Reclaiming the Right to the City

Towards Equitable Active Transport in Glasgow

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DECLARATION

This dissertation is my own original work and has not been submitted elsewhere in fulfilment of the requirements of this or any other award.

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ABSTRACT

A modal shift to active travel is increasingly being recognized as critical to reducing transport emissions and transitioning to net zero. The Scottish Government's transport policy identifies sustainable transport as crucial to creating a healthier, fairer, and more prosperous Scotland, with 10% of transport budget allocated to active travel. Glasgow has successfully prioritized active travel infrastructure by integrating it with city-wide transformations. However, Glasgow's long-standing history of deprivation and legacy of planning mistakes calls into question the effectiveness of its planning paradigms in addressing policy goals and delivering infrastructure equitably. This research critically evaluates Glasgow's active travel policy and delivery through the lens of social justice using Henri Lefebvre's Right to the City. The concept of the right to the city has played a critical role in mobilizing social movements and academic interest to address and resist spatial inequities of neoliberal urban infrastructures. The research uses combined qualitative and quantitative methods to address the fundamental question of who is excluded from the right to mobility. Literature and policy review, semi-structured interviews, and macro-micro spatial analysis has been employed to understand the policy, planning, and delivery of active travel infrastructure. Qualitative methods suggest a complex delivery process involving multiple stakeholders and highlights an inadequate consultation process that overlooks the strength of collective local decision-making. GIS-based spatial analysis indicates the inequitable distribution of active travel infrastructure while neighbourhood level walkability analysis reveals a mixed picture that calls for further research. This research contributes to knowledge in the field of active travel by re-politicizing the dynamics of policy implementation towards advancing critical perspectives on transport equity. It reiterates the need for collective action and collaborative processes to reclaim the right to active mobility thereby the right to the city.

Keywords: *Active travel, equity, social justice, climate justice, right to the city, urban planning, transport planning*

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Contents

LIST OF ABBREVIATIONS

RTTC- Right to the City

AT- Active Travel

ATI- Active Travel Infrastructure

LA- Local Authority

PP- Planning Process

SG- Scottish Government

GCC- Glasgow City Council

PFE – Places for Everyone

MV- Motor Vehicle

CPP- Community Planning Partnerships

ATS- Active Travel Strategy

GTS- Glasgow Transport Strategy

LEZ- Low Emission Zone

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Chapter 1

1 INTRODUCTION

1.1 Problem Statement

Concerns over climate change peaked in the early 1970s with the scientific community increasingly favouring the warming theory. This was also the time when governments across the world chose an extreme anti-regulatory approach to neoliberal globalization which set up the course for deepening climate change while widening inequality. What happened over the next few decades was the creation of a global economy and a period of rapid urbanization. This neoliberal course of urbanization strategically expanded geographical boundaries (of urban areas) and physical assets to gain economic benefits. A key element of this expansion was associated with the global value chains (GVC) through the expansion of maritime ports and the need to gain financial and public support for large-scale infrastructure(Jaffee, 2019).

A range of scholars in geography, urban studies, political economy, and elsewhere echo the fear that the growing power of capital and its pursuit of neoliberalization will increasingly disenfranchise the mass of people, excluding them from the decisions that determine the course of globalization, thus encouraging authoritarianism and undermining democracy (Purcell, 2002). The resultant political and economic restructuring has a significant influence on urban policies that shape our cities. Hence there is an urgent need for research and action to conceive strategies for resisting this and reclaiming the collective power to shape our cities.

A key element of neoliberal cities is their extensive highways that lead to suburbanization and a restructuring of not just the city but the whole metropolitan region (Harvey, 2018). This has allowed the disproportionate use of private cars and has made road transport an essential part of urban life. The climate crisis that we face today quite starkly illustrates the failure of this neoliberal infrastructure. Transport accounted for 29.8% of carbon dioxide emissions in the UK in 2020, remaining the single largest contributor to emissions (Department for Transport UK, 2021). A closer look at the transport sector reveals that private cars and taxis account for over 70% of transport emissions.

Reclaiming road space from vehicles and reinstating active modes of mobility can be a great tool to reengineer our cities to be more sustainable and equitable. Walkable cities have shown a high correlation with improved air quality and narrow income disparity among various other benefits. Walking and biking along with activities that use physical exertion for movement are broadly termed Active Travel (AT) (Cook et al., 2022). Active travel being the most affordable form of mobility can be considered an equalizing mode. In theory, it can delivery accessibility to the most disadvantaged populations and decentralize traditional business districts to fundamentally create to new ways of production of space and hence new forms of urban spaces. There has been global interest in the promotion of active travel recently, but much of this effort and associated investment is on creating infrastructure within commercial centres. In the UK, cities are pioneering efforts to improve active travel infrastructure. As with any neoliberal infrastructure, Active Travel faces the threat of extreme commercialization and failing to deliver access to the most vulnerable populations.

In this context, French Marxist philosopher, and sociologist Henri Lefebvre's idea of the 'right to the city' (RTTC) emerge as a tool to respond to neoliberal urbanism and empower urban inhabitants. Lefebvre's political and intellectual project, inspired primarily by Marx, Hegel, Nietzsche, and Heidegger, was to offer a critique of existing society to pave way for another society, a possible world beyond capitalism, the state, and consumer society (Purcell, 2014). Although this society could be associated with socialism, Lefebvre understood socialism not as bureaucratic but as a collective self-governing society towards the dissolution of the state (Purcell, 2014). Social movements and academics have adopted RTTC, both the concept and the slogan as a means of articulating and resisting spatial inequalities in the capitalist city. Thus, RTTC offers a lens to evaluate active travel both as a neoliberal infrastructure project and as a potential agent for urban change.

In November 2021, Glasgow hosted the 26th conference of parties (COP26), bringing together 120 world leaders in a conference considered pivotal to the future of the planet. Glasgow has projected itself as one of the greenest cities in Europe, with its ambitious aims of achieving net neutrality by 2030 and is investing significantly in active travel infrastructure (ATI). Among its plans are to add 270 km of segregated cycle paths and transform the city centre into a pedestrian first zone. Thus, Glasgow as a case study offers immense potential to understand the ATI planning process (PP) and investigate

the spatial equity of its delivery. The question of who is excluded from the right to active mobility, and thereby the right to the city becomes the crux of this research.

1.2 Aims and objectives

This research aims to evaluate Glasgow's Active Travel policy, planning process (PP), and infrastructure delivery through Henri Lefebvre's Right to the City (RTTC) theory. The study frames active travel as a potential agent for urban reformation while investigating the equitable distribution of ATI in Glasgow. The objectives of the study are to:

1. Synthesise the key ideas of RTTC and draw parallels between RTTC, equity and active mobility
2. Understand the Active Travel policy and consultation process in Glasgow
3. Critically evaluate Glasgow's Active Travel Strategy
4. Evaluate the spatial distribution of Active Travel Infrastructure (ATI) in Glasgow
5. Analyse and compare neighbourhood level walkability of selected sites in Glasgow

1. 3 Dissertation structure

This thesis is structured into seven chapters. The first chapter introduces the rationale of the thesis and defines its aims and objectives. Chapter 2 and Chapter 3 are derived from existing literature. Chapter 2 introduces the key concepts and theories discussed in this research. This includes an in-depth look at Henri Lefebvre's Right to the City and sets the premise for Active Travel, its relevance and importance. Chapter 3 introduces the case study area and covers its historical backdrop, current scenario, policy context, and proposed active travel strategies.

Chapter 4 outlines the methodological framework derived from the learnings developed in Chapters 2 and 3. This chapter develops on existing methods and previous research to form a contextual understanding. The results of the analysis are presented in chapter 5 highlighted through diagrams, maps, and tables. This chapter is divided into four sections based on the methodology applied- policy review, interview analysis, macro spatial analysis and micro spatial analysis.

Chapter 6 brings together the results of different methodologies to develop an understanding in response to the questions posed by the research objectives. It further discusses the findings in the context of other studies and cities. It also proposes recommendations based on the findings of the study. The final chapter (7) outlines the limitations of the study and proposes the possibilities for further research. This chapter ends with concluding statements from the author. Figure 1 visualizes the structure of the thesis.
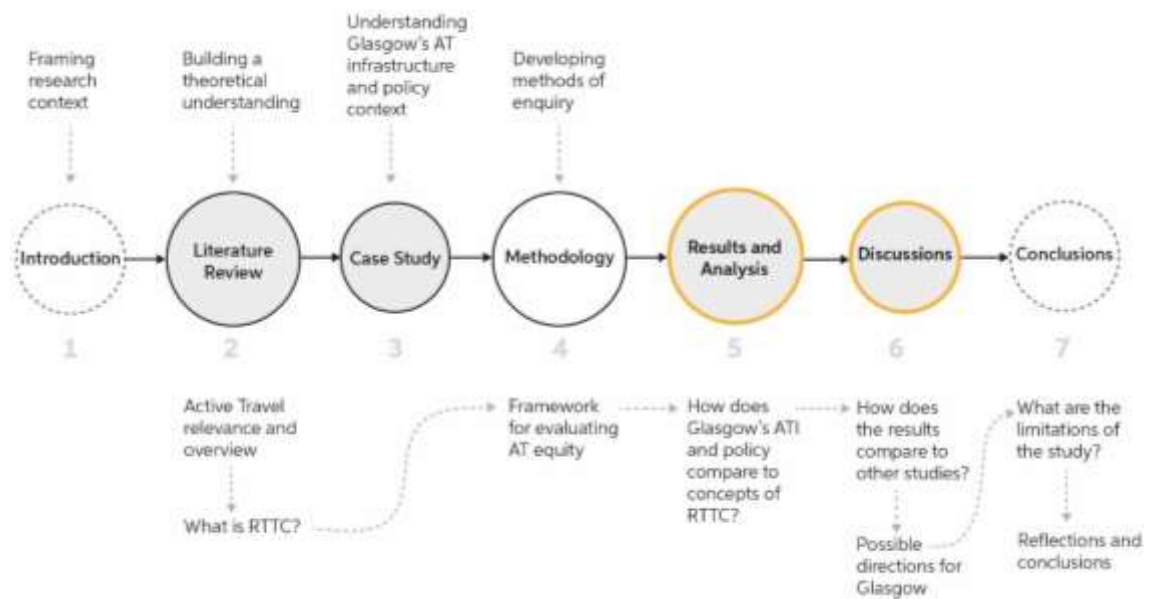
Figure 1: *Structure of the thesis.*

2 LITERATURE REVIEW

This chapter covers two distinct areas of literature reviewed for this study. Firstly, it formulates the theoretical basis for this thesis. This is done by a close reading of Henri Lefebvre's Right to the City to understand the key concepts that underpin the idea and draw parallels with equity and active travel. Secondly, it explores active travel and its role in creating sustainable and equitable urban environments. At the end of this chapter, the knowledge gaps and major research questions that guided the dissertation are presented.

2.1 Climate Change and Social Justice

Power and the struggle to achieve it have been an integral part of human existence. Today, with the impacts of climate change more evident than ever, there has been a growing discussion on climate change adaptation and climate justice. Urban areas with their diverse demography with varying vulnerabilities pose the question of who will be impacted by climate change and how to address concerns of an equitable adaptation policy. Research has time and again shown that the impacts are unevenly distributed with vulnerable communities disproportionately affected by climate change. Climate adaptation has also led to a slew of policy and infrastructure changes at an unprecedented pace. This has led to a stream of scholarship that questions the technocratic, managerial approach to urban planning that overemphasizes infrastructural and regulatory solutions while marginalising socio-economic inequalities that produce unequal adaptive capacity (Chu and Cannon, 2021).

Social justice as an element of planning theories has helped move beyond space as an objective concept to reflect social realities and subjective views. *Dadashpoor and Alvandipour* (2020) identify five schools of thought on social justice in planning studies. This includes equity, communicative, just, critical-spatial, and southern schools of thought. The "critical-spatial" school of thought is considered a response to capitalistic power structures that result in marginalization and inequitable distribution of urban resources. Henri Lefebvre's 'Right to the City' plays a central role in the exogenous dispersion of this school of thought.

2.2 Right to the City

Figure 2: An illustration of RTTC (Source: United Cities and Local Governments)

The Right to the City is both an idea and slogan first proposed by Henri Lefebvre in his 1968 book Le Droit à la Ville (Gupta and Kavita, 2020). Lefebvre proposes this as a radical way to collectively transform our cities against the extensive commodification of urban space. Lefebvre argues that when economic systems value urban space mainly for its exchange value, the true potential of urban life is suppressed (Alisdairi, 2014).

The concept of the Right to the City has been recalled and celebrated by social movements, activists, and the academia. An effort to conceptualize the right to the city to promote social justice, sustainability, and inclusion in cities (as part of a broader human rights agenda) was led by UN-HABITAT and UNESCO. While in Brazil the concept has been codified into the national law, community organizations in the US have formed the Right to City Alliance (Purcell, 2014). The idea has also fascinated academics with multiple conferences and a plethora of scholarships. This has led to multiple interpretations and varied understanding of the concepts originally proposed by Lefebvre. Across this spectrum of interpretations, there are some values that all versions of RTTC share. The value of everyday experience, the power of its inhabitants, and the use value over exchange value are core ideas that remain unchanged. RTTC is

also understood as the inhabitant's struggle to augment the urban environment against the property rights of owners and market values. Urban Geographer David Harvey (2018) puts it as "The right to the city is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization. The freedom to make and remake our cities and ourselves is, I want to argue, one of the most precious yet most neglected of our human rights."

Understanding Lefebvre's original ideas are critical to understanding the right to the city theory. Lefebvre's ideas can only be fully understood in the context of his larger body of work on space and cities. He uses the spatial triad to conceptualize the production of space as what is seen, what is thought and what is felt, that he termed spatial practices, representations of space and representational spaces respectively (Lefebvere, 1991). The right to the city, according to him allows all citizens to participate in the use and production of urban space. He proposes gaining control over urban social and spatial relations through the control of its means of production, thus allowing its social value to be weighed equally with its monetary value (Purcell, 2002). According to him the only way for a free association to take control of their own life is through the idea of autogestion which refers to democratic participation and self-management. A key aspect of RTTC was the right to appropriation which includes the right of inhabitants to physically access, occupy, and use urban space. Lefebvre seeks to supersede the idea of citizenship (as assigned by the state) to advocate for equal rights for all inhabitants of a city irrespective of where they come from. Another key concept in his writing is the focus on everyday life; according to him, late 20th-century capitalism transformed everyday life into a space of consumption (Alisdairi, 2014). Everyday life is the domain where experiences are shared without class boundaries.

The many and varied interpretations of Lefebvre's ideas of RTTC have led to the term being used as a fashionable marketing slogan for neoliberal development projects. This calls for a return to the original and close reading of his body of work. His ideas are radical, and open-ended and do not guarantee a solution, hence it is quintessential to approach this concept with care and scepticism. While most scholars share Lefebvre's view on the need for an alternative post-capitalist form of urbanization, they differ in the way to approach it. The following section distils the key concepts of RTTC

2.2.1 Key ideas of RTTC

Henri Lefebvre's notion of the right to the city emerges from a system of transformations he identified within the workings of capitalism. The four concepts that are paramount to Lefebvre's idea can be distilled down to "participation", "appropriation", "autogestion" and "value"(Kuymulu, 2014).

Before discussing each of these concepts, it is essential to understand Lefebvre's idea of the process of urbanization under capitalism which he based on the ideas discussed in Marx's *Capital*. According to Lefebvre, the process of urbanization has historically played a role in absorbing capital surplus. Competition forces the capitalist to invest surplus profits extracted from labour to further extract even more surplus by expanding processes of production. This perpetual expansion of surplus production is called the primary circuit of capitalism (Lefebvre, 1995). The capitalist eventually reaches a limit as he explores new sources of labour, means of production, and raw materials. This results in a crisis where further surplus capital cannot be invested profitably. At this phase, the capitalist starts to invest in the secondary circuit, to defer this crisis, which is real estate and construction. Harvey argues that this crisis periodically emerges producing conditions for the flow of capital from the primary to the secondary circuit which has a significant influence on the process of urbanization (Harvey, 1982). The secondary circuit investment is physical in the form of productive physical assets (direct or indirect) such as factories, highways, housing, streets, and parks (Harvey, 2018). Harvey stresses that this over-investment of surplus capital does not take into consideration the real needs of people, instead solely depends on the flow of capital.

Participation

Right to the city becomes an idea to reinstate people as the centre of urbanization. The two fundamental rights that define the right to the city are the citizen's right to participate and the right to appropriate. Participation according to Busà is about reclaiming public space through active citizenship, public discussions, and political participation at the local level (Busà, 2009). He sees participation in RTTC as fundamentally challenging the capital-driven process of urbanization. Lefebvre himself writes about this as the "extraordinary passivity of the people involved", the exclusion of the user from questions about the urban. Lefebvre does not explicitly state that citizens alone must be participants but emphasises that they must play a role that is

central and direct. This is an antithesis to the current liberal-democratic enfranchisement which according to Purcell 'filters the voice of the citizens through institutions of the state' (Purcell, 2002).

Appropriation

The concept of appropriation closely relates to the notion of having access to and using urban spaces. While not as widely discussed as central to the RTTC theory, it deals with the citizen's right to use urban spaces fully and completely in their daily lives. Appropriation can hence be associated with equitable access to public spaces and infrastructure. As feminist geographer Tovi Fenster puts it "it is the right to live in, play in, work in, represent, characterize and occupy urban space in a particular city"(Fenster, 2005). Purcell sees the right to appropriation as the 'right of use' against marginalization and exclusion. Kuymulu also expands this notion as the right to occupy, move freely in streets from any form of harassment, and assemble for political expression as essential to appropriation (Kuymulu, 2014).

Autogestion

While the word itself translates to 'self-management', it typically refers to workers in a factory who take control of its means of production in place of the capitalist; hence considered a direct attack on the foundations of capitalism (Purcell, 2014). Lefebvre extends this idea to all aspects of urban life envisioning cities where their inhabitants come together to control aspects of their production. Autogestion arises when inhabitants refuse to accept passively their conditions of existence, and hence forces themselves to understand, master, and change their conditions (Lefebvre, 1966).

The 'Use' Value

The hegemonic process of surplus-induced urbanization according to Lefebvre reduces the value of space to its exchange value. This leads to a situation where inhabitants who use urban spaces are marginalized to seek 'exchange value', thus reducing the inhabitant to being a mere buyer of surplus value. The worst form of marginalization is by displacing and excluding inhabitants who are unable to pay the price for this commodified space. Thus, the right to the city is the right of the inhabitants who use the space daily and not of developers, financiers and capitalists who seek opportunities to

realise exchange values for space. Lefebvre seeks the city's inhabitants to mobilize and organize themselves to claim their right to the city. The only way to seek use value for spaces is by creating means of political participation of the people that can create fundamentally new ways of production of space (Kuymulu, 2014).

Lefebvre also talks about the 'Right to Centrality' (role in decision making and physically occupying central urban spaces), Right to Habitat (housing), right to inhabit (irrespective of citizenship) and Right to Individualization in socialization as integral to the idea of RTTC (Jabareen, 2014). Lefebvre was convinced that 'any revolutionary movement attempting to alter urban power relations cannot define an end goal, or an optimal configuration of power, society or space'(Kębłowski, Van Criekingen and Bassens, 2019). This calls for a process of urbanization that constantly evaluates itself without being stagnant in achieving a preconceived version of 'urban utopia'.

2.3 Active Travel
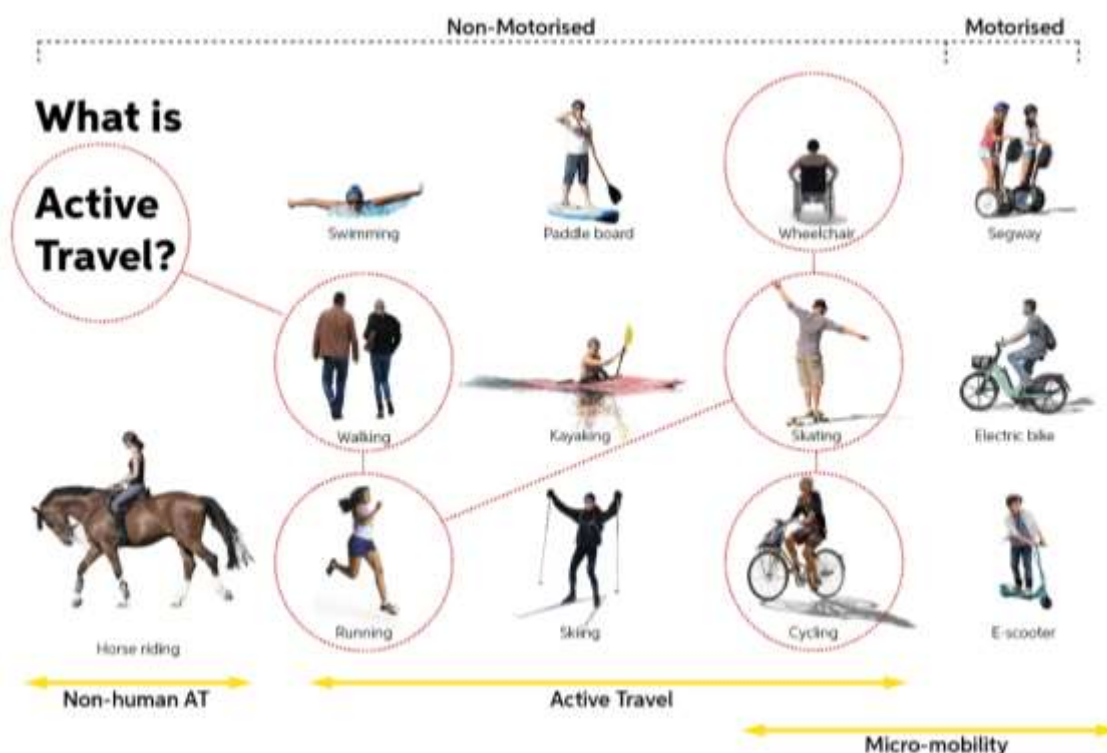
Figure 3: Taxonomy of active travel modes and related categories based on Cook et al (2022).

Cities around the world are changing at an unprecedented pace. New demographic patterns with aging population, nuclear families, and extreme inequity defines urban

areas today. This has led to an increase in the need for easily accessible services and an environment that promotes social interaction. The new urban has moved past the millennial dream of car ownership as an indicator of social status.

Active travel occupies a critical role in almost all modern discourses of a sustainable city. The concept finds itself at the nexus of a series of multidisciplinary fields ranging from urban design and planning to broader issues of climate change, equity, public health, and social cohesion. In a sense the act of walking/biking is the most equitable form of transport and can hence have an equalizing effect on social life. Many ideas of a modern city, such as the '15-minute city' emphasises on the significance of active travel. A 2022 paper defines active travel as "travel in which the sustained physical exertion of the traveller directly contributes to their motion"(Cook et al., 2022). Although used as an umbrella term, walking and biking are the two major modes of transportation that preoccupy the term 'active travel'.

There has been overwhelming evidence on the health and economic benefits of active travel. This is associated with an increase in physical activity combined with a reduction in car use. Evidence has shown that there is an inverse association between active travel and body mass index (BMI) (Wu et al., 2021). A recent study conducted in Scotland finds that almost 50% of active commuters met the daily target of 30 min moderate physical activity. The study further estimated an annual health economic benefit of EUR 700.2 million for walking to work and EUR 79.8 million for cycling to work (Baker et al., 2021). A carbon emission study from seven European cities found that a person who shifted from car to active travel modes decreased his life cycle CO2 emissions by 3.2 kg per day. Economically, AT can have direct impacts by reducing congestion related economic losses and decentralising the city by supporting business opportunities. Most of all, walkable environments create more sociable spaces with vibrant street networks. This overwhelming evidence has placed AT at the centre of urban issues in cities around the world.

BENEFITS OF ACTIVE TRAVEL

INDIVIDUAL

HEALTH
Immunal boost
Stress relief
Cardiac health and longevity
Stronger bones and Muscles

ECONOMIC
Inexpensive
Save fuel cost
Cheap maintenance

SOCIAL
More social interaction
Social status
Convenient for short distances

-22%
early death risk

with just 15 minute physical
activity per day.

ECONOMIC
Less infrastructure maintenance
Reduced parking space
Better for local businesses
Tourism
Reduced healthcare cost
Investment value

LIVABILITY
Reduced risk of accidents
Better animal road safety
Improved air quality
More parks and public space

NEIGHBORHOOD

ENVIRONMENT

Reduced air and noise pollution
Less concrete/asphalt
Decreased use of non-renewables
Optimised land-use
Urban microclimate improvement
Possibility for porus urban surfaces

-3.8mt
greenhouse gas emissions

reduced per year
if mobility behaviours
accommodated one fewer
driving day per week.

Figure 4: Illustrating the benefits of Active Travel based on the literature study

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2.3.1 A global overview of active travel

The renewed conversation on active travel around the world has resulted in significant new policy and infrastructure. Legislative efforts surround two key areas- infrastructure and behaviour change. Infrastructure includes changes to increase pedestrians and cyclists on road and regulations to limit car use (Pucher, Dill and Handy, 2010). There is a clear correlation between adequate infrastructure such as pedestrian paths, dedicated cycle lanes, streetlights and green spaces with increased active travel patterns (Vich, Marquet and Miralles-Guasch, 2019). Access to local amenities such as restaurants, shops and leisure activities also contributes to increased active travel behaviour.

The United Nations Recommendations for Green and Healthy Sustainable Transport pushes the active travel agenda through recommendations for reallocation of road space, increased active travel budget and embracing micro mobility solutions (United Nations, 2021). A recent report by the World Health Organization finds that walking and cycling can reduce cardio-vascular diseases, cancer related mortality, and risk of diabetes by a significant amount. The European Union's (EU) policy on AT is defined by the 2013 Urban Mobility Package (UMP) which supports EU cities in tackling mobility challenges. In 2019 the Commission gave specific directions to incorporate health strategies in the Sustainable Urban Mobility Plans(SUMP) (Lozzi and Monachino, 2021). The EC has also adopted the Vision Zero program to eliminate the number of traffic deaths because of collision between motor vehicles and pedestrians and cyclists. EU countries such as the Netherlands and Denmark have a very high biking share in urban areas.

2.3.2 Learning from case studies

Netherlands

It is said that there are more bicycles in Netherlands than people. The country has one of the highest shares of bike users with 38% of journeys being made by bikes in cities such as Amsterdam. This is attributed to excellent biking infrastructure with its well-maintained biking paths and parking spaces with high levels of connectivity. Netherlands also has geographic benefits with its relatively flat topography and densely populated areas. AT policy is an integral part of the Urban Planning with the woonerf

(living street) approach prioritising pedestrians and cyclists over cars (Frame, Ardila-Gomez and Chen, 2017). The country also has bicycle highways which are dedicated bike lanes for longer distances. The Netherlands have been constantly innovating its transport policy and infrastructure.

Amsterdam's 2013 Mobility plan proposed radical ideas such as the Plus Nets system. This relooks at road hierarchy from a transport point of view (as opposed to land use) regulating roads to no more than two modes of transport. Progressive policies also include strict liability laws protecting cyclists in case of collision with motor vehicle (where the insurer must pay for damages to the cyclist who do not require mandatory insurance) (Wagenbuur M, 2013). The effective use of adequate infrastructure supported by progressive policy is a key lesson from the Netherlands

Paris and the 15-minute City

The 2020 mayoral elections in Paris set an example for political mileage of AT infrastructure and related urban transformations. The 15-minute city was the key concept which led to successful re-election of Mayor Anne Hidalgo. Carlos Moreno, the key figure behind the idea believes it to be the 'post vehicle era urbanism' (Willsher, 2020). The 15-minute city essentially means a concentration of urban amenities within a 15-minute walking or biking distance. A key policy intervention is the 'Participatory Budget' which allows residents to decide how they want to spend a significant part of the municipal budget (5% to be increased to 25%) (Yeung, 2021). Paris already has 1000 km of biking paths with over one million bike journeys a day. A EUR 250 million budget has been allocated to revamping the biking infrastructure with the aim of completing 180km segregated biking paths (Pechin, 2021). The plan pays particular attention to increase connectivity of peripheral areas to the metropolitan region. The Vélib cycle hire scheme launched in 2007 with a fleet of 20,000 bicycles and 1,800 stations across the city has played a major role in promoting the culture of biking. The Paris model has revived the conversation around the 15-minute city concept and cities around the world are integrating it as part of their urban agenda.

