport, and local organisations held a workshop to explore ways of promoting everyday cycling. It was also reported that some time prior, a study tour to the Netherlands had been organised for politicians, members of community organisations and others, in order to gain exposure on sustainable modes of transport. The workshop led to the creation of a nationwide coalition – the Bicycle Transport Coalition of South Africa (Bike TraC) – though with a special focus on the Gauteng Province, where Johannesburg is located. The international organisations that facilitated these early engagements have been credited for facilitating linkages amongst local, previously disparate civil society organisations, helping to create local not-for profit organisations (White, 1999, p. 9; De Waal and Erlank, 2001), and exposing local actors to other contexts with established cycling cultures (Litman, 2003, p. 23).

Following the workshop, members of the coalition organised advocacy events, including engagements with city council officials and transit providers demanding integration with public transit, bicycle infrastructure and campaigns to educate motorists (White, 1999). The Coalition sought "bike lanes on all roads leading to the city, signs on all major commuter routes, bike access to commuter trains [...] legislation to protect cyclists... [and]... [it hoped] to inspire the creation of national and municipal Bicycle/Pedestrian Advisory Councils, in co-operation with government bodies" (Johnson, 1999). The coalition also planned to organise regular group bicycle rides where participants occupy a full traffic lane known as Critical Mass on the last Saturday of every month (Transalt, 1999). These rides would start in Soweto into the central business district with about thirty participants (Johnson, 1999). It is not clear what results these efforts produced in terms of promoting everyday cycling and influencing policy changes. Moreover, the coalition itself no longer exists.

While the activities of the BikeTrac coalition and Afribike lost momentum, their intentions were, in a manner of speaking, carried forward by others from the late 2000s. In 2007 Critical Mass was restarted, albeit by different individuals (Critical Mass JHB, 2015). One of the people involved in

re-starting Critical Mass was inspired by an experience while visiting the United States (Walters, 2011). This public bicycle protest has now grown tremendously. I recall that when I first joined the ride in 2012, there were about 60 participants. By 2015, this had grown to 1 000 people.

In 2011, another community-level initiative was launched. The not-for profit organisation called the Johannesburg Urban Cyclists' Association (JUCA) was created to "promote and defend the use of the bicycle as a day-to-day transport solution" (JUCA, 2015). The association with which I am a volunteer, sees itself as an advocacy organisation, representing the interests of everyday bicycle users. This involves lobbying the city council, private sector and other institutions to make the city amenable to utilitarian bicycle use. It is the only organisation in the city with a direct interest in transport cycling. Other not-for-profit organisations have occasional programmes as part of their other organisational activities (see, for example, WWF South Africa, 2015).

A range of other private sector actors emerged. Some, such as bicycle sales and manufacturing companies, market bicycles as fashionable consumer commodities. For example, in the late 2010s two bicycle shops that build custom-fixed gear and single speed bicycles were opened (Whippet Cycling Co., 2013; Fixin Diaries, 2016). These bicycle firms target urbane youth. They place emphasis on the aesthetics of the bicycles. The bicycles are designed to be colourful and streamlined. Participants of the social rides that the firms organise appear in ordinary but fashionable clothes (see, for example, Sleepless in Soweto, 2015; Waddington, 2015). Other important developments include the launch of a privately-run electric bicycle rental services to serve the wealthy market (Taylor, 2015). Some privately run institutions, such as banks, non-profit organisations and retail centres have been observed installing bicycle infrastructure on their premises (see, for example, figure 9.5.1). The figure is a perfect illustration of the gap between actor intentions and user uptake. It shows an indoor bicycle parking facility used as a recycling centre.



Figure 9.5.1: Bicycle parking facility for a bank in Johannesburg, March 2016. (Source: Author's collection)

Mirroring this interest among civil society organisations in promoting everyday bicycle use, in the early 2000s, national government policy agenda also begun to recognise the role of bicycles in urban transport. In 2001, a national programme – known as Shova Kalula in *isiZulu* (translated to Pedal Easy) – to promote the use of the bicycle as transport to school amongst children in rural and urban areas was launched. At a later stage, it was envisaged that the general working population would benefit from the programme (Mabaya, 2001). The core of the programme was bicycle distribution. In 2002 a national regulation was issued directing provincial authorities in the country. The regulation contained guidelines on the "preparation of... land transport frameworks" (Department of Transport, 2002). In essence, provinces would need to develop documents setting out their strategies for promoting the use of "non-motorised form of transport" (ibid) as part of their land transport development agenda.

In 2006 an official policy document from the National Department of Transport (a gazette) elaborated on what was required in these documents[100]. The rationale for promoting the use of bicycles in urban areas was informed by domestic concerns, such as social justice (it argued that the majority of citizens did not have access to private modes of transport) and urban congestion (Department of Transport, 2006). However, the policy also drew upon international registers. It rationalised bicycle promotion as a measure "to ensure that the country was is in line with international environmental initiatives aimed at both local air pollution and global climate change" (Department of Transport, 2006, p. 30). Furthermore, recognising the prevailing national perceptions of walking and cycling as stigmatised modes, it sought to invert the tables by referencing wealthy urban environments elsewhere arguing that "walking – and cycling ….are not lower-income, second best options... they are the preferred modes in the world's liveable communities and cities" (Department of Transport, 2006, p. 30). Later in 2006, it was also announced that the Ministry of Transport was pursuing measures to limit car use, and to promote public transport and bicycle use by distributing bicycles to pedestrians walking for extended distances (Citizen Reporter, 2006). Various national government departments – especially those dealing with environmental and transport issues – have continued to promote cycling. For more see Jennings (2015).

100 In a remarkable historical point, the same policy also sought to promote the use of animal-drawn transport – a form of transport that had been key in the earliest history of Johannesburg.

At local government level, the municipal "return" to the bike occurred towards the end of the first decade of the 2000s. A respondent who worked in the Johannesburg city council recalls that in the "late '90s … non-motorised transport was not a key priority [instead it was] the minibus taxi industry [which] was a key area of concern at all tiers of government" (interview with Victor de Abreu, 19 July 2016). As with the national government, the municipal pro bike agenda was motivated by a variety of concerns. A document from 2006 argued for measures to "reduce the dependence on fossil-fuel based private transportation modes, by promoting non-motorised and other environmentally-sustainable transport" (City of Johannesburg, 2006, p. 98). Over time other goals, such as reducing traffic congestion, increasing the health of residents, urban liveability, increasing mobility options especially for the poor have also been articulated as rationales for supporting bicycle use (City of Johannesburg, 2009, p. 13). A respondent who was a councillor in the municipal council with a responsibility in transport planning agrees that the impact of automobility was an important rationale for reconsidering the bicycle. As she put it "travel surveys were getting done and they were reflecting an increasing usage in private cars, longer commuting times, but almost a 'stuckness' in a sense of what do we do" (interview with Rehana Moosajee, 26 October 2015).

Further, there was a "realisation that over a period of time, Johannesburg's transport planning had become incredibly car centric" (interview with Rehana Moosajee, 26 October 2015). As a respondent involved in transport planning at the time recalls, the democratic transition in council brought a new ethos into the council that shaped transport-related interventions:

> I think gradually there was a dawning that there [were] other categories of road users who [were] not sitting, one person in a car... [The question became] how do we begin to ensure that their voice comes more strongly into policy making? (Interview with Rehana Moosajee, 26 October 2015).

For this respondent, who was at an influential level in the council[101], while acknowledging other contextual developments, such as air pollution and traffic congestion as generating reappraisals of car use were important, for her there was a social justice agenda:

> I think at a personal level, it was really about a people centred transport system, that then acknowledged that there are different categories of people using the transport system. And that transport is not just people in their cars... the non-motorised transport dimension was responding to that (interview with Rehana Moosajee, 26 October 2015).

Such views echoed with the Zeitgeist, resonating with the "ANC's[102] vision for social justice after

101 She held council oversight into the administration's transport operations.

apartheid" (Powell, 2012, p. 14). An early transport planning document, while articulating a range of technical, economic and operational objectives related to improvements to the transport system in Johannesburg also foregrounded such social goals as "equity" and "transformation" (City of Johannesburg, 2003a, p. 9). Yet, the solution –to policy makers – at this time was public transport. As a respondent recalls, the turn to bicycles amongst policy makers to resolve these issues was not a given. In fact, the desired solution given the apartheid spatial form was improving and developing public transport (interview with Rehana Moosajee, 26 October 2015). This focus is clearly visible in the city's first integrated transport plan after the end of apartheid, which argued that "there is no question that the number one priority for the CoJ [City of Johannesburg] is the promotion of public transport" (City of Johannesburg, 2003c, p. 18).

Cycling (as well as pedestrian improvements) emerged as an adjunct, but integrated solution part of a bus rapid transit system. As a respondent recalls, after a study visit to Latin America it became evident that it would make sense to link cycling infrastructure with the bus rapid transit system (interview with Rehana Moosajee, 26 October 2015). Moreover, these and other international interactions helped develop confidence that it was possible to transform Johannesburg:

> As we met more and more advocates... international advocates of cycling such as ITDP [Institute for Transportation and Development Policy] and so forth... and later I think meeting Sadikh-Khan[103] in New York... the work they had done there... I mean if it was possible in New York why not Jo'burg?... People want the same things everywhere (interview with Rehana Moosajee, 26 October 2015).

In 2009, municipal policy regarding bicycle use was crystallised in a strategy whose vision was for "Johannesburg to be a cycle and pedestrian friendly city" (City of Johannesburg, 2009, p. 13). Within transitions studies, this document can be seen as signalling the arrival of an intentional mode of socio-technical change[104]. In interviews, respondents from the City of Johannesburg argued that this framework was drawn up in response to national regulations discussed above (interviews with Esther Letlahka and Matshidiso Shihambi, 1 September 2016). The strategy sought "to increase the percentage modal split of cycling and walking as preferred modes of transport for travel to work

102 The African National Congress – the political party that governed the country after the end of apartheid.

103 Janette Sadik-Khan was the head of the New York City Department of Transportation between 2007 and 2013. She is widely credited for innovation, speed and boldness in implementing programmes and interventions that have made New York a more bike-friendly city (Cohen, 2015).

104 Transitions scholars argue that such change occurs in two modes; the first is as a result of evolutionary change where there is no intention for change, and in the second, change is driven or stewarded intentionally by actors based on a vision of the desired end state (Loorbach and Rotmans, 2006, pp. 3–4).

and school trips" (City of Johannesburg, 2009, p. 13). It did not however set out the desired modal split nor within what time frames this was to be achieved. Nevertheless, it articulated a series of interventions to realise the strategy. These included:

- Infrastructure (bicycle tracks and parking facilities);
- Traffic calming measures;
- Education and training;
- Connecting the bicycle network with public transport;
- Developing a bicycle share system;
- Marketing measures to communicate associated benefits;
- Developing trip planning information;
- Launching public events, such as bicycle to work days (City of Johannesburg, 2009, pp. 14–17).

Over time some of these measures have been unrolled, including the construction of cycle lanes, hosting cycling events with street closures organised, bicycle parking facilities, and distribution of bicycles (Freedom ride, 2014). See figure 9.5.2 for an example of bicycle infrastructure constructed by the City of Johannesburg.



Figure 9.5.2: Curb separated bicycle and pedestrian lanes, July 2016. (Source: Author's collection)

From the 2010s, the mayor of Johannesburg – Mpho Franklyn Parks Tau – emerged as a key proponent of cycling. He was described by some as "Joburg's number one cyclist" (Reavaya, 2014a). From my observations and interactions on a voluntary basis with a cycling advocacy organisation, JUCA, a key turning point occurred in the year 2014. While officially, the City of Johannesburg had intentions to promote bicycle use, staff in the Transport Department appeared reticent in engagements with advocates. However, once direct contact was made with the mayor by members of JUCA, officials

in the Transport Department demonstrated greater willingness to pursue and implement programmes. In 2014 and 2015, the mayor led by example by riding a bicycle in the public cycling events held in 2014 and 2015 (Reavaya, 2014b; Dipa, 2015). To further underline the importance of mayoral leadership in stewarding bicycle promotion in Johannesburg, in 2015 he brought to the city a path-breaking event (Makhura, 2015) – the Ecomobility World Festival.