100km of exisitng paths targeted for priority maintenance.

new policies and city wide bike storage facility

LESSONS FROM BOGOTA

Over 75 miles (120 kilometres) of roadway are turned over to the Sunday Ciclovia.

1.5 million people come out to bike or wheel on Sunday, when roads are blocked for motor vehicles.

The city hopes to be the cycling capital of the world by 2038.

Bogota COLOMBIA

36% of all work and educational trips are by bicycle

Copenhagen's cycling network

Number of bicycle trips

240,000
200,000
160,000
120,000
80,000
40,000

1970   2010   2025

Number of bicycle trips to/from the inner city from 6am to 6pm on weekdays

LESSONS FROM COPENHAGEN

Copenhagen's integrated approach has successfully minimised conflicts between cyclists and motorists.

Promoting a culture of cycling and supporting that with sufficient resourcing and planning commitments has been crucial to this success.

Copenhagen DENMARK

2005   2010
2015   2017

Press clipping showing a bike demonstration in Seville in demand of cycle paths organised by "A Contramano" (1993)
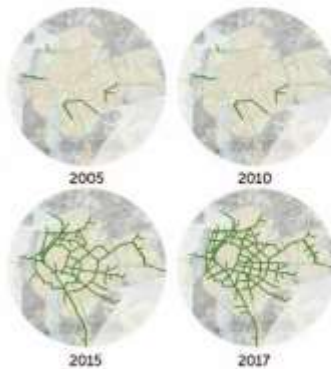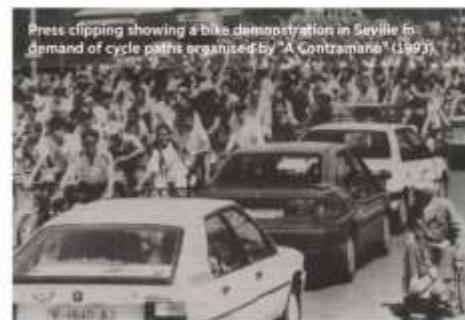
LESSONS FROM SEVILLE

Connected network without isolated cycle routes.

Visible and easy to recognize cycleways with a uniform design.

Safe cycle routesprotected from traffic.

Connect residential areas to amenities.

Two-way cycle routes are better than one-way.

Seville SPAIN

Figure 5: Key findings from case studies of Bogota, Copenhagen, and Seville.

2.3.3 Challenges to active travel

Although efforts and investment are being made to promote active travel and implement AT infrastructure, cars remain the most ubiquitous mode of travel in our cities. Urban areas in their current form are designed for car use which remains the biggest challenge to implementing active travel infrastructure. Existing planning paradigms and power structures are intertwined in a complex web that leads to inadequate policies and inequitable infrastructure. Moving away from the private car is a challenge to both planning institutions and urban inhabitants, which require a fundamental shift in funding mechanisms and planning approaches. Active travel also requires infrastructural upgradation and reallocation of road space. Biking in particular demands specific infrastructural interventions such as dedicated bike lanes, bike boxes (space for bicycles at traffic intersections), and bike parking spaces. Factors that discourage pedestrians and cyclists include concerns of safety, congestion, noise and pollution – all of which are a direct consequence of motor vehicles (Lindsay, Macmillan and Woodward, 2011). Urban sprawl is yet another consequence of motor vehicles that displaces people from amenities, creating a built environment that forces people to use car. High density, mixed use urban environments are found to encourage people to use AT (Sustrans, 2021).

2.4 Knowledge Gaps

The contemporary dialogue on active travel does not acknowledge the political and economic considerations that underpin its dissemination. In most cities Active Travel infrastructure is confined to the economic centre resulting in the creation of a network of pedestrianised routes connecting commercial establishments. The purpose of this AT network is limited to the flow of capital, often ignoring its inherent social value. "Attractivity" of pedestrianization projects become key components in commercial spatial appropriations. Deprived communities that are more likely to walk are often marginalized with low-income neighbourhoods having minimal walking infrastructure (Massingue and Oviedo, 2021). Unequal access has contributed to creating disparities in terms of both health and social deprivation (Aldred *et al.*, 2021). The progressive intentions of AT policy and infrastructure thus do not translate to inclusive and

transformative practices. In the context of this neoliberal class politics, it is ever more critical to re-politicize active travel.

Current studies around mobility and accessibility is limited to the quantitative studies on the availability and distribution of transport infrastructures (Jones, P., Lucas, 2012). Qualitative studies often focus on the user's perspective and behavioural barriers to active travel (JMP, 2009). Active travel projects also tend to be primarily assessed in terms of their impact on local economy, impact on businesses, air quality, and health benefits (Nieuwenhuijsen and Khreis, 2016). However, these studies are divorced from their socio-political context; thus, ignoring the fundamental power relations that create inequitable infrastructure distribution in the first place. Approaches to implementing a modal shift to AT for increased physicals activity levels have shown only modest results (Das and Horton, 2016), and is attributed to the failure to address interlinkages and interactions of factors and processes (Haynes *et al.*, 2019). This thesis proposes an approach to understanding AT through the lens of social justice, as a potential step towards the production of social values as opposed to just health-economic benefits.

3 CASE STUDY: GLASGOW

This chapter introduces the case study area, its context and history. It has been broadly divided into three sections. Firstly, it introduces Glasgow and its planning legacy and how it links to the challenges faced by the city today. Secondly it covers the policy context, active travel patterns, infrastructure, and the current active travel strategy.

3.1 Glasgow

The study area is Glasgow -Scotland's largest city with a population of around 635,000. With a surface of 177.3 km2 the city has population density of approximately 3,500 people per square km. A significant proportion of the city's population live in tenements- a housing typology built in the early 19th century using locally sourced red, grey, and beige sandstone, giving it a unique colour and aesthetics. Although Glasgow had a brugh status as early as the 12th century, it saw radical transformations in urban development with the advent of industrialization in the late 18th century. This extended the city beyond its medieval spine and transformed the city centre as we know it today (Moore, 1994). The post war-era saw the downfall of Glasgow's industrial sector and an attempt to modernize the city. Urban regeneration was one of the key strategies used to overcome the legacy of industrialization. Today, a key aspect of Glasgow's post COP26 narrative is its ambition to become a 'thriving city'. Beyond this narrative is a city with blatant social inequalities and spatial segregation.

3.1.1 From Decentralization to Fragmentation: A brief history of Glasgow

Prior to its modernist urban experiments, cycling was one of the most popular modes of transport in Glasgow and many other European cities. It saw a significant setback with industrialization and the invention of the automobile. Cycling accounted for 15% of all journeys in the UK in the pre-industrial era. Cycling levels peaked in 1949 accounting for 37% of all traffic (Golbuff and Aldred, 2011). Glasgow in the early 20th century was home to an enthusiastic cycling fraternity. Its location astride a river and the proximity to countryside, and good quality of roads were its key attraction. Glasgow was also home to one of the largest tram networks in Europe with over 1000 trams and 160

kilometres of tram network. In the decades that followed, Glasgow's public transport was deprecated, the city was depopulated (a population of over 1 million in 1950s reduced to around 600,000 by 1980), and its communities disintegrated in an attempt to create a modernist city (Urban, 2018).

The City's plan was to transform the city centre to a civic centre and house people in the high-rise towers in the periphery. In addition to this, the UK government's Clyde Valle Regional plan also envisioned South-West Scotland as a series of small towns to dissolve big cities into a network of regional settlements. Eventually, Glasgow embraced a combination of both the plans with new towns like East Kilbride and Cumbernauld and peripheral estates like Castlemilk, Drumchapel, Pollok and Easterhouse (Fleur, 2019). The strategies were influenced by functionalist modernist planning of segregating the city into residential, commercial, industrial and leisure estates connected by a series of motorways. The most celebrated of these motorways is the M8, which passes through Glasgow's city centre (the section of the M8 through Glasgow's Charing Cross and Cowcaddens) and bisects the city. Le Corbusier, Patrick Geddes, among others were the main proponents of this vision of 'automotive city' that was embraced in many parts of the world (FZE, 2018). Eventually old tenement blocks were cleared, people were relocated into the peripheral towns. This disintegration of Glasgow and its functional segregation not only created the need for cars but also reinforced it as a cultural norm in the city.

The poorly designed towers were condemned sooner than they were built as they became the synonym for poor living conditions. In the 1990's many the tower blocks in Gorbals were demolished. Since 2006, a quarter of the towers have been demolished (Leslie, 2015). Many of Glasgow's challenges today are inherited from its modernist experiment. Urban regeneration has been a key strategy to overcome the planning legacy and revive urban areas in Glasgow. Many of Glasgow's working-class neighbourhoods have been subjected to repeated cycles of regeneration. While projects such as the Gorbals and Commonwealth regeneration are considered successful, they have been criticised for displacing people, especially the working class and the marginalized.

GLASGOW OVER THE YEARS

1800s
Chambers's Encyclopedia 1895 book plate illustration of Glasgow from the Broomielaw showing 1800s Clyde.

1900s
The River Clyde in the early 1900s (Media Scotland).

1955
Castlemilk, Aerial Photograph 1955 (Royal Commission).

1946 Clyde Valley Regional Plan

Two boys look at the newly constructed Red Road flats, then the highest in Europe, in November 1967. (PhotoBob Thomas/Getty)
1967

The last tram in Glasgow which travelled in a procession from Dalmarnock Road to Pollokshaws Road on September 4, 1962.
1962

The M8 Kingston Bridge a month before its opening in June 1970.
1970

Red road flats demolished (Photograph: Chris Leslie)
2015

Clyde Skyline
2022

Figure 6: Timeline showing Glasgow over the years.

Academician and writer Neil Gray describes the commonwealth games village regeneration as (McKenna, 2014) "What we have seen in some of these neighbourhoods is not regeneration, but gentrification. Land is cheap in these parts and, after the Games have finished, private housing companies will move in. Very few of the new homes and those in the athletes' village will be affordable for the people who once lived here. It was simply cheaper and an opportunity to disperse a 'problem' community and replace it with a prettier and more gentrified one." Glasgow's convoluted planning history is a stark example of how capital induced development reduces 'social value' to 'exchange value'.

Today Glasgow's vision is to become a world class city with a thriving and inclusive economy that benefits the city, its citizens, and businesses (Glasgow City Council, 2017). The city hopes to position it among the world's most sustainable and resilient places to do business, live, and visit. A key aspect of this is creating liveable environments and active travel is plays a crucial role in achieving this. As significant amount of investment is driving infrastructural change across the city, but its implications need to be scrutinised to avoid the repetition of its historical mistakes. Thus, it is ever more critical to evaluate its active travel infrastructure and strategy through the lens of social justice.

3.2 Transport and Equity: Contradictions in Glasgow

Glasgow is the most deprived local authority in Scotland. Glasgow has consistently been ranked below the national average in various social indicators. Almost half of the city's population (47%) reside in 20% of the most deprived areas. 34% of the city's children were estimated to be living in poverty in 2017 (Glasgow Centre for Population Health, 2018). The poverty and inequality report of Scotland 2016 finds that there had been a rise in the number of people living in relative poverty compared to previous years.
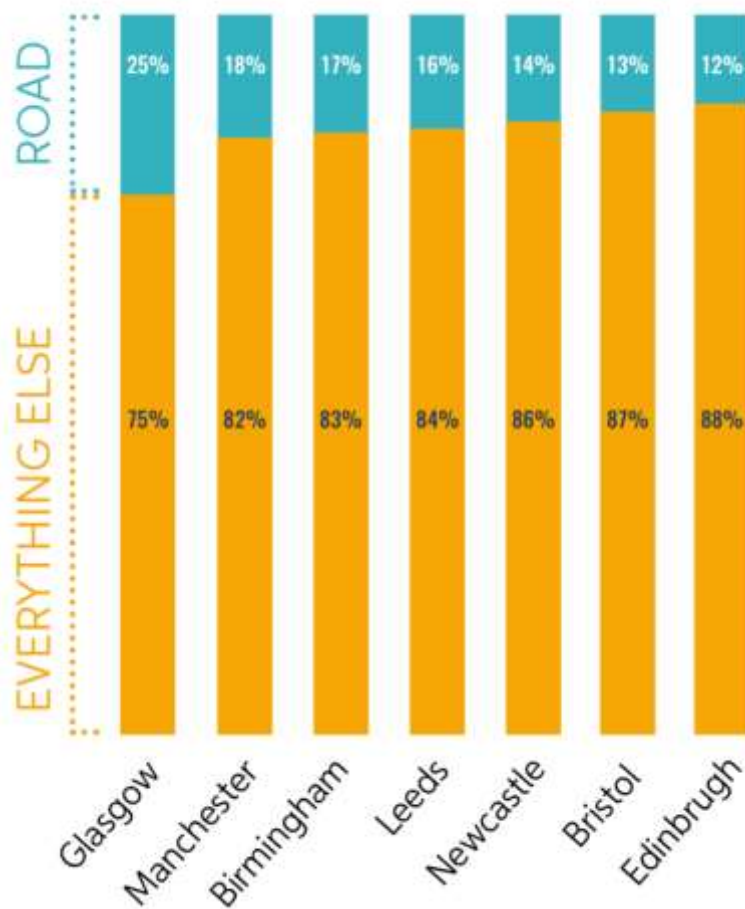
Figure 7: *Land use in Glasgow compared to other major cities in the UK (Glasgow Connectivity Commission, 2018)*

While Glasgow has UK's best suburban rain network outside of London, it also disproportionately high percentage of road space (Figure 7). Consequently, the city also has the largest traffic volume (47%) of all Scottish Local Authorities. As per the Scottish Household Survey 2018, car holds single highest proportion by mode of transport. The issue of equity is also evident in the city's transport sector. It has been found that biking and walking were lesser in low-income neighbourhoods compared to the high-income counterparts (Muirie, 2017). The variation in physical activity by area deprivation is higher in Glasgow than the Scottish average. 1 in 4 adults and 1 in 10 children do not meet the prescribed levels of activity in Glasgow (Fenton, 2017). Interestingly half the households in Glasgow do not have access to a private car (compared to 30% nationally).
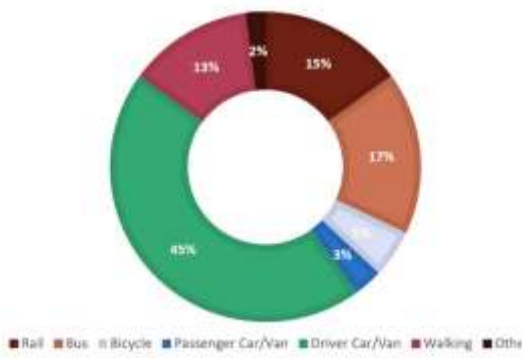
(A)Main mode for journey to work (SHS 2018)
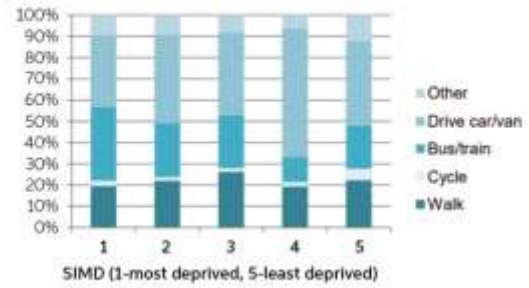
(B)Mode of journey according to SIMD
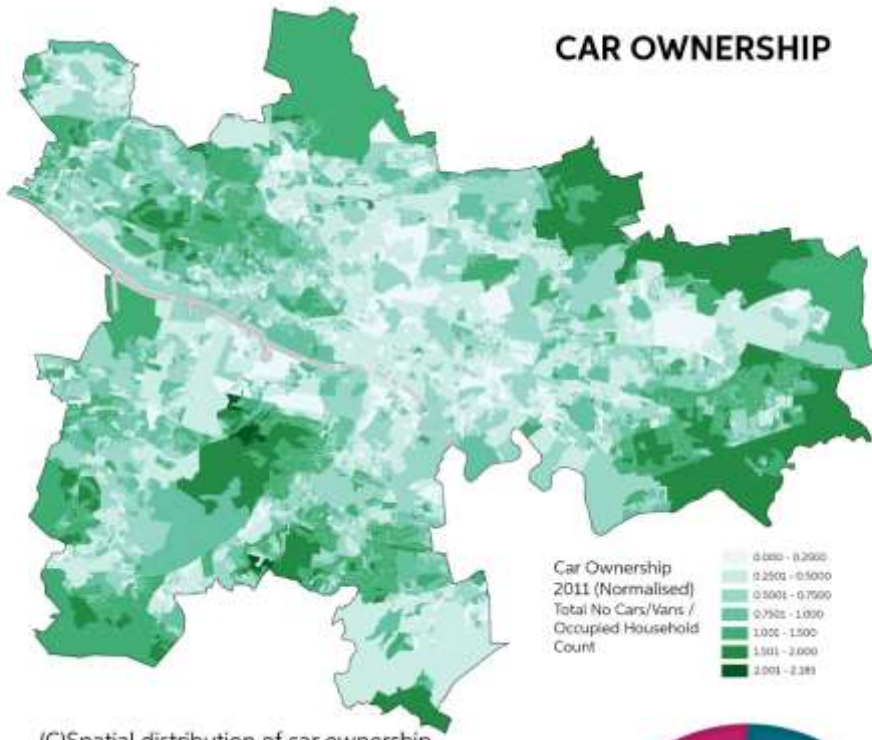
(C)Spatial distribution of car ownership
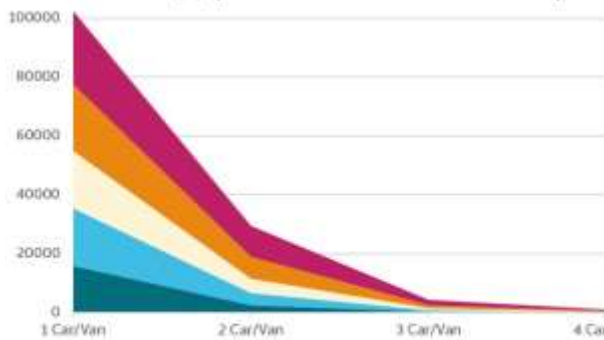
(D)Number of cars according to SIMD
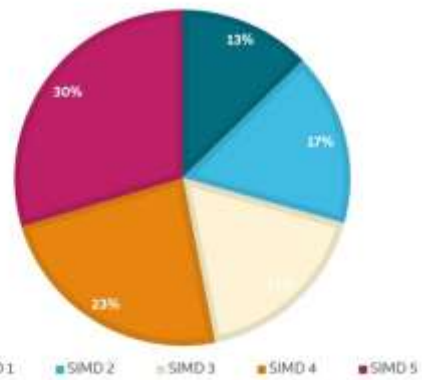
(E)Car ownership according to SIMD

Figure 8: Glasgow main mode for journey to work (SHS 2018)

The most preferred mode of travel (Figure 8A) is driving which account to 45% of work trips. While 17% of the people walk to work, only 5% use a bicycle. Figure 7 (B) shows that the lowest SIMD quintiles not only drive the least but also walk and cycle the least. The spatial distribution of car ownership shows the highest level of ownership in the least deprived areas (SIMD 4 and 5). Causalities due to road accidents also remain higher in the most deprived areas. While Glasgow's equity issues can be attributed to its industrial history, it quintessential to understand how transport trends correlate to deprivation.

3.2.1 Current trends in walking and cycling

165%
increase in cycling in the city center between 2009 and 2019
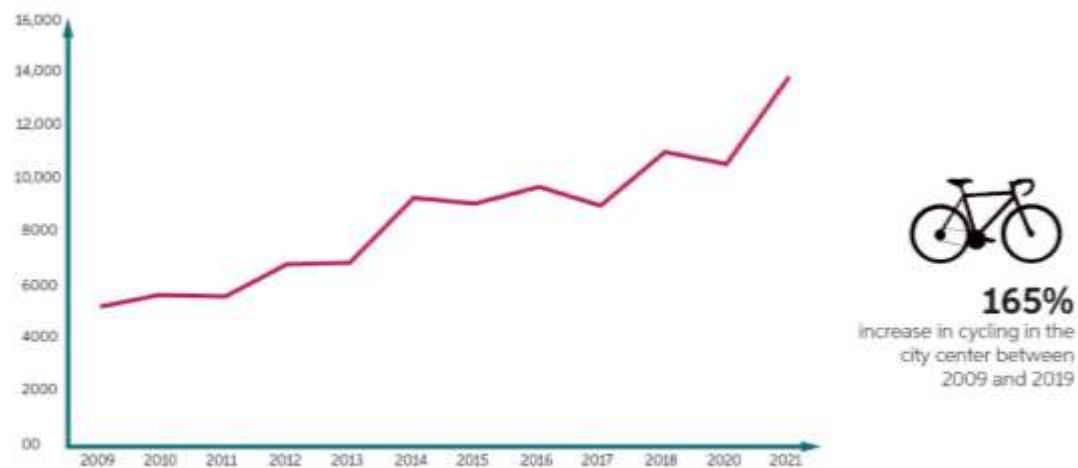
(A) Graph showing counts of cyclists moving into and out of the city centre in the period 2009 - 2021.

2%
annual average increase in walking in the city center between 2009 and 2018

(B) Graph showing counts of pedestrians moving into and out of the city centre in the period 2009 - 2021.

Figure 9: Cycle and pedestrian count in the city centre 2009-2021 (Glasgow Indicators Project 2021)

Glasgow City Council has undertaken annual surveys to monitor active travel patterns in the city centre since 2007. The data shows that there has been an increase in both cycling and walking. Between 2009 and 2021 there was 165% increase in cycling (Figure 9A). This accounts for an annual average increase of 14%. As shown in Figure 9, there was a 31% increase in the number of cycle trips in 2021 compared to the previous year. This could be attributed to the Covid-19 pandemic and associated travel restrictions. The rise in cycling in could be attributed to various schemes implemented by the city council. The Mass Automated Cycle Hire (MACH) scheme was introduced in 2014 prior to the commonwealth games and has since been installed across the city. Additional bikes including electric bikes were introduced in 2017 and 2018 (Glasgow City Council, 2021c). Only 21% of Glaswegians have a access to personal bicycle compared with 35% nationally (Fenton, 2017). While pedestrian counts showed an annual average increase of 2% until 2018, the overall counts reduce 19% in 2021 compared to 2009. The sharp decline was between 2018 and 2020 when the walking rates almost halved. This again is attributed to the pandemic led restrictions (Glasgow City Council, 2021c).

It has been found that people in Glasgow are more likely to use active travel or public transport to commute than in the rest of Scotland. Although there has been an increase in active commuters in Glasgow, this has not matched with any reduction in car use (Fenton, 2017).

3.3 Active travel policy context

Transportation is the second biggest contributor to carbon emissions in the UK. 74.5% of all transport emissions come from road transport and private vehicles contribute to 45.1% of this emission. In Scotland, transport remains the biggest contributor to emission with 35.6% CO2 emissions recorded in 2018 (Transport Scotland, 2019). Scotland has reduced its carbon emissions with considerable success with 49% less net CO2 emissions in 2018 compared to 1990 levels. Despite this, the transport sector saw only a 3% emission reduction in 2017 compared to 1990 levels. Of this, private cars were the largest emitter contributing to 43% of total transport emissions and 59% of total road emissions (Transport Scotland, 2019).

The Climate Change (Emission Reduction Targets) (Scotland) Act 2019 (an amendment of the Climate change Act 2009) currently defines Scotland's legal commitment to

emission reduction. Scotland has committed to achieving net zero emissions by 2045 with interim reduction targets of 75% by 2030 and 90% by 2040. Scotland's Climate Change Plan Update (CCPu) published in December 2020 further sets specific plans to achieve this target. It sets the target for 20% reduction in car kilometres by 2030 (Transport Scotland, 2022). The CCPu identifies demand management (with cross sectoral interventions) and behaviour change as key to decarbonization. In parallel to CCPu, the National Transport Strategy (NTS2) sets the directions for achieving net zero emissions by Switching to active modes of travel such as walking, wheeling and biking along with the use of public transport (Scottish Government, 2019).

Figure 10: *Transport emissions in Scotland (Transport Scotland, 2020)*

3.3.1 Mode shift to AT

The NTS2 defines its vision as providing "sustainable, inclusive, safe and accessible transport system to deliver a healthier, fairer and more prosperous Scotland"(Transport Scotland, 2020). The four priorities that underpin this vision include 'reducing inequalities', 'taking climate action', 'inclusive growth', and 'health and wellbeing'. The NTS2 also provides a range of actions that support the mode shift to active travel which includes (Transport Scotland, 2022):

- The Cycling Framework and delivery Plan for Active Travel in Scotland in 2022.
- An increase in Active Travel investment with the target of reaching 320 million (or 10% of total transport budget) by 2024-25.
- 50 million investments in creating high quality active travel corridors. This will expand and complement the places for everyone program while integrating active travel routes with the national network.
- Access to bikes through grants for e cycle loans and free bike project fort school age children.
- Introduction of Low emission zones in Scotland's 4 largest cities in 2022.

This is in addition to several measures to discourage car use. The local authorities play the critical role of providing strategic response to implement local changes. 85% of net revenue expenditure for Local Authorities (LA) comes from the Scottish Governments block grant funding. This fund is responsible for delivery and management of infrastructure services. However advisory bodies such as Sustrans, Cycling Scotland, Living Streets Scotland, Paths for all and Regional Partnerships are responsible for distribution of these funds to local authorities (Muir, 2020). The LA's investment priorities are determined by local political priorities. Only time bound submission of applications following regulatory guidelines receive successful funding.

3.3.2 Policy context for public consultation

The Community Empowerment (Scotland) Act 2015 defines Scottish Government's legal commitment to empowering community bodies and strengthening local decision making. The Act gives the community bodies a right to be heard and outlines to mechanism to seek dialogue with the public bodies (Revell and Dinnie, 2020). Part 2 Community Planning Partnerships (CPP) mandates the role for community planning in producing locality plans and local improvement plans. Part 3 Participation request (PR) establishes a formal channel for communities to request participation and involvement (Muir, 2020). In Glasgow the Community Empowerment Act along with Place standard tools, and placemaking guidelines set by the City Council drives the consultation process (Giupponi, 2021).

Glasgow Active Travel Strategy Consultation

Glasgow Transport Strategy (GTS) and Active Travel Strategy (ATS) 2022-2031 are the latest policy documents that outline the city's strategic plans for coming years. The strategy builds on the previous AT plans and the 2016-2025 Cycling Strategy. Much of the progress in ATI in Glasgow is attributed to the Active Travel Forum (formed in 2010 as the Glasgow Cycling Forum) which brings together Council officers, third sector organizations, charities, and campaign groups to highlight, plan and discuss AT strategies. The forum meets quarterly and has played a significant role towards the development of current plans.

The GTS and ATS were presented at the extensive public consultation held between September and October 2020 called 'Connecting Communities: A Public Conversation on Glasgow's Transport Future'. Covid 19 restrictions meant that the consultation was done through online and telephonic mediums. The methods included online surveys (2,899 respondents), online conversations with 23 community organizations, one-to-one interactions with 29 stakeholder organizations, online workshops, and written responses from businesses and stakeholder organizations (Glasgow City Council, 2020).