As part of the Ecomobility World Festival, in October 2015, residents and people working in the city's financial centre, Sandton, were provided with "carrot" and "sticks" so they could use public transport, bicycles, walk and other ecologically friendly transport technologies in one of the city's most wealthy areas, instead of private cars (Reavaya, 2015b).Capturing the intention to discourage private car use, the Mayor said during the opening ceremony that the "festival will demonstrate a decongested Sandton and show that it is possible for the residents of Joburg to break away from the habit of using private vehicles" quoted in (Reavaya, 2015a). It was the second time that this event had taken place anywhere in the world with the first one having been hosted in Suwon City, South Korea (EcoMobilityWorldFestival2013, 2013). As might be expected, given the long history of automobility described so far, there were some very negative reactions to the event. One suggested that bicycles were a mode of transport for children and therefore the initiative was infantalising adults. Moreover, cycling did not comport with the image of harried business executives who could not be seen to arrive at work in sweaty clothes (Vegter, 2015).

In a return to phenomenon occurring in the late 19th century, in this phase, actor interest in everyday cycling in this phase can be linked to global circulation of actors, ideas and practices. For example, a Dutch consulting firm, the Interface for Cycling Expertise (I-CE) has a fingerprint in many cycling studies, programmes and strategies across the world, especially in the global South (I-CE, 2014). The I-CE advised the city of Johannesburg towards the



Figure 9.5.3: Bicycle traffic signal, July 2016. (Source: Author's collection)

development of its first bicycle promotion strategy (City of Johannesburg, 2009). The strategy was also developed with assistance from another firm international firm (City of Johannesburg, 2009, p. 4). As we saw above, a key policy developed by the national government justified itself in reference to global registers. A bicycle lane – five kilometres in length – was completed in Soweto in late 2014 with the assistance of a German bank as a legacy project linked to the 2010 World Cup (City of Johannesburg, 2014; Jennings, 2015).

Other international firms, such as a Danish consulting group have a hand advising the City of Johannesburg on bicycle promotion (Køster, 2014). Some private sector firms mentioned earlier – marketing and manufacturing bicycles for their aesthetic appeal – were brought to Johannesburg by multinational companies, or their actors sought to transpose practices they had witnessed while living overseas. Similarly, some civil society initiatives discussed earlier have been inspired by urban experiences elsewhere. For example, two important actors responsible for reviving Critical Mass in the late 2000s were both inspired by exposures in international visits. The Johannesburg Urban Cyclists' Association was founded by a Frenchman who had the experience of cycling in urban environments elsewhere that were more conducive to cycling. As he recalls:

> How this led me to start JUCA was... because soon after I got a cycle to work, people were saying it is too dangerous, it is too far, all these misconceptions that I had never experienced because I came from a cycle-friendly city. This was a strong incentive for me to start trying to change people's mind sets. I felt people might be missing out on the benefits of cycling. There is this drive, as well as the private benefit if you want, for me as a cyclist to have a cycle friendly city (Ntandokawabo and Muneebah, 2013, p. 132).

9.5.1.1 Resisting a transition

While there has been renewed policy attention, emergence of bottom-up grass-roots organisations, and private sector focus, it is not yet clear whether there is a significant increase in the number of people using bicycles for transport. Some promotional cycling events that have been organised have proven popular at the time. For example, in reflecting on the Ecomobility World Festival, the City of Johannesburg and partnering organisations argued that there was "a significant increase in the use of public transport and a decrease in private vehicle use" (EcoMobilityFestival2015, 2015). Further, "walking and cycling also increased significantly" (EcoMobilityFestival2015, 2015). However, it is uncertain if long-term change has occurred.

This is evident in some cycling lanes that have been constructed in the city. Observations over time reveal an almost complete absence of bicycle users. Research exploring the reasons for low uptake

of bicycle lanes found that "lack of respect for cyclists and the cycling lane[s], stigma of being a cyclist, lack of road safety for cycle users, and... physical obstructions in the cycle lane[s]" (Crowhurst *et al.*, 2015, p. 11) as important deterrents. These factors were collaborated by another study, which also argued that "potential cyclists may find the system difficult to navigate as a fully integrated and linked system does not yet exist" (Dos Santos *et al.*, 2015, p. 5). A survey undertaken by an activist promoting a cycling-to-work day found road safety concerns to be the overwhelming deterrent, even though more than half of respondents expressed willingness in participating (personal communication with James Murphy, 20 October 2015).

The low levels of everyday bicycling in Johannesburg is similar to what is occurring in another major South African city, Cape Town. Observing these developments, Jennings writes:

> There may well be a 'bicycle renaissance' of more dedicated cycling infrastructure, bicycle parking, and bicycle policies and programmes – even a growing bicycle 'culture' that mirrors those of cities in Europe and the US – but there is little evidence of increased cycling rates (Jennings, 2015, p. 464).

Or as an organiser of Critical Mass in Johannesburg, observes:

> The other day I was working late (in Braamfontein) and I saw two guys who had just come from Maboneng on their bicycles... they were sitting on that bench over there. You see people [cycling] but it's not prolific. And that's the thing. It sticks out. In a town like Washington DC and if you are around George Washington University, theres (sic) bicycles everywhere, here it's like oh, there is a bicycle. And the sad state of affairs is, often you know whose bicycle that is (interview with Melvin Neale, 13 May 2016).

In the interview, while Melvin Neale acknowledged demographic expansion in bicycle users – for recreational, sporting or transportation purposes – the growth, especially in people using bicycles for transportation, was still very small. A recent survey, while drawing from a very small sample but based on a larger geographical area than Johannesburg, shows a decline in levels of everyday cycling between 2013 and 2015. According to this survey, the modal split in greater Johannesburg was 0.2% across greater Johannesburg (personal communication with Cristina Culwick, 30 September 2016). In contrast, "the proportion of private vehicle use has increased from 44% in 2013... to 47% in 2015" (Culwick *et al.*, 2015, p. 1).

Higher earning income groups do not use bicycles even for short travel distances (Valjarevic and Beer, 2015). Household travel survey data from 2002 revealed that the two regions with the highest bicycle commute mode share to work – 1.4% and 0.7% – were the most impoverished in the city (City of Johannesburg, 2003c, p. 28). Observations carried out through the city of Johannesburg

confirm that the majority of utilitarian bicycle users appear to be low income, black males.

Researchers argue that there are perceptions that people who use bicycles for transport are not able to afford private vehicles (Bechstein, 2010). For some "as soon as [those using bicycles and other forms of non-motorised transport] ...can afford to... [they switch]… to either public or private transport" (Culwick, 2014, p. 162). This is in part because at a symbolic level, cars command the public imagination with "most South Africans aspir[ing] to own a car" (King, 2012) especially luxury models, are important status symbols of material success (Calvert, 2005; McLaughlin, 2005). The symbolic value of a car is high "especially for those who cannot afford the financial solidity of a large-scale house [because] it acts a form of mobile wealth, able to be displayed in and around town at will, irrespective of home circumstances" (Czeglédy, 2004, p. 78). As Jones puts it, "car driving dominates the cityscape materially and discursively" (Jones, 2011, p. 379).

Everyday cycling in Johannesburg is unusual, as it is in the rest of the country. Two photographers travelled through the country taking pictures of everyday bicycle users. They concluded "that South African bicyclists are like those in many nations without a strong bike commuting culture: fearless, adventurous, thick-skinned and, often, more than a little eccentric" (Dixon, 2013). My own experiences can attest to this "unusual" character of everyday cycling in Johannesburg. For example, during the study period I was often the object of curiosity by strangers when riding on my bicycle as I had affixed a trailer and chair to carry a child (see figure 9.5.1.1.1). Reflecting the difficulties of bicycle riding in Johannesburg, I also found that the trailer increased vehicle passing distance. Therefore, even when I did not need the trailer for cargo transportation purposes, it remained hitched as a subjective safety solution. This puts into perspective then the fact that safety concerns are often cited as an important deterrent to everyday cycling in the city (White, 1999; City of Johannesburg, 2009, p. 6).



Figure 9.5.1.1.1: My bicycle in Johannesburg. (Source: Author's collection)

In contrast to the low levels of everyday cycling, sports and recreational cycling is popular. In 1997 an annual race through the streets of Johannesburg hosting thousands of participants commenced. This race, which in its first year had 4 000 people racing has grown annually, with the last race in 2015 hosting over 30 000 participants. It has also expanded in scope to include a separate race taking place off the roads – alongside some rivers and parks (IOL, 2005; Momentum947CycleChallenge, 2016). This form of cycling involves large groups of participants who use specialised clothing, accessories and bicycles. It requires large capital outlays "with some bikes fetching the same eye-watering prices as new cars" (Barry, 2014). Demographically, sports and recreational cycling tend to be practised by middle- to upper-middle class people (Bechstein, 2010). On weekends and in early mornings many sports and recreational cyclists can be observed on the city's streets, parks and river ways. This is similar to Latin American urban areas where "high numbers of well-educated and affluent people do cycle, but for recreational or sporting purposes and mostly at weekends" (Brussel and Zuidgeest, 2012, p. 194).

My own observations suggest that a tier of middle-class people may be starting to use bicycles for transport. This demographic can be observed, for example, at train stations of a high-speed train serving the middle- to upper-middle class market. Conversations with some bicycle users suggest that some younger middle- to upper-middle class South African early adopters of bicycles in Johannesburg lived in urban contexts overseas (Europe and America primarily) where utilitarian bicycle use was socially acceptable. A few students and staff also travel by bicycle to a university. Some of these users use colourful streamlined bicycles (CycleWits, 2016). Bicycle use in this middle-class demographic may be partly linked to particular globally manifest urban cultures as was discussed in the previous chapter. In such cultures, bicycles are positioned by industry – for example – as emblems of fashion and cosmopolitan identities. In Johannesburg, I observe similar processes with a multinational shoe company, along with other international clothing and design companies teaming up with a fixed-gear bicycle manufacturing company to co-market their products (Fixin Diaries, 2014).

Other observations and interviews suggest some modest growth in bicycling among the working classes. However, practitioners are from other sub-Saharan African countries, such as Malawi and Zimbabwe, contexts that do not carry the particular South African burden of stigma associated with bicycle use. For example, in interviews conducted on the 5th of April amongst a group of bicycle

users in one of the areas with the highest levels of commuter cycling in Johannesburg – Diepsloot – I discovered that the majority were recent immigrants from sub-Saharan Africa. The overall argument here is that actors promoting everyday bicycle use and some bicycle users have been influenced by experiences or actors from other contexts for whom or where commuter cycling does not carry the stigma of poverty or generally being an inferior mode of transport. In a historical similarity this phenomenon is very similar to China in the 1870s and 1880s, where the main bicycle users were foreigners. Locals would not touch bicycles at the time because of the extreme social prejudice against exerting own effort in mobility. It was considered more dignified to be carried in mobility on rickshaws or even wheelbarrows (Moghaddass-Esfehani, 2003, p. 97).

As scholars in transitions studies have argued, socio-technical changes evolve over long-term horizons (Markard, Raven and Truffer, 2012; Lachman, 2013). Using the late 1990s as the beginnings of intentional agent interventions in Johannesburg to encourage everyday bicycle use as the beginning of such a process, it has only been only twenty years. There is therefore a story yet to be told about the future. However, socio-technical transitions are not necessarily teleological processes. They can head off in any direction (Geels, 2011, p. 26). As Geels (2012, p. 474) notes, the multi-level perspective in transition theory "emphasises mutually reinforcing developments, alignments, co-evolution, innovation cascades, knock-on effects, and hype-disappointment cycles." It is therefore not a given that modal share of bicycling may increase. The range of possible directions everyday bicycling could head off into have recently taken on a new dynamic as council commitment is under question. A new political administration due to internal coalition politics disputes the value of bicycle lanes. In the aftermath of council elections, which saw no clear winner, the political party of the Mayor – Herman Mashaba – entered into a coalition agreement with a smaller party called the Economic Freedom Fighters (EFF), which allowed them to win the elections. As part of the negotiations in alliance formation, the EFF demanded that on appointment as Mayor, Herman Mashaba would end bicycle lane developments (Kekana, 2016). Holding to the agreement, during his inauguration, the Mayor was quoted as saying "When every road in Joburg is tarred, then maybe the city will again look at bicycle lanes" (Cox, 2016).

9.5.2 Analysis

The key question then is why in spite of the upsurge of actor interests and interventions there were little signs of mode shifts towards cycling? As I shall show below, the cycling niche is weak, the

competitor alternative, the system of automobility is not only robust in spite of some moderate 'externalities, and landscape developments continued to reinforce the dominance of car use over cycling.

9.5.2.1 Bicycling in embryo

In chapter 4 I discussed that for an insurgent niche technology to challenge an incumbent system it itself needs to be sufficiently developed. The prerequisites for such development were summarised into three dimensions: articulation of expectation and visions, building of social networks and learning. I discuss these in turn. It is evident that there is significant societal doubt on the promise of bicycles as a viable urban transportation solution in Johannesburg. Many studies, such as the ones discussed above have shown that bicycling is seen as an unsafe practice. In the course of my research in Johannesburg many general members of the public expressed disbelief about my using a bicycle for transport. More fundamentally, the long history of car use, which I have shown has been actively reproduced, has foreclosed in the public imagination other possibilities. This was well revealed in a survey conducted after the eco-mobility festival where 57% of respondents did not think it would be possible for the business district to ever be car free (Culwick and Trangoš, 2015).

Secondly, the social networks that would develop bicycling are weak. Social networks are important because they "create a constituency behind the new technology, facilitate interactions between relevant stakeholders, and provide the necessary resources (money, people, and expertise)" (Schot and Geels, 2008, p. 540). Recall, I discussed that mayoral support for cycling in Johannesburg has turned away with a change of administration. It remains to be seen whether in the future this will change. With respect to the non-state dimension, while there has been an emergence of an array of actors wishing to promote bicycling, they face significant capacity constraints. The bicycling advocacy organisation that I was involved with at the time of research – the Johannesburg Urban Cyclists Association – is a good example. It remains a voluntary organisation with no staff members. As such, its activities occur if and when board members are available away from their other work responsibilities.

This situation of organisational weakness can be generalised to other bicycling niche actors. In October 2015, during the eco-mobility month hosted in Sandton, the City of Johannesburg invited niche actors in bicycling promotion (and other alternative environmentally friendly transport

solutions) to showcase their products and services. However, many were unable to discharge the roles that they had accepted and where they did, the services were intermittent and lacklustre. While follow-up investigations revealed that their poor performance was due to variables beyond their control, a significant explanation pointed to their weak internal capacity with respect to resource mobilisation, staffing, and novelty at the initiatives (interview with Lisa Seftel, 25 May 2016).

Weaknesses of social networks prevents the possibility of the third pre-requisite of a niche technology developing from occurring – learning. As I discussed such learning involves all the elements of an everyday bicycle socio-technical system that would include symbolic meaning, infrastructure, supply networks, user practices, and regulations. In a simple illustration of this dynamic, the mayoral decision to defer into the indefinite future the development of bicycle lanes in Johannesburg, means that better road conduct cannot occur. That is, it would be difficult for all road users to learn to co-exist in the absence of an ordered street network, which sends signals about appropriate modes of interactions. Further, in a demonstration of how the three prerequisites interact – the mayoral decision also prevents the public from believing that bicycles can be a safe transport solution. Thus, as Geels and Schot (2007, p. 406) note "niche-innovations in an embryonic state do not pose a threat to the regime."

9.5.2.2 A still robust system of automobility

> Incumbent actor-networks, material infrastructures, routines and institutional frameworks have historically evolved around the production, distribution and use of privately owned steel-and-petroleum cars, thereby providing disincentives for radical socio-technical alternative (Sengers and Raven, 2015, p. 167).

As per the discussion in chapter 4, an insurgent socio-technical system can potentially break out if the dominant socio-technical system is weak[105]. This weakness arises if there are internal problems, or if the externalities become unacceptable. With respect to the internal dimension, there are no discernible weaknesses within the system of automobility in Johannesburg. I argued that by the 1930s the elements that make up the private car-based socio-technical system – the technology itself, policy, user practices, cultural meanings, industry and supply networks, and infrastructures – had developed and aligned. In the post-World War II era each of those elements and the social groups that enact them were strengthened crowding out other options in policy and user practices.

105 Other ground transportation options existing from prior decades persisted. These include mini-bus taxi service, buses, and trains. They were joined by a bus rapid transit system and a new high-speed rail line.

Since the late 1990s, not only have the elements developed in prior decades continue to exist, social groups have continued to reproduce each of those elements, and as such the system of automobility continues to be robust. Table 9.5.2.2.1 below offers some examples of these processes.

Element	**Reproductive act(s)**
Industry and supply networks	• Automobile sector provided national financial support since seen as important component for economic growth and job creation (Maylene and Simon, 2004; SARS, 2013; DTI, 2016). • In 2012 a new pipeline delivering fuels from processing plants at the coast to Johannesburg and surrounding areas is opened. It replaces an older pipeline completed in 1965 (Lazenby, 2012).
Infrastructures	Building and upgrading roads, bridges and car parking facilities. For example, in 2003 a bridge named the after South Africa's first president – Nelson Mandela – was opened. It could "accommodate over 3 000 vehicles per hour" (City of Johannesburg, 2003b).

Table 9.5.2.2.1 Reproducing the system of automobility in Johannesburg

9.5.2.3 Moderate externalities of the system of automobility

In chapter 4, I discussed that people can reappraise an incumbent socio-technical system if its "externalities" become intolerable. With regard to car use in Johannesburg, this has not yet occurred. For sure the increased car use has introduced a variety of problems. These are manifest through environmental concerns (air pollution and climate change), urban congestion and health (impact of sedentary transport on health), and urban liveability (atomised social life in private cars) (City of Johannesburg, 2006, 2009; Department of Transport, 2006; Harrison *et al.*, 2014). Indeed, it is precisely some of these problems that have motivated actor return to the bicycle in the post-apartheid era as we saw above.

In summary, the weaker negative impacts of automobility in Johannesburg partly help explain the low penetration of bicycles for transport. They also explain less strident measures against car use. The historical options to encourage users away from motor vehicle use, other than the Ecomobility Month intervention, can be mostly characterised as carrots. Indeed, one official policy describes them as "'soft' Travel Demand Management (TDM) measures" (City of Johannesburg, 2003a, p.

469). Harsher penalties, such as reductions in vehicle lanes for public transport and introduction of paid parking use have been limited and been met with significant public outcry on some occasions leading to capitulation (Cox, 2014; Wheels24, 2016).

Below I also discuss in some detail how two now-seemingly "static" landscape characteristics since the late 1990s have, on the one hand, continued to strengthen car use, and on the other, weaken bicycling: inequality and urban sprawl.

9.5.2.4 Persistent economic inequality but political equality

One argument for the absence of a transition towards everyday bicycling is persistent inequality. Johannesburg is described as "a place of contrasts and extremes" (Everatt, 2014, p. 90) to denote its uneven social-economic profile amongst different population groups. Taking a harsh perspective at changes since the end of apartheid, Murray (2011, p. x11) argues that;

> ... more than a decade since the end of apartheid, Johannesburg remains a deeply fractured city, divided between two highly unequal and spatially disconnected worlds: one that caters to the interests and desires of the propertied rich, and another where those without regular work and without authorized shelter are forced to eke out a marginal existence in isolated pockets at the edges of prosperity.

However, as Everatt (2014) argues, this is not to suggest that since the democratic transformation in 1994 there has not been an improvement in the quality of life of inhabitants. Indeed, "service delivery has been very successful and Johannesburg boasts a high quality of life – but it is not yet a better life for *all*" (Everatt, 2014, p. 80 [emphasis in original]).

Against this background, following insights in consumer studies, it would stand that bicycling would still be associated with poverty. This was well captured by a newspaper columnist. Writing aggressively in support of a decision to halt the construction of bicycle lanes by a newly elected mayor, he said:

> An ordinary South African has big dreams. He dreams of driving the same 'black Mercedes Benz' you drive every day yourself, and then you ask him or her to ride a bicycle? What an insult! Do you cycle to your office? Do you cycle over the weekend to do your shopping? Do you cycle yourself to check out your buddies over the weekend? Who is supposed to cycle? A poor South African! (Siso, 2016, p. 8).

In other words, the persistent economic inequality continues to stigmatise everyday cycling in Johannesburg. Inversely it strengthens the symbolic status of automobiles. The end of apartheid saw

dignity and individual self-worth being formally granted to all populations. Nevertheless, the long history of colonialism and apartheid created a society for the purposes of this study where possession of wealth (and demonstration thereof), including private means of transport, is the apex of personal dignity – of individual self-worth. The end of apartheid freed previously suppressed populations to the extent possible to perform this social imperative. This partly[106] explains the high rates of car use, and in particular acquisition of luxury models. To underline this fact, it was reported in 2005 that "more BMWs are sold in South Africa, as a percentage of new-car sales, than anywhere else in the world except Germany, the brand's home country" (McLaughlin, 2005).

In this post-apartheid moment, previously suppressed populations who lived through apartheid 'need' to consume intensely to express their personal self-worth. This is well illustrated by a famous remark in 2007 by "then head of communications in the South African Presidency, official spokesperson for the African National Congress [ANC] and previously an anti-apartheid activist" (Posel, 2010, p. 157) who, on the back of public pressure to explain his ill-gotten wealth, said "I didn't join the struggle to be poor" (Smuts Ngonyama quoted in Posel, 2010, p. 157). For this reason, everyday bicycle use is likely to remain marginal amongst previously suppressed generations for some time, given lower wealth signalling value.

9.5.2.5 Continued sprawl but with some densification

A second "static" landscape feature that constrains everyday bicycling emergence is the sprawled urban form. Along with population growth, in a seminal study of the spatial change in urban areas in post-apartheid urban South Africa, Harrison and Todes (2015) find urban expansion on the peripheries of Johannesburg (away from the city centre). This urban expansion has been enabled in part by growing private car ownership (Mokonyama and Mubiwa, 2014, p. 205). As such, processes that begun at the turn of the 20th century continue to weaken the technical performance of bicycles as a viable mode of transport. Moreover, car use is further habituated and normalised.

There is however, some future potential bicycling associated with changes in urban form. While sprawl has increased, at the same time there has been densification in some spaces, especially those close to the city centre. Using data from the City of Johannesburg, such as applications for rezoning and subdivisions, Ahmad and Pienaar (2014, p. 103) find densification occurring primarily "in the

106 Poor public transport, sprawled urban form, and pervasive automobile social and material infrastructures are also other important reasons for car use.

northern suburbs of the city and within the 'ring' of highways to the north and south of the CBD [central business district]." These are potentially spaces where bicycles could be used on their own for convenient short trips.

Nevertheless, it should be said that even with sprawled urban form, bicycling can be a feasible transport solution when combined with public transportation (Pucher and Buehler, 2012). This is because "public transport can be seen as a means to dramatically extend cycling's speed and spatial reach" (Kager, Bertolini and Te Brömmelstroet, 2016, p. 208). In this line Kager, *et al*. (2016) have recently argued that part of the success of bicycling in the Netherlands is the way in which it is seamlessly integrated with trains. Furthermore, another technical innovation – electric bicycles – could with greater adoption reduce the level of effort associated with travelling long distances. A main limitation currently is that electric bicycles remain expensive and rare in Johannesburg. One reason that a niche technology can diffuse more widely is due to "internal drivers… [such as] price/performance improvements" (Geels, 2005a, p. 685). From this standpoint diffusion may take some time.

In concluding this section, transitions from one socio-technical system to another can be imagined as a dynamic, or a dance involving three partners. One partner is the incumbent dominant socio-technical system. This particular partner can be dislodged if it develops internal weaknesses or if it produces consequences that are deemed unacceptable to society. I showed that since the 1990s neither of these outcomes have occurred with sufficient force to weaken automobility. A second partner is landscape developments, which can put pressure on the dominant socio-technical system. Here I showed that inequality and continued urban expansion have continued to undermine bicycling and therefore in another direction supported car use. These then can be understood as examples of "reinforcing landscape developments [which] have stabilising effects on the regime and form no driver for transitions" (Geels and Schot, 2007, p. 406).