3.3.3 Glasgow's Active Travel Strategy

The ATS and GTS will work along with the Liveable Neighbourhood Plan 2022 and the City Centre Transformation Plan 2022 to create city wide transformations. The ATS was published in February 2022, post the COP26 conference in Glasgow and seeks to achieve a modal shift to walking, biking, and wheeling. The strategy offers a timebound goal of achieving (a) 30% reduction in car kilometres travelled, (b) vision zero to achieve no deaths or serious injuries on roads, footpaths, and cycleways and (c) achieve net zero carbon goals of the city (Glasgow City Council, 2022). ATS vision states:

> "Walking, wheeling and cycling will be the first and natural choice for everyday journeys, for people of all ages and ability, to travel locally to schools, to shops, to work, or to the city centre."

'Connectivity of infrastructure', 'unlocking change through training and education' and, and' thinking differently by encouraging behavioural change' are three key policy action areas defined in the strategy. While the ATS outlines the broader vision and goals, it is supported by an interim delivery plan for city wide network, Travel Behaviour Change Strategy (to be published in September 2022) and Sport and Recreational Cycling Strategy (also to be published later this year and will build on the Glasgow Cycling Strategy 2016-22). Figure 11 visualizes the policy context within which the ATS is situated.
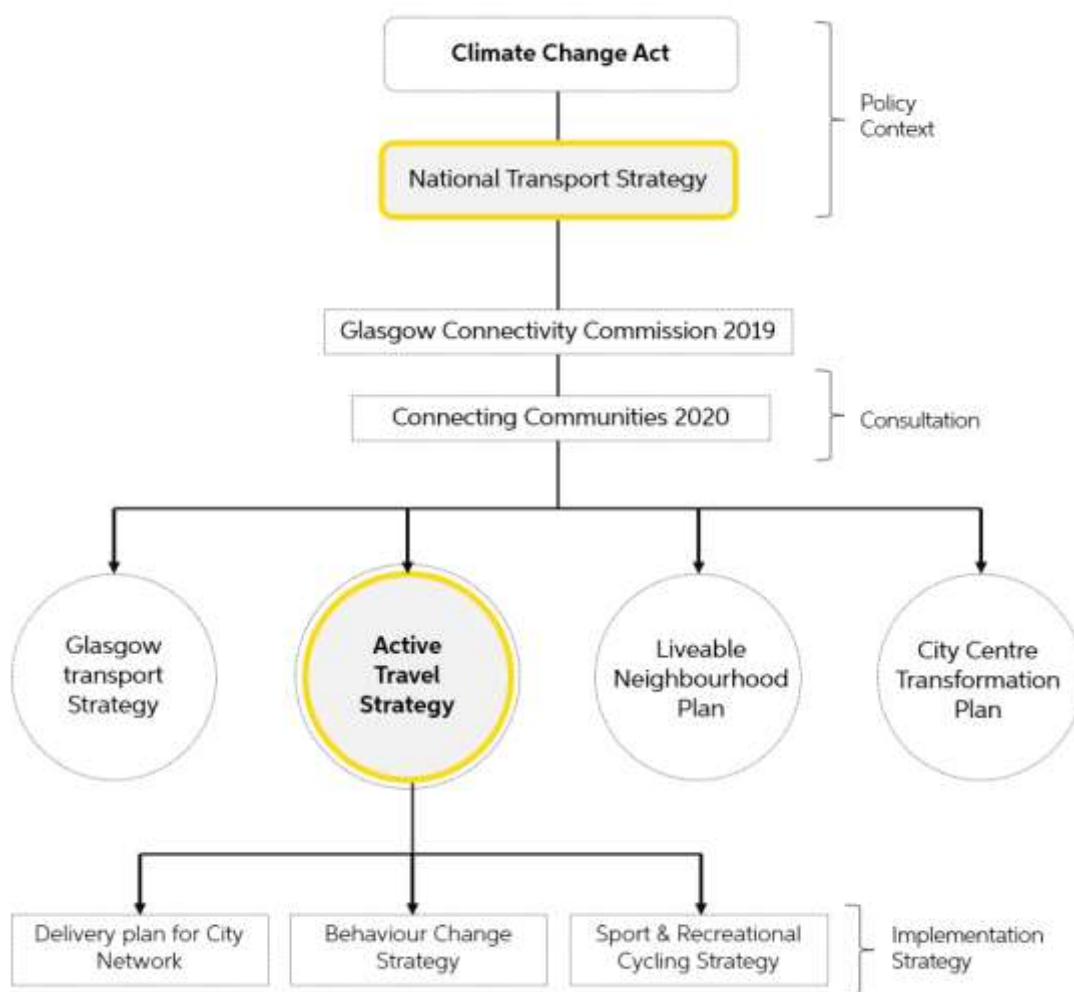

Figure 11: *Author's understanding of the policy context of the Active Travel Strategy.*

The strategy highlights the current travel trends and benefits of active travel in Glasgow and successfully makes a case for ATI. It briefly outlines the behavioural changes required and strategies to address this. A key element of this is providing training and education. The strategy also identifies age and gender groups that require additional support. The interim delivery plan for cycle network introduces the citywide network and presents key international case studies for Glasgow to learn from. It also illustrates various design interventions and options for street sections that can address the successful implementation of the city-wide network. It also addresses a set of problems associated with the existing walking and biking infrastructure. It estimates a £475 million investment for the implementation of the network and predicts an estimated benefit of £1,843 million over a 10-year period leading to a cost benefit ratio between 3 and 4 (Communities, 2022). Thus, it suggests a strong case for the strategy with added benefits such drop-in accident rates and reduced deaths.

The Liveable Neighbourhoods Plan along with the ATS promotes access to essential services and amenities enabling the creation of 20-minute neighbourhoods. The Liveable Neighbourhood toolkit has been published by the city council which offers ideas and tools for community councils and organizations to contribute to creating liveable neighbourhoods. The City Centre Transformation Plan was recently published in September 2022 and has not been covered in the scope of this study.

3.3.4 Active Travel Infrastructure in Glasgow

Glasgow has over 301 km of cycle lanes of various types presently. It has been estimated that there is a 5km increase in cycle way and an additional 2.3km of segregated cycleway since 2016. A 2017 report estimates that Glasgow has 170m of cycle route for every 1000m of local authority road compared to 220m in Edinburgh (Fenton, 2017). The city claims to have surpassed the installation of 100 bike racks per year since 2007. The city introduced its automated bike hire scheme during the commonwealth games which it retained and expanded over the years. The city has invested £115 million to deliver its 'Avenues' programme for the pedestrianisation of the city centre. The aim is to make the city centre "people friendly", attractive, greener, sustainable and economically competitive (Glasgow City Council, 2021b). The first phase of the avenues programme completed is the Sauchiehall Avenue. It currently houses widened

pavements, public seating, a new two-way cycle path, 27 new trees among other changes. The project has offered a significant boost to economy, improving connectivity between businesses, offices, restaurants, and other commercial establishments.

Figure 12: *Kelvin way cycle path and Vincent Street parking space conversion as part of Spaces for People program (Glasgow City Council)*

Glasgow's Spaces for People programme was introduced during the covid-19 pandemic which severely affected people's ability to travel. Implemented through funding from Scottish Government and administered by Sustrans, it funded temporary interventions for active mobility and street transformations. Spaces for people is an excellent example of successful implementation of temporary interventions (also referred to as Tactical Urbanism) through widened footways, dedicated cycle lanes and road closures. This also allowed an ease of social distancing during the pandemic. The Kelvingrove cycleway implemented as part of this project has currently been made a permanent intervention. Other projects are being reviewed to be made permanent highlighting its long-term AT and sustainability benefits.

4 METHODOLOGY

This chapter discusses the methodologies used to investigate the knowledge gaps and achieve the proposed objectives. The literature review forms the basis of both the 'what' and 'how' of the research process. A combination of different methods has been used to achieve specific objectives of this framework. The methodology framework diagram is used to summarise and illustrate the various steps and their interconnections.

4.1 Research Design

The research methodology was guided by the "research onion" developed by Saunders et al (2007). Figure 13 highlights the key conceptual choices in the research onion that helped frame the methodology. The research philosophy is guided by pragmatism that enables a practical understanding of real-world issues (Kelly and Cordeiro, 2020) and allows dynamic and innovative research methods. The effectiveness of empirical analysis in informing public policy is especially controversial in cases when the definition of research questions and methods are bound to assumptions regarding the role of social justice in transport policy (Anciães, 2011). To overcome this, a deductive approach has been used with RTTC helping frame the overarching research questions. Lefebvrian transduction does not require materialization and hence avoids embodying biases or preconceived notions of justice. Strategically, Glasgow City boundary has been used as a case study for this research. Yin (1989) defines case study as "an empirical inquiry that investigates contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". This framework has been interpreted through a mixed method to scrutinize empirical data from both qualitative and quantitative methods applied in the case study area. Qualitative analysis helps interpret the social construct of reality, while quantitative aspects examine the practical outcomes (Morgan, 2014). Explanatory descriptions are used to align findings across various sources and methods to achieve the objectives of the research.
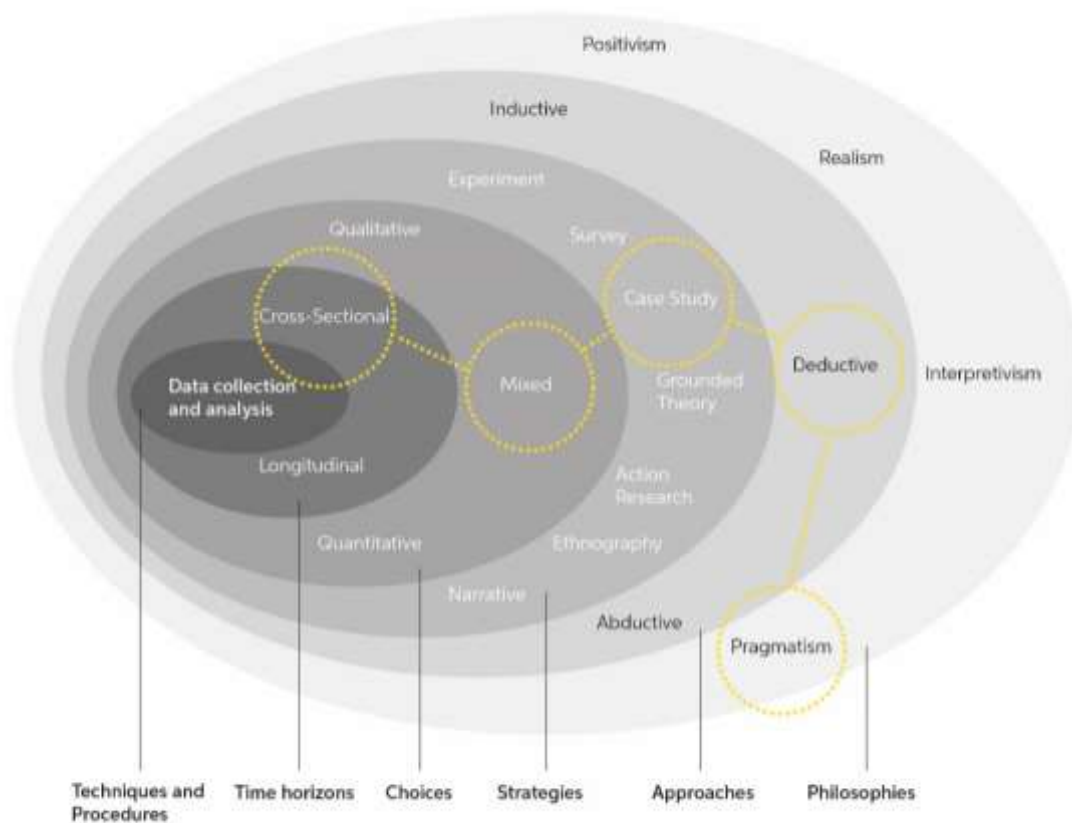
Figure 13: *Research onion (Saunders, Lewis, and Thornhill 2016) showing the layers and choices in each layer. The outer layers show Philosophies and Approaches while the middle layers show Strategies, Choices, and Time.*

4.2 RTTC framework for evaluating AT

In urban geography, the critical thinking approach to transport relates to exploring the relationship between socio-spatial distribution of public services and infrastructure development (Harvey, 2009). Transport induced exclusion, inequality, and accessibility and related research plays an important role in informing this research. Inquiries are aimed at understanding the spatial distribution of infrastructure and of how power relations condition mobility infrastructures. The framework identifies the concept of participation and appropriation as tangible elements of RTTC in understanding AT policy and infrastructure respectively. Within each method of analysis concepts of RTTC are further explored. For instance, 'Participation' is broadly analysed through qualitative methods, but the concept of appropriation and autogestion are further explored within this.

4.3 Interpreting Participation

Participation according to Lefebvre goes beyond the idea of using citizens for legitimacy building or consensus. It is the ability of inhabitants to contribute to appropriation and hence significantly modify the ways of production of space (Kębłowski, Van Criekingen and Bassens, 2019). This methodology emphasises the need to understand current meaning of 'participation' in the context of active travel in Glasgow. This goes beyond review of existing policy instruments to an understanding that is underpinned by the relation between planning institutions and inhabitants. The two qualitative methods used to understand participation are literature review and interviews that complement each other.

4.3.1 Literature Review:

Thematic literature review: The thematic literature review was aimed at identifying theories, themes, and associated studies that guided the formation of research question, approaches, and methods of analysis. A key aspect of this was synthesising RTTC through its various interpretations to identify its key concepts. This was followed by global overview of Active Travel and case studies of successful implementation. The literature also allowed a holistic understanding of the case study area, its history and transport trends. The search of existing literature suggested limited enquiries on the relationship between AT and social justice theories. RTTC informing quantitative studies were also found to be unestablished.

Policy Review: This helped develop an understanding of the policy landscape. Policy review is split between the case study and results chapter. The case study analysis in 3.2 examines Scotland's AT policy context and Glasgow's strategic response to the same. Chapter 5 takes a critical view at the policy and its implementation in Glasgow. Institutional reports, policy documents, strategy documents and academic papers were analysed. Policy review was complemented by interviews which helped bridge gaps in the understandings.

4.3.2 Semi-structured Interviews:

Perspective of those implementing the policy (institutional) and those advocating for change (activists) needs to be captured. A semi structured interview of multiple stakeholders is proposed to develop this understanding. In-depth semi-structured interviews offer the respondent the opportunity to answer open ended questions, while not being limited to the framework of a structure (Jamshed, 2014). Sampling of interviewees were done to include policymakers, policy advocates, and users to give a holistic picture of the processes that leads to the production of ATI. 10 stakeholders ranging from the city council officials to various community groups were approached for the interview. Table 1 shows the list of organizations/individuals that responded to the request and agreed to an interview.

Interviewee	Description	Perspective
Sustrans	Charity, Custodians of the National Cycling Network, and a key advisory body that monitors funding of LAs for ATI.	Governance
Pedal on Parliament	Grassroots volunteer-led campaign pushing for better, safer, and more inclusive cycling conditions.	Activism + User
Community Council/Volunteer	Member of North Kelvin Community Council, Sustrans Volunteer, and resident of Partick.	Activism + User
Woman on Wheels	Founder of Woman on Wheels, an organization that help women overcome cultural barriers to cycling; also, a resident Govanhill.	Activism + User

Table 1: Details of interviewees identified.

Interview Analysis

All the interviews were recorded and transcribed with the permission of the interviewees in line with standard data collection practice (Bravington and King, 2019). The data and observations were summarized into thematic categories by analysing the transcript and identifying comparable descriptions and common terminologies (Barney G. Glaser, 1999). The data was analysed using NVIVO by coding the data as a means of

categorization. Miles M. B., & Huberman (1994) defines codes as "retrieval and organising devices that allow the analyst to spot quickly, pull out, then cluster all the segments relating to a particular question, hypothesis, concept or theme". A deductive approach to coding was used with the broad themes guided by RTTC, research objectives, and knowledge of policy and strategy formed through the literature review. Individual transcripts were re-read to reclassify and merge the overlapping codes. In order to derive empirical evidence, data was compared to the literature and analysed as "a dialogue between data and theory"(Eisenhardt, 1989). The overarching themes of enquiry and sample questions are presented in Table 2. The interview transcripts can be accessed in Appendix 1.

Themes	Topics	Sample Questions
Participation	Consultation	Were you part of the consultation process?
		Could you explain the steps in the process and your views on its effectiveness?
	Activism	How did you get involved in cycling related activities?
		How do you engage in campaigning for better infrastructure?
	Policy	Could you explain the policy context of the ATI consultation process?
		What are the major challenges to public consultation?
		What stages of the project are citizens involved?
Autogestion	Community groups	How was your community group formed?
		What are the different activities that you undertake?
Appropriation	Barriers	What according to you are the main barriers to AT?
		What policies and infrastructural improvement would you recommend?
	Policy	How are ATI projects prioritised and what factors influence this?

Table 2: Broad themes, topics and sample questions that guided the semi-structured interview.

4.4 Analysing Appropriation

Appropriation in this study is evaluated as the ability of inhabitants to access and use active travel infrastructure. Access to active travel represents an extension of the inhabitant's ability to appropriate urban spaces. In an equitable urban space, all residents must have equal access to infrastructure irrespective of their socio-economic position. This is analysed at two scales: (A) Macro-level, which influence the organization of connectivity infrastructure including ATI and ATI as a means of accessing public transport infrastructure; and (B) Micro-level, which looks at spatial equity through human-scale planning outcomes that the inhabitants directly engage with. Macro and micro level analysis have often been used to understand complexities of urban structure and their interrelations (Aditjandra, 2013; Shukla *et al.*, 2021).

4.4.1 Macro Spatial Analysis

The equitable distribution of ATI can help reduce transport inequity and contribute to wider socio-spatial equity (Aldred *et al.*, 2021). The spatial distribution of AT infrastructure and its comparison to area deprivation forms the basis for the analysis which are summarized in table 3.

Scottish Index for Multiple Deprivation (SIMD)

The Scottish Index for Multiple Deprivation is Scottish Government's standard approach to identifying areas of multiple deprivation in Scotland. It relatively measures deprivation levels across 6,976 data zone (small areas). SIMD measures deprivation across seven areas which include income, employment, education, health, access to services, crime, and housing. The ranks are based on the deprivation levels in data zones with most deprived data zone ranked as 1 and least deprived ranked as 6,976 (Scottish Government, 2020). For practical use this can be represented in terms of percentage of data zones below certain rank (ex. 5% most deprived or 10% most deprived). For the purpose of this study quintiles were used with data zones ranked from 1 (most deprived) to 5 (least deprived). The overall SIMD ranks were classified as follows: SIMD 1– Rank 0-427 SIMD 2- Rank 428-1205 SIMD 3- Rank 1212-2501 SIMD 4- Rank 2507-4613 SIMD 5- Rank 4632-6956.

Figure 14 shows the spatial distribution of deprivation based on SIMD. Note that the missing ranks are data zones outside Glasgow City boundary. SIMD is helpful in urban areas as large populations are concentrated on small area of land and hence are bound to experience similar levels of deprivation.
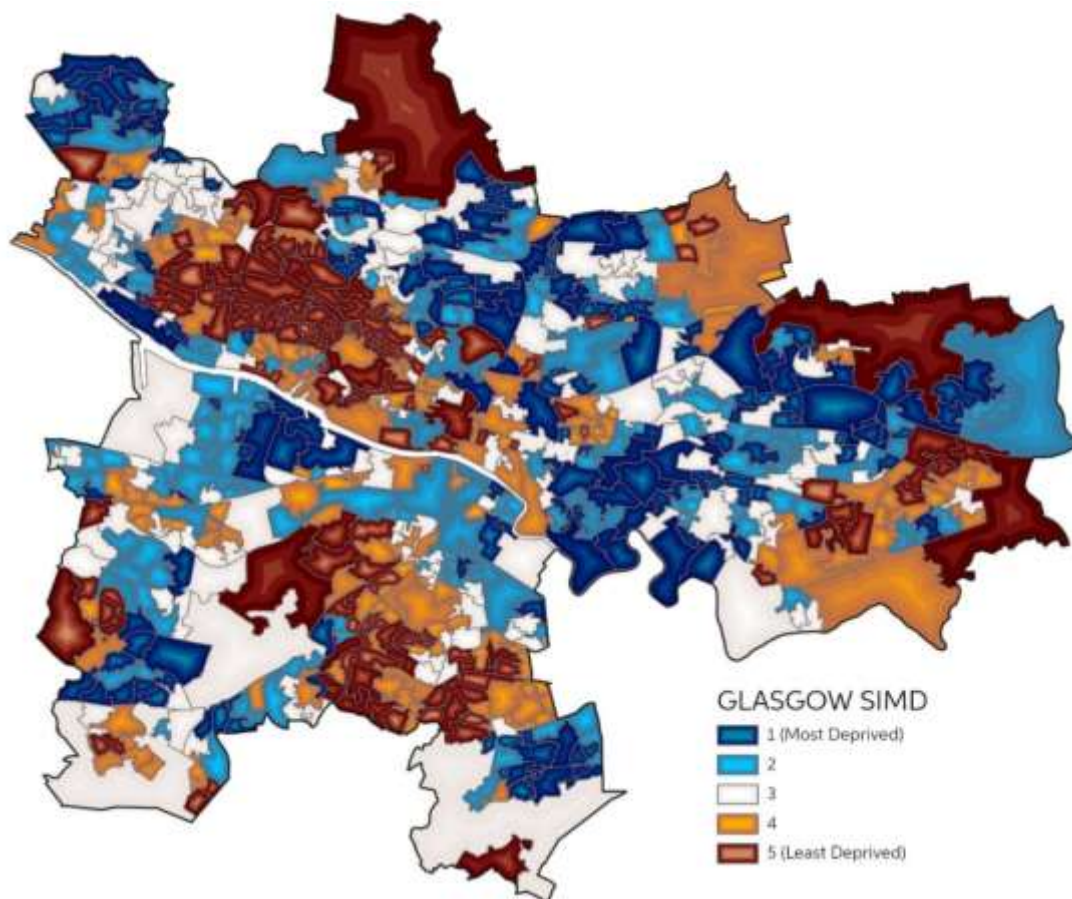
Figure 14: *Scottish Index for multiple deprivation (SIMD) with quintile 1 showing most deprived and 5 showing the least deprived areas.*

Active Travel Infrastructure

- **Bicycle routes:** Existing bike routes, their categories and proportion of each category was analysed. The spatial distribution of bike routes and its relation to SIMD was evaluated.

- **Bike Hire stations:** The service area of the biking routes was defined within three spatial categories-400 meters, 800 meters and 1200. The deprivation levels of service areas were calculated to understand which communities are best served with the biking routes.

Category	Map	Description	Data Source	GIS Analysis
Deprivation Index	SIMD	Scottish Index for Multiple Deprivation, with data zones ranked from 1 to 6000 based on seven parameters	SG, GIS project file	The SIMD ranks were reclassified into quintiles ranked SIMD 1 (most deprived) to SIMD 5 (least deprived)
Bicycle Infrastructure	Bike Lanes Glasgow	Existing Bike Lane in Glasgow categorized into 8 different groups	Shape file received from Glasgow City Council	The shapefile was projected into the British national grid. Summarise within tool was used to summarise the length of routes in each category.
	Service Area of Automated Bike hire stations	Service area defined in terms of walking distance to the facility with 5-, 10-, and 15-minute walking time	Shape file with the location of bike hire station (GCC); SIMD	ArcGIS Pro Network Analyst tool was used to define and calculate the service are. The tool considers existing roads and walking routes to perform the analysis. The SIMD layer was added to the file clipped to the service area. Tabulate intersection tool was used to calculate the proportion of SIMD quintiles in the service area.
	Cycle storage facility	Location of cycle storage facility and the distribution of facility across each SIMD quintile	Shape file with location of bike storage facility GCC	A heatmap was generated to visualize the spatial distribution of bike storage facilities across Glasgow City boundary. The SIMD layer was added to this and tabulate intersection tool within the analysis tools was used to calculate the number of facilities in each SIMD quintile.
Public Transport and Active Travel Infrastructure	Train Station Catchment Area Subway Station Catchment Area	Catchment area defined in terms of walking distance to the station with 5-, 10-, and 15-minute walking time	Shapefile with location of public transport facilities, GCC	ArcGIS Pro Network Analyst tool was used to define and calculate the service are. The tool considers existing roads and walking routes to perform the analysis. The SIMD layer was added to the file clipped to the service area. Tabulate intersection tool was used to calculate the proportion of SIMD quintiles in the service area.
	Public Transport Integration	Map showing transport hubs that are integrated with bicycle hire stations	Produced by merging transport maps	The buffer tool was used to create a 150m buffer for the bike hire stations. Intersect tool was used for each type of transport station to locate the facilities that fall within the defined buffer zone. Depending on the type of integration of transport facility, they were categorised into 5 different groups (A to F).

Table 3: List of spatial maps produced and details of the mapping process.

- **Bicycle storage facility:** The overall distribution of bicycle racks was visualized. The number of bike storage facilities servicing each quintile of the SIMD was calculated.

- **Public Transport:** The accessibility of public transport via walking or biking has a significant impact on its level of use (Ek, Wårell and Andersson, 2021). Walkable distances from the existing rain station and subway stations were calculated along with proportion of SIMD quantiles served by these areas. Similarly, the level of integration of Active Travel infrastructure with the public transport infrastructure was analysed.

Each element of the macro spatial analysis is accompanied with maps and associated charts. While maps illustrate spatial distribution of infrastructure charts represent its spatial equity by relating the infrastructure to SIMD quintiles. In case of service areas, its interception with SIMD was used to analyse spatial equity. The steps followed in the mapping process is discussed in Table 3.

4.4.2 Micro-analysis: Neighbourhood Study

|	SITE 1 Broomhill+Partick	SITE 2 Govan+Ibrox	SITE 3 Govanhill	RATIONALE
Built Fabric				Tenement residential blocks with no major high rise buildings.
Recreational Amenities				Presence of prominent parks and recreational amenities.
Population	15518	15214	15614	Similar population and diverse demography.
Historical Relevance	Annexed in 1912	Annexed in 1912	Annexed in 1891	Govan and Partick were independent brughs and Govanhill was a police brugh.
Distinct SIMD				Two of the most deprived neighbourhoods compared with one of the least deprived neighborhood.
AT Data	4 Data points	2 Data points	5 Data points	Availability of open data.
Distance From City Centre	3.5 km	4.2 km	3.1 km	Similar distance from city centre.

Table 4: Matrix showing the sites selected and the list of parameters considered for the same.

Spatial equity as a key element of human-scale placemaking as theorised by Jane Jacobs (1993), underpins the spatial analysis at micro-scale. Jacob's ideas of the neighbourhood in a way adds a physical dimension to the geographical conceptions in RTTC which looks at the city as a process and not a thing. The indicators of walkability are partly derived from Jacob's writings on the 'conditions for successful, diverse, and attractive neighbourhood'. This includes density, diversity (mixed uses), connectivity (indicating smaller blocks) and access to open spaces; indicators that are evidenced to contribute to walkability (Gunn *et al.*, 2017). This multi criteria analysis thus explores the aspects of built environment that indicate walkability and influence active travel patterns as shown in Table 5. The sites were chosen as a cluster of SIMD data zones based on seven parameters shown in Table 5.

Indicators	Research Question	Description	Source
Density	What is the overall activity intensity of an area?	High density areas are more compact indicating higher walkability.	(Rahman, Islam and Neema, 2022)
Green Space	What proportion of area is accessible for public recreation?	More green space indicates more chances of people venturing out	
Diversity	How mixed is the land development in an area?	Greater entropy index indicates more diverse building uses	(Shannon, 1948)
Connectivity	What is degree of connectivity of existing road network in the area of analysis?	Higher values of 4 leg intersection, link node ratio, and connected node ratio and lower cul-de-sacs, positively influence compactness level and accessibility.	(Tresidder, 2005)

Table 5: Indicators of walkability, their descriptions, and the corresponding research questions.