However, in the long term, if the ongoing densification in Johannesburg continues, coupled with policies and practices for integrating public transport with bicycle use, bicycling might become more feasible. The third partner in the dance of socio-technical transitions is the insurgent niche technology. This partner can emerge to greater societal use if it has developed sufficiently. I showed that this process is still at its very early phases, hence my phrase, "bicycling is in embryo".

9.6 Conclusions

For about forty years, bicycles were a dominant transport solution for the working classes in Johannesburg. Tight interrelationships between the regime, niche and landscape levels contributed to this high level of bicycle use. Yet even as there were high levels of cycling, the practice was suboptimal plagued by weak internal rationales and ongoing competition from insurgents. The way in which cycling as a social-technical system comprising many elements such as technology, symbolic meanings and infrastructures was configured, was therefore weak from the outset prone to unravelling. Here a contextual characteristic – socio-economic inequality that endures – provided an underpinning of this weak configuration as it produced associations that were not inclusive across population groups. Another context-specific landscape development, apartheid inspired spatial form, further undermined the practice.

At the same time, other alternatives that proved more competitive to cycling developed – car use and public transport. As they did, they co-evolved within the attributes of Johannesburg. We saw that in the last historical phase (where actors tried to increase bicycle mode share) while there weaknesses with actor-networks coupled with strengths of alternatives, contextual barriers provided significant resistance. Finally, Johannesburg then suggests that inequality is a poor substrate upon which to build everyday cycling. Future studies should monitor the fortunes of everyday cycling given the possibility of a revival of proponents of the practice.

The following chapter explores comparatively across the study sites, how different or potentially similar contextual characteristics produced symbolic meanings with their respective influences on bicycle mode share.

Chapter 10. Analysis of changes in symbolic meanings about everyday cycling in Johannesburg in spatial historical comparison

10.1 Introduction

The purpose of this chapter is to compare the historical transitions in everyday cycling in Johannesburg with those in Amsterdam, Beijing, and Chicago. Specifically, the intention is to engage with the overarching research question on how contexts shape sociotechnical transitions with associated formation and changes in symbolic meanings.

Recall that as per the discussion in chapter 4, a transition is defined as a fundamental transformation in the provision of a societal function. In chapter 9, these transitions were identified as the widespread diffusion of everyday cycling up to 1935 and then a subsequent decline as the system of automobility (along with public transport) overtook cycling. While these were the most significant with respect to changes in bicycle mode share, I also examine two other periods in the 19th century and between the late 1990s and 2016. In these other periods, bicycles occupy a niche status but their situation is intimately connected to the others so I also subject them to analysis. The chapter is organised following these four historical periods.

As a reminder, I use the multiple-level perspective as a framework for the analysis where change from one way of providing for a societal function is understood to occur as a result of dynamic interactions in three domains. The first one focuses on the state of an incumbent socio-technical regime. It asks the analyst to examine any weaknesses of an existing regime as manifest in internal technical challenges or negative societal outcomes. A second explores how landscape characteristics and developments may strengthen or weaken an incumbent regime creating an opportunity for alternatives to emerge. Thirdly, pertaining to alternatives, an insurgent socio-technical niche may emerge if it has developed sufficiently at the time when landscape dynamics put pressure upon an incumbent regime, which it itself may be undergoing internal weaknesses. In the conclusion, I argue that a comprehensive understanding of how symbolic meanings are formed and change can be obtained by drawing upon disparate insights discussed in chapter 3 - specifically by analysing the interrelationships between i) cycling experiences, ii) activities of actors in building

up everyday cycling STS or alternatives, and iii) contextual characteristics and changes upon contexts.

10.2 Novelty: Late 19th century

In its earliest history in Johannesburg, from the late 19th century into the first few years in the following decade, cycling was a niche practice amidst other transportation options. It offered a means to distinguish race and class in as much as it was also a practical transportation solution. Why was this case in comparison to other contexts? The table below represents the trajectories in all contexts.

Context	**Trajectory or state**
Amsterdam	Novelty
Beijing	Novelty
Chicago	Novelty
Johannesburg	Novelty

Table 10.2.1: Status of cycling in the late 19th century in all contexts

As in the table above, in all contexts, in the early history of cycling[107], the practice offered its users who were mainly the social elite a means of distinguishing themselves. Examining 'internal' characteristics of the cycling niche, bicycles as well as accessories such as clothes and lights, were everywhere expensive beyond the means of the many. We also saw that bicycle dealers developed visual imagery which depicted cycling in ways that depicted prestige. Therefore, high expense together with actor representational activities, and a common landscape attributes, social-inequality and compact urban form, allowed bicycles to offer prestige to users.

With respect to alternatives, other transportation technologies such as street cars, tricycles, rickshaws, animal drawn transportation, and wheelbarrows were more affordable for the many who were materially worse off in all contexts. Motor vehicle technology was everywhere rudimentary in

107 Here the discussion pertains mostly to the late 19th century and few years in first decade of the following century in all contexts – except Beijing where everyday cycling remained a niche mode for many decades after the turn of the 20th century commanding attention of mostly foreign social elite.

this phase and as such, cars as a private transport technology were not a serious alternative. Furthermore, streets were not yet congested or filled with motor cars moving at high speeds.

What can be learned then from this with respect to how contexts shape transitions and in particular formation of meanings? In all contexts, a common contextual characteristic – inequality provided the structural underpinning upon which actors could produce representations of distinction. Cycling offered social distinction to some. As a system of providing for ground transport then, cycling paled in comparison to other solutions. What is already clear here is that a holistic understanding on formation of meanings about everyday cycling requires weaving together insights from literatures discussion in chapter 3. We are for example asked to pay attention to unequal contexts (from consumption studies), actor representational activities (from social construction of technology and consumption studies), practices of riding (mobilities and social practice theory), conditions of movement (mobilities literature), and bicycles themselves (social construction of technology). I will return to this point at the conclusion.

A policy implication flowing from this is the need to reduce social inequality if there is to be wider utilisation of bicycles for transport. The next section turns to the other major historical transition in Johannesburg; the growth of everyday cycling from niche status. In doing so, it will also examine how inequality and other contextual characteristics shaped changes in other contexts.

10.3 Growth: Early 20th century to mid 1930s

In chapter 9, we saw that up to 1935 in Johannesburg, cycling was a dominant mode of ground transportation for the working classes. The table below shows the status of cycling in other contexts in the same period.

Context	**Trajectory or state**
Amsterdam	Growth
Beijing	Novelty
Chicago	Decline
Johannesburg	Growth

Table 10.3.1: Status of cycling in all contexts - early 20th century to mind 1930s

How do we understand the differences and similarities above in the status of cycling? To organise this analysis, I follow the three dimensions of the MLP and assess how these compared in other contexts. Turning to the niche perspective first, we saw that internal improvements in price and technology allowed greater ownership in Johannesburg as was the case in Amsterdam and Chicago. An outlier in this respect was Beijing where prices did not decline to levels affordable to the working classes, well into 1949.

Secondly, an emulation imperative propelled by inequality also encouraged ownership in Johannesburg as it did in Amsterdam (though to a limited extent) and Chicago where those below the social elite sought to mimic upper classes. In Beijing, due to wars and weak economy, such emulation processes could not initiate and as such cycling remained a niche practice for a prolonged period. In effect, the niche status of everyday cycling in Beijing amidst many other transportation options up to about 1949 was equivalent to the situation in other contexts in the late 19th century. In Chicago, the emulation imperative to acquire bicycles would have been stymied much earlier on by the nature of alternatives as we shall see below. In Amsterdam, while the search for social status motivated some working class acquisition for bicycles, cycling proponents as we saw, were able to construct more inclusive symbolic meanings (symbols of nationalism and enabler of peaceful dispositions) that also sustained inclusive cycling. Consequently, the social elite did not desert cycling in droves as was the case in Johannesburg and Chicago. Thus while the quantitative trajectories in Amsterdam and Johannesburg were similar, some factors underpinning their growth were different. The growth in the former was fuelled by social forces (as we shall see below) toward inclusion whilst the other was suffused with differentiation motives.

Turning to the incumbent dimension, in Johannesburg and Amsterdam, the weak status of alternatives (public transport and automobiles) as we saw, was an important reason for cycling growth. This weakness was manifest in terms of cost, legitimacy, technical performance, and availability. In the other contexts where cycling did not grow, we saw that alternatives were more robust. In Chicago, public transport was not only extensively available but also affordable. A unique process in Chicago was that the system of automobility underwent rapid improvements (such as with respect to price and gains in public legitimacy in the face of opposition due to poor safety records) due to the activities of proponents. The internal improvements of the system of automobility as an insurgent niche allowed social elite to more rapidly migrate over and also usher

in emulation processes linked to the car amongst the working classes. In Beijing, other alternatives to cycling such as pushcarts and not least walking were more affordable for the many in the context of wars and tepid economy.

Examining the landscape dimension in Johannesburg, a moderate urban form, early sudden events (war, droughts, disease and pests) weakened incumbent (animal drawn transportation) in favour of bicycles. Inequality also fuelled the emulation imperative[108] in acquisition of bicycles. Other than urban form, very different landscape developments shaped a similar increase in cycling in Amsterdam. While there was an emulation dynamic fuelled by inequality, landscape characteristic (Calvinist ethics) and developments (growing egalitarianism, World War I, nationalist period in Europe, and hyperinflation in Germany) contributed to the emergence of a more inclusive symbolic meaning about cycling and also enabled greater bicycle ownership in Amsterdam.

What landscape processes were unfolding in the other two contexts where cycling did not grow? In Chicago, we saw expanding urban form. This would have undermined the technical potential of cycling. While urban form in Beijing remained compact, wars and weak economic growth suppressed the possibility of cycling growth. While inequality was a constant in both Johannesburg and Chicago, the status symbol became the car more quickly given rapid improvements as discussed above. To put it another way, it was desire for the car that occupied working class imaginations in Chicago and could be fulfilled much earlier (1920s) than bicycles. Other sudden events in Chicago (World War I and Great Depression) further stigmatised cycling as bicycles were used as transportation options in the wake of austerity.

From this discussion, trajectories that witnessed significant change from the prior historical phase can offer sharper insights into dynamics of change. Examining Johannesburg and Amsterdam which both witnessed growth, reveals contextual differences in ongoing socio-economic inequality in the former and growing egalitarianism (supported by Calvinist ethics and a nationalist period) in the latter. Thus, opposite symbolic meanings were constructed with one embracing all residents (Amsterdam), while the other emphasised social differences (Johannesburg). These differences set the stage for decline in Johannesburg while sustaining the practice in Amsterdam. The distinctions in the symbolic meanings that formed in Amsterdam and Johannesburg, sharply brings into relief

108 As we shall see later, while the search for status comparison enabled growth, greater ubiquity in fact contributed to subsequent declines.

how significance given to objects is shaped by social order. Furthermore, it is not merely an emergent process as some streams of the mobilities literature which foreground complexity suggest. We saw for example, the activities of a cycling association in the Netherlands engaging in activities that helped create associations with national belonging.

Chicago which underwent a plunge in utility cycling rates amongst adults after the turn of the 20th century, demonstrates a similar contextual feature to Johannesburg: inequality. Following the emulation logic, members of the working class in Chicago would have sought out bicycles as with Johannesburg. While this occurred, it was not to the scale of Johannesburg because they had an alternative that could provide anonymity (masking class status): public transport. Moreover, the more rapid development of automobiles enabled the new machine to rapidly replace bicycles in status benefits.

In this historical period, we also see (in)equality (alongside other landscape developments) providing an important platform upon which symbolic meanings about everyday cycling could be constructed.

10.4 Decline: Mid 1930s - 1990s

We saw that from 1935 onwards, everyday cycling declined in Johannesburg. In this period, there were significant variations in cycling trajectories across the other study sites as demonstrated in the table below.

Context	**Trajectory or state**
Amsterdam	Collapse of cycling from mid 1950s, return of cycling from 1970s
Beijing	Growth from 1949, collapse from 1980s
Chicago	Cycling growth in the 1960s, return to automobility in 1970
Johannesburg	Decline

Table 10.4.1: Changes in cycling trajectories in all contexts from mid 1930s to late 1990s

Indeed, the reasons for significant variations elsewhere and stability in Johannesburg is a core

puzzle to be explored in this section. In undertaking this exploration, it is useful to examine particular trajectories separately in conversation with Johannesburg given the gyrations. I will discuss these periods sequentially following historical changes.

10.4.1 Beijing vs Johannesburg

Why did everyday cycling escape its niche status after 1949 in Beijing while in Johannesburg the decline trajectory proceeded apace? I discussed in chapter 7 that a vital explanation for Beijing's streets by the middle of the 1980s being awash in bicycles was due to a landscape transformation: change in governance modes. The Chinese Communist Party (CCP) prioritised cycling over car use and while it might have preferred public transportation, it did not have the requisite resources given a poor economy. The CCP then initiated a series of interventions (including the 1980s market liberalisation) that set cycling on a growth path and subsequently contributed to the collapse of cycling.

What does using this lens then - the effect of governance mode on creating a cycling habitat – reveal about Johannesburg? Firstly, we see that a shift to apartheid deepened socio-economic inequalities heightening conspicuous consumption in favour of the automobile. We also see apartheid spatial form weakening the technical potential of cycling as did public transport subsidies provided to the 'native' population who were then main users of bicycles.

While very different contexts, we then see that between the middle of 1930s and the 1990s, the cycling fortunes in Beijing and Johannesburg were shaped by a similar landscape development: changes in governance models.

10.4.2 Amsterdam's cycling collapse vs Johannesburg's continuing decline

In chapter 6, I showed that a forerunner account of the collapse of cycling in Amsterdam from the middle of the 1950s was the impact of World War II (WWII). I demonstrated that severe deprivations during the war including difficulties using bicycles when there were no other viable alternatives, created associations with poverty. In the context of economic growth after the war, there was a turn to a consumerist society within which the automobile became a symbol of a forward movement from WWII.

While Johannesburg did also witness some material difficulties as a result of the war – such as inability to obtain bicycle parts – the hardships were not as profound since the city was not a theatre of war. WWII did not therefore have as a significant impact in the city in shaping symbolic meanings about bicycles or automobiles. People cycling in Johannesburg during the war – who we saw at this time were primarily the 'native' population – did not suffer in the same way as people living in Amsterdam. Instead, it would have been the difficulties of life under apartheid having a more profound impact in creating negative associations with cycling.

Examining Amsterdam and Johannesburg in this historical period draws attention to the possibility of a similar landscape event producing different sociotechnical transitions given differences in severity.

10.4.3 Chicago and Amsterdam (1960s/70s) vs Johannesburg

In chapters 6 and 8, we saw a resurgence of everyday cycling in Chicago and Amsterdam from the late 1960s. In both contexts, the externalities of the system of automobility generated a search for alternatives with the bicycle returning into frame. In Johannesburg, pressures associated with car use such as congestion were not as pronounced due to the lower levels of car ownership across the entire residential populations given apartheid dynamics. It is worth repeating an earlier quotation to underline the racial disparities in car ownership: "...of the 1.1 million registered motor vehicles on record in 1960, only 100,000 were owned by non-whites" (Lamont and Lee, 2015, p. 473). Moderate externalities as they existed in Johannesburg, were addressed by a major programme of infrastructure allocation.

We also saw that subsequent landscape events (1970s oil crises) accelerated the return to the bicycle in Amsterdam. In Chicago however, not only had the renewed attention on bicycles dissipated by the 1973 oil crisis, these dual shocks on the system of automobility were mild in part because the United States has some "domestic energy resources"(Lieber, 1979, p. 534). The Netherlands, on the other hand, relied heavily on petroleum from the Middle East and therefore was vulnerable to disruptions. Johannesburg and Chicago through national levels processes both had domestic resources that cushioned them from the 1970s oil crises. These phenomena in Johannesburg and Chicago is an instance of what has been described as "the adaptive capacity of the regime"

(Fuenfschilling and Truffer, 2014, p. 773) to landscape pressures.

The transition paths in the 1960s and 1970s highlight the relevance of paying attention to the severity of externalities produced by incumbents, and landscape developments.

10.5 Actors rediscover the bicycle: Late 1990s to 2016

Finally, we saw that the last historical phase in Johannesburg was characterised by resistance to transition. That is, while there was an upsurge of actor-networks in support of cycling in from the late 1990s, there were little signs of mode shift. What can developments in other contexts in the same period shed light into this dynamic? The table below summarises situation in all study sites.

Context	**Trajectory or state**
Amsterdam	Continuing growth from last historical phase
Beijing	Decline (with undetermined post fieldwork indications of growth)
Chicago	Growth
Johannesburg	Resisting a transition

Table 10.5.1: Status of everyday cycling in all study sites since the late 1990s

One answer explaining variations, relates to niche level processes. Unlike Chicago and Amsterdam, in Johannesburg, the cycling niche is very undeveloped with weak social-networks, limited learning processes taking place, and muted visions and expectations of cycling as a legitimate and viable ground transport solution. The situation in Beijing as we saw was somewhat mixed with a strong presence of municipal, national and international organisations. On the other hand, other non-state organisations were not very robust at time of research. However, the emergent private sector firms offering dockless bicycles may represent increased capability given their financial clout and ability to position bicycles more positively in consumer markets. It is also the case that given the relatively short period since the decline, there are fragments of a cycling culture such as knowledge still echoing in the present that could be the basis of further resurrection.

Turning to the incumbent dimension, I also showed that in all of its dimensions, the system of

automobility in Johannesburg has continued to be reproduced further weakening alternatives. This trajectory is similar to the ongoing reproductive processes of cycling in Amsterdam (which have also been strengthened by landscape processes). The negative externalities of car use in Johannesburg, we saw are also moderate. In contrast, Chicago, Amsterdam (especially in the early period of cycling return), and Beijing have experienced severe problems produced by car use such as air pollution, congestion and frayed public realm dominated by system of automobility. The symbolic meaning of car use in Johannesburg – as means of communicating social distinction – is also strong especially in generations that were suppressed under apartheid. This is a continuing disincentive to bicycle use in Johannesburg, as it is in Beijing and Chicago.

Finally, turning to the landscape dimension, we saw urban sprawl and inequality having similar cycling suppressing effects in Johannesburg, Beijing and Chicago (in low income populations located far from places of employment). With respect to inequality, it is worth noting that Johannesburg's levels are much higher than any of the other study contexts. For example, Piketty (2014, p. 327) calculates that "the upper centile's share in 2000–2010 [in China] was 10–11 percent [which was]… much lower than in South Africa [which stood] at 16–18 percent... [and] approximately the same as the United States." Some studies show that inequality has increased in the post-apartheid era (see, for example, Leibbrandt, Finn and Woolard, 2012). In this story of inequality, which limits the democratic potential of bicycling, it is Amsterdam that is the outlier with moderate levels of inequality (Onderzoek en Statistiek, 2013, p. 52).

This comparative analysis of Johannesburg's cycling trajectory since the late 1990s again reveals the role of (in)equality as a contextual attribute upon which symbolic meanings can be constructed. Amsterdam as the more egalitarian site shows that under this condition, more inclusive associations can be created. Chicago demonstrates that cycling can grow under conditions of inequality but with demographic limits.

10.6 Conclusions

This chapter has analysed how contexts affect socio-technical transitions. It has shown that societal structure – with respect to relations of (in)equality – provide a substrate upon which different symbolic meanings can be constructed. Changes in governance modes in Beijing (transition to Communism and then a market-economy), when compared with Johannesburg (change to

apartheid) revealed in sharp relief the integral relationship between structure and agency. This is to say that while there may be systemic processes involved in changes in symbolic meanings about everyday bicycling, these transformations are not simply abstract phenomenon. They are also facilitated by deliberate actor interventions who, in acting, benefit from – and are shaped by – landscape processes and developments in transportation technologies. In another example, as we saw in Johannesburg, influenced by the dictates of their unequal context, automobile proponents deliberately associated car use with prestige, a particular form of citizenship, while at the same time re-framing associated safety concerns. Moreover, an expanding urban form weakened bicycles as a mode of transport validating proponent claims about automobiles, whose technical performance was improving. Campaigns by car proponents were vital, since there were profound public doubts about the car as a viable, safe mode of transport.

The chapter also highlights that similar landscape developments can occur across different contexts but produce different outcomes depending on their severity. Similarly, the extent of incumbent externalities can determine user and proponent reappraisal of alternatives.

This study also supports insights from transitions studies where cultural meanings, beliefs, attitudes and practices are viewed as elements of a socio-technical system. These elements co-evolve and depend on each other (this is the point about alignment). For example, while social inequality, in conjunction with actor activities produced associations of prestige in the use of particular transport technologies in different times and spaces, such associations could not have held purchase without technical development, provision of infrastructures and development of user learning. This supports other scholars who have sought to study how symbolic and affective determinants of transport behaviour interact with more rational-instrumental considerations (see, for example, Lois and López-Sáez, 2009).

Finally, and most importantly, it was evident throughout that a comprehensive understanding of formation of symbolic meanings about everyday cycling required drawing into a single frame, insights from bodies of literature discussed in chapter 3. Which is to say, formation processes could be best understood by paying attention to three dimensions. One dimension, cycling experiences, points to how users perceive the practice given the fusion of person pedalling with technology along with conditions of movement. Another, agent activities, points to the interventions related to the building (or not) of bicycling socio-technical system and alternative ground transport solutions.

Thirdly, contexts and associated changes, points to the attributes of spaces within which cycling takes place such as inequality as well as the changes that may unfold therein. While these are broadly distinct categories, there are interrelationships. For example the cycling experience by including conditions of cycling points to contextual attributes such as topography. A second example is that the activities mounted by agents draw upon or are shaped by contextual characteristics such as the case of colonial era elite in Johannesburg seeking to limit cycling amongst the 'native' population.

The table below shows these dimensions, their theoretical heritage, and examples of some elements within each dimension that contribute to formation of significance about everyday about cycling.

	Cycling experiences	**Agent activities**	**Contexts**
Theoretical heritage	Mobilities, Social practice theory, Social construction of technology,	Multi-Level perspective, Social construction of technology, Consumption studies	Multi-Level perspective Social practice theory, Consumption studies
Elements of formation	This refers to how cycling is experienced as a function of the union between pedalling, technology (bicycle), and conditions of cycling. The last draws attention to the materiality of movement such as surfaces, topography and interactions with other road users.	Activities that build up or unravel a bicycling socio-technical system and alternative ground transport solutions. Examples include advertising (as a way of building symbolic meanings), and enactment of laws as a way of governing use of respective STS.	Characteristics of the contexts within which cycling takes place as well as associated changes. Examples include (in)equality, religious beliefs, wars, and demographic change. This category draws extensively from the concept of a landscape in the multilevel perspective.

Table 10.6.1: Dimensions of formation of symbolic meanings about everyday cycling

Chapter 11. Conclusions and recommendations

11.1 Introduction

This aim of this thesis is to explore rationales for changes in the everyday use of bicycles in Amsterdam, Beijing, Chicago and Johannesburg, and in particular associated symbolic meanings. Following insights from transitions theory, where socio-technical change is understood or theorised to take place over long time scales (Markard, Raven and Truffer, 2012; Lachman, 2013), the analysis was situated in long periods of modal shift, towards or away from everyday bicycling. In chapter 10, using the multilevel perspective in transitions theory, I analysed two key transitions periods involving bicycles in Johannesburg, in conversation with developments in Amsterdam, Beijing and Chicago. This was the rise and decline of everyday bicycling. The first unfolding between the turn of the 20th century to the mid 1930s saw cycling become an important transport solution for the working classes. In the second one of decline (from mid 1930s to 1990s), cycling became associated with poverty and racial inferiority. I also examined two other historical phases in the late 19th century and from the late 1990s to 2016 where cycling occupied niche status given their interrelationships with the former two. The comparative analysis across study sites shows changes and durabilities being due to interlocking processes located at the niche, regime and landscape levels. This chapter considers the implications of this analysis on the literature, and for policy efforts to promote utilitarian bicycling.

In section 11.2 , I reflect on the multidimensional, co-dependent nature of the production and sustaining of symbolic meanings of everyday cycling, the role of landscape features in shaping transition, contexts of transitions and the difference that scale or intensity matters in transitions. Section 11.7 then follows these deliberations to propose some policy recommendations to promote utilitarian cycling in low-cycling contexts. These include, from a context-sensitive perspective, improving the cycling experience as the discussion in section 2.2, developing social networks, weakening the public image of automobiles, using landscape developments to discursively promote bicycling, and reducing economic inequality. I end with a discussion on research limitations and some suggestions for future research.