Density

Population density was calculated as people per sq.km of floor space. The population obtained from the SIMD data zones were used for this calculation.

$$Population\ Desity = \frac{Pi}{Ai}\ (1)$$

Pi = Population of the neighbourhood and Ai = Total floor area of the neighbourhood

Green Space

Green Space was defined as the total area of parks and open public spaces. The percentage of green space was calculated as:

$$\%\ Green\ Space = \frac{PRi + Oi}{Ai}\ (2)$$

PRi= Area of Park; Oi=Area of open public space; Ai=Area of the neighbourhood

Diversity of Building Use

Land use diversity is most commonly calculated using the entropy index (Boarnet, 2011). Entropy index ranges from 0-1 where 0 means maximum homogeneity (specialization) and 1 means maximum heterogeneity (diversification). The same method was used here to calculate the entropy index based on building use instead of land use as it is more representative of the neighbourhood level functions. The data obtained from Digimap versik was used to obtain the building use for each of the areas. The following formula was used to calculate entropy index (Shannon, 1948):

$$Entropy\ Index = -\sum_{i=1}^{N} Pi \times \frac{\ln(Pi)}{\ln(N)}\ \ (3)$$

P_i = proportion of land use category i within the selected study area boundary; And N = number of land-use categories

Connectivity

The connectivity of road network in each of the areas were measured using network dataset obtained from digimap ordinance survey. ArcGIS Network Analyst Tool was used to produce nodes and edges for the network within each neighbourhood. Nodes were classified into cul-de-sacs, and three and four-leg intersections. Nodes and edges were created for the entire network instead of the clipped areas to overcome the modifiable area unit problem (MAUP) where clipped network creates dangle nodes. The indices for measurement of connectivity is as follows (Tresidder, 2005) :

$$\% \ of \ Cul - de - Sac = \left(\frac{Number \ of \ Cul - de - Sacs}{Number \ of \ Nodes}\right) \times 100 \quad (4)$$

$$\% \ of \ 4 - leg \ intersections = \left(\frac{Number \ of \ 4leg \ intersection}{Number \ of \ nodes}\right) \times 100 \quad (5)$$

$$Link \ Node \ Ratio = \left(\frac{Links \ per \ unit \ of \ Area}{Nodes \ per \ unif \ of \ area}\right) \times 100 \quad (6)$$

$$Connected \ Road \ Ratio = \left(\frac{Actual \ Nodes}{Actual \ Nodes + Cul - de - Sacs}\right) \quad (7)$$

4.5 Methodology Diagram

Figure 15 shows the methodology diagram which summarises the theoretical framework, different methods, and their intersections. As illustrated, the concepts of RTTC developed in Chapter 2 acts as an overarching frame that connects various methods. Literature and policy review are divided across different chapters; this helps establish a contextual understanding that informs the methodology and case study to further translates to analysis. The methods themselves complement and inform each other to broadening the understanding of AT policy and delivery towards answering the question of how equitable the ATI in Glasgow is.

METHODOLOGY
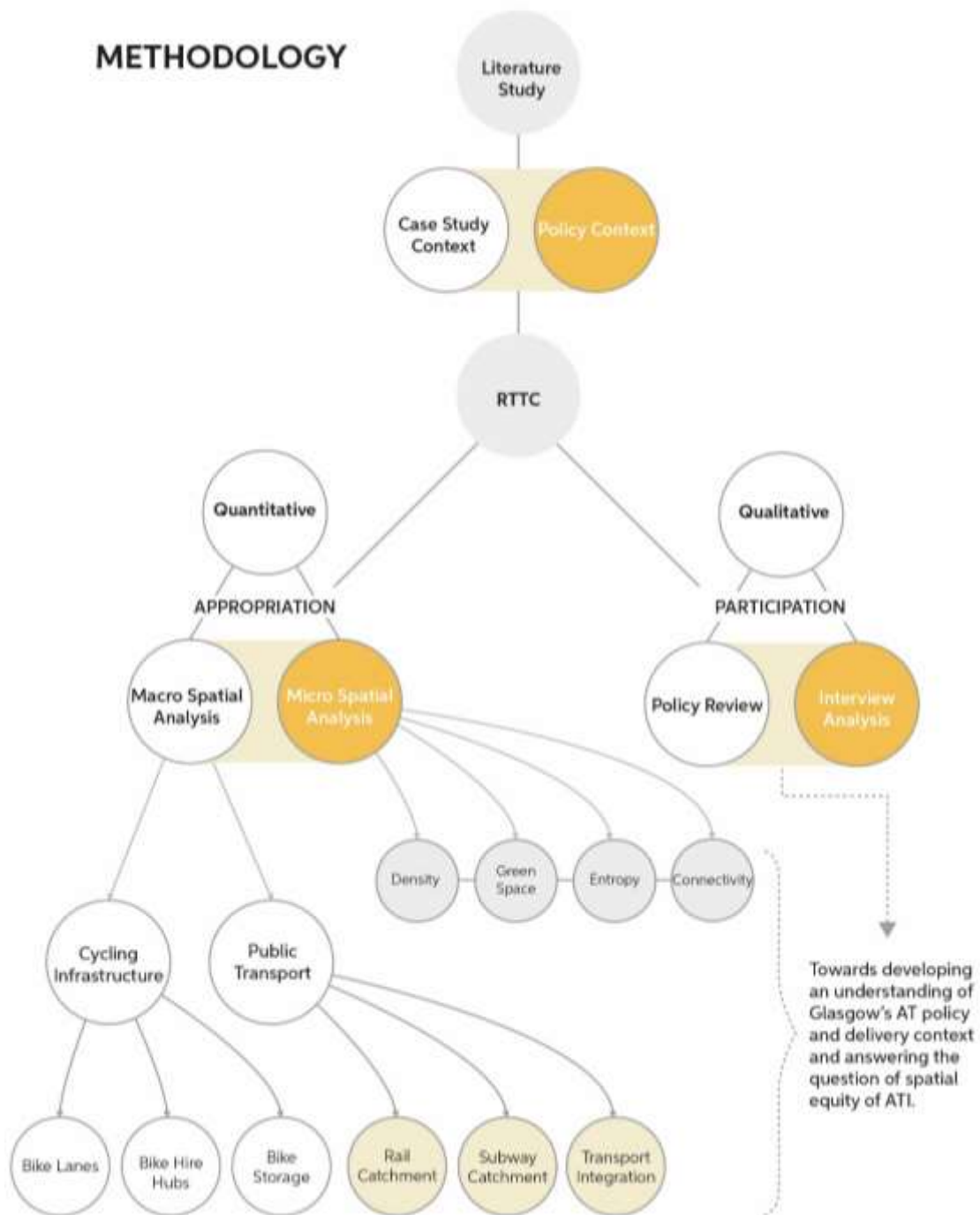
Figure 15: *Methodology diagram.*

5 RESULTS AND ANALYSIS

This chapter covers the results and analysis of the qualitative and quantitative studies. It is structured in four sections and includes Policy Review, Interview Analysis, Macro-Spatial Analysis, and Micro Spatial Analysis. The findings have been presented through a series of diagrams, maps, and charts with descriptive synthesis of the author.

5.1 Policy review

This section builds on the policy context established in Chapter 3 and takes a critical view of policy measures and its implementation in Glasgow. The documents reviewed help develop an understanding of active travel policy framework, planning process, and consultation in Glasgow. It provides a context for the bureaucratic style, capacity of government agency and wider aspects of socio-political trends. Policy documents cannot be looked at in isolation and the interviews help broaden this understanding.

Scotland's transport policies establish a strong rationale for promoting active travel and identifies several social, environmental, and economic benefits. However, the delivery mechanism involves multiple players, primarily local authorities and third sector organizations who act as delivery partners. The Scottish Government also has a very limited role or control in the actual outcomes of ATI implementation. The implementation depends heavily on the priorities of Local Authorities and their ability to seek funding through time bound submission of application. At the local level, multiple senior officials and directors of various departments are influential agents in determining the policy translation (Transport Scotland, 2016). It was noted that smaller LAs could be disadvantaged in their ability to produce these applications due to overlapping priorities and limitations of human resource. Glasgow being one of the largest LAs in Scotland has a significant advantage in terms of available resources and scope of work. The initial review suggests that the city has successfully integrated AT as priority to achieving its wider goals of sustainability. The following section scrutinizes the strategy and its process through RTTC.

5.1.1 Public consultation towards ATS

Public participation is an indicator of the centrality of importance given to the city's inhabitants. The preparation of Active Travel Strategy was based on the Glasgow City Council's extensive public consultation as discussed in section 3.2.2 of the case study chapter. The initial view of the document suggests a deeply participative process. The attempt to be inclusive of minority groups, genders and ethnicities is also commendable. However, direct citizen participation was limited (due to Covid-19) and the character of online surveys were inherently un-interactive. The Council presented the transport problems and acknowledged existing challenges such as connectivity issues, lack of safe spaces to cycle, and lack of public transport integration. The draft of the transport strategies and city centre transformation plans were also presented. However, the method of engagement was found to be extremely prescriptive. The outcome of the consultation was in terms of people's acceptance and agreement of the presented findings and proposed plans (Glasgow City Council, 2021a). Feedback on policy was collected in terms of survey responses indicating "support this policy", "neutral" and "do not support this policy". All policy proposals received support in terms of the consensus of the participants. There was no mention of conflicts or dissent in the process. Good participative processes must acknowledge the plurality of knowledge and expertise and must be oriented towards 'mutual learning' (Pretty, 1995). Thus, the process of consultation paints the picture of a predominantly informative and consensus seeking process rather than participation. Nevertheless, the acknowledgement of public participation and an attempt to implement is a step that deserves appreciation.

5.1.2 A critical view of Glasgow's Active Travel Strategy

The ATS proposes a sustainable travel hierarchy based on GTS which acknowledges the importance of walking, wheeling, and cycling. This represents a fundamental shift from car-oriented functionalism to a people-oriented city, enabling its inhabitants to appropriate its streets. However, achieving the stated goals by 2030 would require intermediate goals, priorities, and site-specific interventions, which the strategy and delivery plan fails to convey adequately. Glasgow's AT strategy is susceptible to the fate of previous targets and plans; Scotland's previous targets of achieving 10% of all road

trips by bike by 2020 was missed by a huge margin as bike share remains only 1% of all the trips (Laker, 2022). The following main findings of the ATS review based on RTTC:

- There is little clarity on how the project will be rolled out and which areas would be prioritised. The existing inequality in active travel patterns of low-income neighbourhoods compared to high income neighbourhoods is acknowledged, but the strategy fails to address or understand the issue in depth. This is in light of the long standing criticism prioritising infrastructure rollout favouring high income neighbourhoods (Hinchcliffe, 2020).

- Larger environmental challenges faced by Glasgow in the wake of the climate crisis has not been included. Addressing issues of urban flooding and urban heat island effect, although not directly relevant, would have made the approach more comprehensive.

- The role of bike hires schemes, e-bikes and e-scooters are not discussed in the strategy. Glasgow bike hire scheme has shown steady growth and success over the years. 40% of users who registered for the scheme are women; a figure much higher than similar projects elsewhere in Scotland (McPherson, 2017).

- The fundamental challenge of tackling existing car users who are currently the majority road user is unclear. It is also critical to not marginalize the existing fleet of working class taxi drivers who are already facing the heat of LEZ (Low emission Zone) regulations in the city centre (Silvester, 2022). Neither is there a parallel strategy to reduce car usage, nor does it address the challenges posed by increased traffic congestion. While the mandatory speed limits and parking restrictions are progressive policies, there is a need to tackle car use as a behavioural challenge. If not congestion, pollution and noise will continue to diminish the potential of ATI.

- Glasgow's plans are also susceptible to enforcing a 'particular vision' of urban environments that subdue others. Lefebvre argues against the attempt to define an end goal for optimal configurations of society or space. The visualization of avenues projects as seen in Figure 16 shows attractive, commerce friendly pedestrianized streets. But they represent strategies developed in urban contexts elsewhere in the world (Uitermark and Duyvendak, 2008). Muir (2020) finds that officers often look at planning models from cities such as Copenhagen while overlooking the potential to generate participative plans. If so, Glasgow

might be repeating its mid-20th century mistake of embracing the modernist vision over again. There is an imminent need to co-create local urban visions responding to public debates and dissent instead of using quick fix global solutions. Utopian labels of urbanism such as 'liveability' and 'sustainability' camouflage the inherent socio-political inequalities, reducing political participation to consumption (Kębłowski, Van Criekingen and Bassens, 2019).

- Estimates suggest that ATI can bring a net economic gain of £1.8bn over the next ten years because of reduced congestion and increased footfall on local high streets (Stewart, 2022). While economic prosperity can benefit people, there is a concern that the needs of businesses will be prioritised over the actual needs of the people. Meanwhile large infrastructure projects such Clyde metro project with an investment of £16bn recently received approval; a sum that dwarfs the AT budget in comparison.

A key observation that emerges is that the strategy fails to echo the voice of the people. Its top-down approach is evident in its attempt to 'educate the people', rather than co-create. Nevertheless, Glasgow has made significant progress in acknowledging the need for active travel and its potential to address many of the city's urban challenges.

Figure 16: *Illustration of Argyle Street for the avenues project (Glasgow City Council).*

5.2 Interview Findings
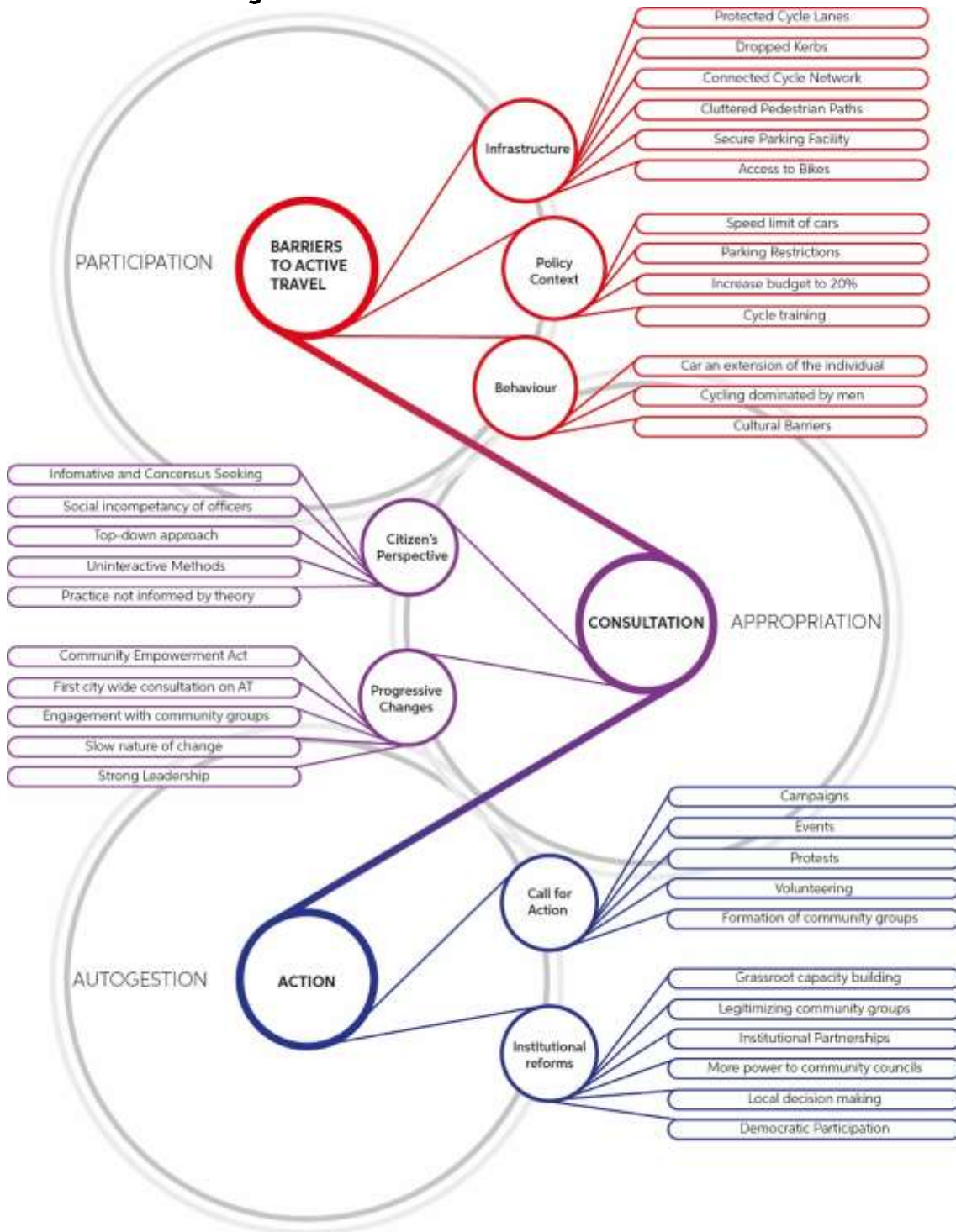
Figure 17: *Figure showing the different codes and themes identified and their link to RTTC.*

Figure 17 illustrates the subcodes, codes and themes identified and links it to the RTTC framework. The following are the key findings of the interview analysis.

5.2.1 Barriers to Active Travel

'Safety', 'infrastructure' and 'policy' were the key codes that were categorised into the theme of barriers to active travel. Barriers are strongly linked to the RTTC, as it reflects the ability of inhabitants to appropriate space in the context of ATI. Across all the interviews, the lack of adequate infrastructure emerged as the key barrier to active travel. When it came to walking, the cluttering of pedestrian space with lampposts, bins, bus stops and other amenities was seen as an attack on pedestrian space. Two of the interviewees pointed out that walking specifically depends on the neighbourhoods they live in as not all areas had adequate amenities within a walkable distance. This is further connected to the urban restructuring of Glasgow in the 1960's which led to a fragmented urban environment.

While all interviewees were seasoned cyclists, they actively engaged with communities in terms of education, volunteering, or campaigning. Thus, they were able provide insights into the perceptions of people and what prevents them from taking up cycling. The lack of segregated cycle paths and adequate policies meant that people were quite concerned about safety which acted as the primary barrier to cycling. As one respondent mentioned "cycle paths in Glasgow end abruptly", indicating the lack of connection between the existing cycle routes. Cycle storage was a key concern with the fear of theft and vandalism. Two of the respondents brought up the demand for cycle storage facility and the difficulty to secure a cycle storage space. Tenement housing also meant that users had to carry their bikes to their flats, causing additional hurdle in storage.

Road safety was seen as the result poor policy which failed to implement speed limit; a concern strongly raised by cycling communities. Roadside parking was seen as an encroachment of private property in public space, and respondents were concerned about the lack of policy to prevent the same.

5.2.3 Views on consultation

The respondents indicated a fragmented understanding of the consultation process. Two of the interviewees were consulted as part of wider community consultation of Glasgow city council's connecting communities. This was one of the first public conversations on active travel strategies. Strategies and plans were presented, and people were asked for feedback. When asked about the effectiveness about the consultation, there were conflicting views- from being appreciative of the progress to calling it 'a purely consensus seeking process'. From the implementor's point of view, there was acknowledgement about the inadequacy of the current process which was attributed to 'engineers and planners being inadequately trained in the social aspects of planning'. Decision making emerged as a predominantly top-down process with poor access to participation. However, the role of Cycling Forum (presently Active Travel Forum) in driving policy change over the years was acknowledged.

5.2.4 Views on activism

While there were contradictions and conflicts in views about the nature of activism, there was a very clear acknowledgement on its role in campaigning for policy and infrastructure change. The contradictions manifested in views that considered 'provocative protests' as ineffective to 'large scale events' being crucial to the positive changes seen in the current political atmosphere. There was a collective consensus on the importance of active citizenship.

5.2.5 Behaviour change, lockdown and media representation

Car ownership and the perception of 'car as an extension one's individuality' was seen as the primary barrier to behaviour change. Parking space and road space are taken for granted due to systemic reinforcement of the car culture. Gender and culture were highlighted as barriers to cycling for women. This was attributed to a general perception of cycling as an appropriate skill for men and inability of minorities to access or learn to cycle.

Two of the activists brough up the role of media and speculated that the editorial stand of major newspapers were pro-car and anti-cycling. This was in line with a Sustrans

report that finds media representations of cyclists to be predominantly negative (Sustrans, 2019).

The impact of lockdown was widely acknowledged by all interviews. The Spaces for People program and its role in showing the possibilities of a car free street was widely accepted. The pandemic proved that given the right conditions more people will choose to cycle.

5.2.6 Leadership and governance

Political underpinnings clearly emerged as a dominant theme throughout the interviews. The role of good governance and committed leadership was seen as quintessential to positive change. Change in the labour party (which held on to power in Glasgow for 70 years) and proportional representation were seen as key political changes that fundamentally changed the decision-making process. The inclusion of multiple parties and groups had wider implications on priorities and approaches. The leadership of councillor Anna Richardson was specifically brought up by two interviewees as fundamental to the current strategies and plans of the city council. The response to inequity in infrastructure was met with fragmented responses. Community mobilization and its formalisation into community groups were seen as a fundamental way of creating inclusive participative processes. The role of community councils and the need for resources and decision-making power at the local level were seen as measures that could drive positive change. The redistribution of power to the people emerged as a key concept that could fundamentally change the production of infrastructure.

5.2.7 ATI funding process and role of Sustrans

The interview also helped reveal the intricacies of the delivery context of ATI, specifically the role of Sustrans and helped fill the gaps in understanding of the policy. Sustrans administer funding to LA's, community groups, and national partners and has a considerable influence on policy delivery. In addition to funding, Sustrans has embedded officers within LAs and partnership organizations (such as NHS) to provide strategic support. Sustrans works in facilitating strategic approach, adding capacity,

identifying funding opportunities, and building connections. The funding is administered through the places for everyone (PFE) program where a funding panel comprising of partnership organizations take the final decision. A staged review process is followed to ensure that the objectives are met at every stage. 100% funding of pre-construction and 70% for construction, land acquisition and post-construction evaluation is provided with the rest of the fund coming from LAs. The LAs are statutorily required submit applications in partnership with communities and are required embed behavioural change within the projects. The projects are also required to follow equality impact assessment and ecological assessments.
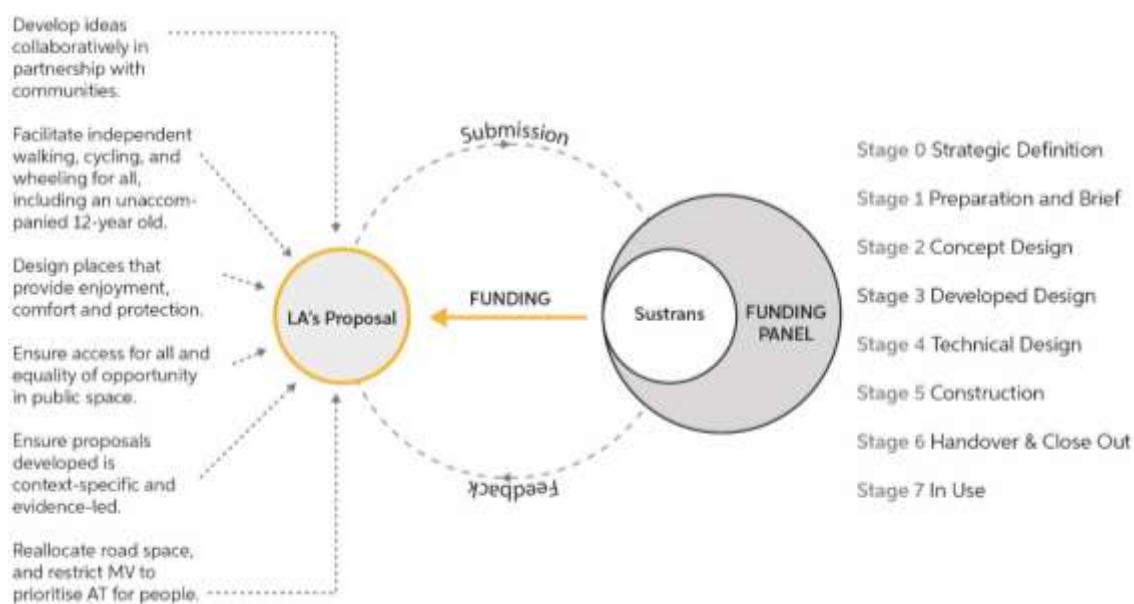
Figure 18: *Visualization of the funding application process.*

5.3 Summarising qualitative analysis: towards understanding Participation

The interviews and policy review complement each other in helping frame a nuanced understanding of the planning process. Both methods lead to an understanding the confirms Lefebvre's argument about the nominal role of citizens in decision making. The findings suggest a limited and partial public participation that allows residents and interested parties to object to planning applications and comment on the development of development plans, rather than actively take decisions. While institutional channels for participation directed through departmental mechanisms were inadequate, the Active Travel Form (comprising of citizen groups and activists) played a significant role

in influencing the policy landscape and the City Council's approach to AT. This is evidence that more control to citizens can lead to participative processes that can create new modes of production of urban space. Involvement of delivery partners democratise decision making to a large extent. Policy interpretation was found to be dependent on several factors including the number of stakeholders, departments and officials involved. Leadership and alignment of goals plays a significant role in policy translation. Figure 19 shows the various entities that play a role in ATI from policy to implementation. The understanding also highlighted the need for self-management which Lefebvre conceptualised as autogestion. Further discussion on this concept is followed in Chapter 6.
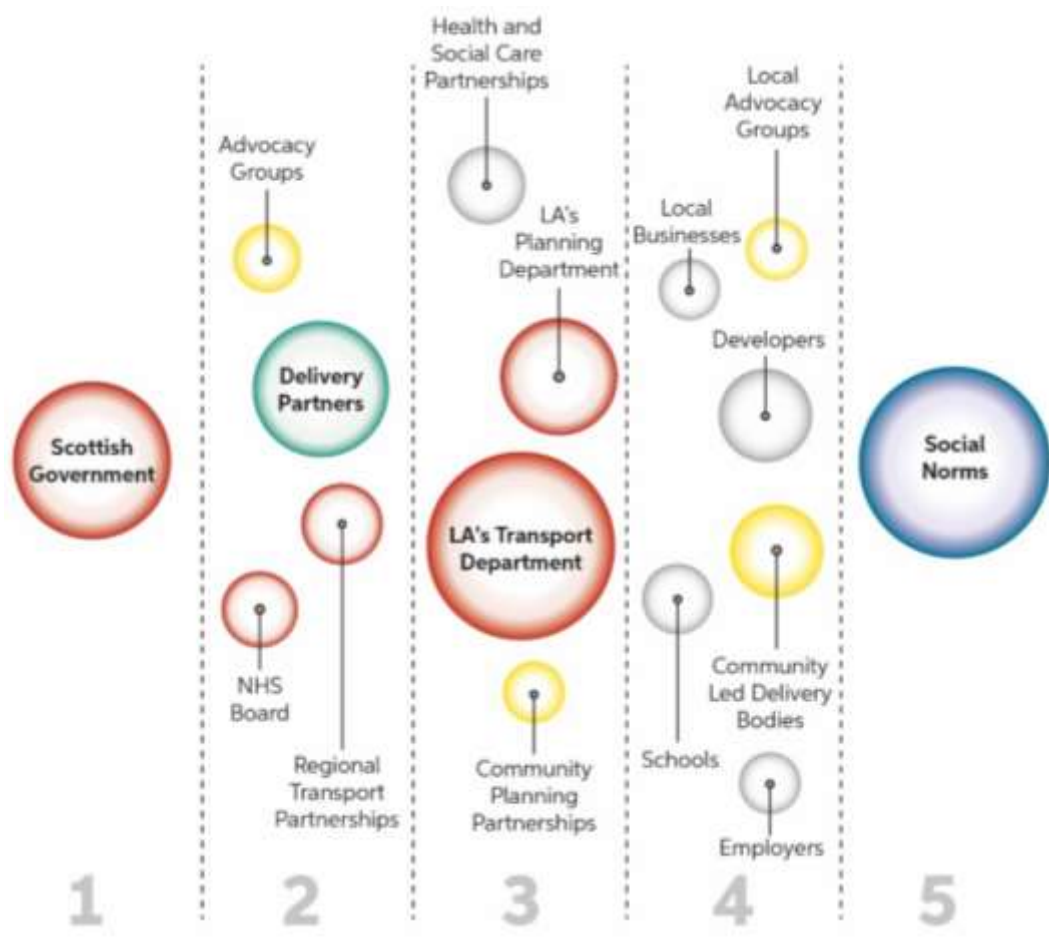
Figure 19: Author's understanding of the stakeholders involved in the Scottish AT policy landscape based on AT Policy implementation review (Transport Scotland, 2016)

5.4 Macro-spatial analysis

This section illustrates the findings of the spatial analysis evaluating ATI at Glasgow city level. The spatial equity of infrastructure distribution is evaluated by calculating the SIMD quintiles that are best served. Each map looks at a separate infrastructural entity and is followed by a brief discussion with reflections drawn from literature and interviews.