11.2 Multidimensional model of change

The purpose of this thesis is to explore how contexts shape changes in the everyday use of bicycles and associated symbolic meanings. The thesis enrolled insights from a diverse body of literature into the multi-level perspective in transitions theory as a framework of analysis. I have demonstrated how the formation and change of the symbolic meanings of everyday bicycling can be analysed in three dimensions:

- Characteristics of contexts and changes upon contexts, which may unfold at different speeds and intensities,
- Actor activities as proponents of niche or incumbent technologies. These activities are in turn shaped by contexts and changes to contexts,
- Cycling experiences which draws attention to the 'fusion' of person cycling along with machine and conditions of movement (roads, other road users etc.)

While it is possible to identify how each of the dimensions shape meanings about everyday cycling, these are in fact intertwined. For instance, in the turn of the 20th century in Johannesburg, pedalling (embodiment) increasingly affordable bicycles (technology), which were depicted as working class tools by retailers (agents), in stratified contexts produced associations with poverty, The social elite then migrated over to cars (contexts) that were technically improving and expensive (technology). Increasing car use upon Johannesburg streets would have produced fearful cycling experiences (embodiment) given presence of fast moving cars, in the absence of measures to cater for everyday cycling (conditions of movement).

11.3 Context and transitions

> The bicycle and cycling need always and everywhere to be understood in relation to the societies in which they exist (Horton, Cox and Rosen, 2007, p. 7)

Hansen and Coenen (2015, p. 105) have argued that one way of revealing the role of contexts in shaping transitions is "using comparative methods more frequently to identify similarities and differences across a range of places and scales." By doing this, I was able to draw out the role of landscape features in shaping transitions. For example, in the analysis of why bicycling became stigmatised and declined in Johannesburg after the mid-1930s in opposition to what occurred in Amsterdam, I argued that one reason for this transformation was that inequality propelled users

towards automobiles to establish distinction. Economic inequality has seemingly become a static feature of Johannesburg, apparent from the founding of the urban agglomeration to the end of the research. In contrast, growing egalitarianism supported by long historically enduring Calvinism encouraged continued bicycling in Amsterdam.

Other important differences, which became almost fixed, were the urban form where Johannesburg – as Chicago – acquired a sprawled urban form, whereas Amsterdam for a significant period (especially the central core) remained compact. Thus, this study has also shown how more sedimented features in addition to *changes* at the landscape level explain transitions, as Geels, *et al*. (2016, p. 901) noted recently is the state of art in transitions research.

In addition to inequality, I discussed how other differences across the study sites contributed to different trajectories and practices. One relevant example was the impact of the OPEC oil crisis on destabilising the regime of automobility. Johannesburg and Chicago, which through national processes had developed their own local solutions, escaped the consequences of the embargo relatively unscathed. In Amsterdam, however, the extreme dependence on petroleum from the Middle East countries severely weakened automobile use. This points to the "potential importance of local natural resource endowments for sustainability transitions" (Hansen and Coenen, 2015, p. 99).

Another demonstration of the role of contexts in shaping local practices, and hence the potentials for transitions, was with respect to road conduct, which reflects prevailing social values. In chapter 3, I discussed how scholars of traffic safety cultures suggest that one reason for lower traffic fatalities in Japan is the sense of obligation to the social collective. This may be similar to Beijing, where the history of collective relations appears to shape street conduct. In my ethnographic work as noted in chapter 7, street conduct in Beijing, while on the surface appearing chaotic, is actually characterised by grace and accommodation. Traffic lights appeared to be treated as offering general but not absolute guidelines. As such, road users could observe conditions (such as when traffic lights directed them to wait for others), but if there were no other road users who had the right of way, they would proceed. However, should the timing of their observations be slightly off, leading to the convergence of multiple traffic streams, road users would not seek to injure each other (see, Morgan, 2015 for a video). In contrast, in Johannesburg the principle of social difference governing much social interactions arguably encourages an individualist approach in road conduct. This means

that there is little consideration for others. Therefore, road interactions can be read as moments in which social power is revealed. It is perhaps why in chapter 7 I repeatedly discussed long historically present concerns about road safety – concerns that have not seemed to fade away. It is important to observe, however, that these are not absolute claims suggesting that every street level interaction in both contexts manifested in such dichotomous fashion, reflecting their different underlying social values.

11.4 Scale and transitions

In a review of the state of the field, scholars working in the transitions field observed that in previous research there was "the absence of concrete scalar territoriality in the levels of transitions" (STRN, 2010, p. 18). Due to this, and recent policy focus on the sub-national as the site where cycling interventions are implemented, I chose to focus on urban areas as site of analysis. I was however, repeatedly drawn to not only the national but also regional and international dimensions. For example, the pattern of emergence, decline and resurgence closely followed national, and even international developments. This was evident in, for example, the resurgence of commuter cycling in Chicago, which mimics phenomenon from other urban locations in the United States. It was also the case where renewed actor attention towards cycling in Johannesburg is also manifest in other South African cities. One reason for the similarities within national levels is the role of national policy. We saw that the growth of cycling after the turn of the 20th century into the 1950s in Amsterdam was strongly shaped by national developments. For example national tax policy which created a more egalitarian context. This is in line with Jordan's (2013, p. 121) assertion that much of the growth of bicycle use in the 1930s in Amsterdam took place "without the government assistance that many municipal bodies worldwide now employ to encourage urban biking." The role of the national was also underscored from the mid 1970s in the Netherlands and in the United States (from 1990), when everyday bicycle use surged, national governments provided policy guidelines and financial resources to municipalities in a uniform manner.

The role of other scales beyond the national in shaping bicycling cultures, in particular urban locations, was also evident in how ideas, technologies, and practices circulated in the late 19th century, as they were presented in the last historical period described in all contexts. This may seem to support the assertion that "the potential for sustainability transitions today are, in fact, governed increasingly by transnational relationships and actors/forces located at scales other than that of the

nation state" (Truffer, Murphy and Raven, 2015, p. 64). This also brings to mind the insights of scholars working from a multi-level governance perspective, where a variety of actors at local, regional, national and international scales are believed to influence social life on the same locales (for example, Bulkeley and Betsill, 2013).

11.5 Of magnitude

This study has also revealed that the *intensity* of externalities related to a socio-technical regime or landscape pressures are important in shaping transitions. It is recognised that "if landscape change is divergent, large and sudden ('avalanche change'), then increasing regime problems may cause regime actors to lose faith" (Geels and Schot, 2007, p. 408). In several transition periods, we saw severe landscape events shaping sociotechnical transitions. In the late 19th century in Johannesburg, we saw a constellation of such events – wars, droughts, pests and disease – afflicting animal-drawn transportation. I argued that the turn to motorisation after World War II in Amsterdam can be understood in part as a reaction to the intense material deprivation during the war. The hardship led generations that had lived through the German occupation to associate bicycle use with suffering.

Turning to externalities, in Beijing, as in the rest of China, the rapid rate of motorisation from the 1990s produced environmental, social and spatial consequences of car use in very short order. These stimulated municipal and national return to the bicycle. In contrast, in Johannesburg, while there have been long recurring externalities of car use, they have not yet been significant. Indeed, I argued that while after World War II Johannesburg became automobile dependent, because of apartheid policies restricting the ability of large sections of the population from owning cars, the city did not experience the negative consequences of automobility until democratisation.

The return to the bicycle in Amsterdam, from the late 1960s and 1970s, is an example of both regime externalities and landscape pressures occurring almost contemporaneously. First came congestion, diminishing road safety, and the destruction of the built environment, to create spaces for cars. This was followed by a severe oil shock, which mobilised policy makers and users towards alternatives. In contrast, we saw that while Chicago and Johannesburg were also embargoed from petroleum supplies, the degree of fuel unavailability was not as severe as it was in the Netherlands. An important difference to keep in mind at this time, between Chicago and Amsterdam, pertains to path dependence. Arguably, the negative impacts of automobility were as evident in Chicago as

they were in Amsterdam. Recall, for example the highway construction projects and reports of high levels of air pollution. These were some rationales for actor attentions towards bicycling. In addition to the limited impact of the 1970s oil shocks, the trajectory towards bicycling that begun in Chicago did not have as much historical infrastructures, user habits and associated experiences, and policy memory to fall back upon. This was because everyday cycling in Chicago had declined many decades earlier after the turn of the 20th century. In contrast, Amsterdam had a vibrant utility bicycling culture well into the middle of the 1950s.

11.6 Future research directions

This research has demonstrated that contextual characteristics deserve much attention in socio-technical transitions. In the study, it became evident that societal approaches towards material objects strongly influence the role of bicycles in transport. This emerged clearly in the case of Amsterdam and other parts of the Netherlands with strong Calvinist traditions, which minimise the extent to which conspicuous consumption takes place. There is a possibility that in other European contexts where Calvinism took hold, bicycles also did not become mired in status games. For example, as Cox (2015a, p. 20) argues in Switzerland (where John Calvin preached for some time), up to the end of World War II "the bicycle [did not] become a symbolic identifier of social class". Japan is also another very interesting case, where even though post-war users had the option to switch from bicycles to automobiles, they did not to any significant degree (Oldenziel and de la Bruhèze, 2012, p. 26). It would be interesting in future research to follow these historical anomalies.

Inversely the research has surfaced on how contexts that have a more material orientation tend to shun bicycle use in favour of other more expensive transport technologies. Recent developments in such contexts, as in Chicago (demonstrated in this study), show that one tier of new bicycle users are middle to upper-middle class. Observing other contexts across the world, Horton and Parkin (2012) write of new users that in addition to being "elite" in the sense that they are hardy or resilient to car-dominated road environments, other new users are middle class. Bicycling here is therefore out of choice, but is at the same time linked to urban spatial dynamics, where residential locations proximate to commercial city centres command higher rents. A core dynamic in these contexts is emulation. Theoretically then, it is possible that over time if lower classes "see" the wealthier use bicycles, it may remove the stigma associated with bicycle use. As such, everyday cycling could acquire a more democratic form. It is however possible, as in the turn of the 20th century in many of

these contexts, as was discussed in the thesis, such diffusion might stimulate the "bourgeois" to flee from bicycling. In doing so, much of the power that they hold, as is observed through advocacy activities and even in formal politics, would be directed elsewhere. This would be a stimulating research programme.

Finally, it was noted in the last historical period discussed regarding Johannesburg, there is a small population of middle-class bicycle users. This is notable because there have been limited improvements in the road environment to support bicycling. This is even more confounding because they are a population group that can afford other modes of transport, including private automobiles. I suggest that part of the explanation might have to do with their connections to social networks (both local and elsewhere), where cycling is more normalised. It would therefore be interesting to explore the validity of this hypothesis and if it proves correct, explore the social networks that embolden this demographic to cycle in Johannesburg.

Future work can also seek to understand the possible return of cycling in Beijing. As discussed in chapter 7, there are intriguing accounts that cycling may yet be regaining currency. A possible line of inquiry might examine niche actor strategies in shaping social acceptance and how these intersect with landscape developments. For example examine what is it about the designs and models of the dockless bicycle share system stimulated acceptance and the extent to which this change is sustained. Furthermore, it would be useful to explore the hypothesis that the attractions of this niche characteristic may also have been made possible by the impact of landscape developments such as heightened environmental awareness in the context of high levels of air pollution produced by incumbent system of automobility.

11.7 Policy implications in low cycling contexts

As discussed above, the production of the symbolic meanings of everyday bicycling is multi-dimensional and co-dependent. Given the complex interrelated sources of the production of symbolic meanings of everyday bicycling, one implication from a policy perspective is that interventions to promote cycling need to take a broader perspective focusing on the aforementioned dimensions of change. What might this entail?