5.4.1 Spatial equity of bike lanes
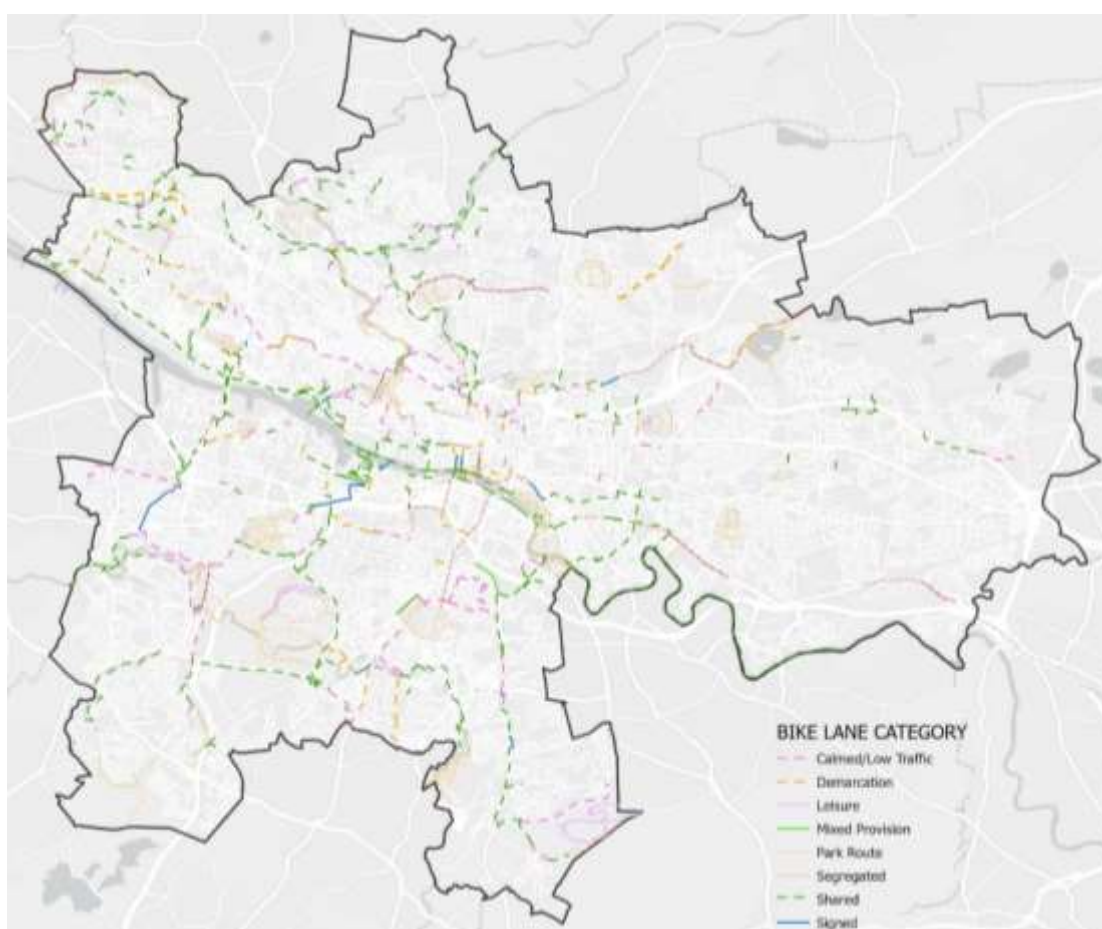
Figure 20: *Bike lanes and their categories.*

Glasgow has 415 kilomters of bike lanes including park routes and those shared with pedestrian paths. Figure 20 shows the spatial distribiution of exisitng bike lanes that are classified into 8 categories. The distribution of bike lanes with respect to SIMD was found to be fairly equitable (Figure 20A). Each SIMD quintile has close to 20% share of bike lanes with SIMD 3 having the largest share of lanes (29%). Only 8% of the lanes are

segregated paths, with 43% of the bike lanes being shared with road space. Evidence supports that segregated cycle paths addresses issues of saftey which is the primary concern that prevents people from cyling. In Copenhagen, segregated cycle lanes helped prevent the risk of serious collissions by 72% per cycled kilometers (Transport for London, 2018). 20% of the cycle routes are within parks, although not all parks were found to be well connected to the rest of the network. This confirmed the views of interviewees who highlighted the disconnected nature of cycle routes.
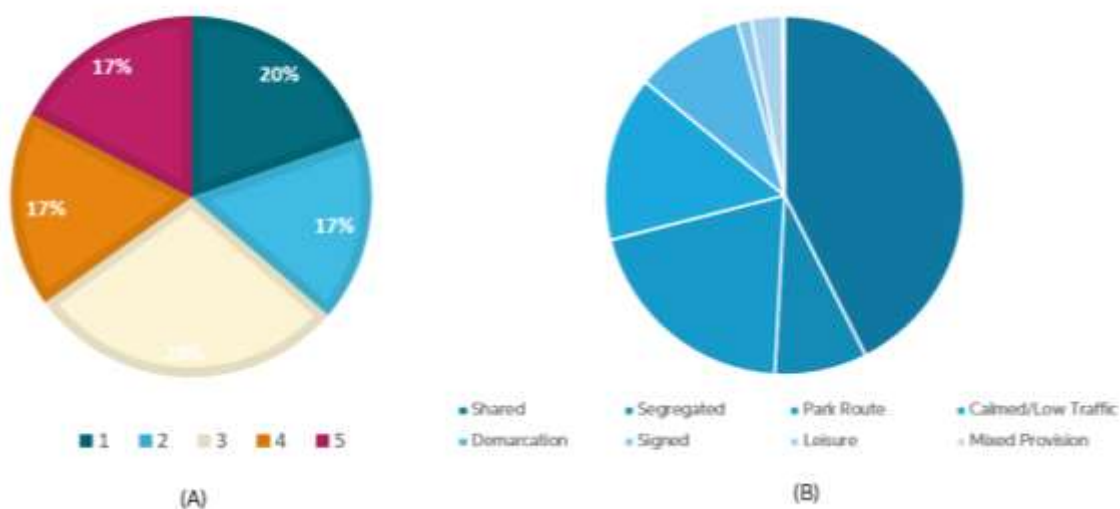
Figure 21: *Bike lanes in Glasgow, (A) spatial distribution based on SIMD, (B) proportion of different categories of bike lane.*

5.4.2 Spatial equity of automated bike hire stations

Bike hire systems combine the agility of bikes with digitization to offer a flexible and convenient way to move around the city compared to the rigid nature of public transport systems. They also remove barriers such as upfront costs, maintenance, and storage. Bike share infrastructure have however been predominantly designed for specific user groups such as younger, well-educated, white, male, who already have good access to mobility systems (Smith, Oh and Lei, 2015, Shaheen, Cohen and Martin, 2013). Bike hire services also tend to ignore the differences in travel pattern among men, women, children, people with physical disabilities or individuals who travel with luggage (Clark and Curl, 2016). Lower socio-economic groups are further side-lined because of lack of smartphone, internet, or credit card facilities (McNeil *et al.*, 2017).
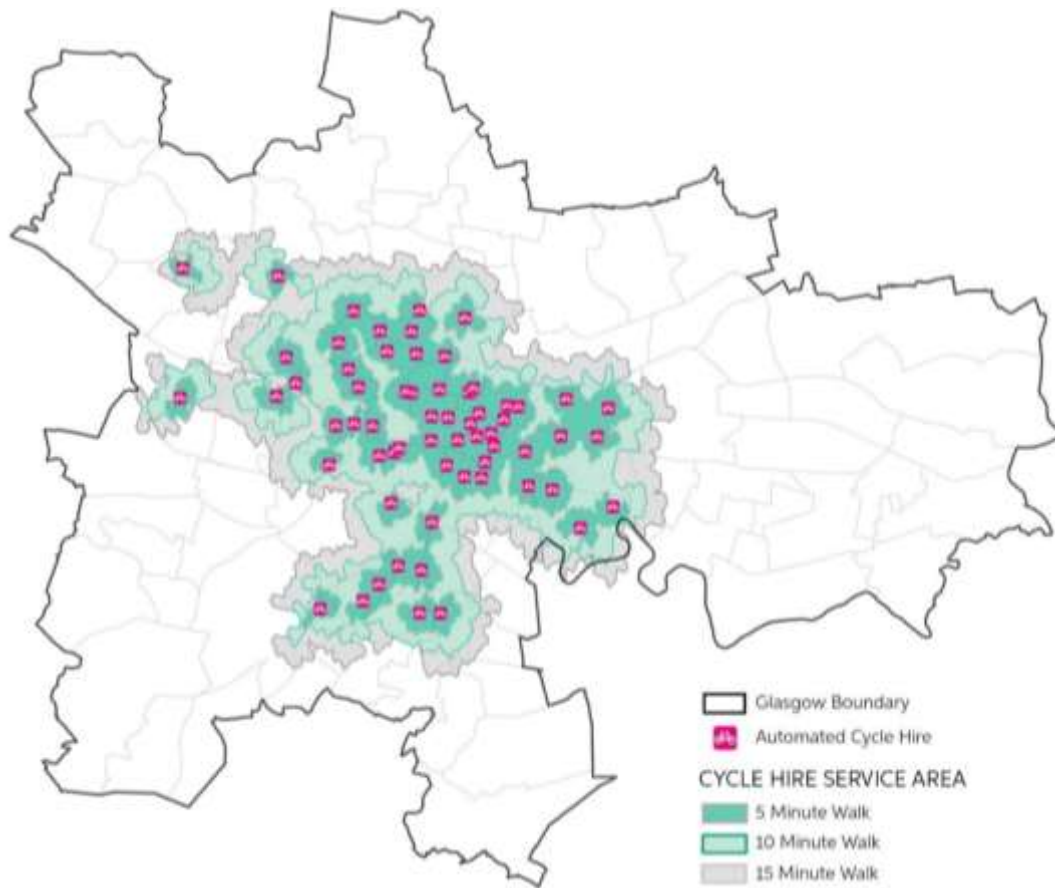
Figure 22: *Service area of automated bike hire stations.*
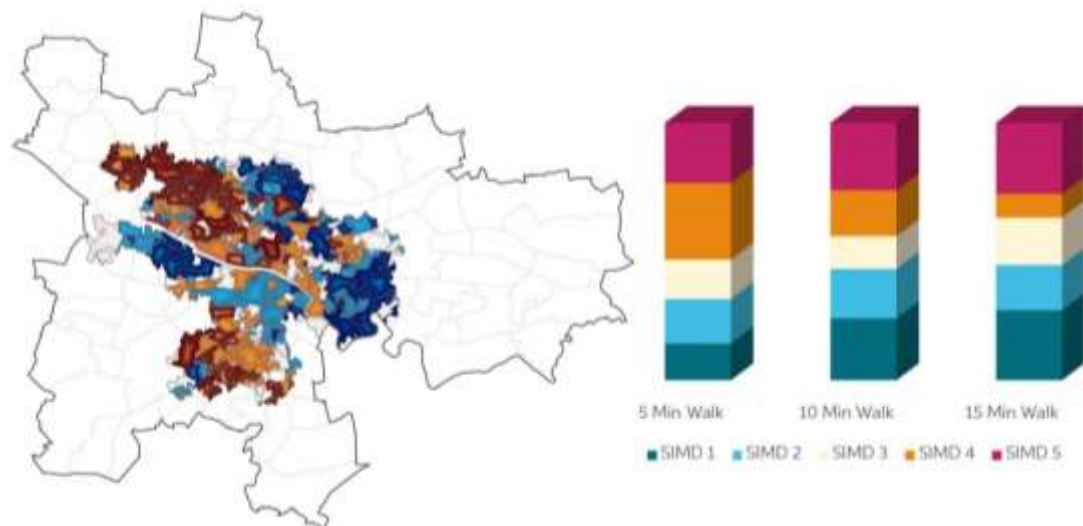
Figure 23: *Proportion of SIMD quintiles in the service area of bike hire stations.*

In Glasgow OVO bikes powered by nextbike runs its fleet of bikes and automated bike hire   stations.

Glasgow Boundary
Automated Cycle Hire
CYCLE HIRE SERVICE AREA
5 Minute Walk
10 Minute Walk
15 Minute Walk
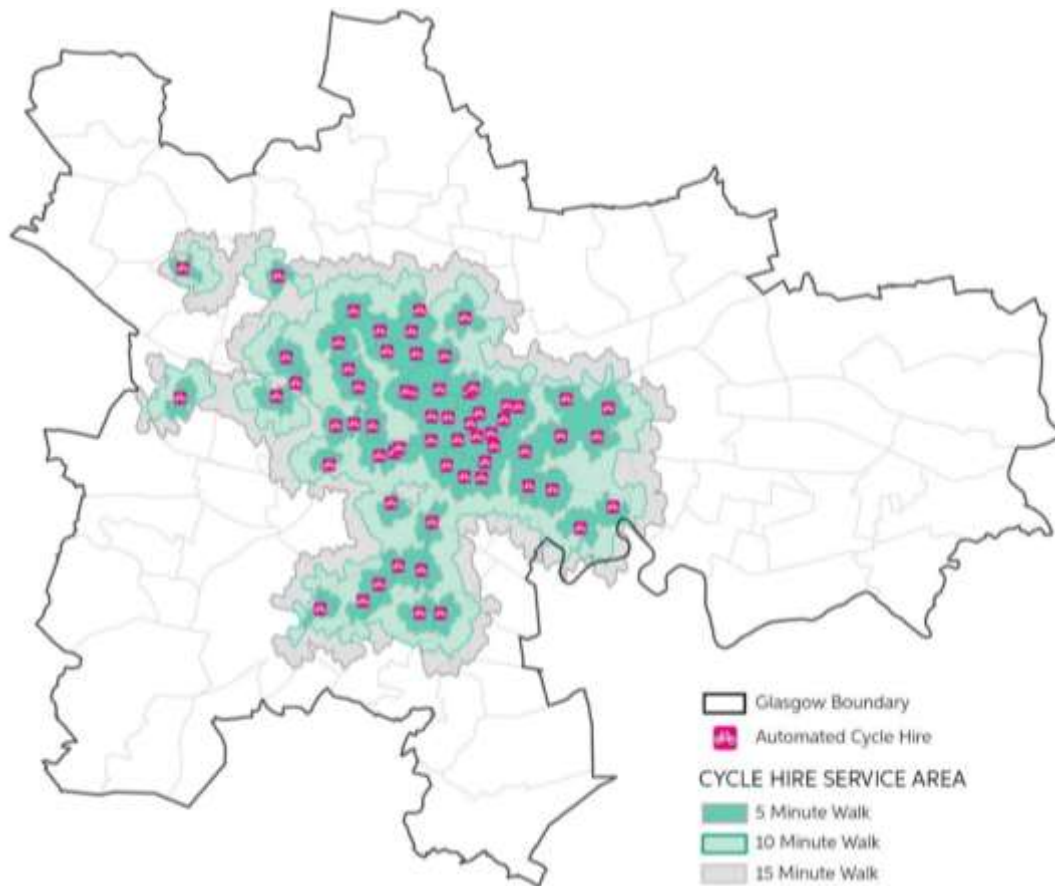
shows the service area of Automated bike hire stations in Glasgow. The service areas were defined in terms of walking time with 5-, 10- and 15-minute zones considered. The largest number of bike hire stations are in the city centre. Figure 23 indicates that the least deprived areas have much better access to bike hire stations with the 4th and 5th quintiles occupying more than 50% of the service areas within 5-minute walking distance (400m). With an increase in walking distance, accessibility of most deprived areas increases marginally. An equitable distribution of stations would have resulted in proportions close to 20% for all areas of deprivation.

The analysis makes a strong case that Glasgow needs a bike hire system that is inclusive and equitably distributed. While this analysis does not look at demographic inclusivity, Clark and Curl (2016) finds evidence of 'failure to deliver benefits across demographic spectrum' in Glasgow, and questions the inclusivity of public investment in such schemes. It is critical to look at users as a wide group with a range of needs and vulnerabilities. Sustrans interviewee highlighted that the bike hire programme was first introduced during the commonwealth games to connect the city centre to the games venue and hence has unique challenges attributed to its legacy. It was also cited that

the priority then was to generate more trips and strategic locations were chosen accordingly.

5.4.3 Cycle rack locations

There are a total of 615 cycle racks across the city. 131 of these are secure cycle storage facilities installed in residential neighbourhoods with provision to store upto 6 bikes each. The residents need to make an application in order to secure a place in the cycle rack in their neighborhood. The interviewees highlighted that the high demand for cycle racks make it extremely difficult to secure a spot.

The spatial analysis found that 357 of the 615 racks are located in the 4th and 5th quintile of SIMD; a whopping 58% of infrastructure located in the areas of least deprivation. Only 12% of storage facilities are available to the first and second quintiles respectively. As seen in Figure 24(A), the bicyle racks are concentrated in the city center and extends towards the west of the city- a historically well off neighbourhood. Cycle racks towards the south are concentrated in Shawlands, which again has low levels of deprivation. All interviewees agreed on the inadequate number of cycle paths. As highlighted by one of the activists "you can put upto 4 bikes in a 1 car parking spot".
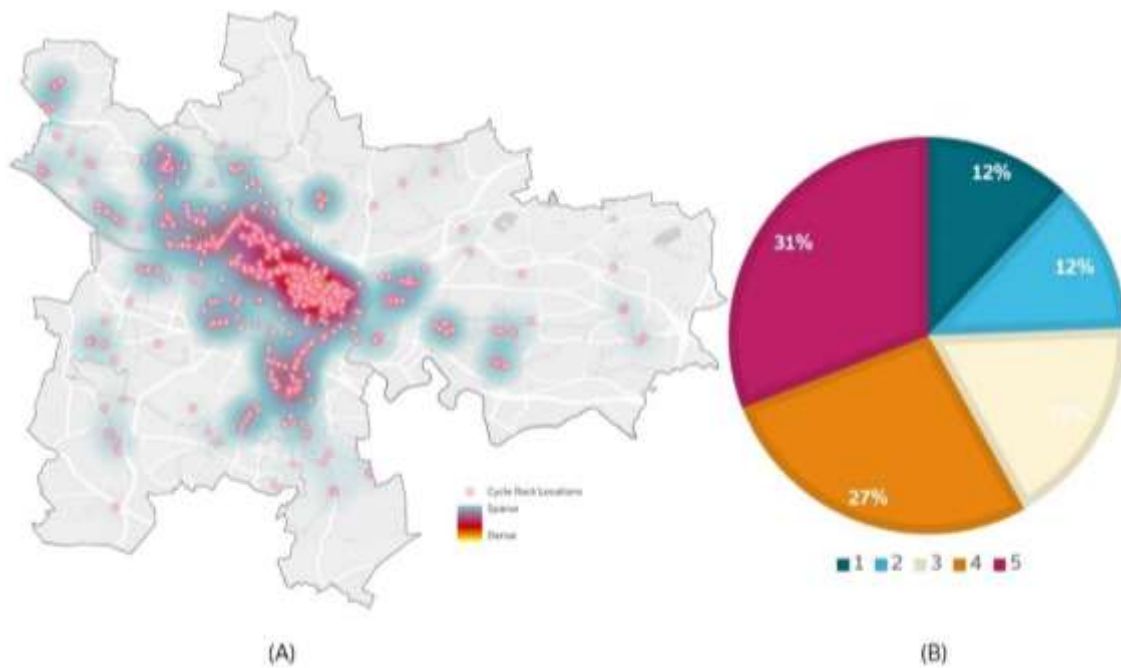
Figure 24: *(A) Location of cycle racks and (B) SIMD distribution of cycle racks.*

5.4.4 Public transport service area

For cycling and walking to be used as primary modes of transport, it should offer competitive advantage over private cars. Studies have shows that isolated measures are insufficient to achieve a modal shift and that the use of public transport increases when services are integrated (Tønnesen *et al.*, 2021). For most users the challenge to using public transport is the first mile and last mile connectivity. Active travel and micromobility solutions can fill this gap and enhance the use of public transport. In Amsterdam 44% of all rail commuters use their bikes to reach the railway station (Jonkeren *et al.*, 2021). Evidence indicates that better trasnport integration of ATI can put forth a competant alternative to car use. As discussed in the literature study, the most deprived population heavily depend on public transport as their means of commute. Thus it is critical to understand what areas are best served by public tranport and how well integrated is the current transport system with active travel infrastructure.
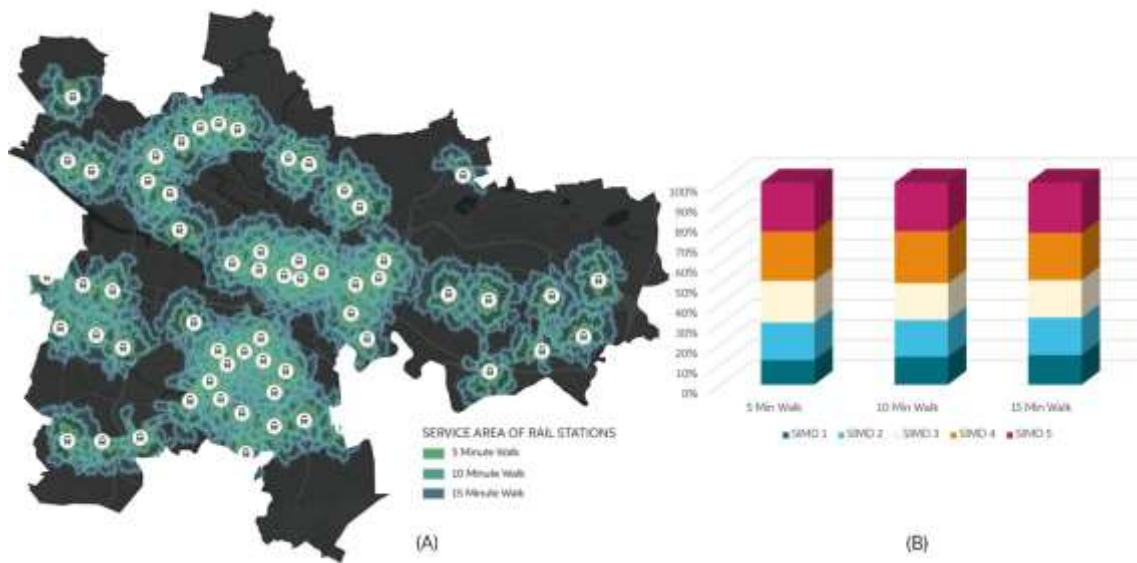
Figure 25: (A) Service/Catchment area of train stations within walkable distance and (B) proportion of service area in SIMD quintiles.
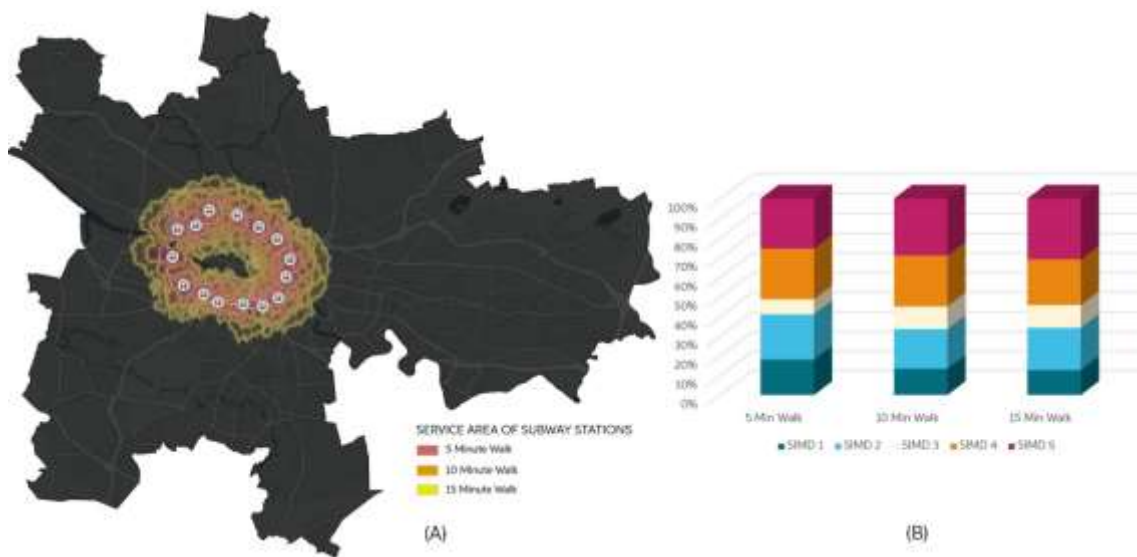
Figure 26: (A) Service area of subway stations within walkable distance and (B) proportion of service area in SIMD quintiles

The catchment area of train stations defined in terms of walking distance/time generally defines their accesibility. Walking distances over 1 km cannot often compete with alternate feeder systems (Kager, Bertolini and Te Brömmelstroet, 2016). The catchment areas for the purpse of this analysis were determined in terms of the walking time – 5, 10 and 15 minutes. Figure 25 A and Figure 26 A shows the catchmet areas generated using ArcGIS Pro network analysit tool which takes into consideration the existing roads and pedestrian paths based on openstreetsmap data. Figure 25 B Figure 26 B shows

the proportion of quintile SIMD in the service areas. A clear pattern that emerges is that the deprived areas have least access to train stations. SIMD 4 and 5 consistently has close to 50% share of the service areas. A mixed pattern emerges in the service areas of Subway stations. However, the limited number of stations and nature of service means that the same conclusions cannot be drawn about subawy service.

5.4.5 Transport integration

Biking infrastructure if integrated with public transport system can reap the benefits of both modes- speed and spatial reach of public transport with the flexibility and door to door accessibility of bicycles. *Kager, Bertolini and Te Brömmelstroet* (2016) argues that a well-integrated biking infrastructure can offer a degree of access, speed and comfort that can compete with motorised vehicles. The inclusion of bicycles also significantly increases the catchment areas of public transport systems avoiding the need for feeder transit.

Integration of existing biking infrastructure with the public transportation was determined by the closeness of transport hubs with existing bike hire stations. Transport facilities within 150 meter of bike hire hubs were identified and ranked based on the type of integration. Table 6 shows the categories of transport integration and its definition. Only Partick has a transport hub with a bus station, subway station and rail station integrated with the automated bike hire station. It was noted that the city centre had transport hubs in proximity although it does not follow the parameters set for this analysis. There are 6 hubs where bike hire stations are integrated with train and bus stations and 10 with subway and bus. Most bike stations are well within the reach of bus stops, although the bus routes have not been taken into consideration. Most integrated hubs were found to be close to or within the city centre.
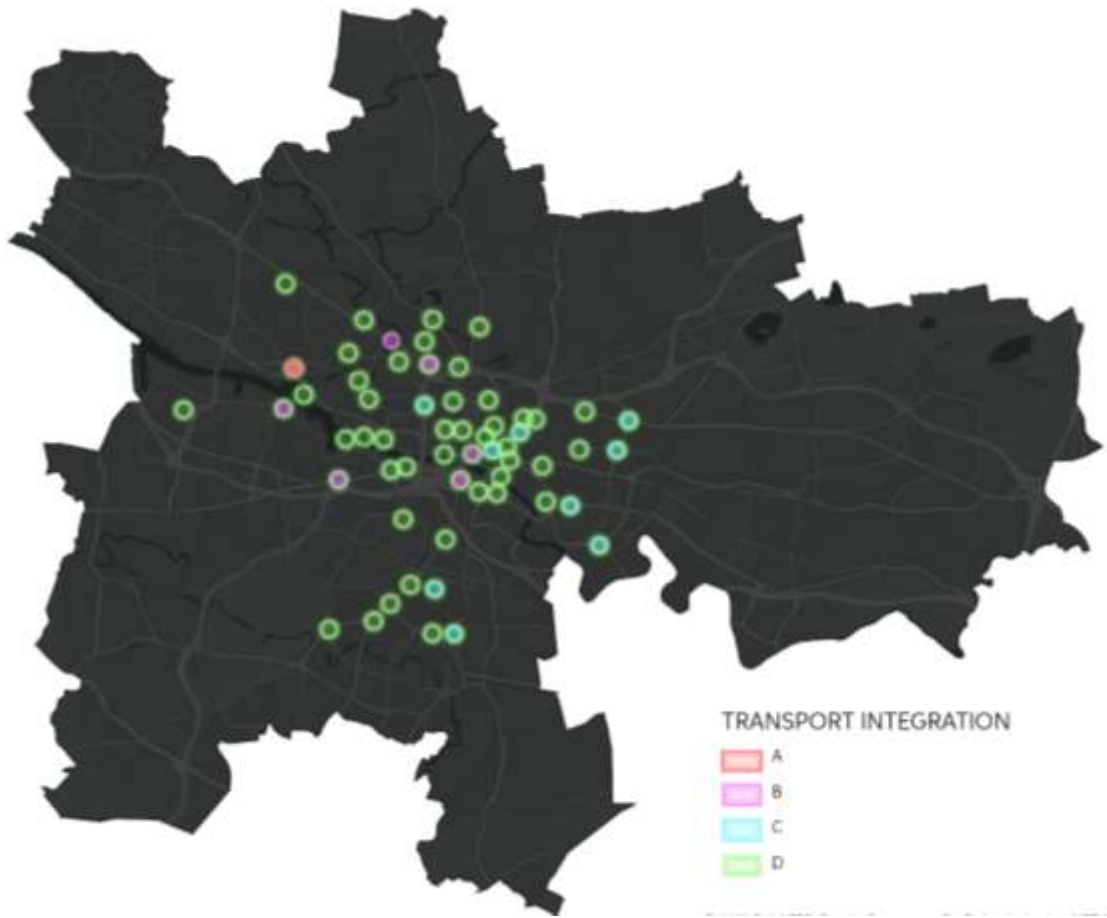
Figure 27: *Transport integration map showing the location of integrated transport hubs.*

INTEGRATION	DESCRIPTION	COUNT
A	Bike Hub+Train+Subway+Bus	1
B	Bike Hub+Train+Bus	6
C	Bike Hub+Subway+Bus	10
D	Bike Hub+Bus	57

Table 6: *Transport integration definitions.*

5.5 Micro-spatial analysis: Neighbourhood study
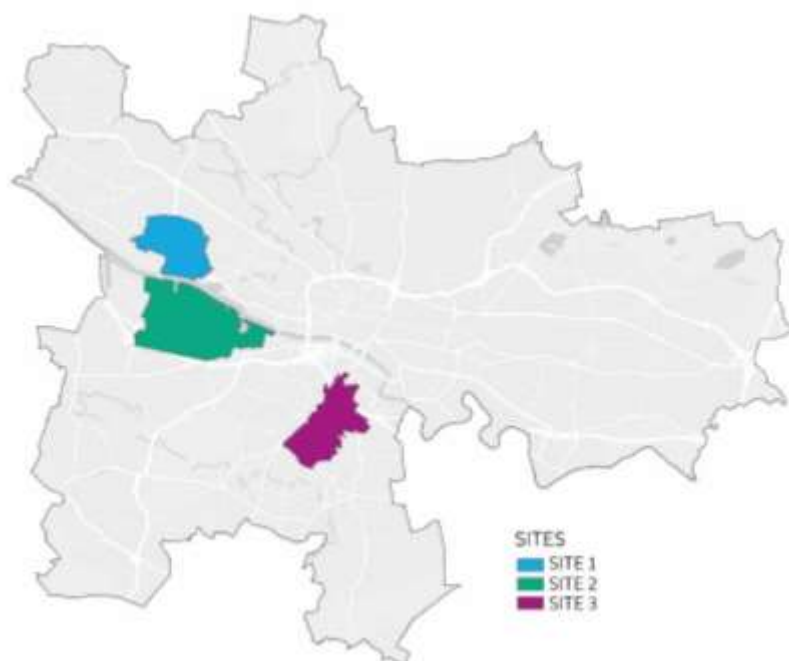
Figure 28: Map showing the sites selected for neighbourhood level case study.

5.5.1 Introducing neighbourhood sites

Site 1 Broomhill + Partick

Site 1 comprises of Broomhill, Partick and Victoria Park in the West End of Glasgow bounded by Jordanhill and Scotstoun to the west and Kelvingrove and Yorkhill to the East. Partick was a burgh until 1912 when it was annexed and incorporated into the city to position Glasgow as the Second City of the Empire (Alderson, 2012). Broomhill was developed in mid-19th century during the development of the Victoria Park as part of Partick Brugh extension (Glasgow City Council, 2015). The area is connected to the city centre via Dumbarton Road. It has a high student population due to its proximity to Glasgow University and has several amenities and services within walkable distance.

Site 2 Govan + Ibrox

Located on the south bank of river Clyde, Site 2 is geographically bounded by the M8 motorway in the south and east. Govan's history is perhaps older than that of Glasgow, with archaeological findings dating back to the 5th century. Govan was brugh since 1864

and the 7th largest city in the UK until it was incorporated into Glasgow in 1912 (Alderson, 2012). Govan has an industrial history rooted in shipbuilding, textile, and mining; and has traditionally been considered a working-class area.
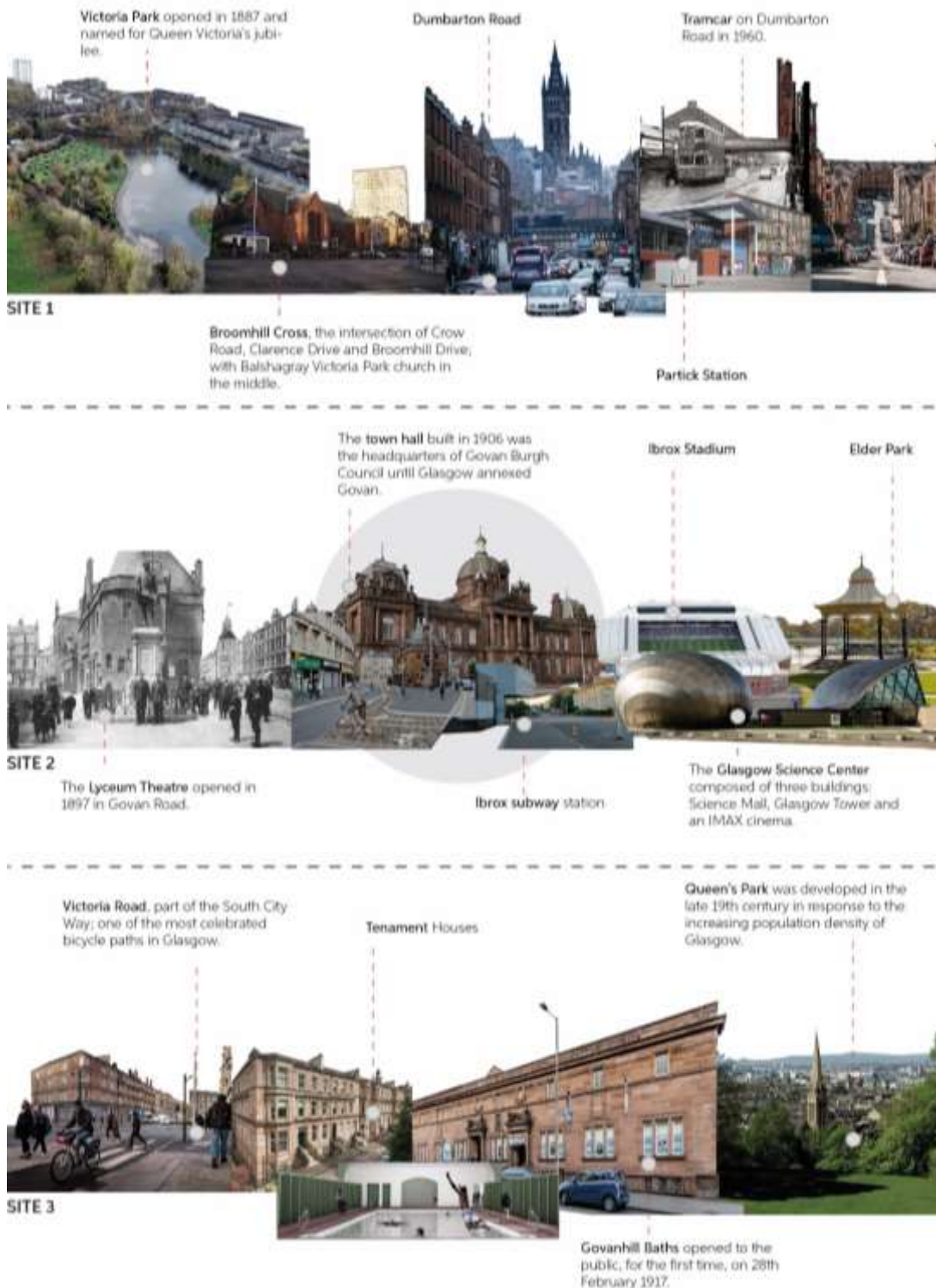
Figure 29: *Urban Sections showing the highlights of the built environment of each site selected.*

Housing estates such as the Moorepark were built to relive overpopulation in the Gorbals, eventually giving Govan a reputation for deprivation. The Queen Elizabeth University Hospital is located in the western end of Govan.

Site 3 Govan Hill Queen

Site 3 comprised of Govanhill, parts of Crosshill and Queen Elizabeth Park is bounded by Gorbals in the North, Shawlands in the South, Pollocksheilds in the west and South side Central in the East. Although Govanhill gained police Brugh status in 1877 it was incorporated into Glasgow as early as 1891 (Maver, 2004). Govanhill was one of the few areas that escaped Glasgow Corporation's modernist program in the 60's. The area has historically had a high number of immigrant population and is culturally very diverse. 40% of the population living in Govanhill are ethnic minorities (McPhie, 2019).

5.5.2 Neighbourhood comparison

Deprivation Levels

Site 1 is the least deprived of the three sites with most areas under SIMD quintile 5 followed by 4 and very small proportions in the last 3 quintiles (Figure 30). More than 50% of Site 2 is in SIMD quintile 1 followed by SIMD 2 and a very small proportion of SIMD 4. Site 3 also has high levels of deprivation with most areas in first quintile of SIMD.

Public Transport and Recreational Amenities

Site 1 has several amenities and services within walkable distance. Recreational facilities include Victoria Park and Kelvingrove park, both of which are within walkable distance. As discussed in the spatial analysis of public transport, Partick has Glasgow's most integrated transport hub. Hyndland and Jordanhill train stations are also located within this area. Site 2 has no rail stations but 2 subway stations (Govan and Ibrox). The Elder Park and Glasgow science centre are two recreational amenities in the area. Govanhill Park and Queen Elizabeth Park are the main recreational amenities in Site 3. It also has several architecturally rich buildings and a thriving arts community. It is outside the service of the Subway catchment area but has two train stations (Queen's Park and Crosshill).

Site 1 Broomhill+Partick 2.1 sqkm

10.7 % Green Space

●1 ●2 3 ●4 ●5

Site 2 Govan+Ibrox 4.2 sqkm

4.2 % Green Space

●1 ●2 3 ●4
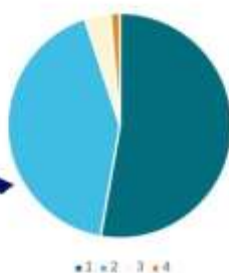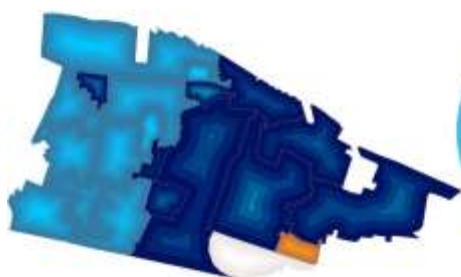
Site 3 Govanhill 2.4 sqkm

19.8% Green Space

●1 ●2 3 ●4 ●5

*maps not to scale

Figure 30: SIMD and percentage of open space in each of the sites.

5.5.3 Active travel patterns
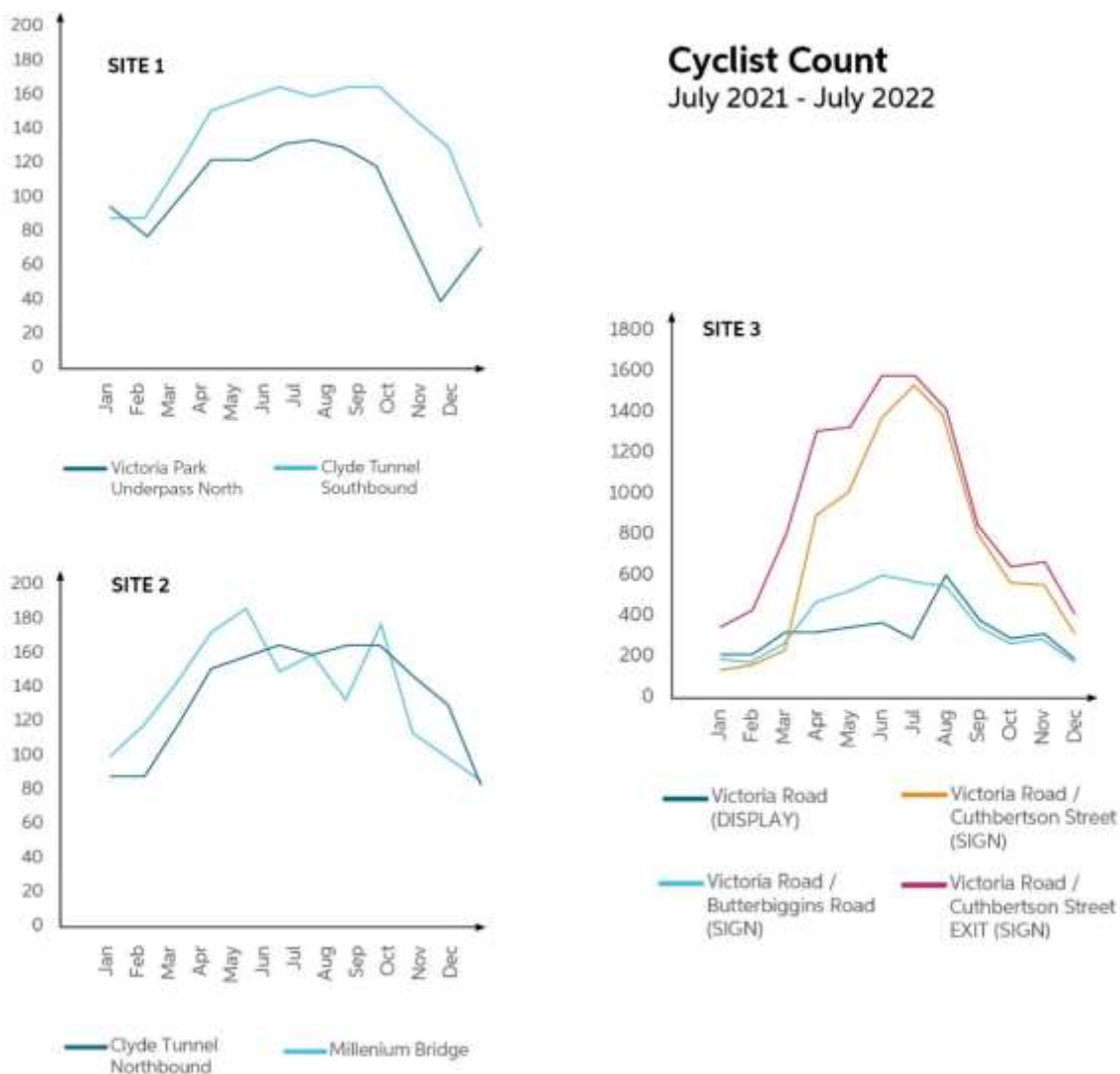
Figure 31: Graph showing the cycling counts from July 2021 to July 2022 based on data from Glasgow City Council's automated cycle count data.

Figure 31 shows the cycle counts between July 2021 and July 2022 collected for all three areas based on the open data obtained from Glasgow City Council's automated cycle counters. Site 3 had the highest number of automated counters and hence the most reliable data among the three. Site 1 had three cycle counters in the vicinity of Victoria Park and is representative of the park visitors and travel patterns to and from to the city centre. Site 2 only had two data points; one located at Queen Elizabeth Hospital premises and second at the Glasgow Science Centre. Since the data points in site 2 were in the periphery of the area within the premises of public amenities, it cannot be representative of the actual travel patterns of its residents.

In terms of the travel patterns, the highest number of cyclists were found in Site 3. The number is disproportionately higher than the other two areas, with daily counts reaching as high as 1600. Both Site 1 and 2 have similar counts with maximum counts reaching 200 per day. In all three cases the cyclist counts peaked in summers between April and September. The lowest counts were between winter months of December and February.

5.5.4 Active Travel Infrastructure

In terms of ATI, Site 3 has the highest share of cycle paths among the three. Victoria road, part of the south city way, with its segregated bicycle paths is considered one of Glasgow's most successful bicycle infrastructures. This is followed by Site 2; however, the proportion of bike lanes in comparison to total area is lowest in Site 2. In terms of the number of bike hire stations, Site 3 has four stations, followed by Site 1 with three stations, and Site 2 with just one station. We see a similar pattern in terms of the distribution of bike shelters. Site 1 has the largest number of cycle racks followed by Site 3 and lowest in Site 2.

Site 2 with its lowest SIMD performs the worst both in terms of infrastructure and lack of data. Site 3 only has marginally better bicycle infrastructure compared to Site 1; but the cycle counts are significantly higher. While it is unreliable to draw any statistical conclusions due to the limited number of areas compared, the inequitable distribution of infrastructure is quite evident.

5.5.5 Neighbourhood walkability

Density

Site 1 has the highest population density with 7355 people living per square km of area. This is attributed to the predominantly residential nature of the neighbourhoods. This is closely followed by Site 3 where 6557 people live in one square kilometre of area. Site 2 has the lowest population density with only 3642 people living per square kilometre. Site 2's low density is attributed to its diverse built environment, with housing only accounting for 34% of the buildings.

Open Spaces and Amenities

Parks and recreational facilities were part of each site selected. One of largest parks i.e. the Queen's Park fall within the boundaries of Site 3. The presence of Queen's Park was considered to be one of the contributors to high cyclist count in Site 3. Site 3 has the highest proportion of green space followed by Site 1 and lowest in Site 2. Victoria Park located in Site 1 is only marginally bigger (19 vs 16 ha) than Elder Park in Site 2.

Diversity

The building use was classified in to 19 categories. Each site had a slightly different set of uses, as the type of buildings differed quite significantly. Mean entropy index was found to be 0.58. Site 2 received the highest entropy index of 0.69. This was complemented by a low population density indicating that the residential areas are concentrated in clusters. This was followed by Site 3 with an entropy index of 0.678. However, Site 1 was found to have the lowest entropy index indicating a highly homogenous neighbourhood. This is attributed to the fact that Broomhill and Partick are predominantly residential areas. Partick's commercial areas are concentrated in the Dumbarton Road and extends to Kelvingrove. The entropy index was indicative of both horizontal and vertical building heterogeneity as categories very divided based on the building's use mix.

Connectivity

A higher link-node ratio, connected node ratio and number of four-leg intersections indicate that the area is relatively well planned and well connected (Tresidder, 2005). A well-connected area will also have a relatively lower number of cul-de-sacs i.e., dead ends. Among the three neighbourhoods, Site 3 has the highest indices indicating high levels of connectivity. Site 3 also has the least number of cul-de-sacs. This is followed by Site 1, with relatively good connectivity. Site 2 has the worst indices for connectivity with the highest proportion of cul-de-sacs. It was noted that none of the neighbourhoods have a perfect grid pattern of road network as the link-node ratio value is much less than 2.5.

Indicators	Variable	Area 1	Area 2	Area 3
Density	Population Density	7355.85	3642.28	6557.03
Green Space	Parks and open Space	10.7	4.2	19.8
Diversity	Entropy	0.38	0.69	0.678
Connectivity	Link node ratio	1.41538	1.35648	1.5235
	Connected node ratio	0.8843	0.8587	0.9246
	% Cul-de-Sacs	13.07692	16.45338	8.15047
	% 4 leg intersections	12.3	6.398	16.3

Figure 32: Comparison of the numerical values of indicators of walkability.

5.6 Summarising Spatial analysis: towards understanding Appropriation

Appropriation according to Lefebvre enables all inhabitants of a city the right to 'full and complete usage' of urban space. Right to mobility is key to appropriation and hence fundamental to claiming the right to the city. Both the macro and micro spatial analysis reveal inequitable spatial distribution of several ATI provisions. However, these findings were not consistent across all parameters and requires further scrutiny. The neighbourhood level study did not reveal a significant relation with walkability and deprivation levels. But the provision of ATI and public transport systems indicate marginalization of the most deprived areas. Spatial analysis could not reveal the reason for the disproportionately high cycling counts in Site 3. But a broader contextual view suggests how the Victoria Road is critical to connecting the city centre to the south side of Glasgow which is one of the least deprived areas of the city [refer Appendix 2 connectivity maps]. The Lefebvrian conception of appropriation also calls for its reading in relation to participation and autogestion. The following chapter further discusses these ideas.

6 DISCUSSIONS

This chapter discusses the comparison of results, theoretical deductions, and examines how the results answer the research objectives. It attempts the bridge the findings from literature review, policy review, and interviews with the spatial analysis to form a holistic picture of Glasgow's AT landscape. The chapter is divided into two sections- discussions and recommendations.

6.1 Discussions

The overarching methodology guided by RTTC helped frame the research questions that revealed interconnections between various parameters to illustrate how planning paradigms do not necessarily translate policies into participative and equitable practices. Established policy norms and historic planning mistakes are reflected in Glasgow's Active Travel infrastructure delivery landscape. The use of mixed methods helps reveal the intricacies and contradictions of the policy and processes.

Policy review revealed several progressive changes that reorients the approach to transport planning giving active travel the priority it demands. Glasgow' active travel strategy has an ambitious vision and is supported by wider plans for citywide transformations. Delivery partners play a critical role in ensuring policy alignment of the proposals. However, project prioritizations and consultations are largely determined by the local authority. Community Councils with active citizens are at an advantage of being prioritised; disadvantaging deprived areas which tend to have insufficient levels of participation (Mak, Coulter and Fancourt, 2021). While the documents indicate a process of wide consultation, the interviews reveal a story of paradoxes and inconsistencies. The user's ability to participate in the planning process was limited and existing provisions were found to be superficial. The consultation process was largely informative and consensus seeking reflecting a systemically top-down approach. The inadequate nature of consultation in Glasgow has been subject to previous studies (Muir, 2020; Giupponi, 2021) and was also highlighted in the interviews.

Both the quantitative and qualitative results indicate a combination of inadequate infrastructure and inappropriate planning process as key elements preventing a modal shift to active travel. Infrastructural deficit found in the spatial analysis substantiate findings in the interviews. Insufficient cycle paths and disconnected routes reflected a lack of safe environment for cycling. This corroborated with previous studies in Glasgow and elsewhere which found that providing safe cycling paths can encourage people to cycle more (Hong, Philip McArthur and Stewart, 2020; Manaugh, Boisjoly and El-Geneidy, 2017). The perception of safety is closely associated with car collisions and hence influenced by policy. Studies have shown that cyclist have significantly lower risk of fatal collisions with a reduction in cars speed limits (Isaksson-Hellman and Töreki, 2019). Policy to enforce 20m/speed limits of cars were demanded by all three users interviewed.
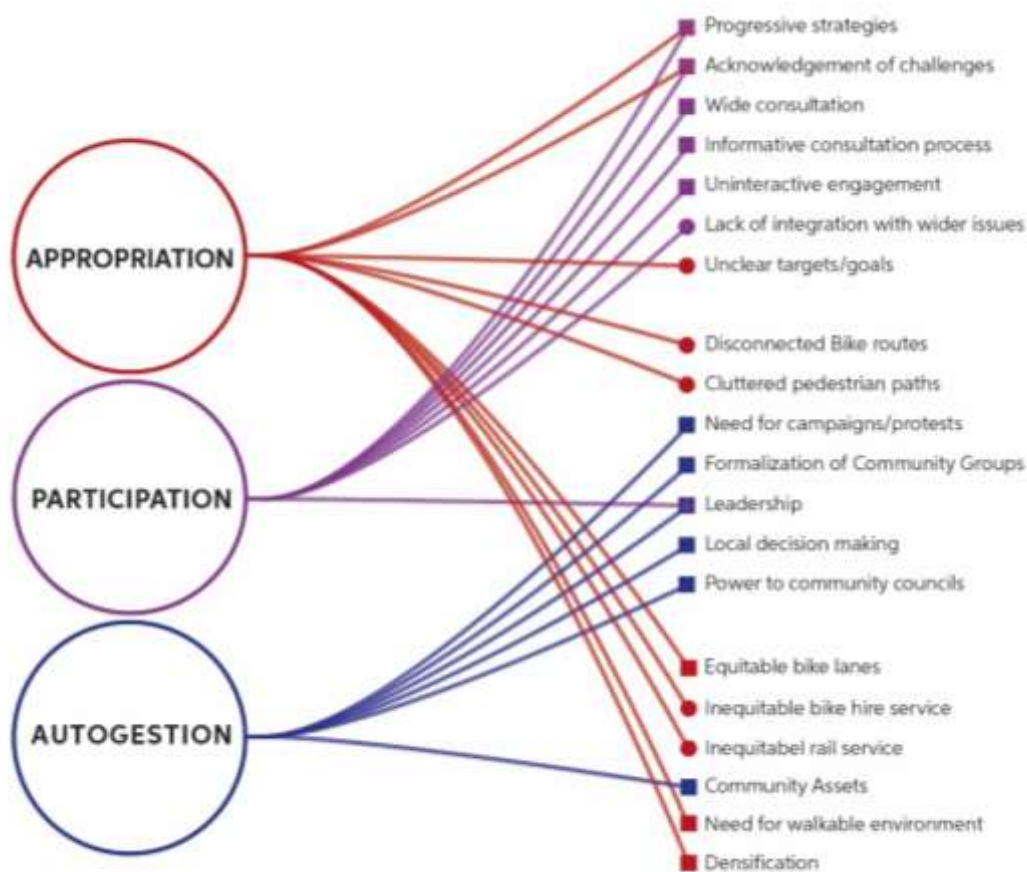

Figure 33: *Key findings of the research linked to the key concepts of RTTC.*

The interviews also highlighted the extent to which the cultural dogma of cars influences politics and behaviours. From the constant cluttering of pedestrian space, privatisation of public transport, to replacing zebra crossing with signals, there has been a systemic attack on pedestrian space that often go unnoticed.

The result from spatial analysis indicates the inequitable distribution of several active travel infrastructures, particularly evident in the distribution of bike hire stations and cycle storage facilities. However, bike routes themselves were found to be equitably distributed. Inequitable spatial distribution of cycle storage facilities was complemented with the already high demand for such facilities. Equity in bike sharing has been the subject of various research approaches in different places. One study in Glasgow corroborated the results confirming the inequitable location of bike hire stations (Beairsto *et al.*, 2022). Nevertheless, spatial inequity was found to be much less compared to cities like Barcelona (Anaya-Boig, Cebollada and Castelló Bueno, 2022), although Barcelona has a much larger fleet of cycles. The distribution was also found to be relatively balanced compared to bike-share systems in North American cities (Beairsto *et al.*, 2022). A study of 35 bike share systems in the United States revealed that only 5% of stations were located in census block groups in the highest economic hardship quintile (Smith, Oh and Lei, 2015).

The spatial analysis of public transport infrastructure and their walkable service area revealed a more mixed result. The location of rail stations resulted in an inequitable service area that resulted in poor access to the most deprived areas. Service area of subway stations also showed mixed results with SIMD quintile 3 and 1 having the lowest share of accessibility. A 2021 study on the 39 day subway closure in Glasgow revealed that subway and bike sharing trips are substitutes (Fung, McArthur and Hong, 2021). This further reinforces the need for adequate walking and cycling infrastructure to improve subway accessibility. The transport integration study revealed scope for improvement to integrate bike hire stations with existing transport hubs to increase first mile and last mile connectivity.

Shortt *et al.*, (2014) suggests that "deprived areas face the 'double jeopardy' of high deprivation and environments that are unsupportive of walking". The neighbourhood level analysis confirmed these theoretical assumptions regarding the role of built environment in promoting neighbourhood walkability. Areas with higher values of

walkability indicators had better ATI implementation and showed a higher footfall of cyclists. Although the number of sites compared is insufficient to indicate a correlation between walkability and deprivation, the findings corroborated previous studies (Kenyon and Pearce, 2019) that found no wider evidence that deprivation levels are related to poorer walkability potential. While there were inconsistencies in the results of spatial analysis, this was attributed to the approach to site selection and quality of trip data. A key lesson was to evaluate these indicators within the context of the area's connectivity to the rest of the city and the underlying historic conditions that resulted in a fragmented built environment.

Many of the challenges that Glasgow face today are the result of historic neglect and inequitable planning approaches. This is characteristic of many modern cities around the world whose urban transformations were propelled by capital surplus resulting in a functional approach that diminished the social value of space. Qualitative studies reveal inherent historic bias in planning processes and ways of thinking. The efforts today are in essence an attempt to reverse those mistakes but falls prey to following the same approach- one that excludes people.

6.2 Possible Worlds: Autogestion and the potential for change

Although the results suggest the underlying inequity in ATI and gaps in the process, there is little clarity on the means to claiming RTTC. As discussed, social value of space can only be achieved through participative appropriation. But the practical grounds for achieving this is vague and is at risk of merely signifying a rebellion than providing a mechanism to work with existing institutions. The answer to this contradiction could lie in Lefebvre's theorization of Autogestion; it refers to the idea of self-management by the inhabitants of city as discussed in the literature review. In Lefebvre's conception, autogestion is a means for achieving RTTC. The idea of autogestion closely relates to grassroot level movements and community organizations and is often seen as a mechanism against the institutions of the state. However, Gray (2017) argues that this politics of for the common can exist "within, against, and beyond the institutions of state". Lefebvre argued that autogestion requires 'a great awakening' on the part of the people, because it refuses to accept the dictated terms of the managerial class of capitalism (Purcell, 2014). As autogestion becomes more generalized, it accentuates the

contradictions in use value and exchange value and society increasingly realizes its power and capability to manage its own affairs.
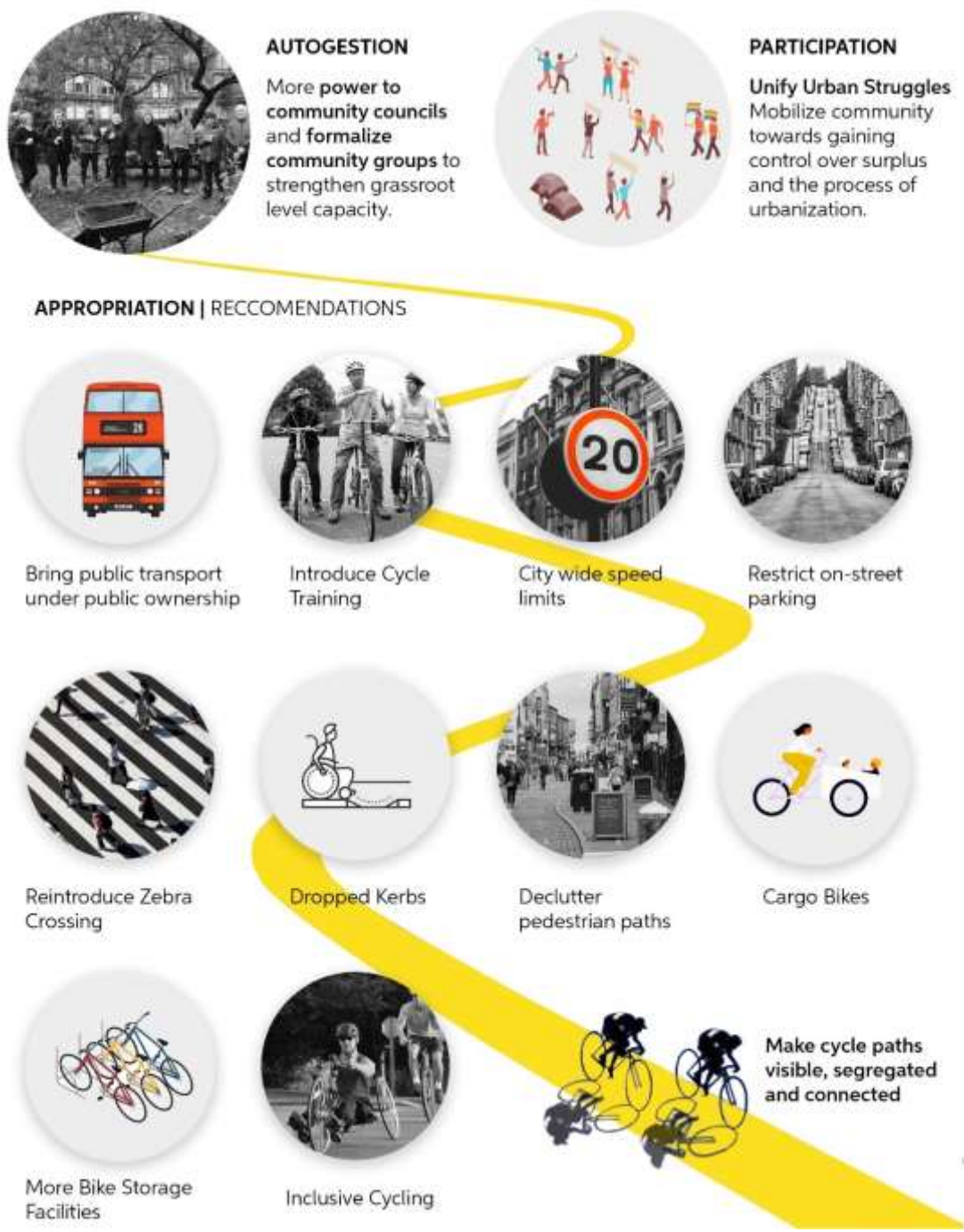
Figure 34: *Illustrating the recommendations proposed by the interviewees.*

As evident from the interviews, the people of Glasgow are aware, active, and political. A compilation of recommendations proposed by the interviewees is illustrated in Figure 34. The recommendations offer incremental steps as a roadmap to equitable ATI.

Glasgow's inhabitants have time and again shown their ability to collectively act in the wake of a crisis. For instance, in May 2021, Glasgow witnessed extraordinary resistance as 100s of people stood against immigration authorities to prevent the detention of its refugees (Brooks, 2021). Glasgow's working-class history makes unionisation and collective action integral to its spirit.

Figure 35: Glaswegians surround immigration agency van to prevent detention of refugees (Photo: The Guardian)

There are several cycling and walking groups that volunteer to people, campaign for better policy and infrastructure, and are contributing to a cultural change. While there are disagreements between groups regarding their strategy, there is a shared concern over meaningful active travel policy. Moreover, new groups, organizations, and events are being mediated through digital media platforms, that are increasingly helping create a more aware and organized community. There is a need to create and nurture this body politic to build grassroots level capacity for autogestion.

7 CONCLUSIONS

This chapter is divided into two parts. The first section discusses the key limitations of this research and identifies the scope for further research. The final section concludes the research with final reflections from the author.

7.1 Limitations and further research

RTTC as a framework is susceptible to increased politicization as means to participative appropriation. The ability to collaborate and work with existing institutions and possibility for institutional reformations are underexplored. The local state apparatus and institutions must be mobilised as partners in autogestion. While RTTC calls for a revolutionary politicization of the planning process, its capacity to guide transformation is depended on its interpretations and the underlying socio-political conditions of the context. The specific context of this study also limits its generalization and theoretical transferability.

While the qualitative inquiry offered comprehensive insights, it was susceptible to interpretations of the author. Glasgow City Council did not respond to the request for interview, which limits the understanding of sentiments and priorities in governance. The policy review was limited to Glasgow's policy interpretations and could differ significantly from elsewhere in Scotland. Interviews as research methods are also susceptible to barriers of biases and prejudices (Alsaawi, 2014). Two of the interviews exceeded the time limit, and participants views were susceptible to the limitations of interview facilitation.

The main limitation of the spatial analysis approach is the assumption that parameters studied are clustered at the spatial unit of analysis and is vulnerable to fallacies and distortions. Only open and free data sources were used which further limit the scope of study. The analysis was limited to existing infrastructure and the proposed citywide network was not evaluated; it is hoped that the network would deliver a more equitable cycle network. In terms of the neighbourhood study the number of sites compared were limited and hence offers a very contextual understanding. Although research seems to align on the correlation of compactness and walkability (Marshall, Piatkowski and

Garrick, 2014), physical parameters alone cannot offer a meaningful picture of people's choices. Measures of connectivity has often been criticized for being oversimplified and inadequate to offer meaningful insights (Marshall and Garrick, 2012).

As discussed in section 5, the policy involved multiple agents with varying degree of influence. Interviews and surveys of agencies involved at various stages can help understand perceptions and alignments which in turn effect the implementation. This study warrants the need for further research for a comprehensive understand the policy landscape and its implementation. Further enquiry into participatory processes through RTTC can itself form a research topic. Leadership as a key element in governance is also an underexplored topic that came to light during this study which needs further research.

7.2 Conclusions

Active Travel infrastructure is reshaping Glasgow's urban landscape, enabling its citizens new ways of mobility and access. This thesis fundamentally questions whether this mobility and access for some is attained at the cost of immobility and inequity for others. Lefebvre's vision of right to the city proves to be a powerful idea that reveal the dichotomy between AT policy and implementation towards answering this question. Equitable access to AT is not only paramount to achieving goals of emission reduction, but also fundamental to creating a sustainable and equitable urban environment. This research successfully integrates thematic debates on the production of urban infrastructure to foster a nuanced understanding of Glasgow's policy landscape and the complex socio-spatial contradictions of its delivery.

The result of this study suggests that institutional mechanisms translate policies for justice into unjust spatial practices. A fundamentally flawed planning process overlooks the inhabitant's ability to contribute to the process of urbanisation. Inhabitants are tools for legitimization of ideas and processes that are developed in cities elsewhere, divorced from the context. Institutions and its multitude of agents prove to be a mechanism that dilutes policy rather than strengthen it. Spatial enquiries draw attention to the uneven ways in which AT is configured in producing unjust mobility scenarios and poses the question of who holds the power over defining urban experiences. Policy changes do not impact local power relations which has more direct control over tangible outcomes

of ATI. Although spatial inequity of ATI was evident, the analysis was unable to establish the same relation at a neighbourhood level. However, it highlights multiple challenges including historical planning mistakes, inadequate participation, uniformed priorities, and the complexity of Glasgow's socio-political landscape.

Within this complex landscape of multiple institutional agents and inadequate planning processes, progressive change was brought by virtue of a prolonged political struggle. 10% budget allocation for active travel became a reality as a result of the power sharing agreement between the SNP and the Greens. Proportional representation created a fundamental shift the Glasgow City Council's approach to planning. Active travel forum pushed the city to reprioritising its transport policy. Delivery partners strengthen the decision-making process regulate infrastructure delivery. What we see is progressive change fostered through collective decision making, and the dissolution of power leading to democratisation of the process. This legitimises Lefebvre's theorization and argument for participative appropriation of the city.

What this thesis succeeds is in politicising the Active Travel by integrating thematic debates and revealing the contradictions in planning and practice. The possibilities for strengthening grassroot level decision making and engaging community actors add a healthy dose of optimism to this debate. It emphasises the need to break the imperialistic structure of decision making to instigate new forms of collaborative practices that transcend institutional boundaries towards a redefinition of how public infrastructure is conceived, constructed, occupied, and used. Changing the current processes of urbanism can only come through the mobilization of the masses. The weight of this is on the citizens of Glasgow, who should translate their collective turmoil into a political struggle. Afterall belonging is something deeply political. As David Harvey suggests, a unification of political struggles is quintessential towards the realisation of the right to the city (Harvey, 2018).

We are in the face of an irreversible climate crisis, one that quite starkly illustrates the systemic failure of the state. Socio-economic divisions are deepening, marginalizing the masses, and displacing minorities in an increasingly volatile and fragmented political environment. The covid-19 pandemic has further shown us the fragility of neoliberal infrastructures and free market fundamentalism. But this contemporary urban crisis is not without a silver lining. The pandemic gave us a brief glimpse of the possible worlds;

one where streets are filled with people and street life brings people together. The contradictions of neoliberal urbanism and its periodic failure offer the opportunity to collectively reimagine the processes of production of space towards the creation of a new urban; one where social value triumphs over exchange value. As Lefebvre writes "A revolution that does not produce a new space has not realized its full potential".

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APPENDIX 1

INTERVIEW TRANSCRIPTS

Interview 01 | Organization: Sustrans | Perspective: Governance

Could you help me understand the role of Sustrans in working with the local authorities? From what I understood, Sustrans play a role in allocating the Scottish Government funds to the local authorities. What is the process?

So Sustrans is a charitable organisation and we're UK wide in Scotland. The structure of how we're set up is slightly different in terms of the funding landscape and the context. We are working towards four strategic objectives, but we are working within the policy context and the funding context that is specific to Scotland and that's different obviously from elsewhere in the UK. Our main funder is Transport Scotland and from that funding, we administer Infrastructure funding, and by this, I'm referring to the places for everyone's funding streams.

On behalf of the Scottish Government, we administer active travel infrastructure funding for local authorities, community groups, other national partners, and other delivery partners and we assure funding across several stages from concept design to delivery of infrastructure. And in addition to that, we run our internal programs.

So, my program is partnerships through a business development program and within the partnerships program, we have several projects like a portfolio. Our program aims to provide strategic support to local, regional, and national partner organisations, and that's to make the case for increased funding and commitment to active travel and that supports our strategic priorities, but also the Scottish Government's aim for a healthier environment enabling the nation with a strong economy and communities. And that's laid out in the national performance framework.

Now our portfolio areas within the program include national partnerships, that's like the NHS, National Park, and Historic Environment Scotland. It includes local authority partnerships, which is across Scotland. Our program doesn't capture all local authorities, but it captures the ones that are requiring the most assistance.

And we also deliver active travel strategies. So, our program is structured around 5 delivery areas and that's facilitating a strategic approach, adding capacity, identifying, and developing funding opportunities, and influencing and building connections by supporting our partners in this way we ensure that travel infrastructure across Scotland develops ambition and quality.

We have an embedded officer program within which embedded officers work as senior project officers within local authorities and national partners, and they work on things like funding applications, design and delivery with the local authorities to take forward the big projects.

Is the funding at a strategic level or is it for specific projects within the strategy?

Glasgow City Council has allocated 10%, I believe, to their transport budget within the manifesto and that includes sustainable transport. Active travel falls within the wider transport, the overarching transport and then falls within the overarching sustainable delivery of sustainable transport, so they will have their own funding allocation. You know they've published their draft consultation for their city centre transformation plan.

We also work across different programs at the strategic level to produce things like an active travel network, which would go inside the strategy and would then lead to strategic development areas. And this would then lead to funding applications, which would then

hopefully lead to successful funding applications where they receive funding from such grants to deliver their infrastructure. You know, a system, a cycle within a wider system, it's a sort of strategic systems approach.

What are the parameters for selecting or prioritising projects?

The way that the places for everyone program, which is the infrastructure funding program changed over the last couple of years. So, we did a program review, and we optimised the program so that it works more effectively and addresses a number of issues. I would refer to places for everyone on the website so that you can understand how that now operates because we set out a places for everyone (PFE) guidance which is issued to partners that take them through the parameters. But I'm going to take you through what they are now because I don't know how useful it would be.

I'll give you a summary of the York Hill project and how that came about. During the cycle you're referring to, the project initially was only opened to local authorities to submit their strategic projects. Now the local authority projects would be driven by their strategic aims and their delivery plans. And, at that time Kelvingrove was a strategic priority. That came about because at that time I had worked with the community council, and they were very engaged and wanted improvement for their local community and they were a very active community council. Among the things they looked at was access to improve their neighbourhood to deliver things like better pavement surfaces, dropped curbs and small interventions that make a big difference. But that happened around the time when the PFE program was only looking at projects proposed by local authorities that were a strategic priority to local authorities. So, what I had to do with the community council was make that project a strategic priority within a wider context of bringing in city development. And then we had an internal discussion about the possibility of a community council progressing a joint application with the local authority, but before that, I had to present the concept to the local authority. And the local authority responded positively to that. The reason that I'm telling you this is because it's different now. Now we look at the very real possibility of projects being driven and led by other organisations, not just local authorities. It may be a joint application; they may work with their local authority to produce it. They may have an agreement with a local authority or another landowner or another organisation like the NHS.

The Sustrans design principle and the aim of the program are to create safe, attractive, healthier places and we want to increase the number of trips made by walking wheel and or cycling, so we are also looking at spatial equity. So, access to safe and effective walking and wheeling infrastructure for all is to generate as much modal shift. They have to be led by all, you know, the people that there has to be a greater degree of engagement and leadership by the people whom we are providing a service to, and users have to show some degree of engagement. It's not just an infrastructure grant fund, the awards that we make in the support that we provide are centred around six design principles. And so, all places for everyone's projects must be able to demonstrate how they're meeting these six requirements.

The 1st principle is that all projects must be accessible to all, including an unaccompanied 12-year-old. The second thing is that projects aren't just about getting people from A to B. They should provide a high level of service and as such provide enjoyment, comfort, and protection. The third thing is the projects must demonstrate how they've considered different users' needs and go above and beyond the basic requirements of the Equality Act. The fourth thing is that your projects must be developed, and not just reach industry standards. Projects must be developed in evidence-led and context-specific ways. The fifth is to ensure that there's a clear business case for each project. Finally, the projects must act as a behaviour change within themselves and therefore require road space to be reallocated for walking, wheeling and cycling and all projects except in certain circumstances such as wholly off-road projects.

What is the process of reviewing these projects? Who are the stakeholders involved in decision-making?

Partners apply for funding to cover the completion of several stages. Stages are 0 to 7, and I'll take you through them. So, we assess applications internally before progressing them to have funding and an internal funding panel made-up of not just people from Transport Scotland, but people from regional transport partnerships. The panel usually consists of heads like me or the director. So that's the level that the panel is set up. So, they've progressed the fund and panel and then at the very early stages, we make the decision internally and we involve external experts when projects have a final concept.

Because we build on stage reviews, projects shouldn't progress with further funding unless they continue to meet the objectives of the program and demonstrate robust project planning. And to give you an idea of the scale of it, we have more than 230 projects in our portfolio with a total commitment of over £190 million over the next five years. That gives you an idea of the scale. In 2021, 16 projects were completed, and we awarded £20 million to 23 projects to progress to the construction phase. We also spent £3.7 million for the development of concepts, which is nearly 8,000,000 for design development and working with my team. To the partner team, we awarded under half a million for the development of active travel strategies. We've got our grant fund done and we do 100% funding for pre-construction costs, 70% funding for construction, 70% funding for land acquisition, 70% funding for post-construction monitoring and we have a commitment to working with partners on evidence like post-construction adaptations. Funds from the local authority or the partner used to be 50%, and 50% from us, but to make active travel infrastructure happen faster and to make that transformational change in order to get that modal shift, we now award 100% funding for preconstruction costs.

Pre-construction is stage zero, stage one is preparation and stage two is concept design. Stage three is developed design. Stage four is technical design. So, these are the four stages before a shovel has gone into the ground before anyone's constructed anything. So, we pay most of the funding for construction, and we offer 70% funding for land acquisition and then 70% funding for post-construction monitoring like video monitoring. We assess the early impact of the infrastructure intervention, and we build on-stage reviews into all this process which is important. That means now for the landscape the Scottish Government has an active travel minister dedicated to active travel. £320 million has been dedicated to active travel funding for the 24-25 financial year.

It is not just Sustrans that administers all that funding, but other active travel delivery partners like Paths for all Cycling, Scotland and Living streets. These other partners will also administer some funding for things like behaviour change.

Now Glasgow has an active travel strategy, a liveable neighbourhood strategy and a city centre transformation plan. And they've also delivered the Walking and cycling index within that context. These steps help deliver the net zero strategies.

So, the infrastructure funding program had to take all of that into account. We help local authorities produce active travel strategies to guide them on the production to fund their active travel strategies. Funding for every little plan and then the infrastructure that comes, you can kind of see that it isn't just about places for everyone funding, it's about the broader context of what Sustrans does.

What that means now moving forward is that the PFE program had to open itself up to several ways that we can think about network planning, engagement equality, and behaviour change in design because equality is threaded throughout the places for every program. We can offer significant support in the development of equity impact assessments or integrated impact assessments. So, things like equality impact assessment, to make accessibility key to influence projects by doing so and improve the quality of infrastructure and by doing that improve the overall outcome of what is on the ground, and we must work with.

We've opened the program to other organisations like community organisations that have-to-have legal standing. Say uh, they must be set up to receive funding, so it can't just be a community, a community group, that is. So it's about more than just local authority. And I think that is highlighted in the fact that the focus this year has been reopening and the fund of brand-new projects. We've updated guidance for partners, and we will continue to support the existing portfolio.

We have rolled out training and events for partners. So, there's been new cycling by design guidance that can be accessed by everyone around the standard of infrastructure, and we use that to score projects against the criteria. You get to know if they meet best practices and guidance. We've also been working with academic institutions on the development of a Scotland-wide propensity to cycle too which will help partners to assess prospective projects.

Are there any specific measures to make sure that there is engagement with the people and community organisations?

So now an important thing to mention is that the PFE funding behaviour change must be built into the project. And part of that is heavily linked to consultation and public engagement. Informing the viability of the project is the first thing to engage with.

The local authority efforts are local authority-run projects or a national organisation. There's a statutory requirement to consult on projects that are doing things like reallocating road space. For some things, you don't have to run a consultation, but it's best practice to do it.

If you're going to do any sort of intervention around the infrastructure, for example, and that's going to materially change the environment and it's going to have an impact on the service users, the air quality, the natural environment, the built environment, then there's a statutory requirement to run a public consultation on it. And there's also a requirement to do an equality impact assessment.

I am of the view that local authorities and other organisations don't fully understand what best practice consultation is because historically the delivery teams are usually made up of engineers and transport planners and these kinds of very technical people who don't understand social aspects. But placemaking is about economic development within a place, it's about healthcare, it's about education, and it's about transport, including active travel. It's about the social world and all of these things make up a place.

But local authority and local authority delivery teams, have their teams made up of technical people who don't see outside their technical specialism, and they don't generally speak and talk to each other. They're talking to each other on the most basic level. And there's no consideration about the quality, the context of the quality of the place. So that brings me back to answering the question about approaches to consultation.

What we typically see is they'll take a load of designs to consultation. If you're a member of the public, typically you can't translate a technical design drawing, with you know, levels and blueprints. And they might put up, you know, a data set, or they'll talk about transport models and the number of trips etc.

Members of the public have a limited understanding of the technical elements of all of this. So, what Sustrans have been trying to do is to provide specialist resources to help partners with consultations, so members of the Sustrans delivery teams will go along, with a local authority, to the consultations, and they'll do a best practice consultation where they'll have accessible information material, like leaflets.

There are multiple approaches to consultation and what I would say is you have to apply context to everything. If you're going to do a consultation you have to acknowledge the context and the setting and what's going to be the right kind of thing for any given setting. The reason that I mentioned behaviour change earlier is that behaviour change should be built in from the point

of consultation and that means people from behaviour change going along to consultations and explaining what behaviour change is also introducing people to behaviour change concepts. But you're also engaging with them in a way that they are experiencing a behaviour change process during the consultation.

Do you want to come and test some of these adapted cycles? Do you want to hear about the benefits? Do you want to hear about how you can access them for free? People come into consultations and say we don't have bikes, we can't afford them. We've got bigger problems. The cost of living is an issue. Have you heard about the free bikes for kids program? You can literally get a free bike fruit for your kids, and we can assist you to access a bike for your family. It's not safe to cycle here. OK, well, that's why we're proposing to take away a carriageway of road space and put in a segregated cycle.

There's that integral link between best practice consultation and how it's set up and who does it and the approach in the context and the consideration of the context with behaviour change and how that factor turns into that process from the very start because behaviour changes work best when it's contextual and targeted. Infrastructure is Co-dependent on community support. It's dependent on people's understanding and willingness. Yes, there's some best practice literature that you can look at. We've got behaviour change guidance.

If you're going to produce a local transport strategy, you need to really produce an active travel strategy, so they're sitting alongside each other, and they will be put out for draft consultation at the end of September. we're also recommending that active travel strategy guidance should also come with a behaviour change plan, a behaviour change strategy.

Is there a difference in how Glasgow City Council approach projects compared to other cities?

Big cities like Glasgow and Edinburgh see large and ambitious projects that are integrated with public transport, regeneration and other development plans. Since resources are larger, they've got a team which just works on active travel delivery, both Edinburgh and Glasgow have a team which just works on that. The resource allocation and the strategic importance and priority that these bigger cities gather are vastly different from the priority it's given by other local authorities. Other local authorities are working up to that. They're getting there. It's taking them a long time but we've got an embedded officer program working within these local authorities and the active travel teams to develop and progress.

There needs to be sustained commitment and leadership from the administrations of local authorities and elected members. Glasgow City Council is a very good example of this. And in my professional opinion as a practitioner it is not just about funding, it's also leadership and its leadership within the local authority and commitment at all levels of the departments.

Are they on board with active travel? Did they understand it? Do they know what it means? Are they taking a strategic approach to it and threading it through everything? There should be a commitment from delivery teams, and these are people who do the consultations, who do their detailed technical designs, who do the concepts. Do they understand it? And are they on board with it? For the last 5-6 years, we had sustained commitment to active travel through Councillor Anna Richardson, who was the previous convenor. It's Angus Miller, now Councillor, Angus Miller, and he only came into his post, when their local elections happened in May. Anna Richardson's term is a very good example of sustained commitment and that is why so much has happened. Because ultimately, any plan for infrastructure goes to the administration and officers take their plans to the Committee for approval, and it's upon the committee that they get approved. If they're not approved and if they don't get approved, that's it. It's dead.

Elected Members don't want to deal with resistance. They don't want to deal with people saying this is the worst thing that could happen because they need to stay in their role. They must get re-elected and to get re-elected they must go with the will of the people. So, there's a co-

dependency happening there and elected members are very fragile in that sense. And that's what you've seen in Eastern Partnership with the Bears Way project. They got so spooked they just were like, no, we can't have this. The public hates it. It's a bad thing. We never want to talk about active travel again. East Dunbartonshire Council didn't submit any proposals for the spaces for people infrastructure fund because they were so afraid of doing anything about active travel.

I wouldn't have oversight of the projects until it comes to the panel. I'll be on the panel for the big projects, and I don't get to hear them until they're presented to me, so I don't know if they've submitted anything but to my knowledge, they've not submitted anything in years because elected members got spooked. What I'm saying here is that the approaches are all different and it's dependent on the commitment and will of the local authority, the officers and the elected members. And there's so much that organisations like Sustrans can help with that.

It's like that, we can do all the things, we can give them funding, we can give them all the support and we can give them all the guidance and we can give them the resources and we give them the team. Embedded officers and experts in the field are to go in and work with a local authority on all these things. You can do all of these things, but if they're not willing and they're not committed, it won't happen.

More deprived areas need not be as active as the richer areas, for example, in Kelvingrove we have a very active Community Council like you said but it may not be the case with a place like Govan.

I would agree with that. And based on my experience and what I see in my current role, that is the case and a lot of that's to do with people in deprived areas having bigger problems than active travel. They have real-world problems like the cost of living crisis. Can they feed their kids? Can they heat their house? and things like that. So, the time and energy that they have in the headspace are about those.

They need to be brought together as a community group or organisation, and when you get them at that point, we can then start to think about taking forward or applying for funding for the kind of things that they need.

Spatial Analysis was shared seeking comment on the inequitable distribution of infrastructure.

My comment would be knowing what I know because I used to work in the team at the council who delivered the cycle hire scheme. It's a different person who does it now, but they were looking at it from the perspective of potential trip generators, so they were citing cycle hire and stations at strategic points where they analysed, it would generate the highest number of trips, so they were looking at cycle count data, which Glasgow City Council has a cordon of cycle counters.

So, they were looking at where they could capture the most users to generate the most trips. And major trip generators would be hospitals, universities, and city centres. Various other things include transport hubs, bus stations, you know so that you would get that trip training. So, it was strategically done, and it was looking up generating the most trips and looking at the areas most cycled or used. But when it was first established, it was established during the Commonwealth Games. At that time, they were also trying to get people to the Commonwealth game sites, so there's a wee bit of legacy that's probably what came into it as well.

I don't think it would be appropriate for me to speak about the details of how they're doing it now, but I think. Let's understand that they do need to have cycle hire schemes and paths in deprived areas and what they've done is a secure cycle parking program over the last two years and they've placed them in deprived areas.

I know Edinburgh, there is a secure cycle parking scheme that didn't target deprived areas, they targeted just areas that wanted them the most. So, the areas that would receive the most

requests, which of course are the areas that are the most affluent and that have the most time to send in a request to the Council.

Interview 02 | Organization: Pedal on Parliament | Perspective: Activism

Could you briefly tell me about the formation of Pedal in Parliament?

So, there was a big ride being planned to the UK Parliament. So, people who sort of talked a lot about cycling on Twitter decided that rather than go down to London to take part, we should organise one at the same time in the Scottish Parliament because that's where, the main funding for transport is a devolved, and then decided to start our own campaign.

So it was me and about six other cyclists, including Dave Brennan, who at the time was using a big helmet camera so he was filming a lot of helmet camera videos of people cutting him up and quite a few people based in Edinburgh.

We looked at The Times newspaper which at the time was running a big campaign about safe streets for cycling in the UK and they had a manifesto. Cities for cycling, I think, and we took some of those manifesto points and we re-wrote them to be more specific to Scotland and slightly more ambitious.

And so, the manifesto which is on the pedal on the parliament site and if you've seen it, it's basically more funding for cycling. Safer space for cycling and slower speeds are the big three tasks and then there are a few other sorts of more minor things that are more specific.

What, according to you, are the biggest barriers to biking in Scotland?

Safety. Basically, traffic. Having to cycle in traffic is the biggest barrier. And that's been, I mean that's like survey after survey says there and then. During the lockdown, you could see when the traffic disappeared, how many people felt safe cycling on the streets, so it kind of shows that people, you know, people will do it, it would.

If you talk to cycle campaigners, they say, we already cycle on the streets, so we already have overcome that barrier. One of the things that were happening at the time that pedal in the parliament started was an understanding that you can't expect everybody to overcome the barriers the way that some people can. So, cycling is dominated by men on the road, so it's about 3 or 4 cyclists. Regular cyclists are male in the UK, whereas in the Netherlands it's 50/50 men and women.

Cycling tends to be for the able, not necessarily the young, but people who are fit and who are able, you know, can hear and see around themselves, you know, move through traffic and so on. So, you have to have a certain level of ability to survive on the streets now.

So, we understood from the beginning that what's needed for it to get mass cycling are the sort of conditions that you see in the Netherlands, basically where cycling might be on the street or it might be on cycle paths, but you'll never be mixing with heavy traffic, and you'll never have to assert your place on the road. You have your own space and that's important.

It's kind of increasingly crucial for women, older people, people here cycling with children, people who are having to transport or to utility trips where they're carrying stuff. But when it comes to the Scottish Government approach, uh, or response to this, over the last like 10 years we have

seen a lot of changes. So, there are active travel policies and strategies that are coming up. And I think right now there is 10% of the transfer budget is allocated to active travel, and there is also an active travel minister.

So how do you evaluate these changes like they are progressive but like what do you see needs to change?

10% of the transport budget for active travel was one of our big asks. So obviously we're pleased to see that was one of our first asks. It's worth noting that it will become policy only by the end of this Parliament. So, it's not what they're spending now

Now, although the Scottish Government has the budget, it doesn't spend the money directly itself, it gives money to Sustrans, which in turn gives it to local authorities and so local authorities must ask for the money. Then they must develop the plans and they must do it in quite a tight time. Scale tends to be a year, I think. And that's very difficult for some local authorities to do so now. Although we have Scottish Government policies which look strong, they're only as strong for the people who live in big councils. If you don't live in a council which is fully on board, then there are only as strong as your own local authority.

During the pandemic spaces for people, you know where they had the temporary measures, we kind of went through all the different local authorities to see what they were bidding for and it's really, patchy. So, some local authorities didn't bid for any money at all. Some local authorities bid for it and then had to give most of it back because they couldn't spend it and other local authorities really went for it from the get-go like Edinburgh and Glasgow. So, we're in a sort of post-code lottery now. Glasgow City seems really on board, but then you get to East Dunbartonshire, West Dunbartonshire and places like that, and they seem hopeless. East Dunbartonshire didn't ask for any money at all. As far as I know, I think some of them have just had to give the money back because they haven't been able to spend it.

Do you have any thoughts on why they have not been able to spend it?

It's hard to know because it's all, it's all quite opaque. They got backlash over some of the measures and then some of them just think, just hadn't thought it through. They hadn't really believed what they wanted to do with the money and so, but when they got the money, they then had to scramble to find ways to. I don't want to be quoted because. Because they didn't really have any plans and they ended up doing some quite timid stuff. And I think with a lot of councils they just didn't have the capacity and of course, it was a pandemic as well. So, people were working remotely as well. So yeah, it was a difficult time.

In terms of mobilizing the community for campaigns what are the type of activities that you engage in?

As our name suggests, we do a mass bike ride. We do pedal on parliament. So that's once a year. It's based in Edinburgh. We try and encourage groups to cycle from across Scotland to join the ride or to cycle to Edinburgh. In, recent years, we've diversified a little bit. So, one thing we did last year was pedal on COP, we sort of coordinated people riding from across Scotland in small and big groups to Glasgow to take part in the Climate March.

Last two years, our slogan is 'this machine fights climate change'. I think I'm wearing on my T-shirt. In Edinburgh, they had a human bike lane where they took a bike lane and in that wasn't

just paint on the road and they stood people, in the bike lane to make a sort of protective barrier. They put up pretend zebra crossing to show where they wanted so that kind of thing. So, we encourage people to actually take local issues. It's quite a lot harder to organize them. And then during the pandemic, we did online stuff.

What has the response been from the government? Have they tried to engage in a conversation?

Yes, it's been patchy. It really depends on who the Minister of transport is. So, we've had a couple of meetings. We had one with Keith Brown when he was the Minister of Transport, then we met with Humza Yousaf when he was Minister of Transport, and he was the guy who first Increased funding massively. We did a pedal on Parliament in Glasgow, and I think his mum came on the ride, so it was quite good to get that pressure. And suppose the main thing has been the fact that the 10% funding became accepted.

So, during the last election, that wasn't the policy of the SNP government. It was only when they got into power-sharing with the Greens that it became policy. So, it's been a mixture of our pressure and the Green Party. The 10% figure has been around for a while, but it's only now that we've really pushed very hard on it.

What do you think is the challenge in terms of behaviour change?

There is a lot of resistance, right in terms of, like people resisting change. One of the things we've focused on is infrastructure because we know that without the infrastructure, behaviour change is hard. For every person you convert to riding a bike, another person will be frightened. You know they'll have an accident, or they'll have a close pass and or they're just saying I can't do this anymore. Whereas if you build infrastructure, we know that it creates cyclists.

To a certain extent, you've got to have a mixture of encouraging people, showing people that it's there and but also probably things like limiting parking. I'm talking about roads, but I mean in a way, just the act of building cycling infrastructure because it tends to remove parking and it tends to cut Road capacity. It sort of also makes it harder to drive. So, it works both ways. And I think that's something powerful.

If you're stuck in your car watching somebody catch up past you on a nice straight path, that's quite good, you know, a nudge to say, actually you don't need to be stuck. You know, it could just drive people to the wall, but it is a good thing.

There are lots of other groups that do encouragement. You know that do group rides and training and fixing bikes and we just feel like we concentrate on the infrastructure and getting the infrastructure built, getting the funding. And when that's in place, other things will start to have a more permanent impact.

Has there been resistance against your campaigns?

There's endless rubbish on Twitter. I've muted so many accounts, so I don't have to look at them. The press that you get in the media, you get this kind of push-pull thing. Every so often they'll be like ohh cycling's great and it's free and you can save money and then the next week its cyclists run red lights and they're dangerous.

I think when we first started doing pedal on parliament because we were asking for 10%, it seemed like an outlandish figure at the time. I think there were some people who thought we were just being greedy, or you know, unrealistic in what we're asking for.

I mean, so when you look at Scotland's active travel policies, they look great. But then when you look at the fact that we're still building massive roads, we're still putting big roundabouts in Edinburgh; the sums involved in A9 absolutely dwarf the active travel budget by factors of 10s. If we keep building roads, we're not going to provide that squeeze that we need to get people to consider other transport options.

Authorities, they'll worry about parking, and they're worried about that kind of thing. And if everything else, if it doesn't affect parking and it doesn't affect roads, then they're happy to put in a cycle path. So that's why we have cycle paths along railway lines because, you know, they don't cause any impact on the drivers.

In terms of bike storage, Is that a concern?

It's not, personally for me, but I know that this is a huge thing in Edinburgh, Glasgow that I've got friends who live in tenement flats. And yeah, I mean, it's either you're capable of carrying up the stairs, or you must find storage on the street. Council's very keen to make sure there's enough space for everybody's car. Well, is there safe parking for bikes?

I think I'm at the end of my questions, I don't have anything specific to ask, but if you have anything to add, please feel free to share.

Yeah, I think I think you sort of talked about consultation as well and that's like that's a huge can of worms. Because we've had a lot of consultations nationally. They're very difficult to respond to. We spend a lot of time looking at these endless big, long surveys. And it's clear that this isn't something that people would normally do. You know, it's not something that just a vaguely interested member of the public would want to spend their evening filling in a form like that. It's a real issue as to how you do go about consulting people and the way we do it isn't great.

Interview 03 | Organization: Community Council member | Perspective: Activism Volunteering

Could you briefly explain your involvement in bicycling activities?

I retired 15 years ago. And a friend of mine had said that he would like to get involved with Sustrans. He was the one who organised the volunteers in Scotland. And he was looking for somebody to look after the Glasgow area. So basically, that was it. Then, there were very few cycling paths, which were limited to scenic routes and not functional roads. But I thought you should be able to bike anywhere, why should we not use public roads, we pay for them. I'm alarmed by the extent to which we're being excluded from them. And if you look at Glasgow itself, the amount of space taken up by the actual carriageway amounts to about a third of the area of the city. Why should we not be able to use roads to bike? It was about the politics of space, to reallocate the road space to people.

Could you talk more about politics and activism and how it's changing governance?

You could say the UK and Scottish Governments are beginning to make changes. You know, I think that the message was getting through. You know, climate change is becoming a problem.

So we really have to do something and stuff. We need to start putting money into things that can actually solve the problem.

In a city size of Glasgow, directors of different departments like roads and education are very powerful people. Most councillors are well-meaning individuals, but the directors often push the councillors to the car agenda.

In the '60s, large motorways were built. Places like Anderson where I grew up, vanished under a waterway and expressway. Motorways have always kept people out of the roads. Pedestrians must go the extra mile to go from one place to another.

Glasgow became a series of small areas because of barriers across roads and fast traffic. It's about changing that disintegration and bringing the city together. Pedestrian ways get routinely blocked, with lampposts, bins and all sorts of things, while the carriageway is free for a fast commute.

There was a systemic attack on public transport. First, they attacked the trams. They were replaced by crawling buses. Again the public transport system introduced was the copy of the one in New York and Chicago. They demolished places in the city and moved people to places like Drumchapel. These places were poorly connected, and people were struggling for transport. Then came the deregulation of public transport in the 80s. I mean now they're trying to put it back. So essentially things got fragmented and there was a lack of connectivity, and you know the public transport is mainly used by the poorest people and as fares go up, it makes life hard for them.

How did things start changing?

The Labour party controlled Glasgow for 70 years. Then there was a change in the way in which local government was elected. When elections were held under proportional representation, the council had to make deals with smaller groups. So, things clearly had to change and there was no overall majority. And I think people gradually realised if we're going to get things done, we will have to start talking. And in a later administration, there was councillor Anna Richardson who was the convenor of sustainable transport. So, she made quite a significant difference. You know she really got the active travel forum more involved. SNP and Greens having more majority have made a significant change. There has been a conversation about bringing public transport back to public ownership. Sustainability brings together several departments. The department structure significantly changed, and a lot of the older staff just retired. So, there was a fundamental change in the mindset.

But I think you know in Glasgow, one of the difficulties I think is the separation of where people live, where people work and where people can get their stuff and, I think these kinds of things need to be brought back together again. In fact, you know, we've got a big shopping centre around here, but still, most people who live in Partick can get most of the things they need at walking distance and it's beginning to get reintroduced - this idea of the 20-minute neighbourhoods and how to get that going.

What are the challenges to Behavioural change?

Large numbers of people have cars and cannot see any way of living without their cars because they live somewhere and work quite far from where they live. But this is also because roads are congested. The roads slow down the buses. You don't want to walk or bike because it is congested and polluted. So, it's breaking that vicious circle. Why do you need your car? Do you really need it?

The debate can get heated, but things are changing. In the Queen Elizabeth Hospital, a massive area with many people working, the whole idea was that people would be able to take public transport and a huge amount of money was put into it. What did the staff want? They wanted to drive, they wanted to have parking space. So, people, particularly in the medical faculties, you

know, they were talking the talk, but when it came to walking the walk, they wanted to live somewhere else, drive to work. So, it's that kind of thing. I mean, we had a very difficult situation where we had the Union which campaigned for parking space as a human right. There are still groups among the citizens who see that car as essential. In fact, they almost see it as a definition of themselves.

Then there are newspapers like 'The Herald' and even BBC where the editorial position is to support motorised transport. So, they run a lot of negative stories about public transport, cycling without helmets and so on.

With the lockdown, people started to see that open street can be fun. You know, a lot of people started walking and then spaces for people come in, it was then when suddenly cafes were putting tables out in the streets, and they said it was really nice.

Have you been part of the consultation? How did the public consultation take place?

The public consultation about something we'd never had before. So, they had public meetings that were going on in different parts of the city and set up stalls and said, "here's what we're thinking". You know, I mean a lot of these ideas came from Sustrans. Since Anna Richardson was the councillor, a lot of positive things have started happening.

Parking control is another issue that came up. Most streets are just filled with these stationery metal blocks. You cannot store private property in a public space free of charge. Two of the lanes are taken up by cars, so we essentially get very limited space. Introduce more 1-way systems.

So I think it was about us making changes gradually. People will get used to it but you know it's essential that you have people who will be able to pay that way._People get verbally abused when in confrontations with car owners. Aggressive driving is not being condemned by the media. The current government in Westminster is pro-car.

What do you think is the next step? What needs to be improved in terms of infrastructure?

We need to make the cycleways more continuous. Too many places with good cycling and then suddenly it comes to an end. We need to connect people to places and also introduce city-wide parking controls.

There is a need to introduce more school zones. That introduces an emotional argument that people can connect to. There was an instance in London where a 9-year-old girl died due to pollution. So, there is clear evidence of how bad it is for our kids. I would like to see signalised crossings replaced by zebra crossings which give more control to pedestrians. The difference is that once you're in it, the car should stop. So again, in many places in London, zebra crossings have been reintroduced. I would like to see things like the sequencing of traffic lights change because they tend to give far too much time to cars compared to pedestrians crossing. You know pedestrians get barely 20 seconds. I mean, these are things which are feasible and achievable.

Improving the rights of pedestrians, and wheelchair users, you know, one of the simple moves could be introducing more dropped kerbs, so that people in wheelchairs can easily move around. We need to bring back work and places where people live and also provide a good public transport system.

Specific problems related to Glasgow because of the decision made in the 50s about the motorway and the policy to move people out to peripheral estates. Can we bring back people into the city centre? Can we make the city compact and an actual liveable environment? For years, George Square was just a roundabout. Now we have more of a civic area and people are starting to realise that it is actually a nice thing.

There are lots of tunnels under Glasgow. We should find a way to somehow use this and probably expand the subway system. So, I think there are a lot of things which can be done which do not need to be shocking.

And I think it's also about connecting, you know, I talked at the motorway breaking the city and one of the projects you may have heard of is connecting Woodside because if they would save it, it would be cut off by motorways. Instead of making people go underground under a dreadful underpass that's poorly lit and floods under heavy rain. You know, let's fill in the underpass, take down the barriers to road crossings and improve the lighting.

What are your thoughts on community empowerment?

The change to the electoral system is less than 10 years ago, so that needs time to come in. In 2015 the Scottish Government passed the Community Empowerment Act.

Glasgow City Council has a huge budget, billions of pounds, but it's all determined centrally, but we have community councils, and I am a member of North Kelvin Community Council. If community councils have more money they can do more things as they are more aware of the local problems. It's about putting and implementing the Community Empowerment Act that might enable us to do these kinds of things.

You then give the Community councils tax raising powers, you know, to say, here's a plan for Partick. 300 individuals own most of the land in Scotland. They have misused the land register. When you go to find out who owns that area, you get bounced from one place to another, as they are owned by offshore companies. If all were taxed under appropriate rates, we might not even need an income tax. But landowners are powerful people, for example, the largest landowner in Scotland is the father-in-law of David Cameroon.

But then it's arguments like devolution of power to smaller districts that can make significant changes and improve the quality of life. So eventually it becomes very political, you know. But I think the change to a proportional representation made a significant change. The Council's now in proportional representation and that gives a wider range of people more access to power.

Where do you park your bike? How adequate do you think the bike storage infrastructure is?

Well, I mean I live in the tenement flat and I take the bike into the flat. That's a problem because Glasgow has many tenements and people are chaining their bikes to railings. If we're going to allow parking we need to allow bike parking on the street. The bike racks are proving very popular. But they get grabbed as soon as you apply. You can get 12 bikes in the place of one car, so you need to provide appropriate space.

Interview 04 | Organization: Women on Wheels | Perspective: Activism + Volunteering

Could you talk about how Women on Wheels was formed?

When I was doing various projects, you know, women would come up and say they're lacking confidence or Rd safety or cultural barriers or religious barriers, but they just wouldn't be comfortable in a space that was open for everybody. And when you're running two projects side by side, you've got one that's open for everybody and one that's for women only. The women-only, sessions are way busier. All of that kind of got me thinking that there's definitely a demand and the need for women cycling projects. It's something I've been passionate about, and my board are all women and all their diverse forms who have got various experiences. We have volunteers teaching women and kids to cycle, whether it's getting them a bike or teaching them maintenance, whether it's teaching them cycling. Salma has been working with the home-

schooling community and has been teaching Hannah is a bike mechanic. She helped me set up a previous women's project. We've all kind of got into cycling overcoming our own barriers and we are here to help other women overcome their barriers.

What do you think are the main challenges to cycling for minorities and women of colour especially?

So you've got your kind of traditional ones, which are which everybody has, which is confidence in our bike and road safety, access to our bike, having a parent or a career, having lack of time. Those are kind of for everybody.

For example, I'm a Muslim, so you know we dress modestly. How do you dress modestly on a bike? There aren't any examples. There aren't any kind of pioneering women. Are we even allowed to cycle in our religion? A lot of women think culturally and in the countries that we're from in the Asian subcontinent, you rode a bike when you couldn't afford a car. Once you've got a car, you don't go backwards. So, there's that cultural barrier. So those are the kind of additional things that are barriers. It's just not the thing for women, I hear that quite a lot as well.

In terms of the cycling infrastructure in Glasgow, how adequate do you think the infrastructure is?

I as a very confident cyclist am fine because I will cycle on roads, and I will cycle, and cycle infrastructure doesn't bother me in the slightest. But for somebody who's just becoming a new cyclist, it's scary and there are lots of places that are not connected. The cycling infrastructure just finishes and then there isn't anything for you to go into. It's not well-lit as a woman; you wouldn't think about going on in the dark in the winter. It's clogged up with water, leaves, etcetera. So, it's probably a whole spectrum challenge.

A lot of women have got serious, serious concerns about the infrastructure and in fact last year I did a talk with some women, and it was about keeping safe while cycling and there were about 18 women there and they came from all over the world. Some of them had cycled in Mexico, and some of them had cycled in India. Some of them had cycled in Malaysia and they all felt that cycling and Glasgow were very unsafe. And then infrastructure just wasn't there. And I found that quite surprising. In countries that aren't as developed as they felt safer cycling there than they did here, and they were all very confident cyclists. So it's not as if they were just learning or they were new, they were all confident cyclists.

Are you somebody who uses the uses your own bike or have you used the bicycle infrastructure provided by the city?

I've got my own bike, but I have used the city bike hire system and it's really good, but it's not everywhere. Sometimes in very kind of busy places, like for example George Square, sometimes you don't get bikes and sometimes the bikes are in a state of disrepair and the bikes are quite heavy bikes as well. So if you're used to like a much quicker bike then it's probably not going to be easy, so it's not my cup of tea. However, if you're living in a tenement and you can't take your bike upstairs.

Have you worked with the City Council or was there any form of consultation with the city?

I work with Glasgow City Council's active travel team quite well. I've been part of the engagement with them and they've been developing the strategy. And when they've been kind of making various plans, but that's been quite a recent thing, I would probably say in the past maybe five

or six months, maybe maximum a year and obviously these things take years. But I've been part of that, but I would probably say that they still are not good at going out into the community. And finding out what the people out there are thinking, women out there are thinking.

In terms of that consultation process, could you please elaborate on what really happened?

They were showing you what the infrastructure plan was, what the stages for that were, and what the time scale for that was, and they wanted feedback on that. They were wanting to know what additional barriers people had and maybe what they'd missed out on. So, there was some kind of focus groups and brainstorming activities around that. So it was more of an informative thing where consensus was taken, like showing you the proposal and not really like trying to understand the issues on the ground.

What kind of support would you like to see in the future for cycling?

I would like them to spend a lot more money on infrastructure. I would like the time scales to be a lot shorter, so some of their plans are going into decades. And as somebody who's teaching people to cycle just now, you just can't tell them that infrastructure is coming up. And I appreciate things take a long time to happen, but as soon as you add Glasgow City Council into the pot, it just seems to take forever. I would probably say the first thing they need to really focus on is infrastructure. Secondly, they need to fund more projects that teach people how to ride a bike. Teach people how to behave on roads and give them that confidence. It's not enough to put the infrastructure out there, the two go hand in hand.

Do you think there is adequate infrastructure in Govanhill given that Victoria Road has segregated cycle paths?

No, even Victoria Rd, South City Way is not adequate. It's got a whole lot of issues wrong with it and I took a group of ladies who had just recently learned to ride a bike along it and one of them had a panic attack. She was so overwhelmed by what was going on and pedestrians don't respect the cyclists, so they're on it. You've got people with tram chairs, and you've got people with disabilities on the cycle path. Cars don't respect it and you know they're blocking the cycle path. They're kind of on it and it's chaos. And sometimes I prefer to take a group out on the quieter side of roads that runs parallel to Victoria Road because it's a lot calmer, and although there's traffic, you know you're on a road and you behave accordingly. But whereas on a cycle path, you don't expect to be battling with wheelchairs and trams and vehicles parked in front of you and debris sometimes.

What are activities that your organization undertake to campaign for better infrastructure?

I attend Glasgow City Council events to be part of that conversation so that we are so that we're part of that and we can do our bit. It's not going to be an essential like weekly thing that we do, but it's definitely going to be part of the bigger picture of what we do.

In terms of like, where do you park your bike? Do you take it to your home or park it outside?

I store it in my home. I live just outside Glasgow City Council, and I've got a garden and I've got a shed. I picked that house because I lived in West End before and there was no adequate parking and I used to take my kid's bikes up onto the third floor. I lived in a tenement and my bike used to stay on the ground and I was forever keeping an eye on it in case it was stolen. It obviously would get damaged with the wind and the rain and I would have to spend quite a lot more on it getting it serviced it was a constant worry, and I had a little cover on it. And the cover would fly off all the time. I spend half my time trying to pin the cover back on, and so when I moved

into my new place one of the main things, I was looking for was a garden and a shed where I could store my bacon.

If there is anything that you want to add in general about your observations or things you want to see, please feel free to add.

Glasgow City Council has lots of plans. There are lots of things that they're doing, and they like the idea of consulting with communities, but they don't really know how to do it. And they're sometimes a bit scared of asking because they're going to get a lot of negative feedback. And so they don't do it as much or they don't or they do it a bit like a tick tock tick source rather than actually really being part of that. But I think that organizations like ours can play a role because we can work with them. To provide the community that can give that feedback and so like a two-way process, they can't do their job without us. We can't do our job without them. And my other major gripe with Glasgow City Council and active travel teams is that most of them don't even cycle.

APPENDIX 2

AN ATTEMPT TO EVALUATE CONNECTIVITY USING SPACE SYNTAX

Space Syntax is a set of techniques for spatial analysis theorized by Bill Hillier and colleagues to develop an understanding between space and social behaviour. It has been used in both architecture and urban design to forecast human behaviour in accordance with the syntax of space. A fundamental hypothesis of space syntax is that activities in space is influenced by relationship between the space and every other space (or network of spaces) connected to it. Choice and integration are the two key measures of space syntax in a network analysis. Integration is the measure of transitions required from every street segment to every other street segment in a network. It a network graph (map) it indicates the most integrated streets (lighter colour) and least integrated streets (darker colour). Choice is a measure of flow and is an indicator of which routes would be chosen for movement. DeptmapX is an open-source software developed by UCL to measure space syntax. It was used to generate the following choice and integration maps for Glasgow.

Figure: Choice Map at 800 meters

Figure: *Integration map at 800 meters*

Figure: *Comparison between choice maps of Site 2 and Site 3.*

As seen, Site 3 has a well-connected network and could be one of the reasons for the high cyclist counts observed in Site 3. The most integrated routes in site 3 extend to the south connecting the city centre to Shawlands. It is also observed that the region of Govan does not have a well-connected network, with very few segments with high integration value. A key drawback of space syntax-based analysis is that it does not identify 3-dimensional elements- as seen in the segment of M8 which shows high integration.