Firstly, the experience of cycling can be improved through a range of measures, such as those discussed in section 2.2. However, these interventions, given the role of contexts in shaping transitions, need to be context sensitive. This has been well recognised by scholars in the cycling literature. Highlighting the influence of context-specific factors, Pucher, *et al*. (2010, p. S122) note "the very same infrastructure provision, program, or policy might have different impacts on bicycling in different contexts, making it risky to generalize about the effectiveness of any individual measure." Therefore, while undoubtedly there is merit in learning from elsewhere, solutions will need to be embedded locally. As Truffer, *et al*. (2015, p. 64) conclude:

> Socio-spatial embedding relates to the conditions of specific places, regions, cities, which may be more or less amenable for the promotion of sustainability transitions, because specific cultures, institutions, political systems, networks or capital stocks have developed in these spaces, which enable the actors embedded in them to promote new technologies, develop new life-styles or to try out new policies in support of sustainability transitions.

Secondly, measures to improve cycling experiences are nonetheless first premised on niche-development processes discussed in section 4.5. For example, transforming the road environment is an exercise of power requiring resources and alliances. In low-cycling contexts such as Johannesburg, processes of building up powerful social networks would be primary since these do not exist or are very weak. Indeed, building up niche actors, including processes of visioning might be considered the first important step towards creating everyday cycling cultures.

Thirdly, policy makers need to act to weaken the public image of automobiles. It was demonstrated throughout that the image of everyday bicycling is relationally dependent on other modes of transport. Indeed, the bicycle was invented as an alternative to the horse. Later, when the car arrived, it formed the basis for comparison with the bicycle. At different historical moments, the costs and operational efficiencies of public transport in Beijing either repelled users in favour of the bicycle (Sit, 1996, p. 262; Chen Si, 2009) or attracted users (Zhao, 2014b, p. 1034). In a similar vein Paterson (2007, pp. 124–125) argues that in the emergence of the car in the early 20th century, the association of car use with "freedom and mobility" were integrally related to "not only in terms of the structuring of cities around fixed-line transport networks [of trains and trams], or the way that people's lives were subordinated to timetables, but also as a populist reaction against the monopolistic practices of many of the transport companies." The argument here is that car use was compared not only to the technical capabilities of other transport technologies, but also the way trains organised people's lives and the nature of the industry.

However, there is special resonance with the public image of automobiles. This is in part because of their similarity as private modes of transport conveying individuals but also their historical development where they followed each other closely in emergence (see, for example, Reid, 2015) on this technical and social history. Automobiles, as shown, were used in all the contexts to connote modernity, progress, freedom, individual liberty and wealth. It was these meanings that in part[109] mobilised actors and use. Given the cost of automobiles over bicycles (which is an important reason for their selection to confer status), bicycles can ill compete with cars.

Therefore, successful promotion of everyday cycling would involve a weakening of the image of cars or an alternative framing, such as that developed by the ANWB (see chapter 6). In contexts where the system of automobility is dominant, one can conclude then that imperatives for change may need to emanate outside of the private car socio-technical regime. In this light one solution that policy makers can deploy is to reduce the symbolic production and circulation of meanings associated with automobility. How to limit if not eliminate the production and circulation of meanings about car use?

The meanings of transport technologies are inseparable from their technical capabilities, infrastructures (roads, parking facilities, for example), social use, industry, regulatory systems, knowledge systems (on production and use) and so on. Therefore, intervening in any of the subcomponents affects the overall meaning system. Urban contexts that show growth in everyday cycling do so in part because they implement measures against automobility. For example, comparing the United States on the one hand and the Netherlands, Denmark and Germany on the other, Pucher, *et al*. (2010, p. S121) conclude that the higher rates of bicycling in the latter are due in part to "the much higher cost of car ownership... combined with limited car parking, car-free zones, comprehensive traffic calming, and lower overall speed limits."

However, one part of automobility that is rarely touched by policy (and one where there is precedence in relation to other consumer products) relates to producer circulation of meanings via advertising. Around the world governments in the United States, Australia, New Zealand, United Kingdom, Canada and others have progressively eliminated advertising associated with tobacco use

109 The role of urban form and unavailability of other viable transport modes are also other important factors shaping transport use. We saw, for example, compact urban forms and poor public transit and limitations on private car use in Beijing prior to the 1990s onwards encouraging bicycle use.

after the negative health consequences became clear (McClory and Malcolm, 1997; Telegraph Media Group, 2014; see, for example, Asia News Monitor, 2016). Even though some studies have shown little effect on such bans (Nelson, 2003), particularly with regard to their impact on already-smoking cohorts (Capella, Taylor and Webster, 2008), other studies including systematic reviews, have found that such bans contributed to reductions in cigarette use (Galduróz *et al.*, 2007; Quentin *et al.*, 2007). Now in this moment, when there is a growing global consensus about the negative environmental, health, spatial and social consequences of car use, governments can reduce and eliminate automobility advertising, which is one way through which the symbolic representations of car use are circulated.

Fourthly, related to the previous point, bicycling proponents may take advantage of landscape developments, such as urban densification or growing preference for urban living to promote and frame bicycling positively. As we saw in the study, landscape developments – whether sudden, slow moving or glacial in pace – can weaken incumbent socio-technical regime. They can also influence actor activities both as proponents of incumbent regimes or insurgent niches. However, it was observed that landscape developments cannot initiate a sudden transition, since many of the elements of a socio-technical system need time to develop. If niche development processes have taken place prior to their arrival, they can accelerate the pace of change.

Fifthly, in order to dislodge bicycling from associations of poverty, it would be important for actors in low-cycling contexts to work to address social inequality, particularly economic inequality. In all contexts across time, we saw that the associations with poverty play a major inhibiting factor. In chapter 2, I discussed how Brussel and Zuidgeest (2012, p. 184) argue that in India low-income bicycling populations are poised to move onto other motorised transportation as soon as they can afford to do so. We also saw that there is some evidence that associations with poverty are also affecting the ongoing bicycling renaissance in Chicago. In this developed economy contexts cycling is as fashionable as it once was for the bourgeois in the late 19th century. However, the materially-deprived populations in shun bicycling. This is therefore a global problem not just resonating in low-income contexts. We saw that the link between poverty and bicycle use was formed due to social stratification and the presence of more expensive private ground transportation technology. The imperative to flee to automobility is very powerful because at a psychosocial level, materially unequal societies communicate that human self-worth is integrally related to affluence. Such social difference can be reduced in a wide range of creative solutions. I suggest a few below.

One solution is through social welfare and tax policies that construct a social safety net where each citizen is not materially at sea. The Organisation of Economic Co-operation and Development (OECD) has found that "taxes and transfers reduce inequality in all OECD countries" (OECD, 2012, p. 5). Here transfers might be "pensions, unemployment and child benefits" (OECD, 2012, p. 6) and taxes pertaining to "personal income... [and] (OECD, 2012, p. 7) household tax" (OECD, 2012, p. 7).

More recently Piketty (2014, p. 493) has made a strong argument that the "social states constructed by the wealthy countries in the twentieth century" [through] "systems of taxation and social spending" helped to reduce inequality. In particular, he points out that "the major twentieth-century innovation in taxation was the creation and development of the progressive income tax... which played a key role in the reduction of inequality in the last century" (Piketty, 2014, p. 493).

Reducing social differences where low income earners are lifted from deprivation is important because while not only minimising the social role of material status in communicating difference, it also reduces the imperative for conspicuous consumption even at great negative costs. Scholars have observed this phenomenon where generations growing up under affluence place less emphasis on material considerations (Blumberg, 1974, p. 486).

Such interventions to reduce inequality if implemented would likely take sometime to develop. This study suggests that in the short term even within unequal contexts, there are options to grow utility cycling. Above, I argued based on the study, that materially deprived populations and what Veblen (2009) termed the *nouveaux arrivés* to describe those that had recently exited low income brackets are unlikely to shift to cycling given the demands to display social status. We saw that a key dynamic in the turn of the 20th century in Johannesburg was working class adoption of utility cycling. While this transition was enabled by diminishing bicycling costs, desire to emulate upper classes for whom we saw the bicycling was also a means for status display was a key imperative. Observing similar dynamics in the same period across several European cities, Oldenziel et al. (2016, p. 12) remark "In the 1920s, when workers and civil servants could afford bicycles for the first time, urban cycling's standing among the elite faltered." Policy-makers can then learn from this history and offer bicycling incentives as discussed for example in Chapter 2 to middle to upper middle class populations. This cohort as secure materially is under less pressure to communicate

status through objects. Furthermore, as a group able to afford automobiles, they would have a longer exposure to the limitations of car use such as experiences in traffic congestion. Greater bicycling amongst this demographic could then generate desire to cycle amongst aspirational groups.

Of course reducing social inequality to enable bicycling is not a sufficient condition on its own. Indeed, other countries have managed to reduce their share of social inequality while witnessing declines in rates of bicycling. A relevant example here is Sweden. Piketty (2014) shows that from 1903 onwards, the share of the income taken by the top 1% earners out of the total national income generally declined steadily until 2005. In Stockholm, while bicycling grew steadily, rising to 70% of the mode share of overall traffic during World War II, it plummeted to under 1% in 1970 (Emanuel, 2012).

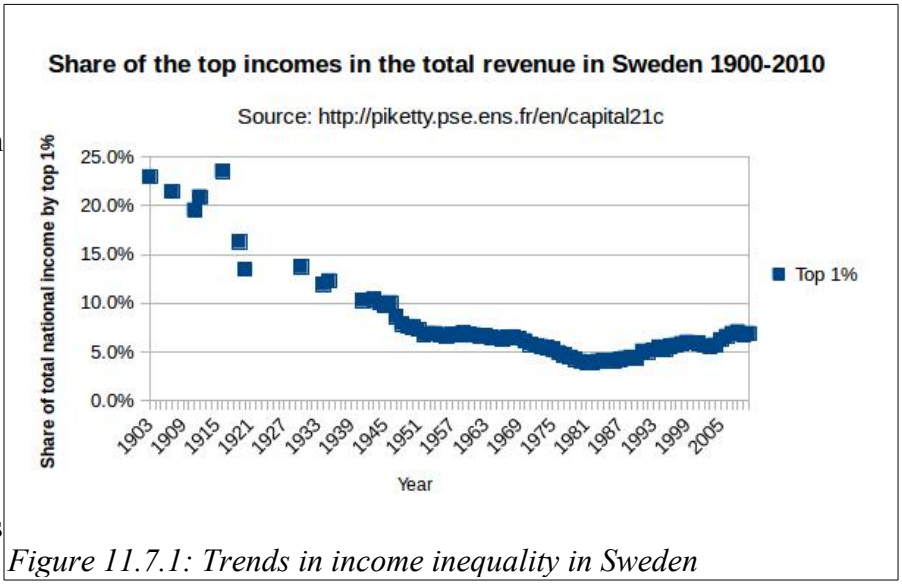


Figure 11.7.1: Trends in income inequality in Sweden

We can trace a similar development in Denmark using Piketty's (2014)income inequality data, which also shows declining trends from 1903 to 2008. As in Stockholm, after a period of steady growth into World War II, rates of bicycle use in Copenhagen declined in the post-war era (De la Bruhèze, 2000, p. 2), especially in the 1960s (Gössling and Choi, 2015, p. 107), though not to Stockholm's low levels.

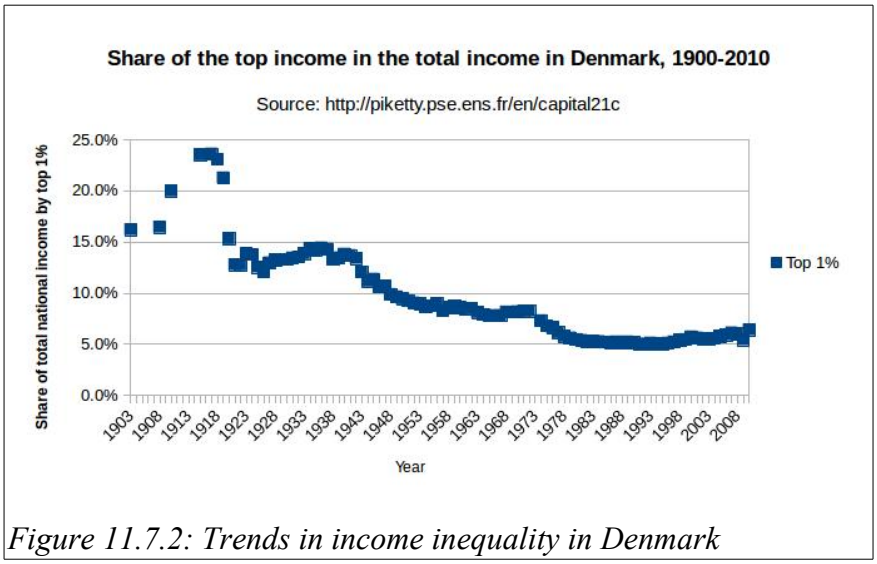


Figure 11.7.2: Trends in income inequality in Denmark

It is beyond the scope of this study to fully explain the collapse of bicycling in Stockholm and Copenhagen after World War II. Doing so would require understanding complex interlocking phenomena pertaining to alternative transportation options (technical strengths, power of social networks, associated promise and so on), landscape developments and the nature of bicycling as a socio-technical system (such as how well the social networks and infrastructures of bicycling had developed prior to World War II). However, some studies have recently pointed to some explanations (Emanuel, 2016a, 2016b), which suggest that while the growing egalitarianism would not have led to a stigmatisation of bicycling, other rationales weakened bicycling.

By way of example with Stockholm, Emanuel (2016b, pp. 149–154) suggests that a sprawling urban form (which commenced in the 1930s and 1940s through state support and continuing well after World War II), combined with investments into an extensive public transport and private car system weakened everyday cycling. That is, policy support into suburbanisation weakened the technical potential of bicycles. In this urban form, the pre-World War II popularity of bicycling occurred only when the alternatives (public transport and motoring) were weakened by landscape developments: economic depression in the 1930s and World War II austerity measures (Emanuel, 2016b, pp. 149–154). Here then, while an emergent egalitarianism would have supported bicycling, it would have been unlikely to do so as the objective material conditions were worsening for bicycling as cycling would have been getting physically strenuous and dangerous as roads were filling up with motor cars.

11.8 Cycling futures for Johannesburg

As Johannesburg is the primary study site, it is useful to consider the potential for cycling in the future. The cracks of opportunity might occur due to developments at the regime, landscape and niche levels. Firstly, users and policy makers could search for alternative solutions if there were internal technical problems with cars. This seems unlikely, at least in the short term, if we examine two potential sources of weaknesses. With regard to performance, the automobile industry is constantly innovating – presenting new technical advances that increase the performance of cars and moderate their externalities. For example, Wells, *et al*. (2011, pp. 133–134) argue that investments into electric powered technologies and other fuel-efficient solutions allow the automobile industry to shield cars from environmental critiques, and as such from demands for more radical change. Nevertheless, I argued that one reason for the durability of car use in

Johannesburg is because the city has not yet sufficiently experienced the negative consequences of car ownership. This may change with greater car ownership. Congestion, air pollution and other related ills could push residents in Johannesburg towards other options. Furthermore, it may provide policy makers in city council and others greater legitimacy to enact more strident measures against car use. In such a scenario, the distinct value of cars in general may also wane (though there may be even more exclusive models to satisfy this requirement), motivating users to seek out alternatives. Indeed, in contexts with high penetration of car ownership, younger generations have been found to switch to other consumer goods (Geels *et al.*, 2011, p. 355). These younger generations "perceive the car in terms of being 'a means to get from A to B', rather than having the connotations of status and image familiar in earlier times" (Geels *et al.*, 2011, p. 355). From a niche perspective, the integration of bicycling with public transport, coupled with the adoption of electric bicycles (which may require policy subsidies) and growing densification, would weaken the spatial obstacle. These policy solutions would be premised on a more powerful ecosystem of everyday bicycling proponents, than as per the discussion in chapter 9. Lastly, landscape developments such as increasing equality could reduce the imperative for conspicuous consumption opening the way for the humble bicycle. Signals of abrupt climate change may also turn the tide away from fossil-fuelled technologies.

11.9 Limitations of the thesis

In a review of criticisms of the methodological approaches, followed by studies using the multilevel perspective, Geels (2011, p. 36) noted that some scholars were concerned with the lack of tight methods. While he drew attention to some possible solutions, such as "comparative or nested case studies, event-sequence analysis, network analysis, even-history methods, and agent-based modelling" (Geels, 2011, p. 36), he still argued that "the research of complex phenomena, such as transitions, cannot be reduced to the application of methodological procedures and will always contain elements of creative interpretation" (Geels, 2011, p. 36). My solution, as discussed in chapter 5 was to adopt a comparative approach as a way of increasing reliability. Furthermore, I focused on Johannesburg for more in-depth study, including searches for primary information. This meant that I relied on secondary information, especially for developments pertaining to older historical periods for the other study sites. I pinned the reliability of the secondary studies on their mostly being peer reviewed studies wherever possible. Still, since their data collection approaches were not similar to mine, in some cases, as Geels (2011, p. 36) points out, I resorted to "creative

interpretation" about what may have happened in a particular context depending on patterns elsewhere.

A second limitation pertains to weaknesses in language. In the selected study sites – in particular Johannesburg, Beijing and Amsterdam – I am not fluent in other languages spoken and written there in these areas, such as Afrikaans, Zulu, Sotho, Mandarin and Dutch. This therefore contained my data sources to those in English. Future studies, especially in the case of Johannesburg, which is the primary study, could therefore examine other records where available to ensure that accounts from other population groups that may have maintained records in other languages are reflected in the empirical narrative. Given the relationship between the written and power in the early history of Johannesburg, this would be vital. I believe data from Amsterdam, given the wider availability of records in English was well represented. While there was a reasonable availability of data in English from Beijing, there were gaps in the literature pertaining to certain historical stages where I could not locate many studies in English. The specific relevant range is from the turn of the 20th century to just after market liberalisation in the late 1970s. See other limitations discussed in chapter 5.

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IX. Appendix A: Interview respondents

1. Amsterdam

Name	Role at time of interview	Interview date
Marc van Wouden	Bicycling campaigner with Amsterdamize	15 June 2014
Dr Manuel Stoffers	Cycling history academic	17 June 2014
Rob Smiers	Staff member in the City of Amsterdam involved with bicycle policy	18 June 2014
Herbert Tiemens	Bicycling planning officer at Region Utrecht	18 June 2014

Table 11.9.1: Respondents in Amsterdam

2. Beijing

Name	Role at time of interview	Interview date
Innes Brunn	Bicycling advocate and bicycle shop owner at Natooke	5 November 2015
Claudio Rebuzzi	Bicycle shop co-owner at Bamboo Bicycles Beijing	7 November 2015
Yin Zhifang	Official at the China Academy of Transportation Sciences	9 November 2015

Table 11.9.2: Respondents in Beijing

3. Chicago

Name	Role at time of interview	Interview date
Mark Mattei	Bicycle shop owner – Cycle Smithy – which has been open since 1973	9 July 2014
Ben Gomberg	Former Bicycle Coordinator in the City of Chicago. Worked in the city from 1996, for 17 years	30 June 2014
Howard Zar	Former board member and volunteer of the then Chicagoland Bicycle Federation – now known as the Active Transportation Alliance	1 July 2014
Dr Lyndon Babcock	A founder of the then Chicagoland Bicycle Federation	19 June 2014
Lee Crandell	Former staff member of the Active Transportation Alliance. At time of interview worked at a neighbourhood business and residential association – Lakeview Chamber of Commerce	27 June 2014
Maria Barnes	Former grassroots organiser of the Chicago Critical Mass and co-owner of a bicycle shop – Uptown Bikes	27 April 2015

Name	Role at time of interview	Interview date
Randy Neufeld	Founding staff member of the Chicagoland Bicycle Federation – now known as the Active Transportation Alliance	1 July 2014
Rebecca Resman	Former staff member of the Active Transportation Alliance	26 June 2014
Jim Merrell	Staff member of the Active Transportation Alliance	22 April 2015
Melody Geraci	Staff member of the Active Transportation Alliance	22 April 2015
John Greenfield	Journalist at *Streetsblog Chicago*, former bicycle messenger and bicycling campaigner	21 April 2015
Michael Burton	Former Chicago Critical Mass organiser and grassroots bicycling campaigner	21 April 2015
Nancy Fagin	A bicycle commuter in the 1970s in Chicago	20 April 2015
Olatunji Oboi Reed	A bicycling campaigner in the south side of Chicago with Slow Roll Chicago	23 April 2015
Steve Lane	Organiser with Critical Mass Chicago and community activist	1 May 2015
Alex Wilson	Former Critical Mass Chicago organiser and bicycle shop owner	15 July 2014
Paul Kozy	A bicycle shop manager of a bicycle company with a long history in Chicago – Kozy's Cyclery	9 July 2014

Name	Role at time of interview	Interview date
John LaPlante	Former transportation engineer at the City of Chicago	11 July 2014
Mike Amsden	Staff member in the Department of Transportation at the City of Chicago	15 July 2014
Waymond Smith	Bicycle mechanic in the south side of Chicago	22 April 2015
David Smith	Consultant to Department of Transportation at the City of Chicago	30 July 2014
Michael Salvatore	Bicycle shop owner	9 July 2014

Table 11.9.3: Respondents in Chicago

5. Johannesburg

Name	Role at time of interview	Interview date
Rehana Moosajee	Former councillor in the City of Johannesburg and Head of Transport Portfolio in the Mayoral Committee	26 October 2015
Melvin Neale	Critical Mass Johannesburg organiser	13 May 2016
Victor de Abreu	Worked in transport planning in the late 1990s and early 2000s in the City of Johannesburg	19 July 2016
James Murphy	A cycling activist. He orchestrated a bicycle to work day in which I also participated	20 October 2015
Esther Letlahka	Official in the Transport Department, City of Johannesburg	1 September 2016
Matshidiso Shihambi	Official in the Transport Department, City of Johannesburg	1 September 2016
Lisa Seftel	Executive Director of Transport, City of Johannesburg	25 May 2016
Christina Culwick	Researcher at the Gauteng City-Region Observatory	30 September 2016

Table 11.9.4: Respondents in Johannesburg

X. Appendix B: Interview forms

1. Consent form

I, ---------- , hereby agree to participate in the research exploring development of cycling cultures being conducted by Mr Njogu E Morgan for his doctoral studies at the University of the Witwatersrand. I have agreed to be interviewed in my personal capacity.

Mr Morgan has explained to me:

- the aims of the research
- that I may not respond to particular questions should I wish not to, or may withdraw from the research at any point during the interview
- where the research will be published and has offered to send me a copy of the thesis.

I agree that this conversation may be recorded in audio.

Signed: ----------

Date: ----------

2. Participant information sheet

Njogu Morgan

PhD Candidate, NRF SarChi

School of Architecture and Planning

University of the Witwatersrand

njogumorgan@gmail.com

Date: ----------

Dear ----------

Hello.

I am a doctoral candidate at the University of the Witwatersrand in Johannesburg, South Africa. My research is exploring the development of cultures of mobility that embrace cycling for everyday purposes. This research will contribute to policy interests in reducing the environmental impacts of transportation by shifting to low carbon forms, such as cycling.

I would like to request your assistance in this study by answering a few questions. This interview will be no longer than one hour. At any point in the research, should you wish not to answer particular questions or wish to withdraw, you are welcome to do so.

Your participation in this study is voluntary. Furthermore, the interview will be conducted in your personal capacity based on your knowledge of the subject. The research will be published in my thesis, which will be available online at the University of the Witwatersrand's website. If you would like, I can also send you a copy of the final thesis.

If you have any questions, please feel free to contact me after the interview.

Sincerely

Njogu Morgan

XI. Appendix C: Ethics clearance certificate

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Morgan

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER H14/02/06**
PROJECT TITLE	Cycling everywhere: A exploration of the development of mobility cultures that embrace cycling for everyday purposes.
INVESTIGATOR(S)	Mr NE Morgan
SCHOOL/DEPARTMENT	Architecture and Planning
DATE CONSIDERED	21 February 2014
DECISION OF THE COMMITTEE	Approved Unconditionally
EXPIRY DATE	19/03/2016

DATE 20/03/2014 **CHAIRPERSON** _____ (Professor T Milani)

cc: Supervisor : Prof P Harrison

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10003, 10th Floor, Senate House, University.

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to completion of a yearly progress report.**

_____ 22 /feb / 2014
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES