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How to make European cities work in the 21st century?

A comparison between moderate and radical approaches to urban sustainability

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List of acronyms

- CDRC – Consumer Data Research Centre
- CLES – Centre for Local Economic Strategies
- CMU Rate – Circular Material Use Rate
- CO2 – Carbon Dioxide
- DVLA – Driver and Vehicle Licensing Agency
- EU – European Union
- FE – Foundational Economy
- GDP – Gross Domestic Products
- GH – Global Hectares
- GHG Emissions - Greenhouse Gasses Emissions
- GVA – Gross Value Added
- LEP – Local Enterprise Partnership (UK)
- LSOA – Lower Super Output Areas
- MSOA – Middle-layer Super Output Areas
- NACE – Statistical Classification of Economic Activities in the European Community
- NGO – Non-Governmental Organisation
- NUTS – Nomenclature of Territorial Units for Statistics (European Union)
- OECD – Organisation of Economic Cooperation and Development
- ONS – Office of National Statistics (UK)
- PEMB – Metropolitan Office for Strategic Planning of Barcelona
- RED – Regional Development Agencies (UK)
- UK – United Kingdom
- UN – United Nations

INTRODUCTION

Over the past three years global hunger has been rising again[1], while 17 of the 18 hottest years since records have been after 2001 (Bendell, 2018). These are just two examples of the rise in global inequalities and the deep ecological degradation, which urge to profoundly rethink current model of development locally, nationally and globally.

A global consensus is emerging around the idea that a 'great transition' is needed towards a different economy and society, where resource consumption is diminished and wealth better shared. The breadth of actors that are embracing this idea is impressive, ranging from social movements to major political institutions and corporations.

This thesis addresses the question of transition towards sustainability focusing on European cities. Beyond personal interests, my research background and institutional context influenced the choice of this subject. My primary field is urban and regional sociology while the PhD Programme that financed this research is called URBEUR – Urban and Local European Studies. As the name suggests, this programme focuses on cities and local development in Europe.

European urbanization has been often presented as sustainable for its capacity to reconcile social cohesion with economic prosperity. However, in the era of environmental collapse, there is debate whether European urbanism can still provide a reference for a sustainable future in the Anthropocene – given a stronger injection of green correctives – or whether systemic change is required. Building on this, this thesis investigates the applicability of moderate and radical approaches to urban sustainability in Europe drawing on a rich empirical research conducted in the UK.

This work is also the result of my involvement in a number of leading European organisations working on alternative local development. They are the Foundational Economy Collective, the Centre for Local Economic Strategies, and the PEMB – Barcelona Metropolitan Strategic Plan. These organisations were dissatisfied with mainstream economic development given its limited results in terms of social cohesion and environmental sustainability. Consequently, they were working on developing alternative policy approaches.

I formally did an Internship at CLES from October 2017 to December 2017. I visited the PEMB in October 2017 and again in January 2019. In June 2018, I started

[1] https://www.who.int/news-room/detail/11-09-2018-global-hunger-continues-to-rise---new-un-report-says

a more formal collaboration with the Foundational Economy Collective, which eventually became my main research partner.

The interaction with these organisations strongly influenced topic, ethos and style of the research. When I started, there was a need to systematise old and new ideas on sustainable development in the European context. This reflected a concern with situating and communication.

While traditional approaches like smart growth were increasingly seen as ineffective, sustainability had gone mainstream. Major development institutions such as the OECD and the European Union promoted green and inclusive growth. At the same time, radical grassroots approaches, like Degrowth or Transition Town, where gaining ground. The organisations I worked with felt the need to situate in the messy new field that European local development had become. Furthermore, they required a communication strategy to interact with local governments, community organisations, activists and the general public.

Beyond situating and communicating, a major concern of organisations like CLES or the Foundational Economy Collective was implementation. Academics are primary concerned with theory building and use case studies to support or explicate. In contrast, development organisations are primary concerned with social change. The endpoint of their work is implementing the innovations they have advanced at the theoretical level.

Developed in this intellectual milieu, this research started with the goal of understanding the following issues:

a) How deep are the main sustainability challenges of European cities?
b) What are the main theoretical differences between mainstream and alternative approaches to urban development of the 2010s in the European context?
c) Insofar and in which ways are mainstream approaches to sustainable urban development insufficient?
d) How to define and operationalise an alternative approach to urban development?

These questions aim at building a knowledge base for new ways of doing urban policy, which can transition European cities towards sustainability. I think this is of utmost importance today. Theoretically, it is easy to dismiss mainstream approaches to urban development and to imagine alternatives. The social sciences vocabulary provides all the concepts and the general trends on global inequalities and environmental degradation.

In the face of environmental collapse and global inequalities, what is needed are alternative policies, not another critical theory of urban capitalism. Developing new policies requires a precise understanding of what is wrong with mainstream policies. Furthermore, it requires testing on the ground. A new policy might look great in theory, but its application could reveal unforeseen weaknesses.

I do not think I would have come up with these research questions just by working in an academic environment. Back in 2016 – when I did the literature review for this research – they were not central in my field. At that time, academic debates in urban and regional sociology concentrated on the processes and consequences of the neoliberalising city. Furthermore, they focused on the practices of resistance against it. Development and implementation of alternative urban strategies were not on the agenda.

At the same time, I do not think that I could have conducted this research as a fulltime employee in development organisations like PEMB or CLES. I am hence very happy about the choice of working in a mixed environment between academia and policy. In this regard, the British group of the Foundational Economy Collective was an ideal partner. The collective is composed by a group of academics, which yet share a true interest for policy and implementation.

Thesis structure

This thesis is structured in three parts, following the convention of Italian PhDs in distinguishing theory, methodology and empirics. The theoretical part is dedicated to the relation between cities, the Anthropocene and development in the European context. This part is dived in two chapters.

In chapter 1, I will look at the concept of Anthropocene, which has been introduced to make sense of the current geological epoch so deeply shaped by human activity. I will then clarify my conception of the city, which is derived from modern political ecology. At last, I will discuss the implications that current levels of resource consumption and environmental degradation have for urban strategies in Europe. I will argue that the Anthropocene poses a much bigger challenge to urban policy than the classic problematic of re-coupling growth to social cohesion after de-industrialisation.

In chapter 2, I will discuss the main approaches to urban sustainability, which have emerged over the past decade in Europe to address the sustainability challenge of European cities. As a consequence of economic downturn, environmental degradation and the persistence of socio-spatial inequalities, sustainable urban development has gone mainstream across Europe. I will argue that two families of approaches to sustainable urban development have appeared. On the one hand, there is the moderate family, which focuses on socialising and greening urban growth. On the other, there is the radical family, which focuses on satisfying basic needs to all in sustainable ways. Consequently, I will discuss at the main features that define the radical and the moderate families.

The second part of the thesis is about methodology. This part consists of one long chapter (chapter 3) that discusses a) research problem, b) research questions and strategy and c) research methodology. Transition towards sustainable urbanism in

Europe requires choosing the right approach to sustainability. The key research problem I address is hence exploring insofar moderate and radical approaches to urban sustainability can transition European cities towards sustainable development over the next decades.

In the same chapter, I will then discuss the research questions that I have derived from this broad problem and make the case for the unconventional strategy I have followed to answer them. At last, I will discuss methods and indicators.

The empirical part of this thesis is the longest. It comprises the three last chapters, that is chapters 4, 5 and 6. They deal with three different yet connected issues. Together they constitute the empirical base for discussing the research problem. For reasons explained in chapter 3, the thesis focuses empirically on the UK. Chapter 4 quantifies the sustainability challenges of British cities. In this regard, I will look at trends in material welfare, social cohesion, waste emissions and natural resource consumption. I will argue that, given levels in environmental impact and persistence of social inequalities, British cities have to structurally change their development model to achieve sustainability.

In chapter 5, I will then look at the Swansea Bay Strategy, a development strategy recently adopted in South West Wales, UK. The Swansea Bay Strategy constitutes a case of a strategy designed within the moderate approach to urban sustainability. Through the analysis of the strategy, I will uncover how the moderate approach to urban sustainability works in practice. I will argue that, given the depth and scale of the sustainability challenges of British and European cities, the moderate approach to urban sustainability is too superficial for transitioning European cities towards sustainability.

In chapter 6, I will than turn to the radical approach to urban sustainability. I will experiment its application on the ground in a neighbourhood in the City of Swansea. I will argue that radical approaches to urban sustainability provide a better conceptual frame for addressing the sustainability of British and, more in general, European cities.

Main strengths and limits

The reader will find in this research its strength and weaknesses, yet here I would like to underline a few things to contextualise this work. Instead of a standard PhD thesis, I did an experimental research in connection with development organisations. Reconciling the academic and the policy world has been challenging, perhaps too challenging for an inexperienced researcher like myself.

This feeds into the major weaknesses of the thesis. These weaknesses regard methodological accuracy, the discussion of the epistemological foundations of the thesis and empirical mismatch.

- Methodological accuracy. Development organisations work with smaller budgets and harsher time constrains than universities. Compared to academia, their take on empirics is more imaginative and pragmatic yet less methodologically aware. Influenced by the working style of development organisations, this research has prioritised the production of a nuanced empirical base through different methods and techniques. In comparison, however, discussion of the methods has been neglected.
- Epistemological foundations. Traditionally in the social sciences, epistemology and methodology are strictly connected. Positivist epistemologies feed into quantitative methodologies while hermeneutical epistemologies into qualitative methods. Realism (Bhaskar, 2008; Næss, 2015; Pawson, 2016; Pawson & Tilley, 1997) is a research paradigm which contests this division. It proposes to combine methods to produce nuanced evidences in support of specific empirical narratives. Realism is the epistemological approach of this thesis. This approach is implicit in the modus operandi of most development organisations. Within academia, realism has steadily grown, yet it is still less known than positivism or hermeneutics. The academic common sense would have required a discussion of realism. Unfortunately, the reader will not find such discussion. Within the time-constrains of a 3-years PhD, the researcher has to make choices. At one point, the choice was between discussing realist epistemology and developing the case studies. I decided to develop the case studies. As I will explain in the methodological chapter (chapter 3), they were one-time opportunities. Furthermore, my PhD is in empirical sociology not philosophy of science. With better planning I could have done both – no doubt. However, experimental research is harder to plan than standard research. With deadlines to meet, this type of debatable choices can occur.
- Empirical mismatch: The last weakness regards empirical mismatch. This work is not a standard test-an-hypothesis-style PhD research. I did not start from a hypothesis derived from the literature and then went on to test the hypothesis through a database or an ethnographic field. This thesis is an empirical exploration of a new subject guided by the theoretical insights discussed in chapter 1 and chapter 2. The empirical theses of the research have taken shape step by step as data were produced. As a result, some of them rely on a solid empirical base, while others would have benefitted from more research. I am aware of these limitations. In the conclusions, I propose the consolidation of the empirical results as a direction of development of the present work.

Nonetheless, the experimental research strategy in connection with development organisations had great advantages. It made it possible to explore new subjects, try out new methodologies and look at things from new perspectives. As a result, I think this

thesis has a number of major strengths. They pertain theoretical innovation, methodological integration, empirical breadth and policy relevance:

- Theoretical innovation. My primary field is urban and regional sociology. At the time of starting the research, sociological studies of urban development were concerned with the growth-social cohesion problematic, with limited concern for the environment. This work originally fuses urban and regional sociology with environmental sociology theoretically and empirically. The result – as I will discuss in the conclusions – is a redefinition of the urban development problematic in Europe in the face of an integrated understanding of economic development, social cohesion and environmental impact. This is a relevant step forward in the sociological literature on European cities and local development.
- The mix of methods. Despite recurring calls for methodological integration, most empirical research in urban and regional sociology relies on one or few research methods and techniques following the quantitative/qualitative divide. In contrast, this research mixes a wide range of methods and techniques including time-series analysis, spatial analysis, quantitative tables, ethnographic interviews, surveys and system modelling. This is of value in a discipline that lacks mixed-method-based work. It shows the kind of work that can be done by mixing methods. Furthermore, it enables to see the limits of this approach and sheds lights on how methodological integration could be improved.
- The large and nuanced empirical base. The wide range of methods feeds into the third strength of the thesis, which is the large and nuanced empirical base. Using different methodologies has enabled me to explore different topics and scales. This research covers material welfare, social cohesion and consumption of natural resources of European cities. These topics are explored at different scales, including the international scale of Europe, the national scale of the UK, the regional scale of the Swansea Bay City Region and the neighbourhood scale of Morriston, a neighbourhood in the City of Swansea. As a result, the research has produced a nuanced empirical base on urban sustainability in Europe. This has resulted in a lot of material from different perspectives to think about this complex subject. Even though the reader may not agree with my interpretation of the empirical results, I think it will still find the empirical base informative.
- Policy relevance. Based on few research methods applied in depth, academic research leads to robust yet circumscribed empirical results. Typically, they shed light on very broad or very small subjects. In both cases, this type of knowledge is of little help for policymakers, activists and community organisers. These actors require meso-level knowledge from different perspectives, which can be pragmatically adapted to a context of intervention.

I think this research succeeds in producing this type of knowledge in relation to strategic planning and urban sustainability in Europe. Those interested in these subjects can find in this work many insights on how to do urban policy differently over the next decades.

I. The Anthropocene, sustainability and its implications for European cities

Human activity has always impacted on natural ecosystems. As long as humans have been organised in small communities of hunter-gatherers and farmers this impact was small. Most of the time, these social formations did not permanently alter the natural ecosystems they depended on. The emergence of urban settlements changed this sustainable relation between humans and the environment. Cities enabled an impressive rise in human wellbeing. Yet they started to structurally change and, sometimes, degrade natural ecosystems.

This chapter deals with three issues. The first one is the magnitude of human impact on natural ecosystems since the 1950s. Starting from that period, global economic expansion has dramatically impacted natural ecosystems up to the point of affecting their foundations. This has led scientists to call our current geological epoch Anthropocene, to highlight the unprecedented human impact on the planet.

The second issue I address in this chapter is how cities work. Cities are becoming the main type of human settlement. Compared to other human settlements, they are characterised by their reliance on a vast hinterland for their sustenance. In this section, I will focus on how cities generate the goods and services they require and how they distribute them.

At last, I will discuss the implication of the Anthropocene for European cities. Modern European cities have been able to generate and distribute massive material welfare. They are the result of a particular model of territorial development, centred on economic growth and redistributive policies. In the face of the environmental degradation, this model will have to be rethought to be environmentally and socially sustainable.

1. The Anthropocene and the great acceleration of the last century

For millennia human impact on nature has been insignificant if compared to what humans have done to natural ecosystems over the last couple of centuries. From the half of the 18th century, and especially after World War II, economic activity has exponentially grown to a massive extent with dramatic consequences for our planet.

The following examples may help to give an idea of this phenomenon (Anthropocene.info; McNeil & Engelke, 2014). Since 1945, the number of motorized vehicles has grown from 40 million to 800 million in the 2010th. Plastic production in the 1950s was about 4 million tonnes, while in 2015 it had reached 85 million tonnes. The number of large dams in the world in the 1950s was roughly 5,000; by the early 2010s it had increased to more than 30,000 thousand. Use of fertilizer has risen from 20 million in the 1950s to more than 160 million tonnes in 2010.

According to environmental historians McNeil and Engelke (2014), the main drivers of such increase in economic activity were population growth and cheap energy. In 1780, total human population is estimated between 800 and 900 million; in 1930 it had already raised to two billion, while today is around 7,7 billion. Availability of cheap energy has enabled this extraordinary human population growth. With the discovery of fossil fuels – oil, coal and natural gasses – humans accessed formidable energy sources cheaply. In combination with innovation in mechanics, this extremely amplified human labour creating the material premises of demographic growth.

However, economic activity did not just follow demographic increases – it largely exceeded it. In the 20th century economic growth grew faster than population growth (World Commission on Environment and Development, 1987), lifting millions of people out of severe material insecurity across the globe. However, the distribution of global wealth has remained highly unequal (Hickel, 2017). Considering a poverty threshold of 5 dollars a day, the number of poor people has actually risen from 3,3 billion in 1982 to 4,3 billion in 2010. This is nearly 80 percent of the world population.

The impact on natural ecosystems of this 'great acceleration' has been massive. This has manifested in manifold ways including ocean acidification, deforestation, loss of bio-diversity, loss of soil fertility, reduction of the ozone layer, global warming and extreme weather (Anthropocene.info; Bendell, 2018; McNeil & Engelke, 2014).

In the early 1990s environmental scientists Rees and Wackernagel developed a comprehensive indicators to quantify the main ways through which human societies impact on nature (Wackernagel & Rees, 1996). Despite theoretical and methodological limits, this indicator – called 'ecological footprint' – enabled to envision the burden of the human species on the planet's ecosystems. The results are impressive. Nowadays, humans are using an amount of productive land which exceeds the capacity of such land to renew itself by 1.7. This means that to be sustainable, the current world economy would require more than another half planet of resource to be sustainable.

Over the past two decades, the concept of Anthropocene got traction to describe the present geological era so deeply shaped by humans (McNeil & Engelke, 2014). The argument is based on the depth and durability of human influence on the planet. Supporters of the term note that since roughly the 1950s humans have become the single most influential force shaping fundamental earth systems, including the main biogeochemical cycles of carbon, nitrogen and sulphur.

Recently the term 'Capitolocene' has been proposed as more appropriate than that of Anthropocene (Moore, 2016). Historically, the tremendous growth in human activity is related to the emergence, rise and consolidation of capitalist economies, where profit-maximising firms operating on a global level have become the main economic actors. Until recently, these firms have shown very little concern for environmental impact. However, this approach downplays that communist economies, like the former Soviet Union and China, degraded the environment as much as capitalist economies (McNeil & Engelke, 2014).

In the late 1980s the emergence of a global environmental movement made the case for changing development models at global, national and local level. High-profile publications like the *Limits to Growth (*1972*)* and *Our Common Future* (1987) were influential in rising environmental awareness. These publications argued for the need to restructure development models so to make them compatible with natural ecosystems. They warned that not respecting planetary boundaries would have changed once for all the equilibrium of natural systems with dramatic consequences for the planet and humans. Contemporary works on sustainability management observe that this has happened by now and that countries will have to approach development strategy from the perspective of deep adaptation (Bendell, 2018).

In any case, the current state of environmental degradation will have massive impact on urban development, given the concentration of human population in cities. In the next section, I will look at how modern cities work, whereas in the last section the focus will be on the main implications of the Anthropocene for urban strategy in the European context.

2. How do cities work?

The concept of 'city' is largely taken for granted in media and everyday life. However, at closer look it is stratified and articulated (Brenner, 2004). In modern urban studies, there seems to exist three main understandings of this concept.

The first one is the city as *urbis*, that is a geographical space characterised by a human settlement of a certain size, stability, density and social and/or functional diversity. In this sense people talk about the city as a place different from the countryside, or about the city as different from a town, a village or a suburb. In this regard, Louis Wirth (1938) formulated in the late 1930s a classic definition: the city as a settlement characterised by permanence, large population size, high population density and social heterogeneity. As sleek and self-evident as it may seem at first, this definition poses substantial challenges when it comes to empirical operationalization. Typically, population has become the main variable through which urban settlements are differentiated from other types of settlements. However, the so-called 'urban

population threshold' (UPT) changes significantly from country to country (Brenner, 2015).

A second understanding of the city it that of *civitas*. This refers to the city as a type of local society, the urban society, a community of people with specific cultural attitudes and/or rights and duties. In this respect, historians have reported how the citizens of ancient Athens had more rights and duties compared to slaves. Looking at cultural attitudes, it is in this sense that people say that the urbanite is different from the countryman, that there are differences between Londoners and Berliners, or define a clothing style, a type of music or political beliefs as urban.

The city as an urban society has been a central topic of classic urban sociology. For instance, George Simmel in its classic essay *The Metropolis and Mental Life* published in 1902 (reprint in The Blackwell City Reader (2002)) argues that the lifestyle of the metropolis creates specific psychological traits in its inhabitants. As a result, he thought metropolitan men more dynamic and rational then those of small towns. Almost 40 years later, developing Simmel's intuition, Wirth argued in *Urbanism as a Way of Life* that a 'spirit of competition, aggrandizement and mutual exploitation' characterised the urban man (Wirth, 1938, p. 15).

At last, we can talk about the city as *polis*, that is as a political organisation grounded in a bounded territory. In this sense, people talk about the city as a type of local government, a jurisdiction and even a state – the city-state. The classic reference in sociology, and urban studies more broadly, is Max Weber. In his grand work *The City*, Weber undertakes a famous comparative analysis of European and Oriental cities of the middle-age, highlighting the features that made European cities autonomous political actors compared to their Oriental counterparts. The city as a political and administrative unit – a collective actor that does things – has been a recurring subject of research, which inspired later classics in urban studies including Dahl's *Who governs? Democracy and Power in an American City* (2005), Molotoch's *The City As Growth Machine* (1976) and more recently Kantor's and Savitch's *Cities in the International market-place (2002)*.

Whether a physical settlement, a community of people or an organisation, cities require vast amounts of resources – including energy, goods, services and water – on a daily basis. The perspective of study chosen in this research cuts across the different understandings of the city as outlined above, focusing on the processes that produce and reproduce human settlements as material and social entities. On the one hand, this perspective has a classic reference in Harvey's theoretical work on urbanization (Harvey, 2006). Here he argues against the reification of the city as a thing, calling researchers to rather concentrate on the political and economic processes that shape urban development. On the other hand, the classic reference is the pioneering work on urban metabolism of Abel Wolman (1965), who proposed to look at cities as complex organisms, which require a constant influx of resources (raw materials, goods, services, energy) to sustain themselves.

The contemporary theoretical reference of this work is modern urban political ecology as exposed *in The Nature of Cities – Urban Political Ecology and The Politics of Urban Metabolism (Heynen, Kaika, & Swyngedouw, 2006a)*. In this work the editors criticise the sociological bias of modern urban theory, which has looked at the city primary as a social phenomenon neglecting the relation between urbanization and nature. Instead, they argue for 're-naturing urban theory', understanding 'the urban condition as a fundamentally socio-environmental process'. Furthermore, the key idea of urban political ecology is to consider socio-environmental processes as political, both in sense of being structured by collective decisions and in the sense of reflecting power relations and struggles among different social groups.

Following this theoretical approach, the present research looks on the processes that enable cities to sustain human life continuously over time by using natural resources. In this respect, it focuses on the economy of cities – using the term economy in its substantive meaning (Jo, 2016; Polanyi, 1977) – considering the processes that provision urban settlements with the material and immaterial goods they require. This also includes the way cities deal with the wastes they produce in the processes of producing, distributing and consuming goods and services.

Human settlements have always existed by bringing in resources – construction materials, food, goods and tools – from wider areas and processing them to reproduce the social body. In this regard, ecological literature has identified human settlements – especially modern cities – as dissipative structures (Giampietro & Saltelli, 2014; Wackernagel & Rees, 1996). Human settlements require host ecosystems, which are much larger than the settlements themselves. This applies especially to 'contemporary high-income consumer cities which are concentrated nodes of material consumption and waste production that parasitize large areas of productive ecosystems and waste sinks lying far outside the cities' (Rees, 2012, p. 247).

These supportive ecosystems, crucial for the existence of urban areas, have been typically underestimated over the past century in policy, public debate and academic research. As a result, urban populations have increased to the point of consuming productive ecosystems faster than the capacity of such ecosystems to regenerate themselves. This causes the environmental degradation discussed in the previous section.

Improvements in living standards of human settlements have most time involved relationships to other human settlements and territories in the form of trade or plunder. With this respect, the mechanisms that generate local development are rather relational than local. Cities have depended from the development of other localities, with whom they trade. This delineates bonds of co-development among cities (Wackernagel & Rees, 1996), which can manifest at regional, national and even international level, given different patterns of economic integration.

Perhaps, one of the sharpest theorisations of the development process of cities is Jane Jacobs' *The Economy of Cities* (1970). Here Jacobs notes that, excluding war and

plunder, localities have fundamentally two ways to develop. On the one hand, they can increase the quality and quantity of locally available goods and services by diversifying, innovating and optimizing their local production. On the other hand, they can increase the quality/quantity of available goods and services through trade, i.e. by importing more/better goods and services from other localities. This implies that localities improve the quantity/quality of their tradable goods and/or services.

Jacobs emphasises that the trading partners of localities can be geographically close as well as far away. They can be the towns in the nearby countryside, other cities within the same region, other cities within the same country, as well as cities from other countries. This configures cities – especially modern cities embedded in national and global economies – as fundamentally open systems. The hinterlands of modern cities are not primary their surrounding countryside, as in pre-modern cities. As argued in different guises by Engelen et al. (2014) and Rees (2012), modern cities rely nowadays on a global hinterland for their provisioning.

Modern cities distribute welfare through a plurality of ways (Calafati et al., 2019). Many of the crucial consumption goods and services – food, for instance – are accessed through personal incomes, generated by wages connected to the formal participation in the production process. Furthermore, non-income-based infrastructures, including public transport or health-care, are crucial in the generation of local welfare. These are often organised through the mechanisms of the public economy (Sekera, 2016) – that is, through taxation, public enterprises with not for profit business models – and distributed via collective provision free at the point of use or accessible at low prices. To make cities work it is crucial to consider the mechanisms that generate welfare-critical resources together with the mechanisms that distribute such resources.

3. The implications of the Anthropocene for urban strategy in Europe

In urban studies, European cities have been associated to urban settlements that are dense in structure, moderate in size, endowed with public spaces, whose development is regulated and shaped by public institutions (Bagnasco & Le Galès, 2000; Hartmut Häussermann, 2005; Kazepov, 2005; Novy & Mayer, 2010; Savitch & Kantor, 2002; Vicari Haddock, 2004; Wacquant, 2008). Furthermore, those interested in development have identified in the European city a model of urban development characterised by two key features: a) the capacity to generate economic prosperity and b) the capacity to extensively distribute this prosperity across the social body.

In the literature, the capacity to produce and reproduce economic prosperity has often been called 'competitiveness' and operationalized via indicators such as GDP per capita, GDP per capita growth rate, and patent activity (Kazepov, 2005; Ranci,

Brandson, & Sabatinelli, 2014).[2] The capacity to extensively enable citizens' access to material wealth is usually called 'social cohesion' (Kazepov, 2005; Ranci et al., 2014) and measured via social inclusion and social inequality indicators.[3]

The constitutive other of the European city is the US-American city. The crucial idea of the literature is that the European city is an actor primary concerned with regulating/intervening in the local economy to promote/ensure the collective wellbeing of the citizenry – in particular, with those at the bottom of the social structure. In contrast, the US-American city is primary concerned with unleashing the market forces and generate economic growth. As a result European cities – even when facing social polarisation – display much higher levels of social cohesion compared to US-American cities (Wacquant, 2008).

European cities are the result of a distinctive territorial development model, which took shape between the end of the 19th century and the consolidation of national welfare states during the post-war period (Brenner, 2004; Reynaud, 1988). This model put emphasis on ensuring high and equal levels of welfare across the national territories, especially in large and middle-sized urban centres. Despite different variants, it has consolidated in most European countries. Arguably, this model was characterised by three key features.

The first feature is trade-oriented local development in the context of nationally protected markets. In the post-war period, localities across Europe adopted strong trade-oriented strategies to develop. In the context of national market, localities specialised in the production of certain tradable goods and services which were exported throughout the country. The rationale for such local development model was based on theories of economies of scale, local availability of natural resources and comparative advantages within regions. This process led in almost every European country to forms of regional specialisation, like the concentration of agricultural production in some regions, or the concentration of the automotive industry in other regions.

The second feature is a mainly nationally financed foundational economy. The foundational economy is that part of the economy that provisions welfare-critical goods and services, like education, gas, transport, health-care and so on (Froud, Haslam, Johal, Tsitsianis, & Williams, 2018). Since World War II, European countries have organised the provision of foundational goods and services via various types of public production, based on nationally collected taxes. In this way, the quality and quantity of foundational goods available in a locality are made independent from the performance of the rest of the local economy. Such financial model ensures the

[2] Both modes of conceptualisation and operationalization of economic prosperity are increasingly contested in recent times, as we shall discuss later in the methodological chapter more in detail (Engelen, Froud, Sukhdev, Salento, & Williams, 2016; Goff, 2017).

[3] Widely used indicators are the poverty rate, unemployment rate, the Gini index, housing affordability indexes, and access to health-care services (Pantazis, Gordon, & Levitas, 2006).

provision of foundational goods and services also in phases of local economic downturn.

The third feature refers to spatially compensatory policies, which worked in addition to the equalising effects of nationally financed local public economies. Depending on the country, these policies have taken a variety of forms and names. Commonly implemented policies in Europe included localisation of large public enterprises in backward regions, incentives to private enterprises to locate in backward regions, extra financial resources to backward regions to build development infrastructures.

This model of development has been based on economic growth, with the welfare state as a redistribution mechanism in addition to the distribution happening through wages. It has largely worked until the 1980s. However, as a consequence of Europeanization and globalisation, many European cities have lost substantial parts of their tradable economy, especially in manufacturing, extraction of natural resources and agriculture. As a result, poverty and social inequalities have reappeared in urban areas across Europe.

These features have been exacerbated by a partial localisation of the fiscal base of local authorities (Brenner, 2004), which borrows from the American model of territorial development (Harvey, 1989; Savitch & Kantor, 2002). The US-American model of territorial development shares with the European model regional specialisation of tradable production and the public involvement, although smaller, in the foundational economy. However, in the US-American model, the local public economy is mainly financed by local taxation, not by national taxation. This makes the local public economy much more dependent from the performance of the local tradable economy and explains the entrepreneurial approach of the US-American urban policy.

The return of poverty in many European cities and the entrepreneurial turn of some local governments have sparked a debate on the end of the European city (Hartmut Häussermann & Haila, 2005). This was followed by a discussion on how to regenerate the development model of European cities so to promote economic growth together with social cohesion (Ranci et al., 2014). On a policy level, this debate has led to an interest for urban strategies focused on rebuilding the tradable sectors of urban areas, connecting new industries to low-incomes and low-work households and reforming local welfare provision.

However, the Anthropocene poses a much deeper challenge for the European model of urban development than coupling economic growth to social cohesion. The future challenge for European cities will be about generating wellbeing for all, while at the same time reducing consumption of material throughput and energy to sustainable levels. What is possible, desirable and achievable in this scenario drastically changes.

Arguably, the key problematics for urban strategies in Europe are the following two. The first is the possibility of economic growth. The development model of

European cities since the 1950s has been ultimately based on growing their way to prosperity, with the welfare state ensuring decent levels of distribution of the surplus across the national space and the social body through social and regional policies. This model had no major concern for energy and matter use as well as for the input of pollutant wastes back into the ecosystems. Considering state and trends in environmental degradation, a crucial theoretical and empirical question is understanding insofar and in which ways a growth-centred urbanism can be sustainable.

The second key problematic is the approach to social justice. High-income societies are characterised by significant inequalities, especially since the 1980s (Piketty, 2013). A constantly growing economy has made these inequalities more acceptable. Using a classic metaphor, if an unequally distributed pie grows over time, those getting the smaller share still see their share increase from year to year in absolute terms. This has enabled high-income societies to tolerate high levels of inequality. In a less growing or – maybe – even degrowing economy a crucial question is understanding insofar the current approach to inequalities has to change to ensure decent levels of welfare across the social body and especially at the bottom of the social structure.

Over the past decade, new approaches to urban development have emerged to address these questions. In the next chapter, I will discuss the main approaches to sustainable urban development, which have been applied across Europe.

II. MODERATE AND RADICAL APPROACHES TO URBAN SUSTAINABILITY IN EUROPE

Sustainability is political (Heynen, Kaika, & Swyngedouw, 2006b) and over the past decades a range of approaches to sustainable urban development have appeared in Europe. These approaches provide different frameworks, within which the sustainability challenge of cities can be addressed leading to different views of what a good urban strategy is.

This chapter is structured in three sections. In the first one, I will propose a conceptual framework for understanding the variety of approaches to urban sustainability that exists nowadays in Europe. I shall argue that there are two big families of approaches to sustainable urban development. On the one hand, the family of what I call the 'moderate' approaches to urban sustainability; on the other hand, the family of what I call the 'radical' approaches to urban sustainability.

In the second section, I will focus on the moderate approaches to urban sustainability. This family of approaches is the mainstream and shapes most urban policy programmes in Europe. I will discuss the key ideas defining the moderate approach to urban sustainability, looking also at its theoretical roots and underlying assumptions.

In the third section, I will then move to the family of the radical approaches to urban sustainability. These approaches have their roots in the radical environmental and social thought of the 1970s and 1980s. Yet, only over the past decade, an increasing number of cities and communities started to experiment with their implementation in Europe. Also in this case, I will look at the main ideas of this family of approaches while also looking at its intellectual roots and underlying assumptions.

1. A conceptual framework for mapping approaches to urban sustainability in Europe

From the 1950s to the 2000s, urban entrepreneurialism and urban managerialism (Harvey, 1989) represented the main approaches to urban development in Europe. Taking advantage of the economic growth of the so-called Glorious Thirty – and from steady revenue streams provided by the central state –, urban managerialism focused on local service delivery with the aim of ensuring socio-spatial justice. Since the 1980s,

as a consequence of de-industrialisation and austerity, a stronger and more pro-active approach to local development was needed. Urban entrepreneurialism emerged, which focused on promoting economic growth by using public assets, powers and policies strategically to attract, expand and retain key industries.

Urban managerialism was concerned with social sustainability, yet lacked a strategic vision of the urban economy, which showed its limits when dealing with de-industrialisation processes. Urban entrepreneurialism had a built-in concern with how the local economy works and how it can be improved. However, it contained a simplistic understanding of how economic development could be translated into social wellbeing, primary based on wages and employment. Ultimately, both these approaches did not consider the environment.

Over the last two decades economic downturn, rise and persistence of social inequalities and environmental degradation have led to an extensive rethinking of local and urban development across Europe. Entrepreneurial approaches were pushed to integrate social and environmental issues. Furthermore, there has been a rediscovery of municipal approaches to urban policy (Cohn, 1910; Rubio-Pueyo, 2017), which go beyond managerialism by incorporating a concern for economic development as well as for socio-spatial justice. At the same time, ecological approaches started to fundamentally question urban economic growth in itself.

As a result of this conversation among different strains of development thought and practice, a considerable number of approaches to sustainable urban development are nowadays present in Europe. They include The Smart City (Morozov & Bria, 2018), New Municipalism (Rubio-Pueyo, 2017), the Self-Sufficient City (Diez, 2017), Transition Towns[4], The Foundational Approach (Engelen et al., 2016; Engelen et al., 2014), Local Wealth Building (CLES, 2018), the Inclusive Green Growth Approach (European Union-Regiomal Policy, 2011; Hammer, 2011; Oecd, 2016; The World Bank, 2012), the City of Commons (Bauwens & Onzia, 2017) and the Degrowth Approach (D'Alisa, Demaria, & Kallis, 2015) just to mention a few. High-profile organisations and institutions have developed some of those approaches. For instance, the EU and the OECD developed the Inclusive Green Growth Approach. In contrast, grassroots organisations developed other approaches, as the case of Transition Towns.

These approaches to sustainable urban development have inspired policies and projects in many European cities. Sometimes these projects and policies are delivered by the same organisation working on the theoretical development of the approach. For instance, the local Transition Town group stirred the innovative projects of the town of Totnes, UK. Similarly, the progressive urban policies of Barcelona under the Colau Administration were implemented in connection to the theoretical development of New Municipalism. Nonetheless, there are many cases of community organisations, social movements and municipalities that have implemented policies and projects with

[4] See http://municipalitiesintransition.org/

no specific reference to a certain urban development approach, or by mixing different approaches.

From a theoretical standpoint the challenge is putting order in this messy field that contemporary urban development has become without over-simplifying the differences and nuances that exist among the approaches to urban sustainability. To achieve this, I propose a conceptual framework for mapping approaches to urban development based on two dimensions to be seen in a continuum perspective. The first dimension is the economic growth vs. basic needs dimension, represented in the Figure II.1 by the vertical axis. This dimension groups approaches to sustainable urban development according to how much they prioritise economic growth vs. satisfaction of basic needs. The placement of an approach around the centre of the axis means that the approach tries to combine both growth and satisfaction of basic needs to all.

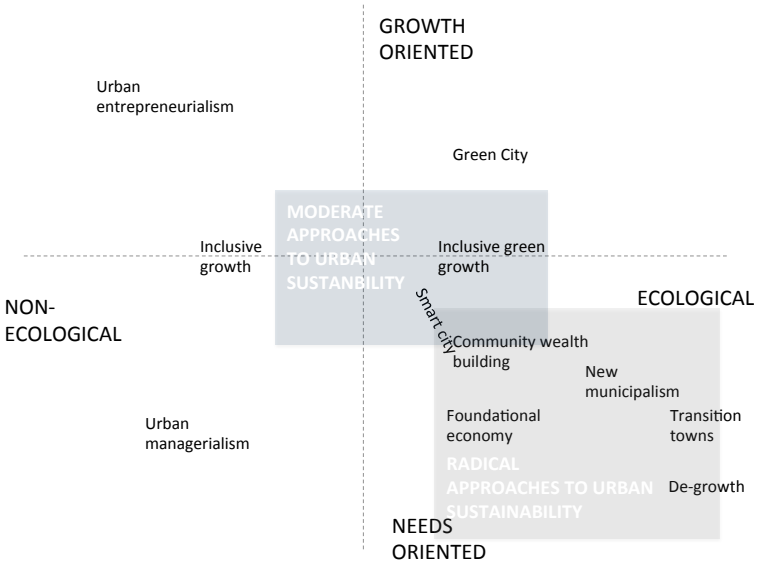
The second dimension is the ecological dimension, expressed in the graph by the horizontal axis. This dimension groups approaches according to how much importance they give to the environmental sustainability. A placement at the left-end of the axis means no concern for the environment. A placement around the centre of the axis means that the approach moderately includes concerns for the environment. A placement at the right-end of the axis means a strong concern for the environment.

A few examples may clarify the framework. 1980s urban entrepreneurialism is at the top left because it looks at promoting urban economic growth with no major concern for the environment and basic needs. In contrast, De-growth is on the bottom right because it strongly advocates equality and is not at all concerned with growth. Urban managerialism is on the bottom left because is concerned with basic needs, yet it does not entail a concern for the environment.

Sustainable development approaches are those that integrate both a concern for basic needs for all and a concern for the environment. Graphically, these approaches situate at the centre of the two axis and in the fourth quadrant. I argue that within this conceptualisation, two families of approaches to sustainable urban development emerge. These families of approaches are to be understood as policy assemblages (Savage, 2019), which incorporate different strains of economic, social and environmental thought.

On the one hand, there is the family of the moderate approaches to urban sustainability. Moderate approaches to urban sustainability are the mainstream, shaping most urban policy programmes in Europe. These approaches, as I shall show more in detail later, have their roots in mainstream understanding of urban and regional economics filtered through moderate social and environmental thought. The main idea is that urban growth can be orchestrated to be environmentally sustainable and socially inclusive.

Figure II.1 - Urban development approaches in Europe



On the other hand, there is the family of the radical approaches to sustainable urban development. These approaches have their roots in a deeper understanding of sustainability that reference heterodox economics, ecology and radical social and political thought. The main idea shared by this family of approaches is to focus on satisfying basic needs for all – like quality healthcare and accessible housing – in environmentally sustainable ways.

2. The moderate approach: greening and socialising urban growth

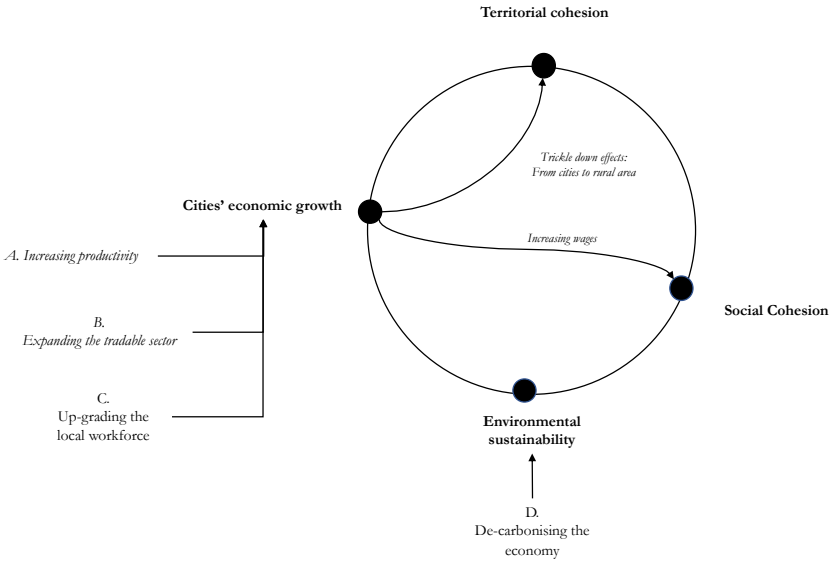
The moderate approach to urban sustainability is an approach to urban development and policy elaborated by major international organisations such as the European Union (European Commission, 1997, 1998, 2006, 2012, 2014), the OECD (Hammer, 2011; Oecd, 2016) and the World Bank (2012). The moderate approach to urban sustainability focuses on improving the capacity of the current urban systems to generate social and environmental sustainability. Its key idea is that European cities should continue to promote economic growth to generate wellbeing. Yet they should

do so in ways that are more efficient, socially inclusive and environmentally sustainable.

According to this approach, European cities do not require a fundamental re-organisation of their development model. They rather require a set of strategic adjustments in key sectors including a) the tradable sector, b) the labour market, c) energy production, d) transport and c) housing. According to this approach, agglomeration should be encouraged, and investments concentrated in the advanced sectors of the private tradable economy. Cities should adopt greener energy sources, and the building stock upgraded in terms of ecological efficiency. Urban planning should promote compact settlements and public transport. Employment and education policies should upskill the workforce.

The underlying theory of the moderate approach to urban sustainability is the following (see figure II.2). Cities should expand the tradable sector, improve its productivity and favour urban agglomeration through better public transport in order to generate economic growth. Furthermore, cities should upskill the labour force to make growth inclusive. In this way people can find employment in the new, higher payed, local economy. At last, to make growth green, cities should decarbonise the energy sector and make business, households and transport infrastructures more efficient in terms of energy use.

Figure II.2 - The Strategic adjustment approach



Ultimately these adjustments have the objective of achieving two fundamental changes: to de-couple economic growth from carbon-based energy and matter consumption and to re-couple growth to social cohesion through quality employment.

Policy documents on cities and sustainability tend to present these ideas as uncontroversial. However, they are the result of a specific understanding of sustainability, local development and, more broadly, the economy. In what follows, I will discuss the main theoretical roots of the moderate approach to urban sustainability.

Capitalo-centric understanding of the economy

Compared to other key concepts in the social sciences – like for instance 'society', 'politics' or 'city' – the concept of 'economy' seems solid and well defined. Economics textbooks share similar definitions of economy, typically centred on the notion of market-exchange. However, defining the economy poses a number of challenges, which have kept social scientists busy for over two centuries. According to Jo (2016), the reason is that both nature and scope of that subset of social activities generally called economy are essentially contested.

The capitalo-centric understanding of the economy is a specific view of what the economy is and how it works, which has become hegemonic over the past century (Gibson-Graham, 2006). The roots of this approach are 19th century utilitarianism. Utilitarian influenced authors such as Senior, Menger and Stanely equated the economy to market exchange where disembodied entities – individuals and enterprises – try to maximise gains by optimising the use of scarce resources (Jo, 2016).

Capitalo-centric understanding of the economy separates the economy from society and nature. In this approach, the economy is a separate system with its own laws. Attempts to regulate and stir the economic system towards certain objectives are regarded as altering a supposed natural way of functioning, ultimately leading to sub-optimal outcomes. As a result, in the capitalo-centric view society should limit as much as possible the use of politics to govern the economy.

Capitalo-centric understanding of the economy conceives capitalist markets and private profit-oriented enterprises as the best ways to organise the productive process. Within this view, non-capitalist economic institutions and organisations – like cooperative firms, common pool resources and public production – are regarded as integrative. They are included as second best in order to cope with market-failures in specific sectors such as education, health, transport infrastructures.

Mainstream understanding of local development

A second key theoretical component of the moderate approach to urban sustainability is mainstream local development. Local development is also essentially contested (Pike, Rodriguez-Pose, & Tomaney, 2006; Pike, Rodrìguez-Pose, &

Tomaney, 2011; Rist, 1997). Mainstream understanding of local development proposes a distinctive vision of how localities develop rooted in mainstream economics. The roots of this approach is a body of work developed in the late 1990s and the early 2000 by a group of spatial economists and economic geographers, whose main figures are Florida (2003), Fujita, Krugman, and Venables (1999) and (Glaeser, 2011).

A first core idea of mainstream local development is that localities develop primary by expanding the local tradable sector, with a specific focus on private firms. This export-oriented view of local development is rooted in a vision of the world economy where each region should ideally specialise in a set of exporting sectors and trade with other regions. In this competitive world-economy, the key to prosperity is to specialise in high-value sectors, such as advanced manufacturing and services.

A second core idea is that economic growth is the big policy to combat poverty and create wealthy localities. The argument is based on trickle-down theory, according to which the benefits of economic growth tend to diffuse socially and spatially through supply-chain relations and consumption flows.

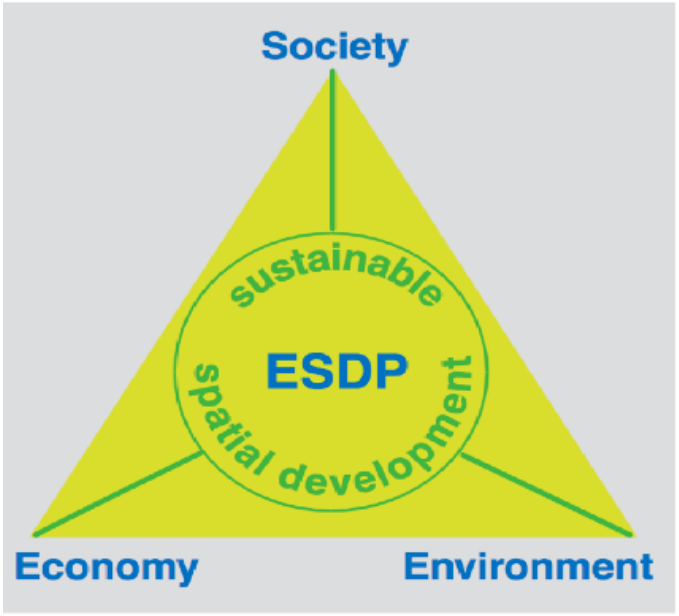
A third core idea is that large urban agglomerations – that is metropolises – are more functional to growth than other human settlements. This argument is based on a mixed bag of observations, which includes the reduction of transport costs for goods, services and human capital, facility to connect among professionals and more stylish explanations about the 'city buzz'. Mainstream understanding of local development hence prioritises urban regions and encourages rural areas to anchor their economies to those of successful cities.

A fourth core idea is that inter-locality competition for firms and grants makes local authorities more efficient. This argument is mutated from mainstream understandings of the market-economy according to which competition makes organisations and individuals more efficient.

Weak understandings of sustainability

The third key component of the moderate approach to urban sustainability is a weak understanding of sustainability. The concept of sustainability has had complex history. It is largely accepted today that a weak and strong version of sustainable development exists (Buriti, 2019; Neumayer, 2013). In the weak version of sustainability, economic development is equated with economic growth, but this goal is weighted against a broader view of development, which a) gives more importance to social, political and cultural aspects of wellbeing and b) considers the issue of ecological sustainability. This approach recognises other dimensions to development beside growth in material wealth and postulates that the goal of economic growth should be pursued considering social wellbeing and environmental sustainability.

Figure II.3 - The triad of sustainable development



The classic visual representation of weak sustainability is the triad economy, environment and society as proposed in the European Spatial Development Perspective (European Commission, 1999, p. 10) (figure II.3). The triad represents economy, environment, and society as separated spheres with potentially different as well as overlapping objectives. Within the weak sustainability framework, the objective of the economic sphere is growth, the objective of the social sphere is wellbeing, while the objective of the environmental sphere is sustainability. Sustainable development is about finding and pursuing development strategies that enable to meet the three objectives simultaneously.

In relation to development, this translates into strategies that go under the labels of 'inclusive growth' and 'green growth' (European Commission, 2012; The World Bank, 2012). The underlying idea is that there is good and bad growth. Bad growth is economic growth that happens at the expenses of the environment and society. Good growth is growth that fosters social progress and takes into account environmental concerns. More operationally, this means growth that creates employment while minimising natural resource consumption and carbon emissions. Two are the fundamental policy ideas of this approach: on the one hand, economic growth needs

to be coupled to social cohesion; on the other, it needs to be de-coupled from resource consumptions and pollutant emissions.

An influential contemporary publication, which embodies weak sustainability thinking, is the so-called Fitoussi Report (Stiglitz, Sen, & Fitoussi 2009). The Fitoussi Report is a major attempt to rethink development that involved a group of leading economists and social scientists. One of the main ideas of the report is to 'shift emphasis from measuring economic production to measuring people's well-being' (Stiglitz et al., 2009, p. 12). The Report starts with a critique of GDP as a partial measure of social wellbeing. Building on this critique, it proposes a wider list of indicators, which should provide a full picture of social progress.

However, the Fitoussi Report does not fundamentally challenge economic growth – measured through GDP – as a goal and indicator of material welfare. Table II.1 shows the indicators the Report identifies for measuring various wellbeing-related themes, ranging from socio-economic development, to social inclusion and sustainable transport. As the table II.1 presented in Stiglitz et al. (2009) shows, the Report proposes the growth rate of GDP per inhabitants as the main indicator of socio-economic development.

Table II-1 - European sustainable development indicators

Theme	Level 1 indicators
1: Socio-economic development	Growth rate of GDP per inhabitant
2: Sustainable consumption and production	Resource productivity
3: Social inclusion	At-risk-of-poverty rate after social transfers
4: Demographic changes	Employment rate of older workers
5: Public health	Healthy life years and life expectancy at birth
6: Sustainable development	Total greenhouse gas emissions
	Consumption of renewables
7: Sustainable transport	Energy consumption of transport
8: Natural resources	Common bird index
	Fish catches outside safe biological limits
9: Global partnership	Official Development Assistance (ODA)

Source: Eurostat, 2007.(http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-77-07-115/EN/KS-77-07-115-EN.PDF)

3. The radical approach to urban sustainability: meeting basic needs for all within planetary boundaries

Persistence and increase in social and spatial inequalities in and among European cities are increasingly questioning the capacity of traditional urban strategies to deliver collective wellbeing throughout space. Furthermore, the magnitude of environmental degradation displays the unsustainability of traditional trajectories of urban growth.

As a reaction to these trends, over the past two decades a range of radical development projects haves increasingly appeared in European cities. Hot spots of this alternative urbanism have been cities like Barcelona, Preston but also Ghent, Berlin and Brussels. The projects have included re-municipalised enterprises, social and solidarity economy projects, local food systems, creation and stewardships of urban commons and community energy schemes. These projects, which are largely work in progress, have emerged in different political milieus and refer to different development approaches.

Nonetheless, they share a number of key ideas, which define what I call the family of the radical approaches to sustainability or – more concisely – the radical approach to urban sustainability. The radical approach to urban sustainability focuses on transitioning European cities to a different urban development model. According to this approach, European cities need to be fundamentally re-organised to achieve sustainability. This stretches well beyond the strategic adjustments of the moderate approach to sustainability. In the radical approach to urban sustainability, production, transport, consumption and leisure patterns have to be transformed to make cities work in future decades.

The key idea of radical approaches to urban sustainability is that to achieve this goal urban capitalism as we know it has to be substantially rethought. The local economy should be rebalanced towards social enterprises in the broadest sense – including municipal enterprises, social businesses and cooperatives. Furthermore, regulations should limit the extractive relation that large corporations have towards places. According to radical approaches, growth should be abandoned as a social and economic goal to achieve environmental sustainability. Instead, urban policy should focus on satisfying basic needs to all in environmentally sustainable ways.

This view on urban development has its roots in heterodox understandings of the relation between cities, economy and sustainability. Arguably, the theoretical pillars of the radical approach to urban sustainability are the following three.

Pluralist understandings of the economy

A first theoretical pillar of the radical approach to urban sustainability is what might be called a pluralist understanding of the economy (Gibson-Graham, 2006). Compared

to the capitalo-centric view of the economy, the pluralist understanding of the economy proposes a different take on what the economy is and how it works.

The classic theoretical reference in the pluralistic understanding of the economy is Karl Polanyi (1977). In his essay *The Two Meanings of Economic* he distinguishes two different conceptions of economy. On the one hand, there is the formal meaning – which is the core of capitalo-centric understanding of the economy. Polanyi (1977, p. 20) notes that the formal meaning 'springs from the logical character of the means-ends relationship' and denotes the process of optimising the use of means for reaching certain goals. This meaning is best associated to the expression 'economising'.

On the other, there is the substantive meaning of economy, which constitutes the core of pluralistic understandings of the economy. The substantive meaning refers to the relation between humans, nature and sustenance. As Polanyi (1977, p. 20) notes, human 'survives by virtue of an institutionalized interaction between himself and his natural surroundings'. That process is the economy, which supplies him with the means of satisfying his material wants'.

Building on Polanyi, Grauchy (1987) defines the economy as social provisioning (1987, p. 21), that is the 'on-going process that provides the flow of goods and services required by society to meet the needs of those who participate in its activities'. As Jo (2016, p. 12) notes, the social provisioning approach 'views the economy as an embedded part of society (…), and which concerns the material basis of the society as an outcome of the open-ended interaction or struggle between human beings and nature (…)'.

The way humans have interacted with the natural environment to sustain themselves has varied and changed greatly across time and space. The classic works of Braudel (1981), Polanyi (1944) and Ostrom (1990) show how human societies have consistently organised their economies through a plurality of institutions according to the tasks to be accomplished or the resources to be managed. All economies are mixed or, using a more contemporary expression, 'diverse' (Gibson-Graham, 2006), that is based on a combination of market production, household self-provision, state production and harvesting of common pool resources.

Pluralistic understandings of the economy recognise and emphasise this diversity. In contrast to capitalo-centric understanding, they do not conceive profit-maximising firms and capitalist markets as the best way to organise the economy. Pluralist understandings of the economy acknowledge self-provision at family or community scale, social markets, public production, commons-based production as effective ways to organise the economy. Furthermore, they acknowledge beyond profit-maximising firms, families, public enterprises, mutuals, cooperatives, community and organisations.

In the pluralistic approach to the economy, no economic system is in itself better than others. Every economic system works better than others in certain contexts and for certain purposes.

An alternative understanding of local development

A second key theoretical element of radical approaches to urban sustainability is an alternative understanding of local development. Alternative approaches to local development have their roots in the classic work of Geddes (1915, 1998), Jacobs (1970), Schumacher (1973) and, more recently, Gibson-Graham (2006). Over the past decade, local development practitioners have contributed to progress the subject. For a selection of key contemporary references see Estela Barnet (2015, 2018), Akuno (2012), CLES (2018), Engelen et al. (2016), Imbroscio (2013), Goff (2017).

A first key element of alternative local development is the emphasis on local assets. The mainstream view also emphasises local assets to promote urban and regional development. Yet it has a preconceived and restricted view of what those assets are. Mainstream approaches to local development prioritise advanced services and manufacturing, research institutions and large-scale transport infrastructures. In contrast, in alternative approaches to local development, every resource that a community values can – with the right strategy – be turned into a development asset.

A second key aspect of alternative understandings of local development is a whole-place approach. Mainstream approaches to development locate the driving force of local development in the tradable sectors, sometimes referred to as the economic base of localities. Alternative approaches to local development recognise the importance of the tradable sectors. Yet they equally see in the re-organisation of non-tradable sectors of the economy potential in generating development. Furthermore, they envision scope for development in import-substitution at the local level in specific sectors – like energy and food, for instance.

A third aspect of alternative understandings of local development is territorial neutrality. As previously shown, in the mainstream approach to local development, metropolitan cities – and, more in general, large urban agglomerations – are regarded as more functional to development than other types of settlements. In contrast, alternative understandings of development do not *a-priori* assign functional primacy to specific types of settlements. Within this approach, all types of settlements can – with the right strategy – develop and improve wellbeing for their inhabitants.

Strong versions of sustainability

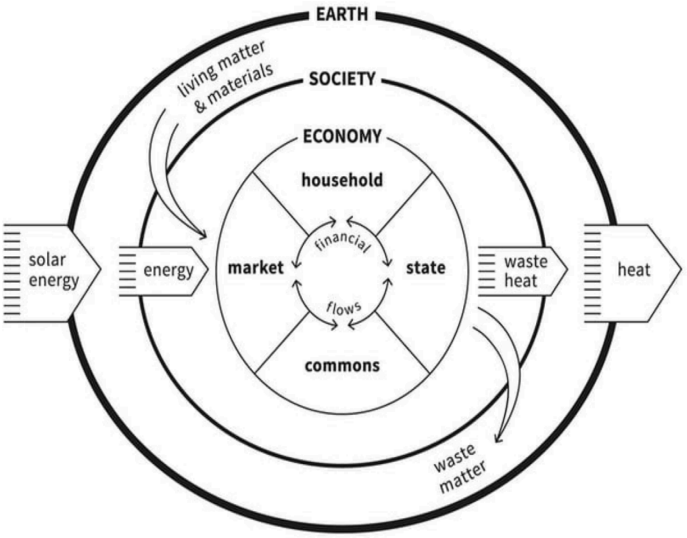
At last, I argue that another crucial theoretical element of the radical approach to urban sustainability is a 'strong' understanding of sustainability (Buriti, 2019; D'Alisa et al., 2015; Neumayer, 2013; Wackernagel & Rees, 1996; Zehner, 2012). In this view, sustainability is defined as 'equity within the means of nature' (Rees, 2012) The strong sustainability framework refuses the idea that economic growth can be de-coupled from material throughput and energy consumption. Within this approach, development is no more associated with growth in the production output, but in the capacity of the production output to fulfil the material needs and wants of all members

of a given society within environmental limits. The objective of economic development is hence not 'growing consumption' but 'improving consumption' (Zehner, 2012).

In strong sustainability approach the economy is not a 'sphere' with its own economic objectives, which needs mediation with other spheres, notably environment and society. In the strong sustainability approach, the aim of the economy is by definition social in the sense of providing material welfare for all members of society. Furthermore, the context of the economy is by definition the carrying capacity of the environment. Recently Kate Raworth (2017) elaborated a now classic graphic representation of this conceptual frame based on three circles. It is known as the 'doughnut' because of its shape (see Figure II.4). The triad economy-society-environment of weak sustainability depicts the economy as a separate entity suggesting this sphere has objectives on its own. In contrast, the doughnut shows the economy embedded in society, and society embedded in the natural word.

In the strong approach to sustainability, classic measures of material wellbeing like GDP growth are not rounded up with others measures of social/cultural/material wellbeing or natural resource use to produce a complete measure of wellbeing and development. In this approach, the concept of material welfare itself and its function are rethought as equal access to welfare-critical services. As a consequence, within this perspective GDP growth is strongly rejected as a measure of economic development.

Figure II.4 - The earth, society and economy relation



III. RESEARCH QUESTIONS, STRATEGY AND METHODOLOGY

In chapter I I discussed how the ecological crisis urges to rethink urban development in Europe. In chapter 2 I discussed the major approaches to sustainable urban development that have emerged in Europe. One of these approaches is what I called the moderate approach to urban sustainability. This is the current mainstream approach. Major national, regional and international organisations such as the European Union, the OECD and the World Bank have developed this approach. This approach proposes to optimise economic growth at urban level to generate wider social wellbeing and make it compatible with sustainable resource use.

The emergent alternative to this approach is what I called the radical approach to urban sustainability. This approach is inspiring development projects across Europe, in different cultural and political milieus. The radical approach to urban sustainability abandons economic growth and reconstructs urban policy around the sustainable provision of welfare-critical goods and services to all.

Different research questions can be derived from the theoretical discussion conducted in chapter 1 and chapter 2. They depend from the problem, aim and ethos of the research. This chapter deals with these issues with the aim of clarifying and justifying why the empirical part of the research is the way it is. In section 1, I will discuss the empirical research problem, considering the ethos of the research and its broad aim. In section 2, the focus will be on the research questions and the strategy adopted to answer them. At last, in section 3, I will explain the methodologies I use and discuss the key empirical indicators employed.

1. Research problem and aim

Over the past decades, cities across Europe have increased their powers in the field of local development as part of a broader process of state-rescaling (Bagnasco & Le Galès, 2000; Brenner, 2004). As a consequence, urban authorities have become strategic actors of sustainable development. In this scenario, understanding what cities can do becomes a key area of research.

There is a substantial literature (Baabou, Grunewald, Ouellet-Plamondon, Gressot, & Galli, 2017; European Commission, 2007; Kazepov, 2005; Ranci et al., 2014) on what is wrong with the current model of urban development in Europe. This literature

has largely documented a) the persistence and increase of social inequalities in European cities, b) the persistence of spatial inequalities among cities and among regions and c) the unsustainable levels of natural resources that are associated to European urbanization. In contrast, there is much less research on how to do urban development differently.

Only recently, a body of literature (Akuno, 2012; CLES, 2018; Earle et al., 2017; Engelen et al., 2016; Engelen et al., 2014; Estela Barnet, 2015, 2018; Froud et al., 2018) is emerging on new approaches to urban development, which put collective wellbeing and environmental sustainability first. Practitioners have developed this literature largely outside the academia – though in some cases they have academic backgrounds. Exceptions exist, including the Foundational Economy Collective, which is mainly composed by academics and yet has exerted substantial influence on practitioners. The Foundational Economy Collective has been my main partner in this research. I shall return on this point later in this chapter.

Situating in this research stream, my research aims to contribute to the body of applied work on how to transition European cities to sustainability. The ethos of this research is action-research (Eikeland, 2012; Reason & Bradbury, 2008; Welsh Assembly Government, 2008) in the broad sense; that is, research whose aim is to inform action – be it a public policy or a community project – by producing transformative knowledge.

The empirical research problem addressed here is which one of the two approaches to urban sustainability – that is the moderate approach and the radical approach – is best equipped to support the design of sustainable urban strategies in Europe.

This is an empirical question. Theoretically, both approaches could work. Beyond political belief, there is no theoretical reason for favouring moderate over radical approaches. Choosing moderate over radical approaches to urban sustainability is a matter of empirics. It pertains understanding issues like how deep the ecological and social challenges of cities are, or to what extent green growth is possible.

In what follows, I will discuss the strategy used to operationalize this research problem.

2. Research questions and strategy

Exploring the capacity of moderate and radical approaches to urban sustainability to generate good urban strategies in the European context poses a number of challenges. The first is identifying operational research questions. This research problem cannot be summarized in one main empirical question, from which a set of sub-questions are derived, which can then be operationalized and analysed through the same methodology.

Instead, I will identify a set of key themes around which I will produce empirical data. These data will be then used to discuss the research problem through empirically based arguments. These themes will be explored through different strategies and different methodologies.

The first theme I will investigate is how deep are the social and environmental challenges that European cities are facing and will realistically face over the next decades. Understanding the current situation is a crucial piece of information in this discussion. The scale of the social and environmental challenges is the point of reference from which to judge how radical the approach to the solutions needs to be.

The second theme that I will explore is what kind of urban strategies can be designed within a moderate approach to urban sustainability. This is crucial to understand what can be realistically achieved – and what cannot be achieved – within this approach. The third issue is outlining the kind of urban strategies that can be designed within the radical approach to urban sustainability. Again, it is important to have an idea of what is possible and what is hard to achieve within this approach. On the basis of the results of the analysis of these three themes, I will then discuss the applicability of moderate and radical approaches to urban sustainability in European cities.

I chose the following research strategy to explore the three themes:

1. Focus on a specific European country

I could have done this research with a European-wide focus. I decided not to do that for a number of pragmatic reasons. When I started the research, I did not know all the data I would have needed. Today, there are a number of established databases, including those of Eurostat and OECD, which enable empirical research on socio-environmental trends. However, when I started the research, I did not know whether these databases would have contained the necessary information. This opened up the research scenario of combining the databases of single countries, which is very time-consuming. I hence decided to focus on one country yet maintaining reference on the European context.

The reason to focus on the UK is also related to pragmatism. My University lacked the expertise to conduct the kind of research in applied local development I wanted to do. Working with no guidance on this complex subject could have led to poor results. Consequently, when I did the research design, I planned time to identify and get in contact with organizations working on local development from an applied perspective. I shortlisted a few options and the best working opportunities came from two UK-based organizations. The first one is the Foundational Economy Collective, whose founding members were based at Manchester University. The second one is the Centre for Local Economic Strategies, a progressive consultancy also based in Manchester. Both groups worked primary in the UK, so I decided to focus my research on the UK.

2. Analyse trends in wellbeing and environmental impact of that country and identify sustainability challenges

This research is about choosing the right conceptual frame to solve a complex problem. The problem is urban sustainability in Europe and the conceptual frames are the moderate and the radical approaches to urban sustainability. Choosing in a non-ideological way requires understanding which frame works best in relation to the specific problem to be solved. For this reason, understanding empirically the problem is crucial. The second step of my research strategy is hence putting numbers on the sustainability challenges that European cities will have to face over the next decade. I wanted to know how deep the sustainability challenges are now and how steep trends are. I analysed trends in social wellbeing and environmental impact in the UK context. To contextualize these trends – and retain the European-wide reference – I also looked at trends in other European countries.

3. Choose a case of a city where the moderate approach to urban sustainability has been applied and analyse the resulting urban strategy

The third step of the research is understanding the strategies to which the moderate approach to urban sustainability leads. To do this, I will choose an urban region where the moderate approach has been applied. I will then analyse the territorial context and reconstruct the sustainability challenges of that context. At last, I will reconstruct the urban strategy that resulted from the application of the moderate approach to urban sustainability.

I chose the Swansea Bay City Region as a case study for a number of reasons. The first is that it can be conceptualized as an 'ordinary' urban region. As argued by Robinson (2006), urban research disproportionally concentrates on global capitals and metropolitan cities, focusing on exceptional places in terms of success and failure. In contrast, there is a knowledge gap in relation to ordinary cities and ordinary places, which constitute a substantial part of the urban ecology worldwide. In the European context, filling the gap of ordinary cities implies focusing on urban areas between 100,000 and 1,000,000 inhabitants with average income or below average income. These cities constitute the bulk of the European urban system, once national and big regional capitals are left out (Bagnasco & Le Galès, 2000). Swansea is a secondary regional centre of a lagging-behind region with an urban area of 300,000 inhabitants. Therefore, it fits the definition of ordinary urban area in the context of Europe.

The second reason that makes the Swansea Bay City Region a good case study is that it has recently undergone strategic planning within the coordinates of the moderate approach to urban sustainability. The process started in the mid 2000s and enabled the City Region to get major government funding in 2017 for implementing

the resulting urban strategy. This makes this territory a place where a researcher can study a reasonably good application of the moderate approach to urban sustainability.

In the UK there are other ordinary urban areas where the moderate approach to urban sustainability has been applied. However, the choice of Swansea over other suitable cases was mainly due to field-access reasons. The analysis of strategic planning is time-consuming. It is easy for a junior researcher like me to get lost. Having the right network to access relevant materials and data can make the difference. At the time of selecting the case study, I had chosen the Foundational Economy Collective as my main partner in the research. The Collective had already worked on the urban strategy of the Swansea Bay City Region and was about to do more work. It was hence a unique opportunity to have a privileged field-access to the Swansea context.

4. Apply the radical approach to urban sustainability to a case and illustrate the results

The fourth step of the research consists of understanding the urban strategies to which the radical approach leads. Instead of analysing an urban strategy based on the radical approach, I will apply the radical approach to a policy problem. I will design an urban strategy following this approach and discuss the results of the application.

There are several reasons that justify this decision. The first one is time constrains. In Europe there are examples of cities that have applied different versions of the radical approach, most notably Preston and Barcelona. Over the course of the PhD, I had built relations with the organizations involved in the design of urban strategies of both cities. These organizations are CLES for Preston and the PEMB – the Office for Strategic Planning of the Barcelona Metropolitan Area – for Barcelona. Starting a new field in a new city is time consuming. I could have risked not finishing in time.

At the same time, the Foundational Economy Collective was starting action-research in Swansea. They were interested in developing and applying a new approach to sustainable urban development. Getting involved in this research was attractive. It would have given me a privileged observation point. Furthermore, I would have saved valuable time.

5. Critically examine the empirical results and discuss the research problem

The fifth step of the research is discussing the research problem in the face of the empirical results. At this point of the research, I will have an overview of how deep sustainability challenges of the UK and, in part, of Europe are. I will have then an empirically-based idea of what kind of strategies can be done within the moderate approach to urban sustainability. Furthermore, I will also have an empirically-based idea of the kind of strategies which can be done within the radical approach to sustainability. I will hence proceed to discuss which of the two approaches is best

equipped to transition European cities to sustainability in the British and, more broadly, European context.

3. Research methodologies

In terms of methodology, this research is strongly based on mixed-methods. It uses traditional methods of social inquiry including qualitative interviews, ethnographic observations, quantitative tables, time-series, surveys, document analyses, regression analyses and spatial analyses. Furthermore, it uses more innovative methods, including system-modelling (Fischer, 2007; Meadows, 2009) and social-system design (Nelson & Stolterman, 2012).

The mix of research methods partially changes according to the three main research questions, which are addressed in the three empirical chapters. The first of my research question is assessing how deep are the sustainably challenges that British cities will face over the next decades. To answer this question, I will use quantitative tables to highlight the current state of the challenges. Furthermore, I will use time-series to highlights trends. I will also employ some basic system-modelling to explore future scenarios.

The second of my research questions regards exploring the potential of the moderate approach to urban sustainability to address the sustainability challenges in the British context. As explained in the previous section, I will analyse the Swansea Bay City Region. In this City Region the moderate approach was applied and translated into an urban strategy. To assess the moderate approach to urban, I will employ spatial-analysis, quantitative tables and time-series. I will then use document analysis to look into the urban strategy of the City Region.

The third research question regards exploring the potential of the radical approach to urban sustainability to address the sustainability challenges of the next decades. As explained above, I will adopt a different strategy than the one adopted to explore the potential of the moderate approach. I will apply the radical approach to urban sustainability to an urban policy problem in Swansea and formulate an urban strategy. In the process, I will use quantitative tables, time-series and spatial analysis to explore the economic, social and spatial structure of the area of study. Furthermore, I will use a survey, ethnographic observations and in-depth interviews to explore the policy problem. At last, I will use social system design to formulate the urban strategy.

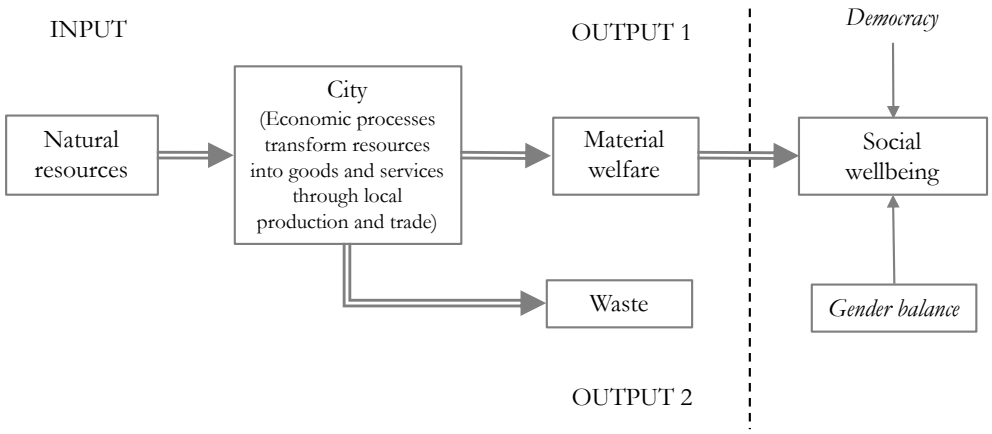
The same underlying model of urban sustainability runs beneath the empirical section. This model links social wellbeing, economic provision and environmental impact. Conceptually, the model combines the urban/social metabolism approach (Şorman, 2015; Wolman, 1965) with the social wellbeing approach (Martha C. Nussbaum, 2011; Martha C. Nussbaum & Sen, 1993).

Building on the discussion in chapter I, the basic idea is that cities are similar to organisms, which assimilate resources to sustain themselves and, in the process, produce waste. Cities require raw materials, goods and services to sustain the life of their citizens. Some of those raw materials, goods and services are imported from other places through trade. Others are produced locally by transforming natural resources and raw materials. The material welfare of the population and, consequently, its social wellbeing depend on the quantity and quality of the goods and services available for consumption. In the process of production and consumption cities generate wastes, which are emitted back into the natural systems.

This approach is materialistic. It focuses on the material basis of social wellbeing. Wellbeing in a city depends on other factors beyond material welfare, including gender balance, level of democracy and so on. The corollary is that no linear relationship exists between the material welfare a community and social wellbeing.

Other variables beyond material welfare are not considered in this work. A comprehensive analysis of all the drivers of wellbeing would have not be manageable. I do not want to suggest that these aspects are less important. They are just as crucial as material welfare. The decision to focus on material welfare is related to the persistence of significant material inequalities across Europe. Furthermore, it is related to the link between material production and environmental degradation.

Figure III.1 - The city as socio-environmental process



In this perspective, social sustainability is reached when the city is able to provide all its citizens with the goods and services they require to flourish. Environmental sustainability is reached when the provision systems, which supply the city with the

goods and services it requires, do not generate imbalances in the natural systems – this includes emissions of polluting wastes. figure III.1 depicts graphically the model.

The main macro variables on which the empirical analysis is based are the following:

- The urban development model. It refers to the way a city organizes its spatial structures and political economy to provision itself with the goods and services it requires. Urban strategies try to change the development model so to achieve better outcomes.
- Environmental impact. It refers to the way a city impacts on the natural systems by withdrawing natural resources and releasing wastes as a consequence of the chosen development model.
- Material welfare. It refers to the quantity and quality of the goods and services that a locality provides to its inhabitants through its development model.

When suitable I will consider spatial variations in the analysis of the three variables. The unit of analysis of spatial variations will change according to the scale of reference. At the national scale, I will investigate spatial differences using regions as a subunit. At the (city) regional scale, I will look at counties. At the urban scale, I will look at neighbourhoods and smaller spatial units.

Let us now turn the empirical indicators I will use to analyse these three macro-variables.

Environmental impact

The environmental impact of human activity manifests mainly in two ways. On the one hand, it manifests in the withdrawal from the natural system of resources and materials, like productive land or metal ores. On the other hand, in the release of polluting wastes, like greenhouse gasses.

Compared to other aspects of the economy, human impact on natural system has entered the mainstream only recently. In this field measures are less developed and databases less accessible.

To empirically explore environmental impact, I will mainly employ four indicators:

- CO2 emissions
- Greenhouse gasses emissions
- Resource productivity
- Circular material use rate
- Ecological footprint

CO2 emissions are important for their relation to global warming. They are usually expressed in tonnes per capita and quantify a major way in which humans release

pollutants into the natural system. At current, a consumption of 2 tonnes per capita is considered a sustainability threshold in relation to CO2 emissions (Gough, 2017). Nonetheless, CO2 emissions have major limits as an indicator of waste emission. They do not consider other greenhouse gasses such as nitrous oxide and methane, which contribute to global warming. Furthermore, it does not tell anything about other major source of environmental impact, including depletion of fixed resources such oil, coal or metals and loss of natural ecosystems and species.

When available, I will use another indicator of waste emissions, the 'greenhouse gasses emissions'. This indicator includes all gasses, which generate global warming, including CO2. The standard unit of measure are 'tonnes of CO2 equivalent'.

The fourth indicator I will use in the analysis of environmental impact, is the 'resource productivity'. Resource productivity measures the amount (in terms of kilograms) of material input required for one euro of GDP. It hence shows how much of the financial output of an economy is dependent from material throughput.

A fifth indicator of environmental impact is the 'circular material use rate'. The circular material use rate measures the percentage of the input of an economy coming from recycled materials. It hence shows how much an economy is dependent from the extraction of new resources.

I will use the 'ecological footprint' as a last indicator of environmental impact (Wackernagel, Kitzes, Moran, Goldfinger, & Thomas, 2006; Wackernagel & Rees, 1996). The ecological footprint focuses on land consumption. It counts the amount of biologically productive land and see required to provision a given human settlement with the goods and services it consumes and to assimilate its waste. The ecological footprint focuses on forests – both for CO2 absorption and extraction of timber – grazing land, built-up land, and cropland. While datasets are available at national level, there are no open datasets of ecological footprint at regional and city level. The unit of measure of the ecological footprint is the global hectare (gh), which is an hectare of land with average world productivity. The per capita sustainability threshold diminishes every year as population increases and unsustainable production practices depletes natural resources. A 2006 study by the Ecological Footprint Network (Wackernagel et al., 2006) sets the threshold at 1.8 global hectares per capita. A more recent study by researchers of the same network sets the threshold to 1.7 global hectares per capita (Lin et al., 2018).

The ecological footprint of a given place can be calculated for production and consumption. The ecological footprint of production estimates the environmental impact of a given region generated by households and business in the same region. The ecological footprint of consumption takes into account the ecological impact of imported goods and services produced in other places yet consumed in the spatial unit of reference. At the same, it detracts the environmental impact associated to the exported goods and services.

At the global scale, the ecological footprint of production and that of consumption are the same. At country at regional scale, there can be significant variations between the footprint of consumption and the footprint of production at the regional and national scale. This is due to differences in consumption levels and economic specialisation across regions and countries.

Despite being a rather comprehensive indicator, the ecological footprint still underestimates the extent and ways in which human settlements impact on the natural environment. According to Giampietro and Saltelli (2014), the most important shortcomings relate to the inadequate treatment of the ecological footprint framework of water flows, soil health, non-renewable resources such as metal ores, bio-diversity loss and accumulation of pollutants in different elements including seas and air.

Material welfare

Depending on the situation, I will use mainly three indicators to analyse material welfare. These indicators are:

- Gross domestic product (GDP)
- The relative poverty rate
- Foundational liveability

In the first two empirical chapters, I will rely on a combined and critical use of the GDP per capita and the relative poverty rate. The GDP per capita tells if the per capita output of a place has grown, stagnated or declined. GDP per capita and average income are strongly related.[5] GDP per capita hence provides a raw measure of the average capacity of people in that place to buy goods and services. As a result, GDP tells something about the potential material welfare of people in a given area.

However, GDP must be used in a critical and cautionary way. Today this measure is as much used as contested (Fioramonti, 2013; Latouche, 2009; Stiglitz et al., 2009). A first critical issue regards the distributional blindness of GDP. An increase in GDP tells that a place has become richer in terms of the market value of its production. However, it does not tell anything about the distribution of income and wealth. Average increase in income does not tell if the overall wealth has diffused across the

[5] When it is possible, I will use income per capita. Conceptually, GDP measures the monetary-value of the production output of a territorial unit – a region, a city or a country. Income per capita captures the average income available in that unit. The two measures are closely related, but there might be some differences between them as a consequence of commuting flows. This applies to small settlements and to settlements close to country and regional borders. Differences are minimal at the level of large cities or bigger territorial units. In macro analysis – like the one I am conducting – these small differences are not relevant. As a result, in development analysis GDP per capita and income per capita are largely used interchangeably.

local society or has concentrated in pockets of wealth. As a result, GDP struggles to capture advancement in material welfare of all members of a given community.

Furthermore, GDP does not tell whether a place has improved or just grown its consumption. GDP captures quantitative advancement in the value of production and consumption. Yet it struggles with advancement in quality, which may not be represented in higher market value of goods and services. For instance, an increase in GDP does not tell whether a place has improved access to welfare critical goods – quality health care, healthy food, broad band connection – or solely the quantity and quality of disposable consumer goods such as cheap clothing or furniture designed for planned obsolescence.

GDP does not tell also anything about the provision models of goods and services. A place could have increased its GDP over a given time. Yet, over the same time, it could also have changed the provision systems of services such as health care and education from public to private. As a result, health care and education might have become more expensive. In this context, for those on low-income, an increase in GDP may not have translated in any advance in material welfare.

To partially overcome these limitations, in the first two empirical chapters I will use the GDP in conjunction with the relative poverty rate. Poverty is a complex concept with different dimensions, ranging from the availability of material goods to being part of social networks, being endowed with cultural capital and the possibility of political influence (Pantazis et al., 2006; The World Bank, 2009). Here I will focus on material poverty, which is typically conceptualized as living below a certain level of income or wealth. In high-income societies, the poverty threshold is not absolute, but relative to average income. Poverty rate can be calculated both at individual and household level. When possible, I will use the poverty rate at household level. This because in Western Europe the household is the basic unit of social organization at which income consolidates and is redistributed (Froud et al., 2018; Stiglitz et al., 2009).

In the last empirical chapter, the possibility to work on an urban policy problem at neighbourhood scale has allowed me to fully replace GDP. Instead I used a more accurate measure of material welfare called 'foundational liveability0 (Engelen et al., 2016). This measure redefines material welfare as access to welfare-critical goods and services. I measured material welfare at community level through a survey, which focuses on housing, transport, education, health care and food (see Appendix 1).

Urban development model

Empirically analysing the development model of a given place – be it a city or a region – poses a number of challenges. An integrated analysis would include at least the following:

- Energy, land types and natural resources

- Industry structure
- Trade relations
- Supply chain analysis
- Local welfare system
- Spatial and transport patterns
- Recycling and waste emissions

Acquiring data on all these aspects would have required a separate PhD. I hence focused on three accessible yet informative indicators:

- Industry and employment structure
- Mobility patterns
- Urbanization levels

Industry and employment structure is a widely employed indicator to understand the development model cities and regions. It is a revealing piece of information if used critically and pragmatically. It can tell a lot about key aspects of the development model of places, including:

- Trade relations and dependencies of the regions (no employment in agriculture suggest the area is dependent for food from other areas).
- The presence of stabilisers (big public employers suggest areas of stable well-payed employment).
- The kind of environmental impact the regions might have (e.g. presence of heavy industry suggests high environmental impact).
- Future economic resilience (e.g. high employment in retail suggest employment decline in the context of Europe)

In the analysis of the employment and industry structure, I will adopt a new classification elaborated by the Foundational Economy Collective (Froud et al., 2018). I will discuss the classification in detail below. But before a few words on the other two indicators I have considered to provide a fuller picture of the development model of places. The firs are urbanization levels. Urbanization levels tell if a community is fully urbanised or has potential access to rural and natural land. This is a key piece of information from a sustainable development perspective. Non-urbanized land is crucial for sustainable development as it enables re-localisation of food systems and re-forestation.

The third indicator I consider in the analysis of the development model of cities are transport patterns. Transport patterns help understanding how different areas in a region are economically and socially connected. They give an idea of how wealth flows as consequence of consumption patterns. As a result, they help to assess how

development might spread spatially across an area. For reasons related to data availability, I mainly used travel-to-work data to reconstruct transport patterns. However, in Chapter 6, working on a small scale and use a survey made it possible to investigate also transport patterns for consumption and social activities.

As anticipated, I will use a new frame elaborated by the Foundational Economy Collective to analyse employment and industry structure. This frame has the advantage of looking at the local economy from a system of provision perspective (Fine, 2002) and not from the standard sectorial perspective. Furthermore, it unpacks the category of consumption, highlighting the varying importance that different goods and services have in relation to welfare. This classification needs some discussion, because it is new and might confuse those who are not accustomed to it.

Conceptually, the classification distinguishes between different zones of the economy instead of looking at the economy as a unified entity. There has been changes over the years (Bentham et al., 2013; Earle et al., 2017). Relating critically to the latest formulation (Froud et al., 2018) of the classification, I propose to distinguish in the economic field the following categories:

- The core economy of the family, which includes the goods and services produced by the household outside the market. The core economy is widely beyond the radar of traditional accounting, with its monetary bias, although some core economy activities can emerge through the SIC codes '97: Activities of households as employers of domestic personnel' and '98: Undifferentiated goods- and services-producing activities of private households for own use'.
- The foundational economy, which focuses on the production and distribution of goods and services ready for consumption which are critical for sustenance, like housing, food, education, security, energy; here the discussion (Earle et al., 2017; Froud et al., 2018) has distinguished between the material foundational and the providential foundational. The material foundational includes the production and management of those material infrastructures with a strong physical dimension including energy systems, road systems, and water systems. The providential foundational focuses instead on those key services associated with the welfare state, hence education systems, health care systems, domestic and foreign security etc.
- The mundane economy, which includes the production and distribution of goods and services that are not critical for sustenance, yet important for wellbeing and have become over the years cultural necessities. This goods and services include furniture, clothing, haircuts, consumer electronics, socialisation, sport etc.

- The aspirational economy, which includes more glamorous goods and services which represents cultural choices such as jewelleries, watches, luxury cars etc.

The 2018 classification distinguishes the tradable economy as a separate zone. The tradable economy includes those services and manufactured activities that in nationally organized economies tend to be local tradables. Although useful in earlier formulations, I contend that the tradable economy as a separate entity is necessary in this latest formulation, which distinguishes between the mundane, the aspirational, the foundational and the core economy. From a system of provision perspective, both in the foundational and in the mundane economy there might be parts of the economic processes, which happen to be tradable. Consider the food system, the quintessential foundational provision system. Food distribution is non-tradable as supermarkets are spread across a country. However, food production – both in terms of agricultural activities and in terms of food processing – typically concentrate in certain regions or towns becoming a local tradable.

Once the whole provision system is considered, the core economy, the foundational economy, the mundane economy and the aspirational economy exhaust the field of the economic. The exact boundaries within these zones are relative. They can change in relation to time, development level, culture and political view. Nonetheless, the classification is a powerful analytical tool to interpret modern European economies from a new perspective.

Operationalizing empirically the zonal frame is a challenge, as industry and employment data are classified in national accounts based on sectors. Table III.1 1 shows the difficulties of fitting a system of provision perspective into sector-based accounting. In Table III.1 goods and services are distinguished in foundational, mundane and aspirational. Columns indicate different stages of the economic process, from extraction of raw materials, to production to disposal.

Table III-1 - Systems of provision of different types of goods and services

		Extraction/generation of raw materials	Production (Finished goods/services	Distribution/Consumption (Wholesail and retail	Disposal
Foundational (livelihood necessities)	**Goods**	36 : Water collection, treatment and supply 01 : Crop and animal production, hunting and related service activities	37 : Water collection, treatment and supply 10 : Manufacture of food products 35 : Electricity, gas, steam and air conditioning supply	38 : Water collection, treatment and supply 472 : Retail sale of food, beverages and tobacco in specialised stores 35 : Electricity, gas, steam and air conditioning supply	38 : Waste collection, treatment and disposal activities; materials recovery
	Services		84 : Public administration and defence; compulsory social security 21 : Manufacture of basic pharmaceutical products and pharmaceutical preparations 86 : Human health activities	84 : Public administration and defence; compulsory social security 86 : Human health activities	
Mundane (cultural necessities)	**Goods**	02 : Forestry and logging	31 : Manufacture of furniture	4759: Retail sale of furniture, lighting equipment and other household articles in specialised stores	38 : Waste collection, treatment and disposal activities; materials recovery
	Services		93 : Sports activities and amusement and recreation activities	93 : Sports activities and amusement and recreation activities	
Aspirational *(cultural choices)*	**Goods**	07 : Mining of metal ores	29 : Manufacture of motor vehicles, trailers and semi-trailers	45 : Wholesale and retail trade and repair of motor vehicles and motorcycles	38 : Waste collection, treatment and disposal activities; materials recovery

As the table shows, some sectors are split across the provision process. An example is car production. The employment related to this provision system is arguably listed in '07: mining of metal ores', '29: manufacture of motor vehicles, trailer and semi-trailers' and '45: wholesale and retail trade and repair of motor vehicles and motorcycles. Other examples of provision processes that are split across NACE codes include furniture provision and food provision. In contrast, there are some goods and services whose provision processes are classified in only one category. For instance, this is the case of water supply. Employment in water supply is included in one NACE category, namely '37: water collection, treatment and supply'.

To use the zonal framework with sector data, I worked at 2-digit level in order to keep the number of employment categories manageable. I considered the following elements to build a consistent classification:

- Distinction between primary, secondary and tertiary sector.
- Complexity of the process: some services and some goods imply a more elaborated production; hence the distinction between 'high-end' and 'mundane' in service and manufacturing.
- Role for wellbeing, hence the foundational as a separate category. I applied the foundational only to services for reasons related to the way data are classified.

As a result, I will use the following industry and employment classification (see also table III.2):

- Primary sector: one category classified as 'extraction and generation of raw materials'.
- Secondary sector: split in two sections, and namely a) 'mundane manufacturing and construction' and b) 'high-end manufacturing and construction'.
- Tertiary sector: split in three sections, and namely a) 'mundane services' (haircuts, retail etc.), b) 'foundational services' (education, housing, food distribution) and c) 'high-end services' (advanced professional services to enterprises and people).

Table III-2 - Industry and employment classification

Extraction and raw material production	1	Extraction and raw material production
Manufacturing and costruction	1	Mundane manufacturing and costruction
	2	High-end manufacturing and construction
Services	1	High-end services
	2	Foundational services
	3	Mundane services

Table III-3 - Zonal framework SIC breakdown

Label	SIC	Sector
Extraction and raw material production	01 : Crop and animal production, hunting and related service activities	Primary
	02 : Forestry and logging	Primary
	03 : Fishing and aquaculture	Primary
	05 : Mining of coal and lignite	Primary
	06 : Extraction of crude petroleum and natural gas	Primary
	07 : Mining of metal ores	Primary
	08 : Other mining and quarrying	Primary
	09 : Mining support service activities	Primary
Mundane manufacturing and constructio	10 : Manufacture of food products	Secondary
	11 : Manufacture of beverages	Secondary
	12 : Manufacture of tobacco products	Secondary
	13 : Manufacture of textiles	Secondary
	14 : Manufacture of wearing apparel	Secondary
	15 : Manufacture of leather and related products	Secondary
	16 : Manufacture of wood and of products of wood and cork, except furniture;manufacture of articles of straw and plaiting materials	Secondary
	17 : Manufacture of paper and paper products	Secondary
	18 : Printing and reproduction of recorded media	Secondary
	19 : Manufacture of coke and refined petroleum products	Secondary
	20 : Manufacture of chemicals and chemical products	Secondary
	23 : Manufacture of other non-metallic mineral products	Secondary
	24 : Manufacture of basic metals	Secondary
	25 : Manufacture of fabricated metal products, except machinery and	Secondary
	31 : Manufacture of furniture	Secondary
	32 : Other manufacturing	Secondary
	41 : Construction of buildings	Secondary
	42 : Civil engineering	Secondary
High-end manufacturing and constructio	21 : Manufacture of basic pharmaceutical products and pharmaceutical	Secondary
	26 : Manufacture of computer, electronic and optical products	Secondary
	27 : Manufacture of electrical equipment	Secondary
	28 : Manufacture of machinery and equipment n.e.c.	Secondary
	29 : Manufacture of motor vehicles, trailers and semi-trailers	Secondary
	30 : Manufacture of other transport equipment	Secondary
	43 : Specialised construction activities	Secondary
High-end services	58 : Publishing activities	Tertiary
	59 : Motion picture, video and television programme production, sound recording and music publishing activities	Tertiary
	60 : Programming and broadcasting activities	Tertiary
	62 : Computer programming, consultancy and related activities	Tertiary
	63 : Information service activities	Tertiary
	64 : Financial service activities, except insurance and pension funding	Tertiary
	65 : Insurance, reinsurance and pension funding, except compulsory social	Tertiary
	66 : Activities auxiliary to financial services and insurance activities	Tertiary
	68 : Real estate activities	Tertiary
	69 : Legal and accounting activities	Tertiary
	70 : Activities of head offices; management consultancy activities	Tertiary
	71 : Architectural and engineering activities; technical testing and analysis	Tertiary
	72 : Scientific research and development	Tertiary
	73 : Advertising and market research	Tertiary
	74 : Other professional, scientific and technical activities	Tertiary
	82 : Office administrative, office support and other business support activities	Tertiary
	90 : Creative, arts and entertainment activities	Tertiary
	91 : Libraries, archives, museums and other cultural activities	Tertiary

Table III-4 - Zonal framework SIC breakdown (Continued from the previous page)

Label	SIC	Sector
Foundational services	49 : Land transport and transport via pipelines	Tertiary
	50 : Water transport	Tertiary
	51 : Air transport	Tertiary
	52 : Warehousing and support activities for transportation	Tertiary
	56 : Food and beverage service activities	Tertiary
	61 : Telecommunications	Tertiary
	78 : Employment activities	Tertiary
	84 : Public administration and defence; compulsory social security	Tertiary
	85 : Education	Tertiary
	86 : Human health activities	Tertiary
	87 : Residential care activities	Tertiary
	88 : Social work activities without accommodation	Tertiary
Mundane services	45 : Wholesale and retail trade and repair of motor vehicles and motorcycles	Tertiary
	46 : Wholesale trade, except of motor vehicles and motorcycles	Tertiary
	47 : Retail trade, except of motor vehicles and motorcycles	Tertiary
	75 : Veterinary activities	Tertiary
	77 : Rental and leasing activities	Tertiary
	79 : Travel agency, tour operator and other reservation service and related activities	Tertiary
	80 : Security and investigation activities	Tertiary
	81 : Services to buildings and landscape activities	Tertiary
	92 : Gambling and betting activities	Tertiary
	93 : Sports activities and amusement and recreation activities	Tertiary
	95 : Repair of computers and personal and household goods	Tertiary
	96 : Other personal service activities	Tertiary
	55 : Accommodation	Tertiary
Other	94 : Activities of membership organisations	Tertiary
	97 : Activities of households as employers of domestic personnel	Core economy
	98 : Undifferentiated goods- and services-producing activities of private households for own use	Core economy
	99 : Activities of extraterritorial organisations and bodies	Tertiary

IV. THE SUSTAINABILITY CHALLENGES OF BRITISH CITIES IN EUROPEAN PERSPECTIVE

In this chapter I examine the social, economic and environmental challenges of British cities. I will include references to other major European countries, including Germany, Spain, Italy, France and Sweden. As discussed in chapter 1, these challenges pertain improving wellbeing for all while reducing environmental impact. Putting numbers on these challenges is crucial to understand their scale and nature.

To provide a context, I will start (section 1) with an overview of the British urban system in terms of size classes and economic prosperity. Following the methodological approach discussed in chapter 3, I will than focus on two main issues. The first – addressed in section 2 - is material welfare in the UK: I will assess insofar material welfare in the UK has grown and for whom over the past two decades.

The second main issue – addressed in section 3 – is the environmental impact of the British economy and society. Economies use matter and energy to generate material welfare, and I will empirically explore the consumption of natural resources and the emission of pollutants of the British society, raising the question of how far current consumption patterns are from sustainability levels.

In the last section of this chapter, I will summarise and discuss the empirical findings, focusing in particular on the consequences that trends in material welfare and environmental impact have for urban strategy in the UK.

When not otherwise stated, all tables and figures in this chapter and in the next empirical chapters are the results of my research.

1. Overview of the British urban system

I will employ population data from two main sources to analyse size and structure of the British urban system. The first is the NOMIS database, which provides population estimates for built-up areas in the UK. The second is the OECD Metropolitan database. This database provides populations and GDP per capita for the main urban-based travel-to-work area. Both databases are open access.

Nowadays, over 53 million people in the UK live in settlements classified as 'built-up areas'. This is roughly 70 percent of the British population. Yet a significant part of the population – about 30 percent – lives in dispersed settlements.

Of the roughly 38 million Brits who live in 'urban areas' – that is in built-up area with a population higher than 50,000 – 44 percent resides in four metropolitan conurbations, namely the Greater London built-up area (over 9.5 million inhabitants), the Greater Manchester built-up area (2.5 million inhabitants), the West Midlands built-up area (2.4 million inhabitants) and the West Yorkshire built-up area (1.7 million inhabitants).

Another 26 percent lives in large cities (between 300,000 and 1 million inhabitants), the largest ones being the Liverpool built-up area (860,000 inhabitants) and the South Hampshire built-up area (850,000 inhabitants). There is clear cut-off between large cities and metropolitan conurbations. The smallest British metropolis, the West Yorkshire conurbation has 1,7 million inhabitants. It has double as much inhabitants as the Liverpool built-up area, which with 850,000 inhabitants is the largest city.

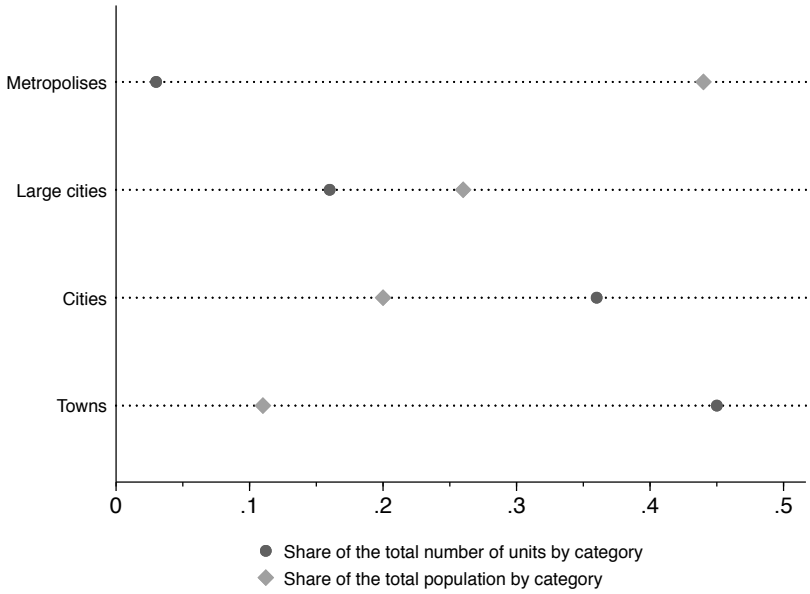
Table IV-1 - British urban areas by population groups in 2011

Size category	Number	Percentage	Total inhabitants	Percentage
Towns (more than 50,000 and less than 100,000)	57	45%	4,008,030	11%
Cities (from 100,000 to less than 300,000)	46	36%	7,593,948	20%
Large cities (from 300,000 to 1 million)	20	16%	9,746,100	26%
Metropolises Over 1 million	4	3%	16,559,725	44%
Total	127	100%	37,907,803	100%

Source: Nomis (Census 2011)

Towns and middle-size cities (between 50,000 and 300,000 inhabitants) host 31 percent of the British urban population. Yet they constitute the largest group of urban areas in the UK, accounting for 80 percent of the total urban areas (built-up settlements over 50,000 inhabitants). As a result, is correct to say that the UK has a mixed urban structure, which combines metropolises, large cities, middle-size cities and towns in a rather balanced way.

Figure IV.1 - British urban areas by population groups in 2011 (Data source: Nomis)



Data on the economy of British cities suggests this mixed urban structure might endure. The OECD metropolitan database – which provides data on the inhabitants and on the GDP per capita – enables to investigate the relation between size and economic prosperity with respect to the largest urban-based travel-to-work areas in the UK. Data suggest that population size and economic success have not necessarily a positive correlation in the British urban system. London is of course an outlayer. The London travel-to-work area is with 12 million people over 10 times larger than the average British travel-to-work area (779,967 people, median value not considering London), while also being the richest one in the sample.

However – London aside – urban travel-to-work areas of comparable size show striking differences in GDP per capita. In the lowest population tertile, which comprises Edinburgh, Leicester, Cardiff, Portsmouth and Bradford, there are urban areas listed in the first (Edinburgh and Portsmouth), second (Cardiff) and third (Leicester and Bradford) tertile in terms of GDP per capita (table IV.2). The six urban travel-to-work areas between 700,000 and 1,000,000 inhabitants (figure IV.2) are of particular interest in this regard. Within this rather small range, on the one side of the spectrum there is Sheffield, the second poorest urban area in the sample with a GDP per capita of 27,000 dollars; on the other side, there are Edinburgh and Bristol, the

second and third richest metro areas in the UK with a GDP per capita of 41,000 dollars and 45,000 dollars, respectively.

Table IV-2 - Main urban travel-to-work areas in the UK in 2012 (Data source: OECD)

City	Population	GDP per capita (thousend $)	Population tertile	GDP tertile
London	12,090,254	54.0	1	1
Birmingham (UK)	1,919,346	31.9	1	2
Manchester	1,885,530	36.2	1	2
Leeds	1,181,206	36.6	1	2
Newcastle	1,065,336	27.5	1	3
Glasgow	956,593	39.2	2	1
Liverpool	939,870	31.1	2	2
Sheffield	898,347	27.4	2	3
Nottingham	849,372	31.0	2	3
Bristol	815,137	41.8	2	1
Edinburgh	744,798	46.0	3	1
Leicester	676,119	30.6	3	3
Cardiff	652,280	31.0	3	2
Portsmouth	585,604	38.3	3	1
Bradford	557,445	25.4	3	3

Figure IV.2 - Main urban travel-to-work areas in the UK in 2012 (Data source: OECD)

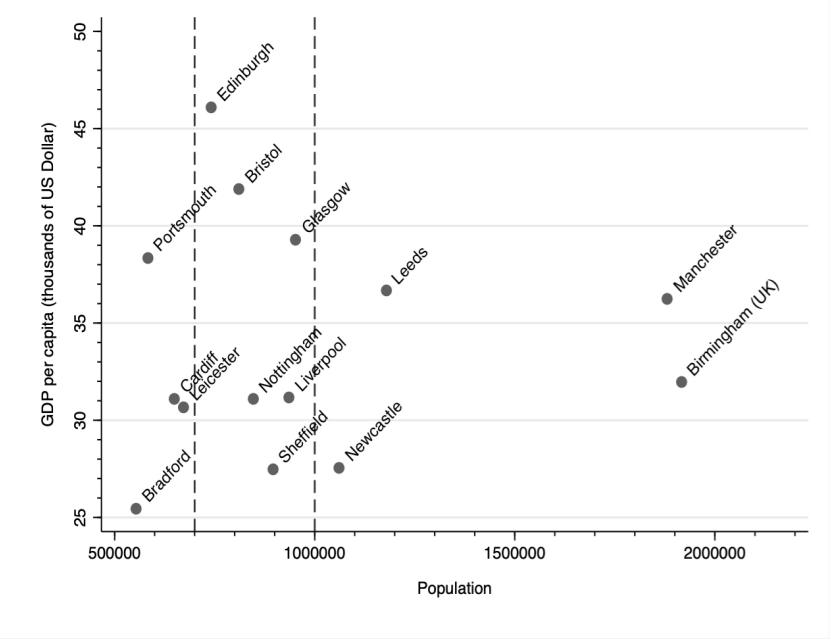
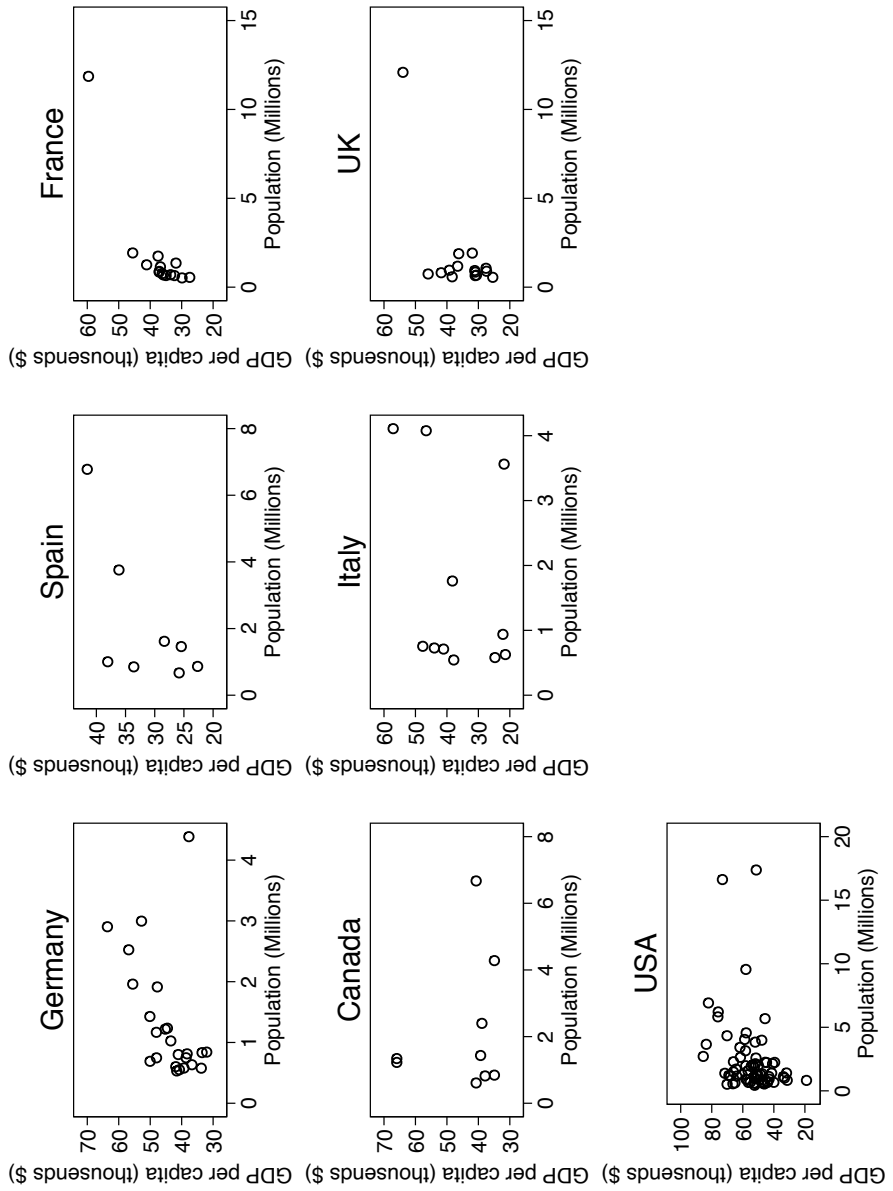


Figure IV.3 - Population and GDP per capita of major urban travel-to-work areas in 2012 (Data source: OECD)



This pattern is typically European. The OECD database provides data for the major urban travel-to-work areas of most high-income countries. The graphs in Figure IV.3 shows the relation between GDP per capita and population in a number of large European countries plus Canada and the USA. In Spain, France, Italy the largest city is also the richest. This is usually the national capital – like Madrid for Spain – or an important regional centre like Milan in Italy. Germany seems at first an exception: Berlin is the largest city yet is not the richest. However, the German capital has had a complex history since the Second World War, which explains its current economic state. Once Berlin is not considered, Germany follows the European pattern, with regard to the economic status of capitals. (In the German case, Munich has the role of the largest and richest cities).

However, bigger is not necessarily better. Once the largest cities are taken out of the equation there is no clear positive correlation between size and GDP per capita. In all the considered national urban systems one finds relatively small cities that are successful economically.

The socio-economic challenge: trends in material welfare

A key sustainability challenge is providing collective wellbeing. As discussed in the methodology chapter (Chapter 3), my research project focuses on the material basis of collective wellbeing. This is what I call material welfare. In this section, I will examine trends in material welfare in the UK. I will look at overall wealth growth and distribution. I will use regional data to highlight territorial differences.

To analyse overall material wealth, I will employ GDP as a proxy. This choice is related to data-availability. As discussed in the methodological chapter, GDP has several limits as a measure of welfare. However, if used critically, it can assist in the analysis of material welfare. I will use different databases for reasons relate to data-availability in relation to specific years. As a result, some tables and figures display GDP in dollars and other in pounds. I am interested in long-term trends, not conjunctural changes. Mixing GDP in dollars and pounds does not bias structural analysis.

I will use the relative poverty rate to analyse the distribution of material welfare. The relative poverty rate is calculated on incomes. I used different databases also in this case. Again, the reason is to data-availability in specific years of interests. Some of these databases provide the poverty rate at individual level. Others provide the poverty based at household level. I will specify which poverty rate I use throughout the text avoid confusion.

Table IV-3 - UK regions: population, GDP per capita and poverty rate
(Data source: OECD)

Name	Population 2011	GDP per capita 2011	GDP per capita growth 2001-2011	Poverty rate after transfer 2011 (%)	Poverty rate before transfer 2011 (%)	Poverty reduction (% points)
Greater London	8,133,530	61,639	6,905		31.3	31.3
South East England	8,615,530	39,103	2,054	13	26.4	13.4
Scotland	5,280,580	33,583	3,544	17.7	33.7	16
East of England	5,835,000	32,260	185	14.2	28.9	14.7
South West England	5,281,090	31,733	1,618	15.5	32.4	16.9
North West England	7,038,000	31,180	2,516	20.1	40	19.9
Yorkshire and The Humber	5,271,540	29,190	1,728	21.7	39.6	17.9
East Midlands	4,522,260	29,142	1,332	18.7	35.5	16.8
West Midlands	5,587,180	29,133	621	22	40	18
Northern Ireland	1,809,540	27,635	763	23.8	40.1	16.3
North East England	2,591,630	27,304	3,194	21.3	41.5	20.2
Wales	3,056,650	26,026	2,110	21	39.5	18.5

I will start with a static analysis of material welfare. A static analysis looks at the levels of material welfare at one specific point in time. Data in this case refer to 2011 and are taken from the OECD regional database. The poverty rate is calculated on personal incomes. The GDP per capita is expressed in dollars. As table IV.3 shows, British regions rich in overall material wealth as measured through GDP per capita tend to have lower levels of poverty, both after state transfer and before state transfer (see also figure IV.4).

The South East of England, the second richest region in the UK after London, had a GDP per capita of almost 40,000 dollars in 2011. Its poverty rate after transfer in the same year was 19 percent, the lowest poverty rate of 2011. Instead, in 2011 The North East was one of the poorest regions in the UK with a GDP per capita of 27,000. Its poverty rate after transfer was 21 percent, one of the highest in the country.

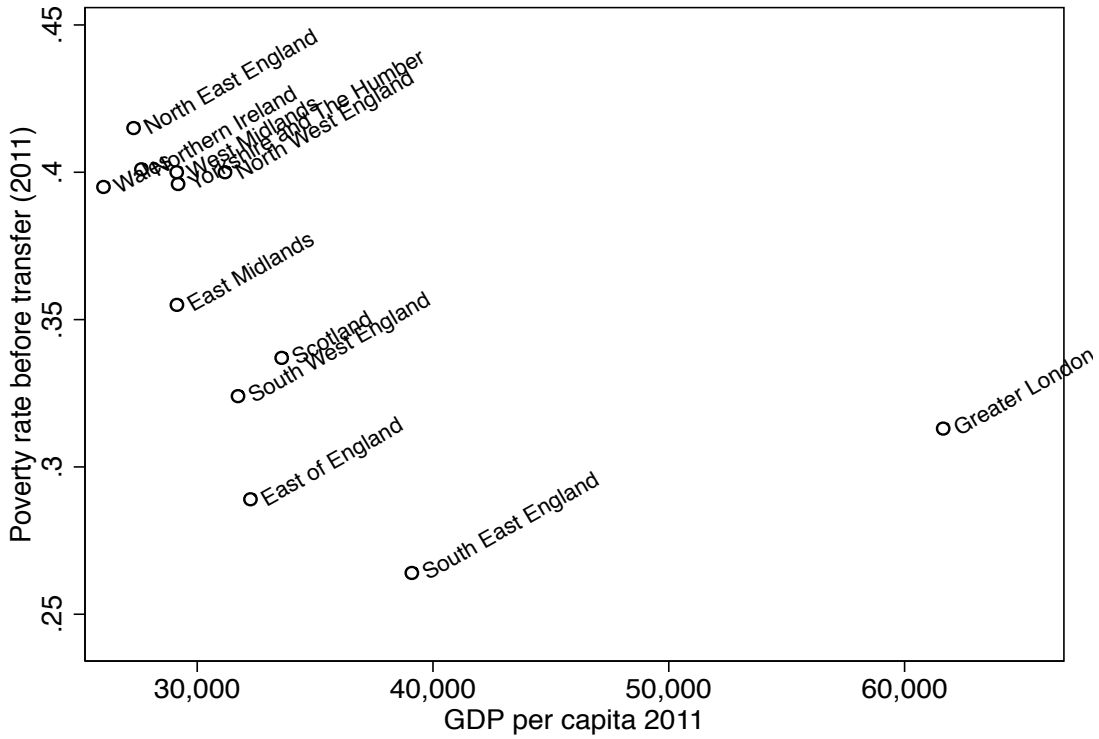
These findings suggest that material welfare tends to trickle-down socially and spatially to a certain extent. From this static picture, the researcher is tempted to conclude that in the UK, over the past decade, economic growth has been coupled with social inclusion.

However, looking at poverty before and after transfer questions this interpretation of regional development in the UK. The poverty level before transfer gives an idea of how many poor people would exist in a region without the redistributional effect of the state. The picture is impressive. Even in rich regions, the economy struggles to produce equitable distribution patterns without after-the-fact state redistribution.

For example, in the South East of England, 26 percent of the population would leave in poverty without state intervention. Greater London is an even more extreme case. London has a GDP per capita twice the value of many lagging-behind regions. Furthermore, it has a GDP growth-rate 3 times higher than the GDP growth rate of northern regions (figure IV.4). Nonetheless, London displays a 30 percent poverty rate before taxes and transfer. In 2011, 1/3 of the inhabitants of the richest metropolis in

the UK and of the world would have lived in relative poverty without state redistribution.

Figure IV.4 - Poverty rate before state transfer by region in 2011
(Data source: OECD)



I will now further explore the relation between growth in material welfare and social cohesion from a dynamic perspective. The Welsh Office of Statistics provides long-term data on the percentage of household in relative poverty and GDP per capita for regions in the UK since the mid 90s. I have indexed GDP per capita and household poverty after housing costs to 100 in relation to the first year of the historical series, that is 1997. In this way, I can easily compare relative trends of both indicators. The results of the analysis are summarised in the 12 graphs of figure IV.5 (see pages 57-60).

Over the period 1997-2015 all UK regions have experienced significant economic

growth.[6] In the considered period, the overall value of the economic output UK regions has increased by 75 percent in almost every region. The metropolitan region of London is an outlier here. The value of its economic output has doubled over the decade. However, the percentage of households in poverty has barely diminished over the same period. North East England and South West England have experienced the highest reduction in the percentage of households in poverty. The reduction is about 25 percent less than the initial value. In most of the other regions, poverty levels have been fluctuating around the same value of 1997, showing no consistent downward trend.

These findings have relevant implication for urban and regional policy. The development trends of the past decade show no or weak coupling between economic growth and poverty reduction at the household level. In this context, the promotion of economic growth may have almost no effects on relative poverty. Only in conjunction to policies, which couple economic growth to social inclusion, growth might generate material welfare for all.

In this context, is also important to consider the time that growth-based anti-poverty policy might require to work. To explore this aspect, I have constructed a simple development model for Wales. The model does not aim to propose an exact estimate of how this region will develop over the next decades. The aim is providing an empirical scenario to discuss the theoretical argument. The data for the model are again those from the OECD database, hence they are expressed in dollars.

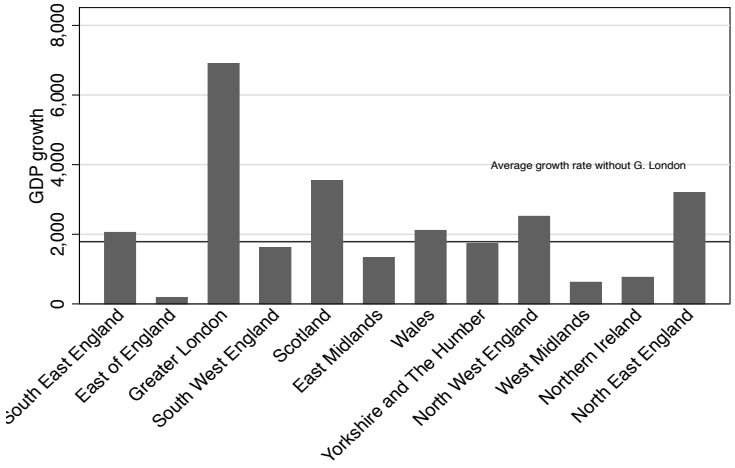
In 2011 Wales was the less wealthy region in the UK in terms of income per capita. The average income of the region was 26,000 dollars. As Figure IV.5 shows, its growth rate of 2,110 dollars a year is slightly above the average value – this has been calculated not considering the exceptional performance of London.

As table 3 shows (fifth column), before state redistribution, an alarming 39.5 percent of the Welsh population is virtually poor according to UK standards in 2011. After state intervention this percentage decreases to 21 per cent (table IV.3, fourth column), which means a poverty reduction of 18.5 percent (table 3, sixth column). In 2011, about 1 out of 5 Welsh people lived in poverty, despite the welfare state. Other northern regions share similar poverty profiles.

Assuming that, by adopting the right coupling policies, economic growth can be associated to a poverty decrease of 1.2 percentage points every 1,000 dollars increase of GDP. This is the average value (Beta coefficient) of the relation between GDP per capita and relative poverty in 2011 obtained through regression analysis. In the extraordinary scenario in which, *ceteris paribus*, Wales grows as London did in the decade 2001-2011 – that is 690 dollars a year – it will take 25 years to reach a poverty rate before state intervention of 20 percent.

[6] This part of the analysis is based on Welsh Government data. GDP is expressed in pounds.

Figure IV.5 - UK regions: average annual GDP growth rate 2001-2011 (Data source: OECD)



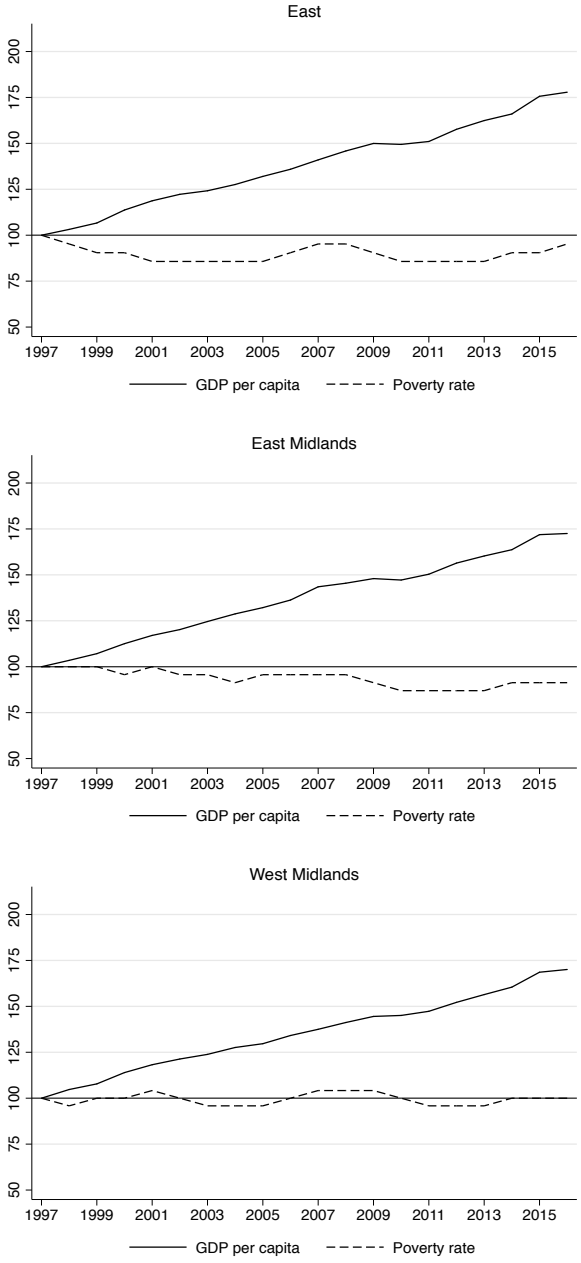
In the more realistic scenario in which, *ceteris paribus*, the Welsh economy will experience in future decades the same GDP growth rate it experienced in the decade 2001-2011 – that is 300 dollars a year –, it will take almost half a century to reach a poverty level of less than 20 percent before state intervention.

This configures a context were growth-based anti-poverty policy will require decades to be effective. For regions that have already rather low-poverty level this might not be a problem. However, for the many regions that lag behind in terms of GDP levels and growth rates, it means that poverty will persist to significant levels over the next decades. I will further discuss the implication of these findings for cities and urban policy in the last section of this chapter.

Table IV-4 - Relation between GDP and poverty in Wales: scenarios (Data source: OECD)

Average relation between GDP growth and poverty in 2011		1.2 percentage points reduction every increase in 1000 $	
GDP increase neded to produce a 20% points decrease in poverty		16666.00	Dollars
Welsh growth rate 2001-2011 (yearly average)		300.00	Dollars
London growth rate 2001-2011 (yearly average)		690.00	Dollars
Years needed to get a 20 % points decrease in the poverty rate	Scenario 1: Wales grows like Wales in the period 2001-2011	55.55	Years
	Scenario 2 Wales grows like Greater London in the period 2001-2011	24.15	Years

Figure IV.6 - UK regions: trends of GDP per capita and poverty rate
(Data source: Stats Wales)



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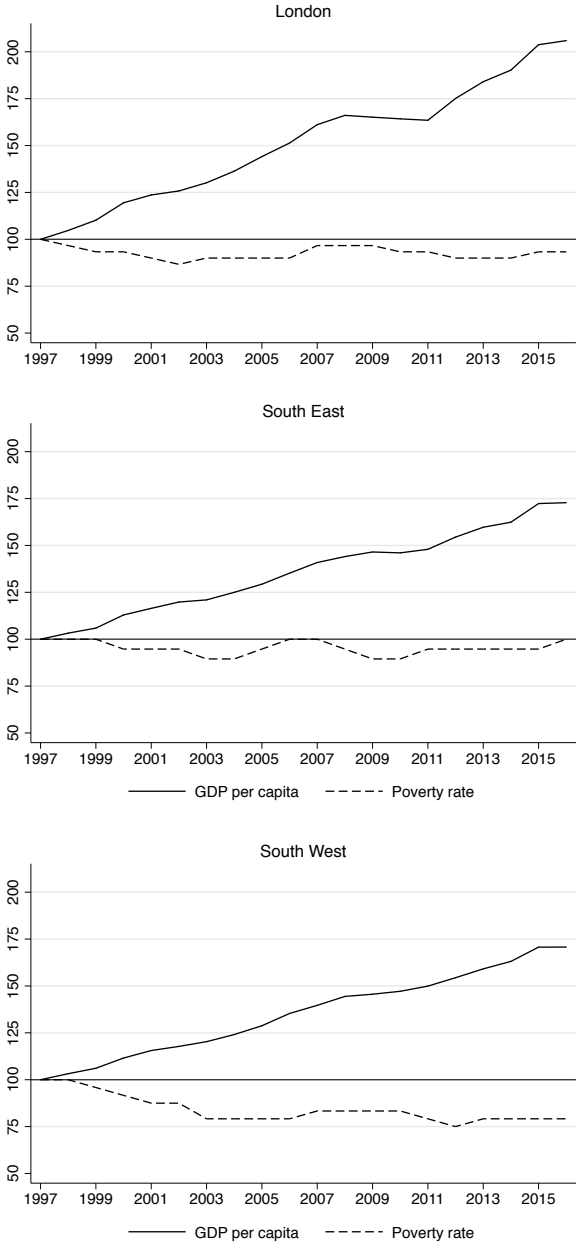

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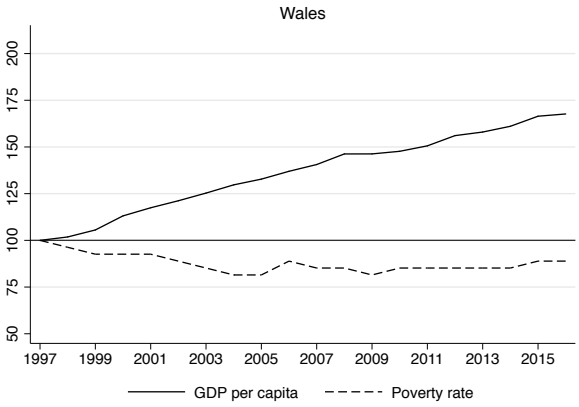

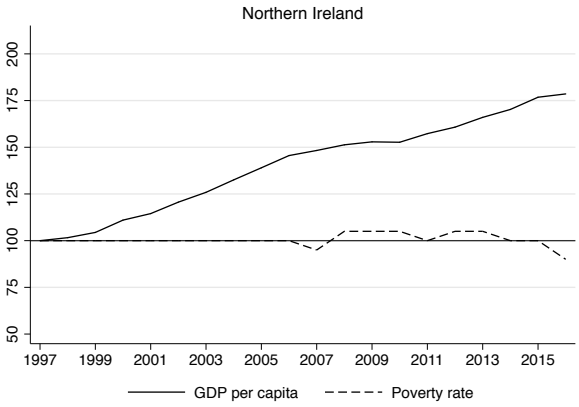

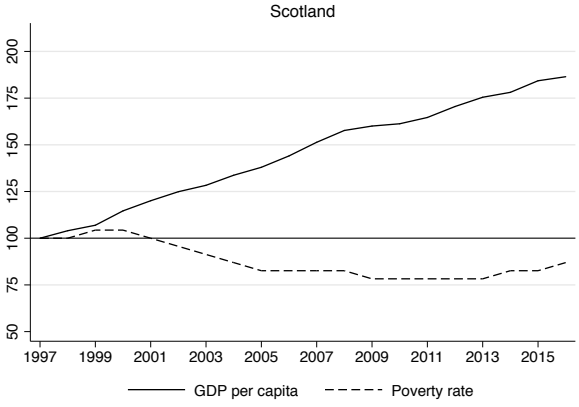

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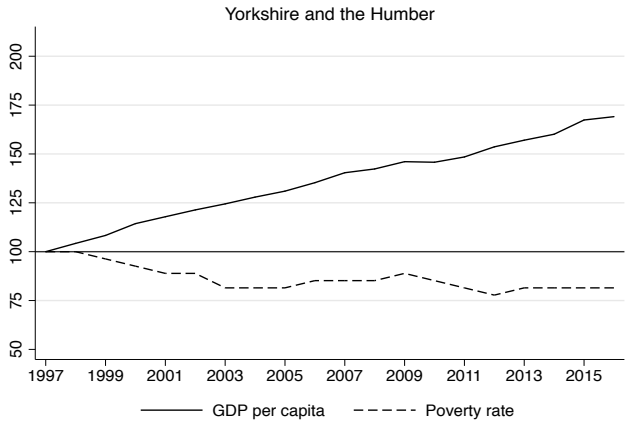
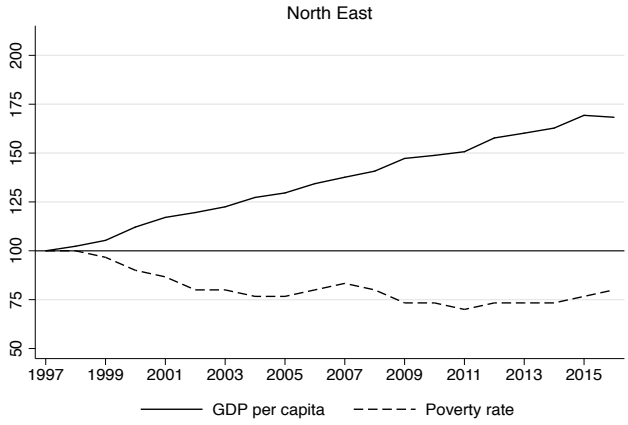
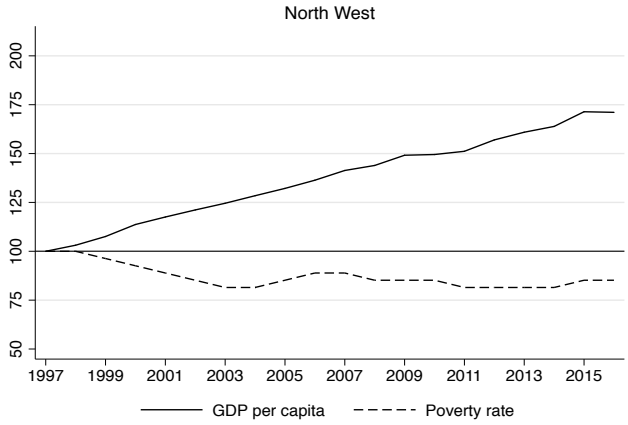






2. The environmental challenge: trends in natural resource consumption and pollutants emissions

Economies use natural resources and emit pollutants to generate material welfare and collective wellbeing. For most of the 20th century, these issues constituted secondary concerns for urban policy makers and the public. In the face of the environmental crisis, UK cities will have to consider their environmental impact. This section analyses state and trends of the environmental impact of the British economy and society. The national scale was chosen for reasons related to data availability.

The assessment of the environmental impact of a national economy is difficult in a global economy. National economies increasingly depend on imported goods and trade. The production of material goods – like energy, consumer goods or food – is significantly more matter and energy intensive than the production of services like healthcare. As countries specialise in certain goods and services, their environmental profile can change from production to consumption.

This is especially the case for the UK and European countries. These countries have specialised in services, which are less matter and energy intensive. At the same time, they import matter and energy intensive goods from non-European countries. A production-based analysis may underestimate the environmental impact of European countries. To have a full picture of the environmental impact of European countries is crucial to include also a consumption-based analysis.

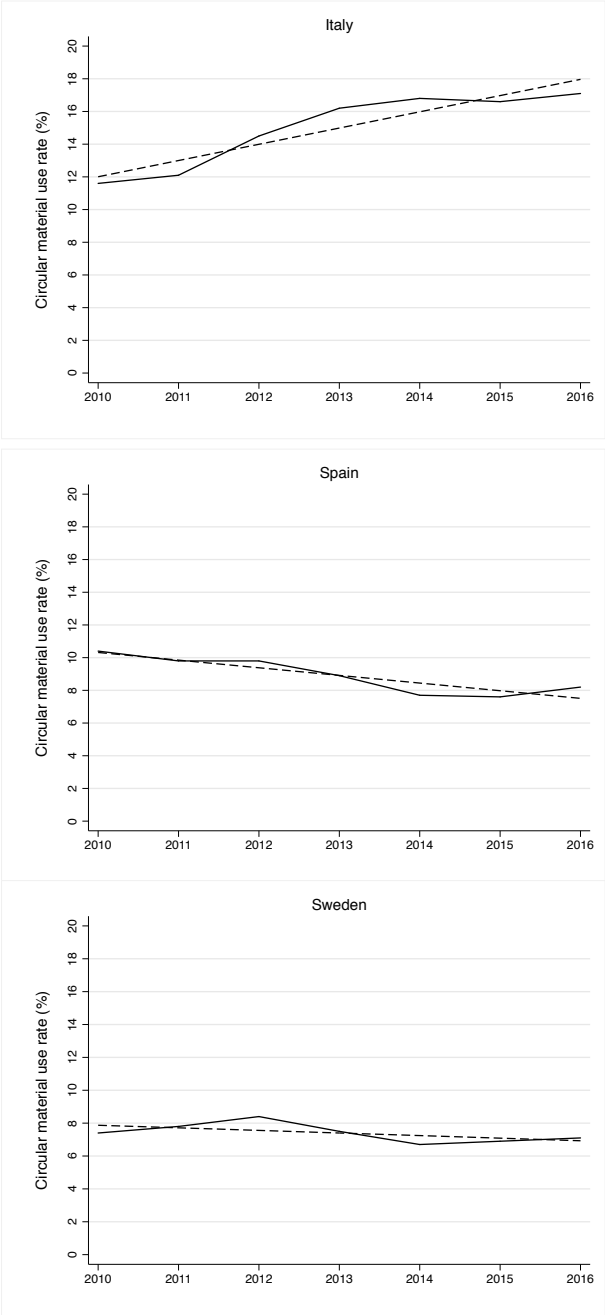
The difference between the production and consumption perspective is the reason why this section is structured in two parts. In the first part, I will look at the ecological impact of the UK from a production perspective. In the second part, I will look at the ecological impact of the UK from a consumption perspective.

From a production perspective the UK – as most European countries – has increased its environmental sustainability over the past decade. A first indicator of the sustainability of production is the rate of material input coming from recycled material. This is measured by the circular material use rate (CMU rate).

In 2016, 17.2 percent of the material input in the UK came from recycled materials. As the graphs of figure IV.7 shows, the UK has become slightly more successful over the years. In 2004, 15.6 percent of its material input came from recycled material. Other European countries – for example, Italy, France and to a lesser extent Germany – also experienced modest increases in the circular material use rate. In contrast, over the same time period Sweden and Spain have recorded, respectively, stagnating and even declining CMU rates.

Figure IV.7 - Trends in circular material use rate

(Data source: Eurostat)



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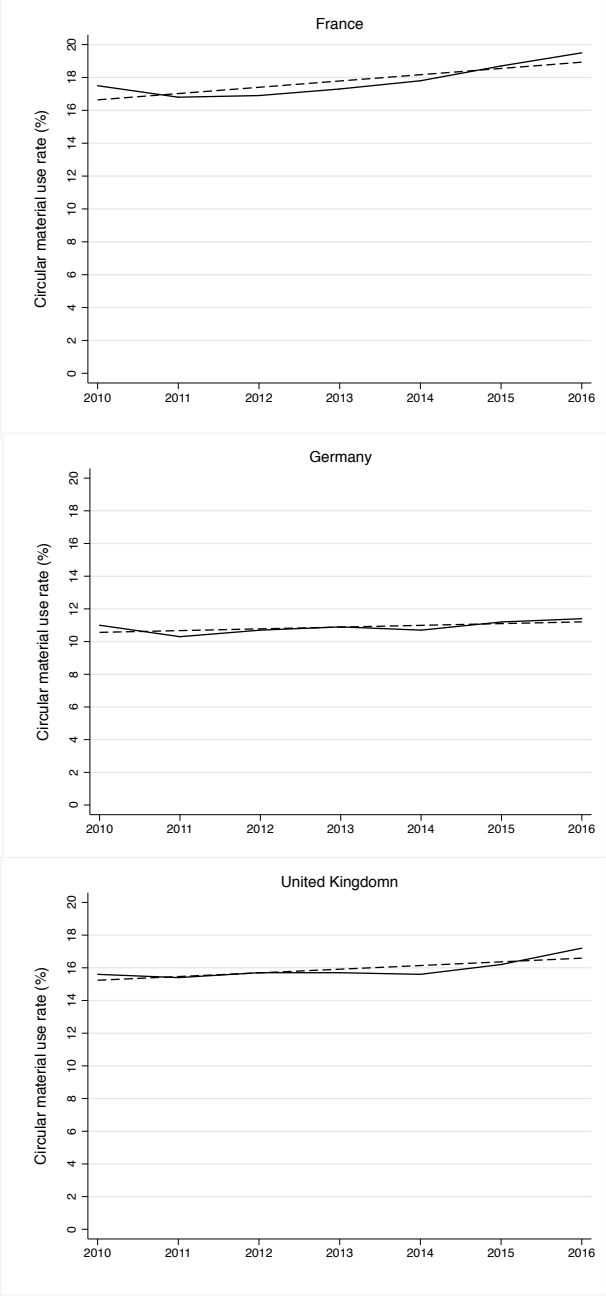
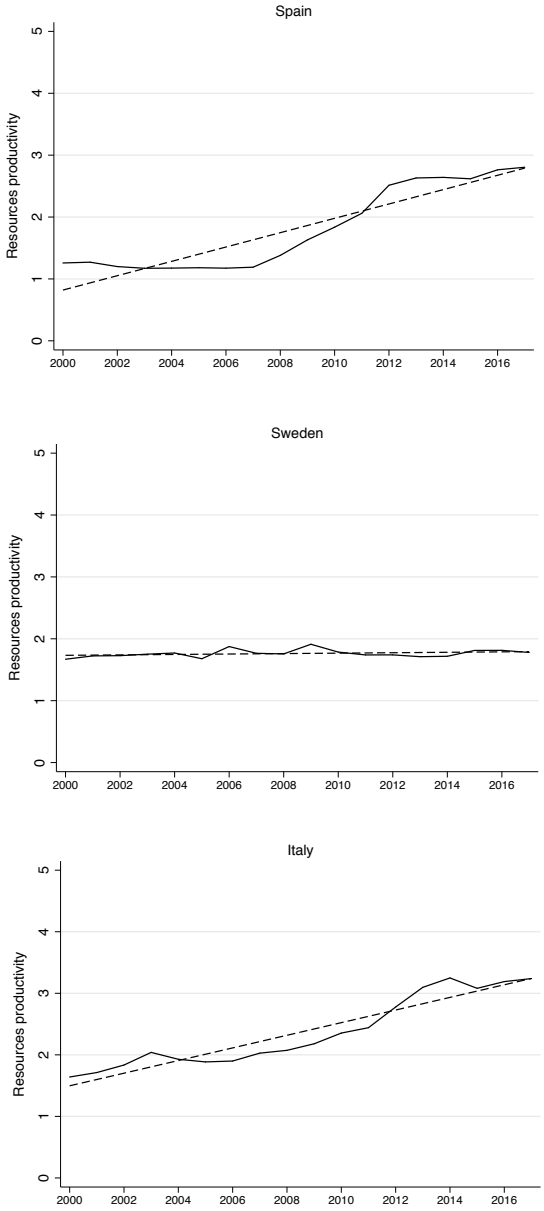


A second indicator of the sustainability of production is the resource productivity. As illustrated by the graphs of Figure IV.8, the UK has become more efficient in this regard, as most European countries, throughout the period 2000-2016. In 2000 the UK generated in average 2 euros of GDP for every unit of material input. Within less than a decade this measure doubled. In 2016, the UK generated 4 Euro with one unit of material input becoming the most efficient country in Europe in the sample.

Greenhouse gas emissions (ghg emissions) are a third widely used indicator of the sustainability of production and consumption. Countries do not impact the environment only through use of natural resources for production. Another major way of affecting the environment is introducing pollutants into the ecological systems as a result of economic and social processes. Greenhouse gasses are particularly important as they cause global warming. Also in this regard, the UK shows positive development. As shown in figure IV.9, emissions of greenhouse gasses have declined in the UK – as well as in other EU countries over the past 30 years. From the 1990s, ghg gasses emitted per capita in the UK have dropped from 14 to 8 tonnes per capita. This is a 35 percent reduction, the highest among the countries in the sample.[7]

[7] According to a recent report, this trend is related to a number of reasons including the switch to clean energy sources, outsourcing of carbon heavy production of manufactured goods: See 'https://www.carbonbrief.org/analysis-why-the-uks-co2-emissions-have-fallen-38-since-1990' and 'https://www.carbonbrief.org/mapped-worlds-largest-co2-importers-exporters' and 'https://www.carbonbrief.org/are-the-uks-emissions-really-falling-or-has-it-outsourced-them-to-china'.

Figure IV.8 - Trends in resource productivity by country
(Data source: Eurostat)



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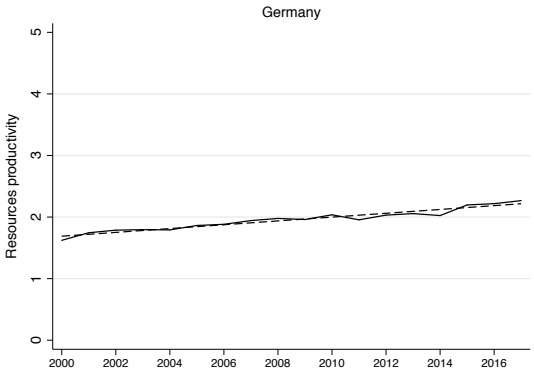
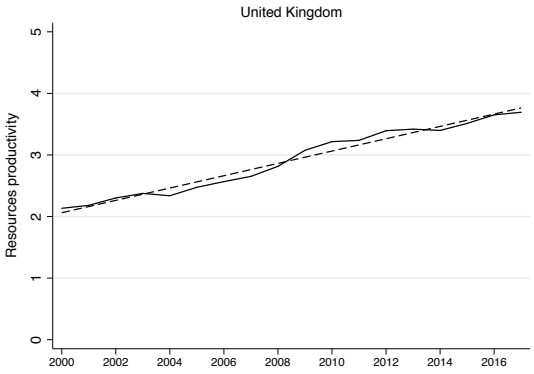




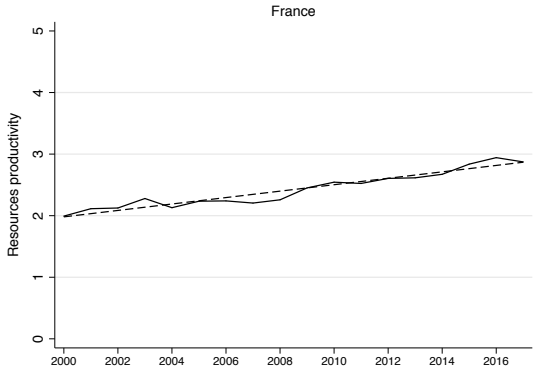
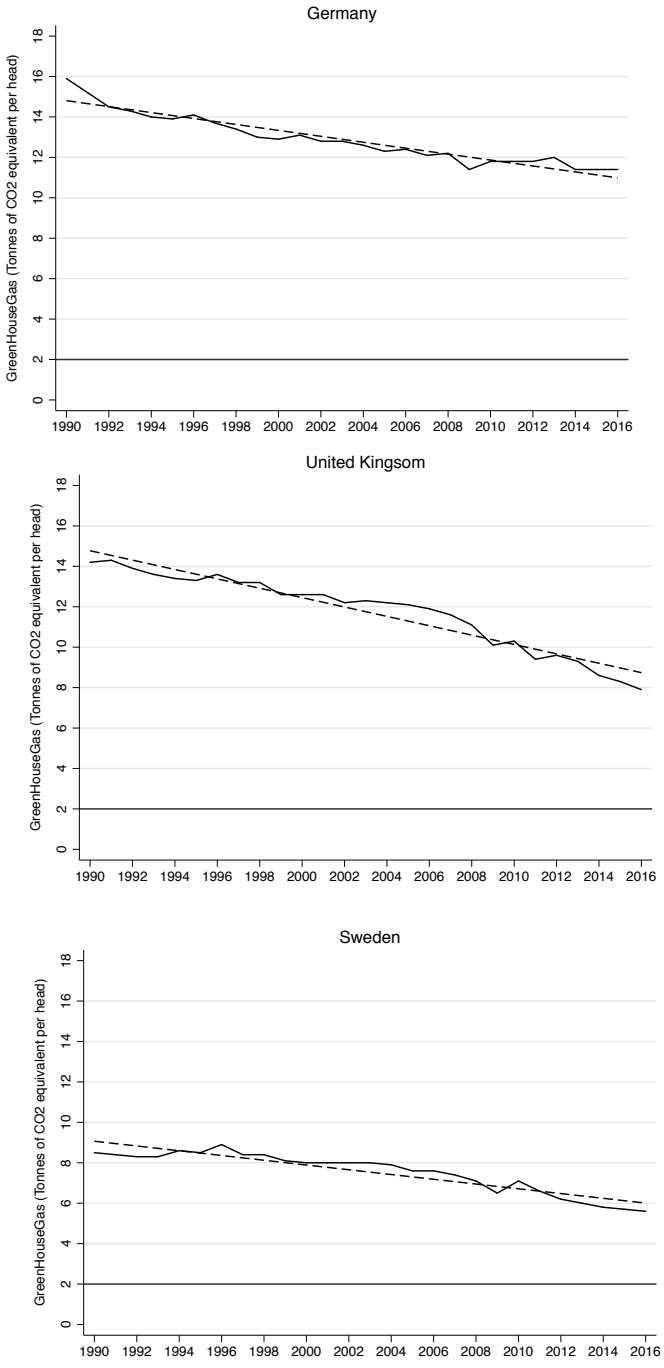


Figure IV.9 - Trends in greenhouse gas emissions
(Data source: Eurostat)



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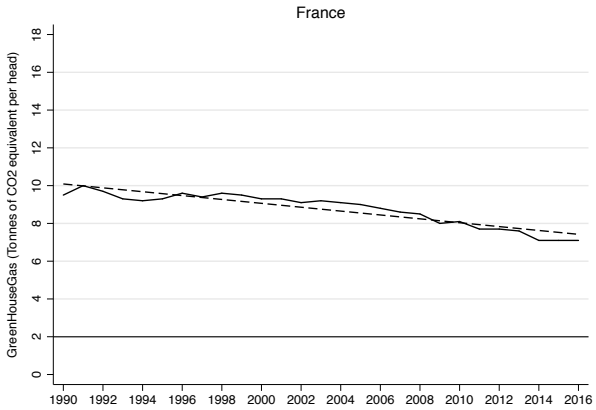
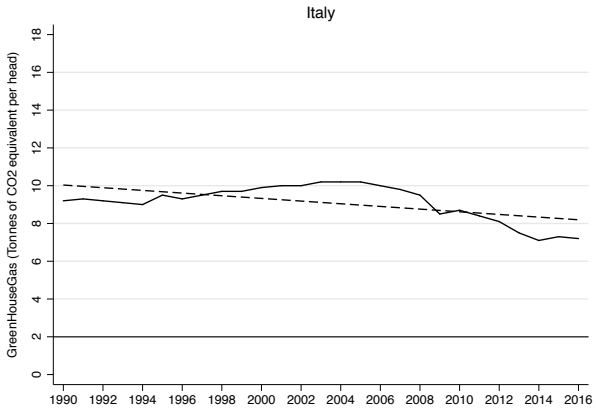
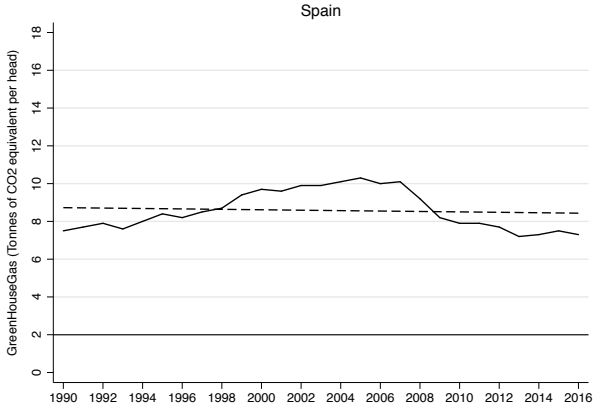
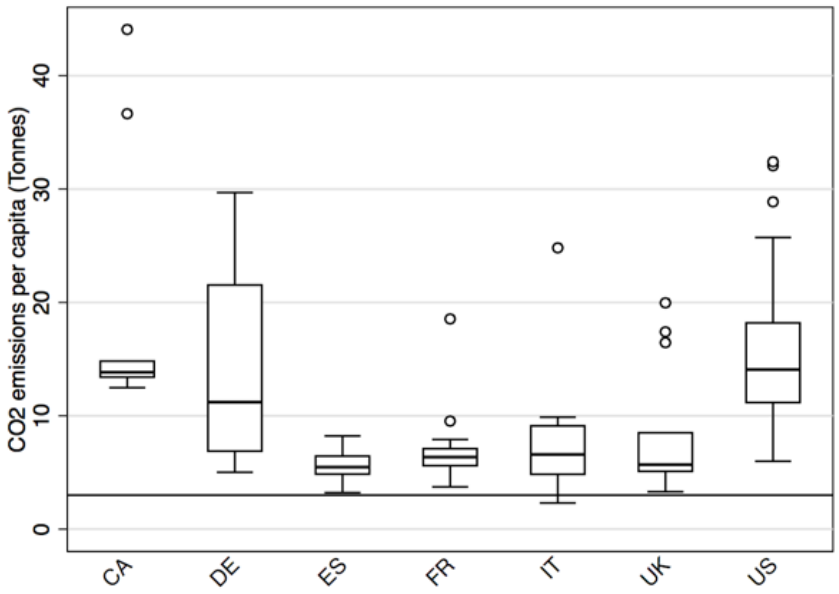






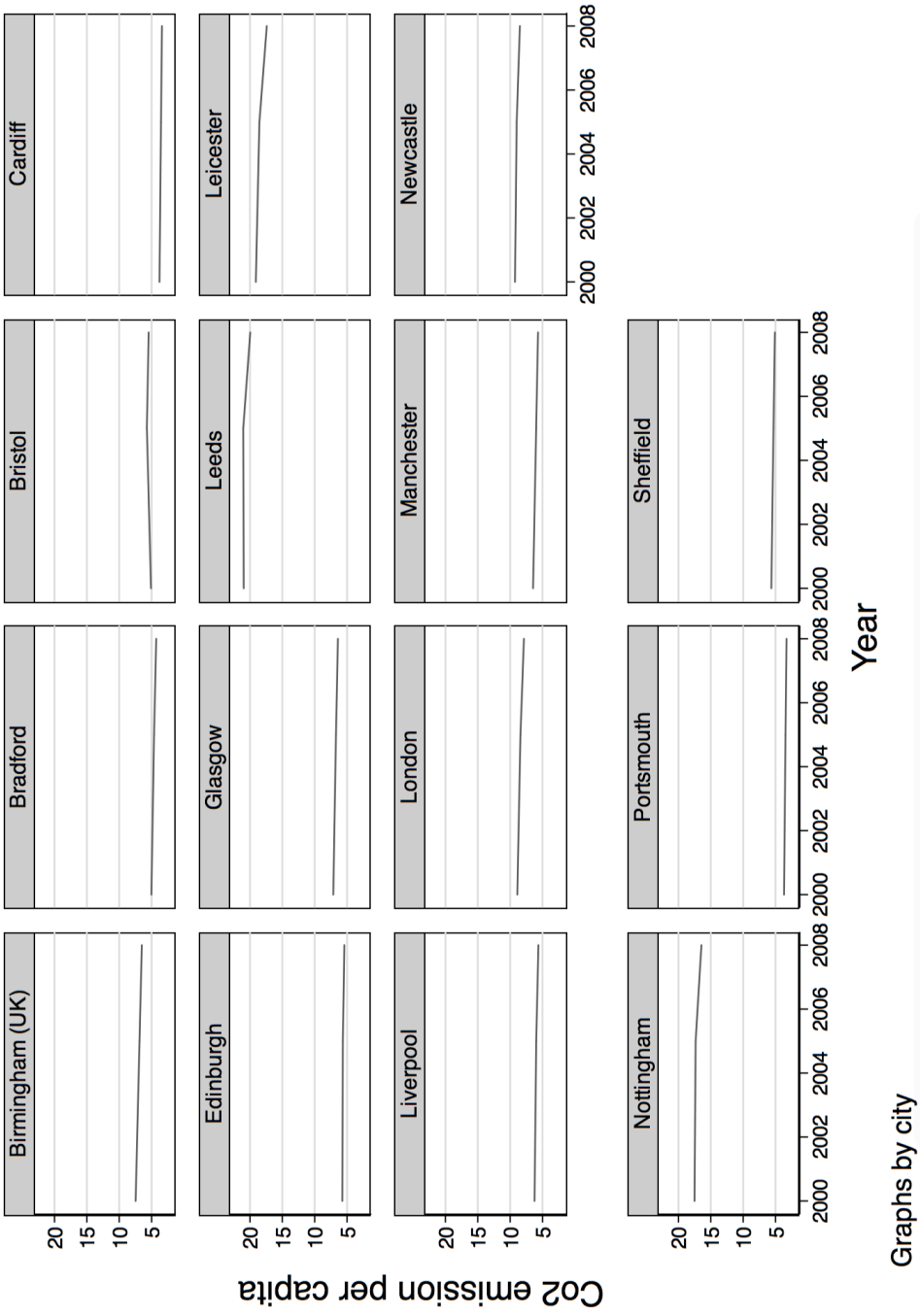
OECD data enable to analyse spatial differences in CO2 emissions at the scale of the major urban travel-to-work areas (figure IV.10). Reflecting a European-wide pattern, within the UK there are significant differences among urban areas in term of CO2 emissions produced by enterprises, buildings, and transport. In 2008 – the latest year in the OECD dataset – the average level of CO2 emission of the major urban travel-to-work areas of the UK was of 7 tonnes per capita. This is almost 4 times higher than the sustainability threshold of 2 tonnes per capita. A few cities – like Cardiff and Portsmouth – situated rather close to the sustainability threshold with CO2 emissions of respectively 3.4 tonnes per capita and 3.3 tonnes per capita. Yet, other urban travel-to-work areas like Leeds, Nottingham and Leicester had in 2008 CO2 emissions levels of over 15 tonnes per capita. This means almost 8 times more than sustainability levels.

Figure IV.10 - CO2 emissions of urban travel-to-work areas by country in 2008
(Data source: OECD)



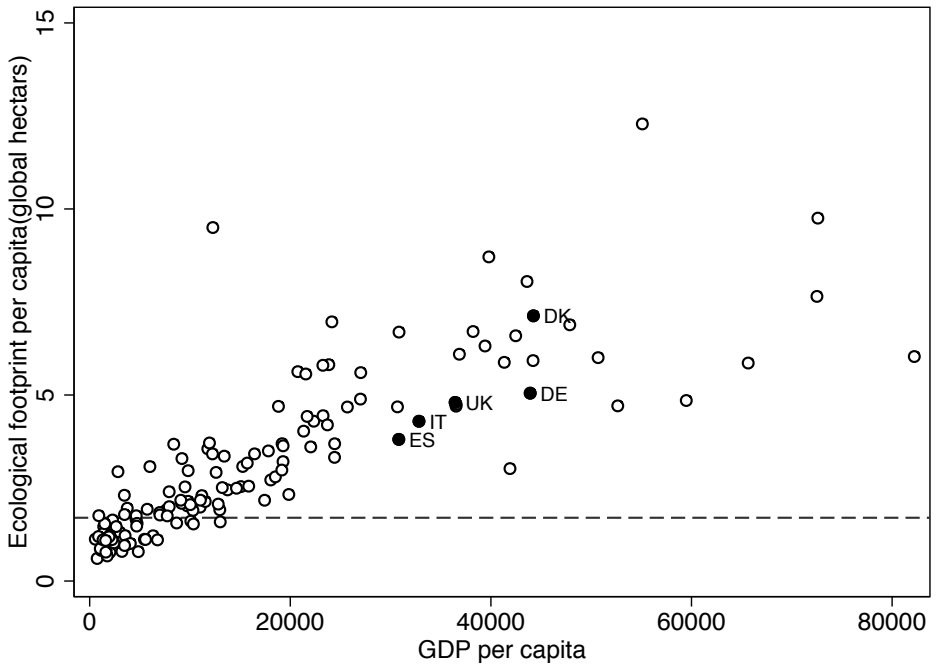
Trend analysis shows some decline at this scale as well. The graphs in figure IV.11 show CO2 emissions for urban travel-to-work areas in the UK over the period 2000-2008. As the figure shows, in all cities emissions declined. However, the decline has been modest. Ceteris paribus, it will take years to reach sustainability levels.

Figure IV.11 - CO2 emissions of British urban travel-to-work areas
(Data source: OECD)



The analysis of the environmental impact of the UK from a production side shows a country, which is making consistent steps towards sustainability compared to the 1990s and early 2000. However, shifting from production to consumption drastically changes the picture. I will use the ecological footprint calculated for consumption to analyse the environmental impact of the UK from a consumption perspective.[8] Looking at the ecological footprint of consumption it emerges a very different picture of the environmental impact of the UK and other European countries.

Figure IV.12 - GDP per capita and ecological footprint per capita in 2014
(Data source: Footprint Network)



[8] See chapter 3 p. 40-41 for a discussion of the differences between the ecological footprint of consumption and production.

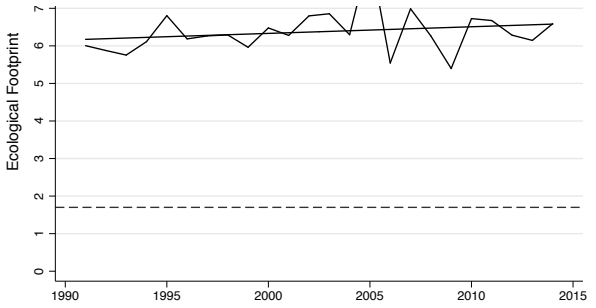
Figure IV.13 shows the relation between GDP per capita and ecological footprint of consumption per capita in 2014 for most countries in the world. GDP is expressed in dollars while the ecological footprint is expressed in global hectares per capita (gh per capita). The graphs show that, at country level, GDP per capita and the ecological footprint are strongly related. As the overall output of the economy rises, also the consumption of productive land rises.

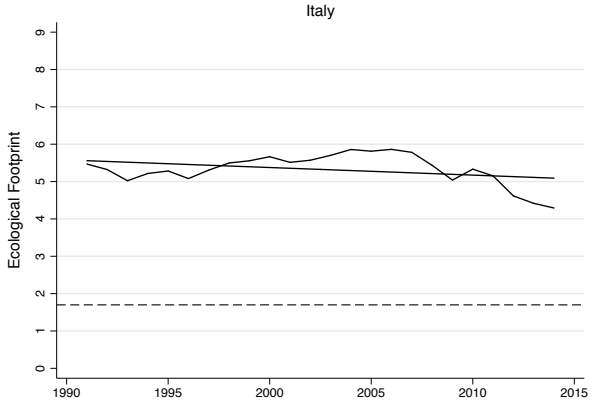
High-income countries are all well above the sustainability thresholds of 1.7 global hectares per capita. For instance, Spain had in 2014 a consumption of 3.8 gh per capita. Italy of 4.3 gh per capita. Germany of 5 gh per capita. The UK of 4.8 gh per capita and Denmark of 7 gh per capita. If every country in the world would consume the amount of productive land that these countries consume today, we would require the equivalent of 3 planets earth of resources. The implication for global justice is significant. The current global resource consumption is possible only because rich countries consume at the expenses of poorer countries.

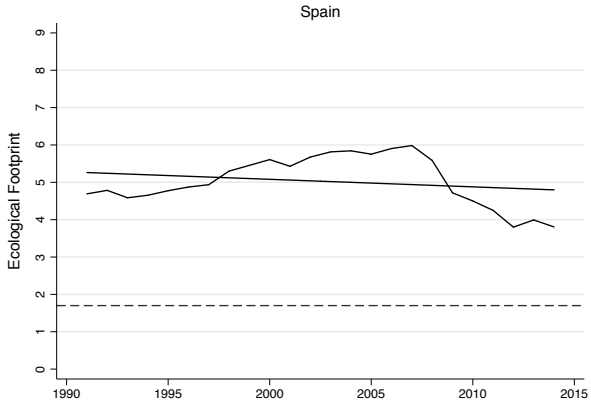
In the past quarter of a century, overall consumption of natural resources has not substantially changed in the UK. From 1995 to 2008 the ecological footprint of the UK in terms of consumption has slightly grown or stagnated. Other European countries have similar figures. The reason is economic growth. Economic growth has increased a) the total use of resources in the production process, b) the total emission of wastes and d) the total level of consumption. As a consequence, the import of matter and energy-heavy commodities from other countries has increased.

The ecological footprint declined in the UK and most European countries only after 2008, as the economic crisis led to a decrease in consumption in most countries. However, in countries like Sweden that suffered less from the 2008 crisis, the ecological footprint has kept growing. The only exception is Germany, where there seems to be a consistent trend in the reduction of the ecological footprint both before and after 2008. Assuming that the post-crisis downward trend will continue through policy, it will take decades before advanced countries will use their fair share of resources within the current growth-centred model of development.

Figure IV.13 -Trends in ecological footprint
(Data source: Footprint Network)







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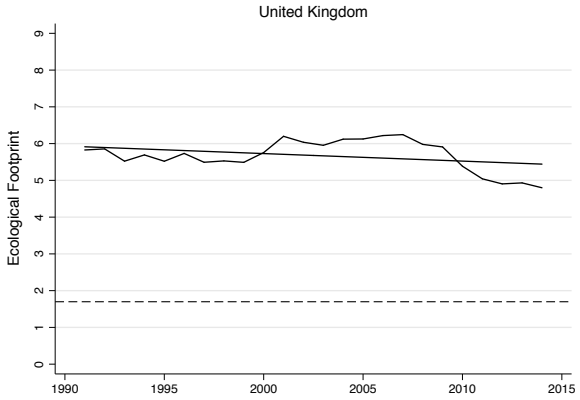
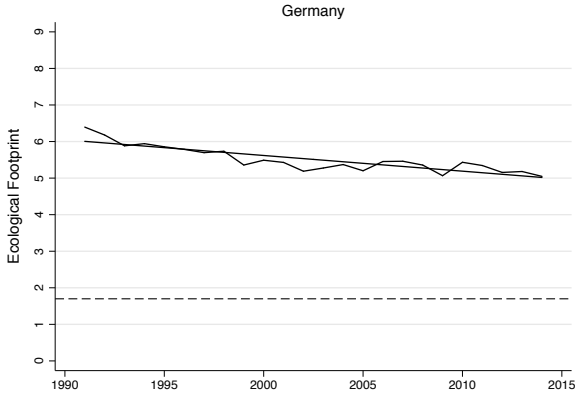
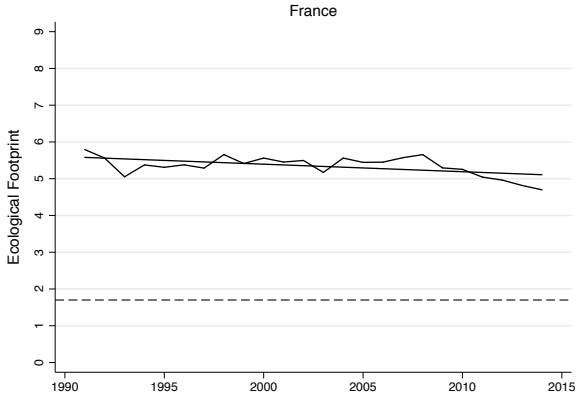






4.4. What implications for cities and urban strategy?

This chapter had the objective of putting numbers on the main sustainability challenges of British cities. The results of this chapter are the first main empirical block of this research. They provide the background from which, in the next chapters, I will assess moderate and radical approaches to urban sustainability. I will now summarise the findings and discuss the implication for urban strategy.

Let us start with material welfare. Despite de-industrialisation, UK regions have been growing since the 1990s. In less than 30 years, their economies have increased by 2/3 the financial value of their output as measured through GDP. This suggests that the material welfare of UK regions has potentially increased.

However, over the same period, relative poverty rates have not substantially diminished. In 2011, before state-redistribution, the percentage of those in poverty in most UK regions is above 30 percent. In few cases, poverty rates reach almost 40 percent. State redistribution mitigates this phenomenon. Yet, in 2016 most UK regions still have 20 percent of households living in poverty.

The wage structure of the British economy seems incapable of generating inclusive growth. Consequently, the British economy depends from state redistribution to produce acceptable levels material welfare. Rather than a 'broken' welfare state, the analysis shows a dysfunctional economy, which systematically struggles to distribute material welfare throughout the social body.

Over the past two decades, the UK has improved its efficiency in terms of environmental impact. Improvements have been achieved in terms of CO2 emissions, circularity of the economic process and resource productivity. This is a pattern common to other European countries.

However, economic growth has offset these domestic advancements. Economic activity is strongly related to natural resource consumption and pollutant emissions. As the British economy grows, people consume more. As a result, from 1995 to 2008, the ecological footprint of British consumption has remained roughly at the same level of 6 ghg per capita. This is 2 to 3 times more than the global sustainability threshold of 1.7 hectares per capita.

The implications of these findings for urban strategy are substantial. At present, British cities are structurally unequipped to support human life sustainably. They require massive amount of resources and yet struggle to distribute material welfare to all. The development model of British cities requires structural changes to become socially and environmentally sustainable.

In this scenario, generalised economic growth is not sustainable for improving living standards. There are two main reasons. The first is that economic growth – *ceteris paribus* – does not produce welfare to all. As shown in the previous section, UK regions grow but the relative poverty rate stays the same.

The second is that economic growth is accompanied by increases in environmental impact. Further increasing the use of natural resources is not possible. The British urban society is already using an amount of resources far beyond sustainability.

In this context, economic growth is possible only in relation to selected services. Compared to goods, services have a much lower environmental impact (Baabou et al., 2017) In contrast, degrowth up to a sustainable steady state is inevitable in relation to material goods. Here, only a 'qualitative growth' in the functionality of goods is possible. The implications for social justice are substantial. In a partially degrowing economy, more equitable distributional patterns will be crucial to ensure social sustainability.

V. THE MODERATE APPROACH TO URBAN SUSTAINABILITY: THE CASE OF THE SWANSEA BAY STRATEGY

In the previous chapter, I analysed trends in material welfare and environmental impact in the UK. The goal was assessing the scale of the sustainability challenges of British cites. These challenges can be addressed within different approaches of sustainable urban development. Each approach entails a problem-definition, prioritises some solutions and put others in secondary position. In this chapter, I shall investigate what kind of urban strategies can be generated within the coordinates of the moderate approach to urban sustainability.

For this purpose, I shall analyse the case of the Swansea Bay City Region in Wales. This region has undergone strategic planning within the coordinates of the moderate approach to urban sustainability. The process has resulted in a legally binding development strategy at the scale of the urban region.

In discussing this complex process different elements are relevant. To provide context, I will at first introduce the institutional framework, which regulates strategic planning at the local scale in the UK. Over the past decade, the British government has reformed this framework, emphasising economic growth and urban agglomeration.

In section 2, I will provide a territorial analysis of the Swansea Bay Region, looking at spatial forms, economic structure, environmental impact and social cohesion. Section 3 focuses on the Swansea Bay Strategy. Here I will reconstruct the content of the strategy. Furthermore, I will provide a critical assessment of the strategy on the basis of the territorial analysis.

In the conclusion, I will use the case of the Swansea Bay City region to discuss insofar the moderate approach to urban sustainability constitutes a helpful policy frame in the British and European context.

1. The institutional framework of local development strategy in the UK

Since its election in 2013, the Conservative Coalition has deeply reformed the institutional framework of local development strategy in the UK. The reform has affected different institutional dimensions, including the fiscal base of local authorities, the financing of local development strategy and its governance.

Let us start with the changes in the fiscal base of local authorities. British local authorities are funded through a mix of sources (Local Government Association, 2018; Ministry of Housing Communities & Local Government, 2013). The main sources of finance are council tax, government grants and business rate retention; secondary sources include rents, fees and charges, sales, investments and contributions.

Until the 2010s, the major source of revenue for local authorities was central government grants. In 2015 the average figure was 67 percent of local authority revenue coming from central government grants (Centre for Cities, 2015, p. 6), although major local differences exist (Gray & Barfod, 2018). Grants were financed by pooling a nationally set business rate and allocated to local authorities according to need. The funding formula was explicitly designed to enable spatial redistribution of financial resources.

Since 2013 the Conservative Coalition has reformed this system localising the fiscal base of local authorities (Local Government Association, 2018). The new funding formula envisages local authorities to be mainly funded through retention of business rates. In this scenario, local governments can set business rates within a cap fixed by the central government. In the context of specific deals, combined authorities were given the power to increase the business rate. Consequently, central government grants are strongly reduced. In 2013, the Conservative Government set local retention of business rates up to 50 percent, but the plan is for a 100 percent retention by 2020 (Gray & Barfod, 2018).

The second key reform of the Conservative Coalition regards the empowerment of the private sector in strategic planning. In 2013 the British Government established Local Enterprise Partnerships (LEPs) as the institution responsible for strategic planning at the local scale. LEPs are voluntary associations of local authorities, businesses and other institutions with no fixed geographical boundaries. They replaced New Labour's Regional Development Agencies (REDs), which operated at a fixed scale (namely, NUTS 2 regions) and had the statuary mission to promote economic development within a business-oriented frame and some secondary concerns for sustainable development. LEPs emphasise the role of private business in local strategies even more. They are explicitly designed to be business-led. The official website of the LEP network describes LEPs as 'business led partnerships between local authorities and local private sector'.[9]

The third reform regards the embedding of economic growth in the finance of local development strategies. The Conservative Coalition introduced 'City Deals' to support local development. City Deals are packages of funding and decision-making powers negotiated between central government and local bodies, including councils, combined authorities and local enterprise partnerships (Ward, 2018). They are flexible instruments, employed to devolve powers and provide additional financial resources

[9] https://www.lepnetwork.net/about-leps/location-map/

to local authorities through a case-by-case approach. To get a deal, local authorities have to present an urban strategy, which demonstrates capacity to generate economic growth.

There has been substantial debate among British local development scholars on the consequence of the reform for local action (Bentley, Bailey, & Shutt, 2010; Bentley & Pugalis, 2013; Clarke & Cochrane, 2013; Gray & Barfod, 2018; O'Brien & Pike, 2015). Common concerns regard de-politicisation of local development, deepening of spatial inequality and dis-empowerment of poorer localities. A full discussion of this literature would shift too much focus. What matters in the context of this chapter, is that this literature consistently points out that the new institutional framework pushes local strategy in the UK to be growth centred.

In this new regime, local authorities strongly benefit from promoting economic growth at the scale of the urban region. On the one hand, authorities – through City Deals – can obtain additional resources by presenting economic strategies that promote growth at the scale of the urban region. On the other hand, authorities whose local economy actually grows, profit by retaining business rates.

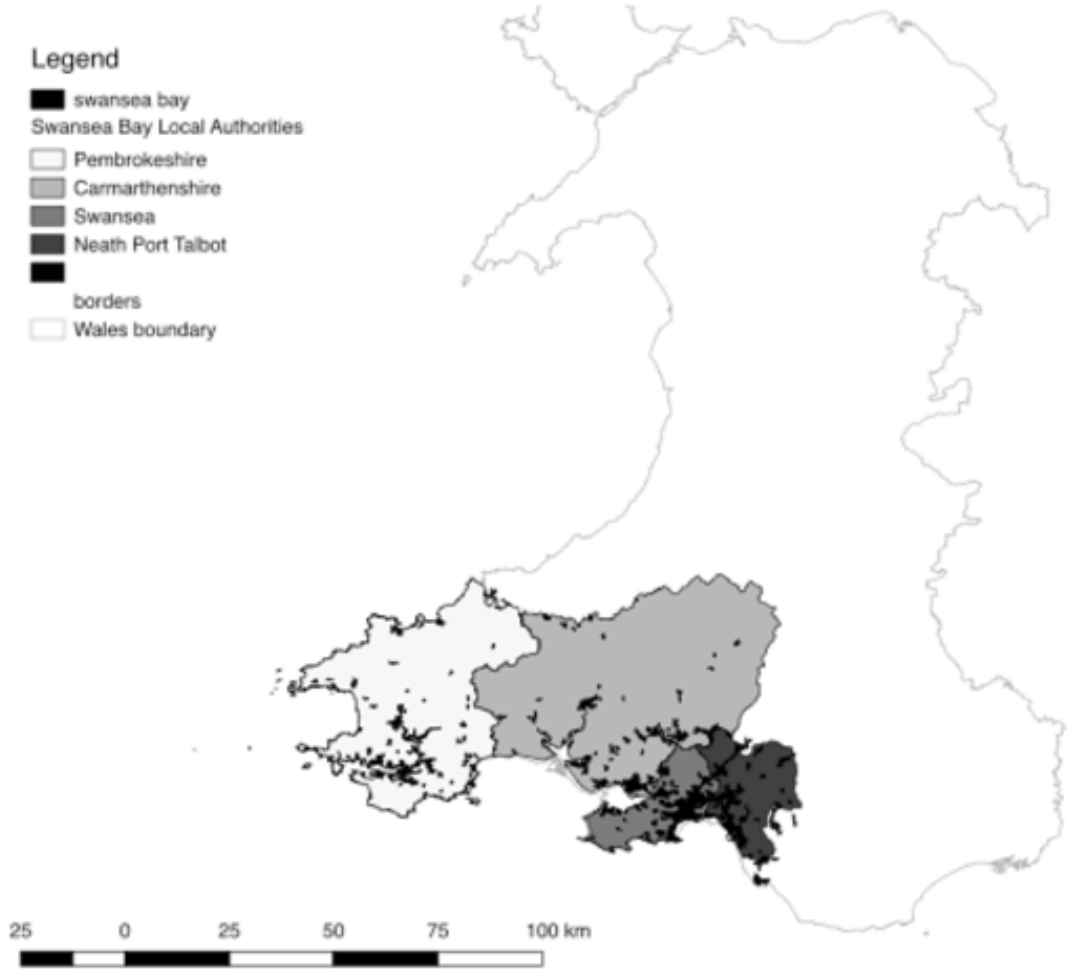
2. The Swansea Bay Region: territorial analysis

As anticipated, I will start the case study by presenting the territorial and administrative articulation of the Swansea Bay City Region. This region is a recently created planning unit with no previous relation to administrative or functional boundaries. At present, the Swansea Bay City Region is an 'aspirational geography', in the sense of a territorial project to be realised over the next decades.

The Welsh Governments established the area as a strategic planning unit in 2004.[10] It comprises a territory that falls under the Unitary Authorities of Carmarthenshire, Neath Port Talbot, Pembrokeshire and Swansea plus small bordering areas of the County of Bridgend and Powys (map in Figure V.1). Altogether, they make up a territorial unit, which amounts to 685,051 inhabitants (Table V.1).

[10] In 2004, the Welsh Assembly officially designated the area for policy planning purposes in the document *People, Places, Futures*, updated in 2008 (Welsh Assembly Government, 2008). In 2012 the unitary authorities of Carmarthenshire, Neath Port, Talbot, Pembrokeshire and Swansea joined to bid for the City Region status, which was obtained in 2013. The publication of the *Swansea Bay City Region Economic Regeneration Strategy 2013-2030* (Swansea Bay City Region, 2013) accompanied the launch of the City Region. In March 2017 the Swansea Bay City Region signed with the Government the *Swansea Bay City Deal.*

Figure V.1 - Swansea Bay City Region in 2011



The main settlement of the region is the city of Swansea – officially the City and County of Swansea. Swansea is the second largest urban centre of Wales after Cardiff. Located in South-West Wales, it had a population of about 241,000 inhabitants in 2011 and of 245,000 in 2016.[11] A ring of small urban settlements connected to Swansea surrounds the city. As a result, the Swansea travel-to-work area has a total population of 390,000 inhabitants.

Table V-1 - Swansea Bay City Region: population by Unitary Authority

	Total	Urban		Rural	
Local Authority	**Count**	**Count**	**%**	**number**	**%**
Pembrokeshire	122439	28178	*23%*	94261	*77%*
Carmarthenshire	183777	89154	*49%*	94623	*51%*
Neath Port Talbot	139812	106074	*76%*	33738	*24%*
Swansea	239023	210418	*88%*	28605	*12%*
Total	685051	433824		251227	

Source: Nomis (Census 2011)

The Swansea Bay City Region is economically and spatially divided in two parts (Figure V.1 and Table V.1). On the one hand, there is the Swansea travel-to-work area, an urban region where 80 per cent of its inhabitants live in urban settlements. On the other hand, there are the so-called 'Western Valleys', which include the territories of Western Carmarthenshire and the Pembrokeshire.

The Western Valleys are a rural region with a total population of 300.000 inhabitants. This is roughly 40 percent of the population of the whole Swansea Bay City Region. The Western valleys are structured in a network of small settlements. At

[11] The 'Swansea Urban Area' is a built-up area larger than the City and County of Swansea. It accommodates about 300,000 inhabitants (2011) and comprises a number of urban settlements in the Swansea Valley and the towns of Neath (wider urban area of about 50,000 inhabitants (2011) and Port Talbot (37,000 inhabitants (2011).

present, this area is not technically the hinterland of Swansea, as it is not part of the Swansea travel-to-work area (table V.2).[12]

Figure V.2 - Swansea Bay City Region's administrative and functional units

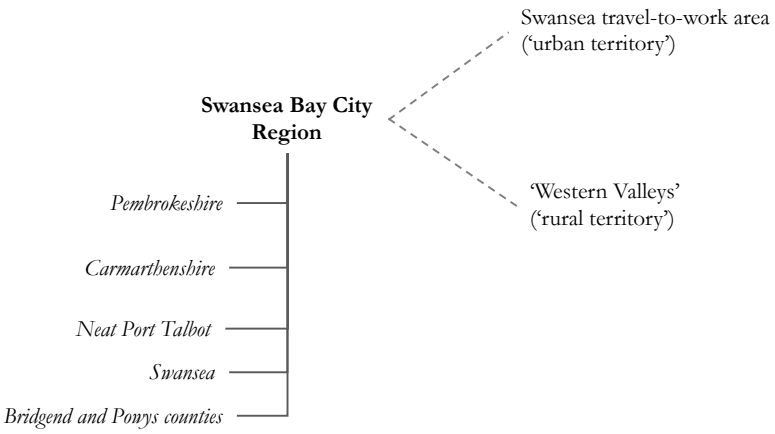


Table V-2 - Swansea Bay City Region: commuting flows

	Total commuters: distance travelled							
Distance travelled	Carmarthenshire		Neath Port Talbot		Pembrokeshire		Swansea	
Less than 10 km	29923	37%	29789	50%	23450	43%	66659	64%
10 km to less than 30 km	23971	29%	16502	28%	11663	21%	12983	13%
30 km and over	8636	11%	4546	8%	4573	8%	8155	8%
Work mainly at or from home	12055	15%	4160	7%	9705	18%	8427	8%
Other	6817	8%	4261	7%	5383	10%	7233	7%
Total	81402	*100%*	59258	100%	54774	100%	103457	100%

Source: *Nomis (2011 Census), ONS*

[12] In the current usage the term 'hinterland' refers to a low-density area – it could be suburban, rural or partially rural – that is economically strongly connected to a major urban settlement.

As a result of strong de-industrialisation – the Swansea Bay City Region lost 30,000 manufacturing jobs between 1990 and 2010 (Earle et al., 2017, p. 12). The economy of the City Region is based on foundational and personal services, which account for almost 75 percent of total employment (table V.3). Swansea, being an administrative centre, has the highest percentage of employment in the foundational sector. 48,705 units out of 108,000 within the boundaries of the Swansea Unitary authority are employed in this sector, which corresponds to 45 percent of total workforce.

Table V-3 - Swansea Bay City Region: employment by Unitary Authority

	Carmarthenshire		Neath Port Talbot		Pembrokeshire		Swansea		Total	
Economic sectors	Count	%	Count	%	Count	%	Count	%	Count	%
Foundational services	28370	42,9	17460	37,8	14525	35,3	48705	45	109060	41,8%
Personal services	20625	31,6	14040	30,6	18230	44	35600	33	88495	33,9%
Traditional manufacturing and co	6735	10,1	7815	17	2690	6,3	5395	4,7	22635	8,7%
Advanced manufacturing and cor	3705	5,7	2640	5,8	1045	2,3	3220	2,8	10610	4,1%
Services to enterprises	5565	8,4	4395	9,4	3965	9,4	15215	14,1	29140	11,2%
Extraction and agriculture	1595	2,4	390	0,8	1675	4,1	100	0	3760	1,4%
Total	66000	100,0	46000	100,0	41000	100,0	108000	100,0	261000	100%

Source: *Nomis 2017*

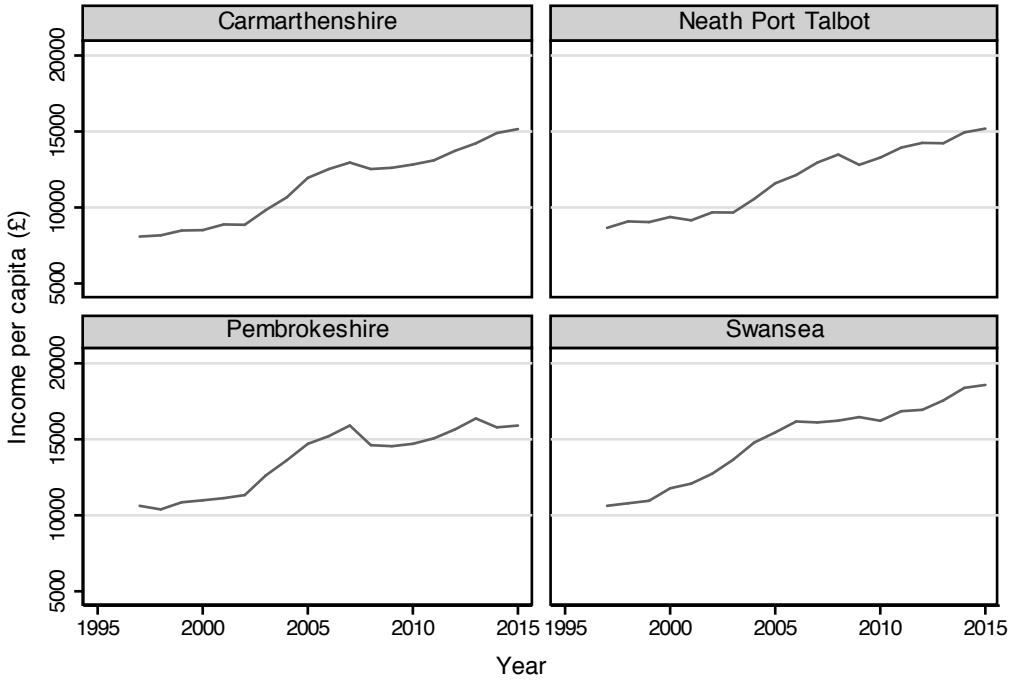
Traditional manufacturing and construction sectors have a varying importance across the City Region. They are rather relevant for Neath Port Talbot – 17 percent of total workers (about 8,000 units) – and Carmarthenshire – 10 percent of total workers (about 7,000 units). In contrast, they are secondary for Pembrokeshire – 6.3 percent of total workers (about 3,000 units) – and for Swansea – 4.7 percent of total workers (about 5,000 units).

Advanced manufacturing and construction constitute a residual fraction of the local economy across the City Region, varying between 25 and 6 percent. The advanced services sector – enterprises producing services to businesses and public bodies – is roughly 9 percent in Carmarthenshire, Pembrokeshire and Neath Port Talbot, whereas is up to 15 per cent in Swansea (about 15,000 units). Employment in agriculture and row material extraction is very low in the City Region. No people in Swansea are formally employed in these sectors, whereas about 400 people – less than 1 per cent of the total workforce – are employed in Neath Port Talbot.

Despite de-industrialisation, average income per capita has grown substantially across the Swansea Bay City Region over the past two decades. In the mid 1990s, average income was slightly over £10,000 in Swansea and Pembrokeshire and around £8,000 in Carmarthenshire and Neath Port Talbot Counties. In 2015 Pembrokeshire,

Carmarthenshire and Neath Port Talbot had an average income of about £15,000, while Swansea reached an average income of £18,000 (Figure V.3).

Figure V.3 - Per capita income by Unitary Authority
(Data source: ONS)

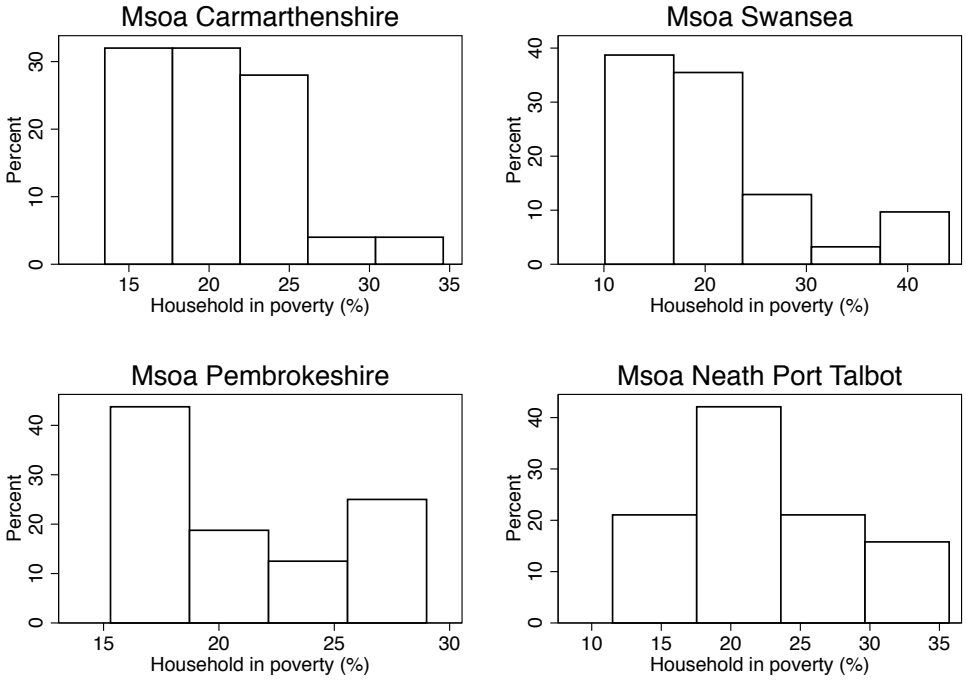


The benefits of economic growth have been unevenly distributed. Compared to median household income, in 2014 20 percent of population in the City Region is still in poverty after deduction of housing costs and net of government transfer. Digging deeper into the geography of poverty, substantial uneven development emerges across the city region.

In order to examine this aspect, I analysed levels of household poverty, at MSOA level. MSOA is the acronym of 'middle layer super-output areas,' a statistical unit of 7,000 inhabitants in average, used in the UK for territorial analysis. Figure V.4 is a set of histograms, which show the proportion of MSOA by level of poverty for each of the 4 unitary authorities of the Swansea Bay. As figure V.4 shows, with the exception of the Carmarthenshire County, each unitary authority has substantial pockets of spatially concentrated poverty. These areas have levels of poverty far higher than the average of the City Region. For instance, Neath Port Talbot has roughly 15 per cent

of MSOA where poverty rate is over 30 percent, while Swansea has 10 per cent of MSOA where poverty rate is over 38 per cent.

Figure V.4 - Distribution of households in poverty by Unitary Authority in 2013/2014 (Data source: ONS)



The cost of economic growth for the Swansea Urban Region has been high in terms of environmental impact. This territory – like practically all regions in Europe – is unsustainable in terms of natural resources consumption and emissions of pollutants. According to the 2015 annual report of the 'Global Environmental Institute' (Stockholm Environmental Institute-GHD, 2015), based on the Ecological Footprint Methodology, the unitary authorities together consumed above 3 hectares of land per capita at the global scale in 2011. The global sustainability threshold is fixed at 1.7 global hectares of land per capita. If the current consumption of natural resources in the Swansea Bay City Region were the average regional consumption globally, 2 and a half planet earth would be required to sustain the economy. The City Region is hence distant from what is the current sustainability threshold of global natural resource consumption.

The Swansea Urban Region is also unsustainable in terms of waste emissions. According to the above-mentioned 2015 annual report, CO2 emissions in the Swansea Bay City Region amounts to an average value of 11 tonnes per capita (table V.5). The sustainable threshold is of 2 tonnes per capita. The territory requires cutting CO2 emissions of almost 80 per cent in the next decades to become sustainable.

Table V-4 - CO2 emissions by Unitary Authority

Unitary authority	**Gha/c per capita**	**tC02 per capita**
Swansea	3.25	11.02
Neath Port Talbot	3.20	10.85
Camarthenshire	3.25	11.36
Pembrokeshire	3.36	11.40

Source: *Stockholm Environment Institute and GHD 2015*

From this analysis, the Swansea Bay City Regions emerges as an area characterised by three main structural development challenges. The first is rebalancing the local economy and rebuild a tradable sector. The second is making the economy more socially and spatially inclusive. The third is drastically reducing natural resource consumption and emission of pollutants. Let us know see how these challenges have been interpreted within the moderate approach to urban sustainability and what kind of urban strategy has been produced to face these challenges.

3. The Swansea Bay Strategy

As in most Europe, the British policy-community has largely received the moderate approach to urban sustainability. Leading publications on urban strategy in the UK strongly incorporate the assumptions of this approach (see for instance *Unlocking growth in cities (2011)*, *Beyond Business Rates* (Centre for Cities, 2015) and *Competitive Cities, Prosperous People: A Core Cities Prospectus for Growth* (Core Cities, 2013).

Over the past decade, the moderate approach to urban sustainability has been applied to the Swansea Bay City Region. The process has entailed the production of a

number of strategic documents – the *Wales Spatial Plan* (Welsh Assembly Government, 2008) and the *Swansea Bay City Region Economic Regeneration Strategy* (2013) – and culminated in a City Deal, *Swansea Bay City Deal*, signed in (2016).

The following section is structured in two parts. In the first, I will reconstruct the content of the Swansea Bay Strategy, analysing the above-mentioned strategic documents. In the second section, I will critically discuss the strategy with reference to the territorial analysis of the previous section.

The content of the strategy

I will start the analysis of the Swansea Bay Strategy with the *Wales Spatial Plan*. The *Wales Spatial Plan* is the first and most strategic of the 3 main documents of the Swansea Bay Strategy. The document sets the conceptual coordinates on which the *Swansea Bay City Region Economic Regeneration Strategy* and the *Swansea Bay City Deal* are based.

The *Wales Spatial Plan* acknowledges the split between the Swansea travel-to-work area – called Swansea Waterfront – and the sparse settlements of the Western Carmarthenshire and Pembrokeshire, called Western Valleys' This plan, schematized in Figure V.5, identifies the Swansea Waterfront as the 'main driver for economic growth in the region' (Welsh Assembly Government, 2008, p. 110) and the place where to concentrate the development policies. The Western Valleys area is expected to develop through spill-over effects. In this regard, the *Wales Spatial Plan* emphasises the need to 'develop a strong network of urban centres across the region which spread prosperity to surrounding smaller settlements' (Welsh Assembly Government, 2008, p. 110). It also stresses that to 'achieve the aim of spreading prosperity throughout the region it is critical that all communities are linked to the key employment hubs by both road links and public transport provision' (Welsh Assembly Government, 2008, p. 112). The plan establishes 11 key settlements, which constitute the economic and spatial hotspots of the City Region.

Figure V.5 - The Wales Spatial Plan

Vision	Challenges	*Strategic assets*	*Policy fields*
Diverse economy	Unused territorial capital	*Expertise in life sciences, digital media, creative industries, telecommunications, nanotechnology, energy and environmental science*	ICT infrastructure
Innovative economy	Low-skilled labour force	*Established Medical School*	Tourism infrastructure
Knowledge-based economy	Low labour market accessibility	*Natural resources (Gower, Black Mountain, Afan Forest)*	Road infrastructure
Touristic region	High share of employment in 'traditional' sectors	*Swansea Waterfront*	Innovation park
			Labour force skill
			Waterfront regeneration

The *Wales Spatial Plan* identifies the main barriers to development of the region in the high economic inactivity, the backward industry structure, the lack of access to the labour market and an the under skilled workforce. The Plan's development vision is to diversify the economy of the Swansea Bay Region. This means a larger proportion of 'innovative/knowledge-based' economies for the Swansea Waterfront and an all-year tourism industry for the Western Valleys.

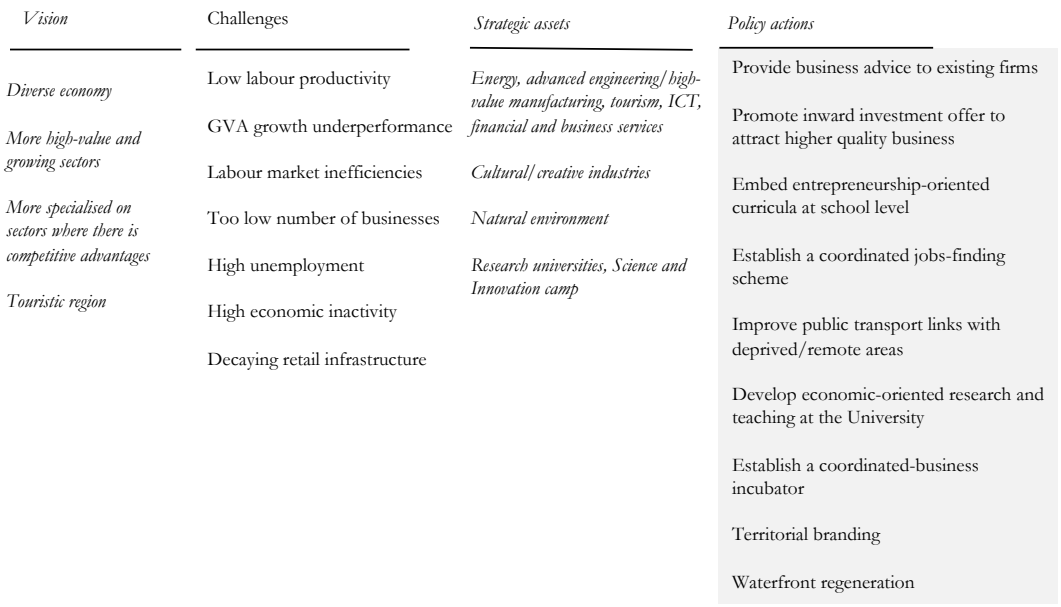
The *Wales Spatial Plan* identifies the main development assets of the area in the natural resources of the Western valleys, the Swansea waterfront and in the research institutions and businesses of the advanced sectors. The definition of advanced sectors includes life sciences, digital media, telecommunications, nanotechnologies and the energy and the medical sector. With regard to policy, the plan's main lines of intervention include improving mobility and ICT infrastructures, property development in the Swansea waterfront, the creation of an innovation park and an integrated up-skilling programme.

As anticipated, the second document I will review in the analysis of the Swansea Bay Strategy is the *Swansea Bay City Region Economic Regeneration Strategy*. This document was released in 2013. The document confirms the overall development vision of the *Wales Spatial Plan* (cf. Figure V.5 and Figure V.6). Building on that vision, the document proposes an empirical place-analysis and a set of related policy recommendations.

The *Swansea Bay City Region Economic Regeneration Strategy* provides a detailed analysis of the industry structure of the Swansea Bay Region in terms of employment and productivity. The analysis makes the case for conceptualising the main development challenge of the region as a productivity gap with better performing regions. Furthermore, it proposes the expansion of advanced sectors as the main way to develop the region.

With regards to policy, the *Swansea Bay City Region Economic Regeneration Strategy* recommends the establishment of city-regional agencies including a business incubator, a business development agency and a job recruitment agency. Moreover, it recommends the creation of an inward investment package, a territorial branding strategy for the whole City Region, the promotion of entrepreneurship in schools, the expansion of economic-oriented research and teaching in universities and the improvement of public transport between rural and urban areas.

Figure V.6 - The Swansea Bay City Region Economic Regeneration Strategy

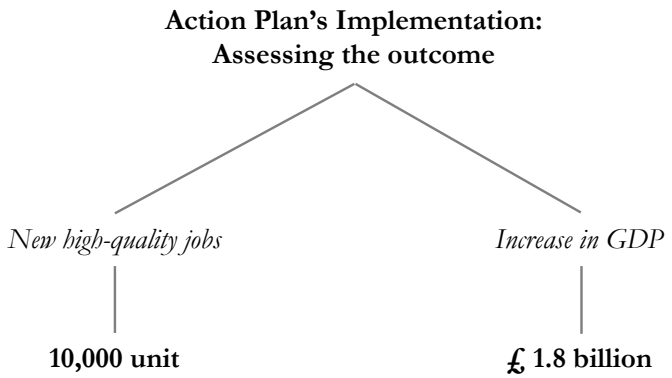


The third document I will analyse is the *Swansea Bay City Deal*. Compared to the other documents, the *Swansea Bat City Deal* is of different nature. It constitutes a legally binding document, which ensures additional revenue streams to the Swansea Bay in relation to the accomplishment of a set of policies and projects.

The stakeholders involved in the City Deal are the Unitary Authorities – Carmarthenshire Council, Swansea Council, Neath Port Talbot Council and Pembrokeshire Council – the Swansea University, the Abertawe Bro Morgannwg and Hywel Dda University Health Boards, the University of Wales Trinity Saint David, and a selection of private sector organisations.

In the words of its architects, the aim of the City Deal is to provide 'an opportunity to continue tackling the area's barriers to economic growth through developing higher value sectors and higher value employment opportunities to match; increasing the number of businesses within these sectors to widen the economic base; and improving the region's GVA level against the UK average (UK Government-Welsh Government, 2016, p. 3). The outcome of the plan's implementation is measured in terms of 'number of new high-quality jobs' and 'GDP increase'. The policy target is respectively the creation of 10,000 new high-quality jobs and a £1.8 billion increase in GDP (see Figure V.7).

Figure V.7 - Output of the Action Plan



In order to implement the Action Plan a £1,3 billion investments is planned. Public institutions will provide roughly 50 percent of the investments. Private organisations are expected to contribute to the other half. The contribution by the Welsh government and the UK government amounts to 19 percent of the investment (table V.8).

Figure V.8 - Funding streams of the City Deal

Institutions	Amount (Millions of £)
Welsh and UK government	241
Other public sector investment	396
Private investment	637
Total	**1274**

Source: https://www.swanseabaycitydeal.wales/about/

The interventions of the action plan are 11 projects, which are grouped into four areas: a) the Internet of Economic Acceleration, b) Smart manufacturing, c) the Internet of Life Science and Wellbeing and d) the Internet of Energy. These projects are:

1. Homes as power stations: building new ecological houses, retrofitting existing building stock and deliver construction skills in green building.
2. Digital Infrastructure: provision of broadband infrastructure in urban and rural areas.
3. Centre of Excellence in Next Generation Services: office space for companies in the advanced service sector.
4. Canolfan S4C Yr Egin: office space for creative industries.
5. Swansea City and Waterfront Digital District: office space and homes for creative workers plus cultural facilities.
6. Pembroke Dock Marine: research centre in blue energy.
7. Life Science and Well-Being Village: workspace and housing for healthcare professionals.
8. Life Science and Well-being Campus: research centre and business incubator in the life-sciences.
9. Steel Science: research centre in steel industry, which works as an open access facility for the steel and metal supply chain.
10. Skills and Talent initiative: identification and delivery of the skills and training requirements for all City Deal projects.
11. Factory of the future: research centre in smart manufacturing.

Three of the projects involve interventions across the City Region. The others are site-specific and involve property development in particular areas of the region. Most of the site-specific projects concentrate in the Swansea travel-to-work area, in the counties of Swansea, Neath-Port Talbot and Carmarthen. Only two of the site-specific projects will take place in the Western Valleys.

The Assessment

In this last sub-section, I will assess insofar the Swansea Bay Strategy responds to the economic, social and environmental challenges of the region. The territorial analysis of the Swansea Region has uncovered a number of evident development challenges. The first is rebuilding a fairer local economy after decades of de-industrialisation and un-inclusive growth. The second is finding a development model, which drastically reduces environmental impact in terms of consumption of natural resources and CO2 emissions.

The Swansea Bay Strategy partially responds to these challenges. Firstly, it entails a strategy to expand the tradable sector. This is an important objective. As a consequence of de-industrialisation, the region has lost a substantial part of its tradable production and the 'imported' wealth associated. A larger tradable sector can increase wealth and employment in the area.

Secondly, the Swansea Bay Strategy responds to the development challenges of the area by committing to the de-carbonisation of energy production. Energy production is a main source of pollution. The Swansea Bay Strategy entails an ambitious plan for the construction of a green energy production facility. This is a crucial objective for sustainable welfare in this territory.

Furthermore, the Swansea Bay Strategy responds to the development challenges of the region by committing to retrofitting the housing stock. Heating and cooling buildings is another main source of ecological footprint and CO2 emissions in the area. De-carbonising the housing stock is a relevant objective for making the region sustainable.

However, the Swansea Bay Strategy seems too superficial given the scale of the sustainability challenges of the region. Furthermore, it seems too superficial considering the spatial articulation of the area. I have identified a number of weaknesses, which pertain the spatial, environmental, social and economic domain. Let us look more closely at those weaknesses.

A. Spatial weaknesses.

The City Deal concentrates most investments in the Swansea Urban Area. As identified by the territorial analysis, the Swansea Bay Urban Area is indeed a travel-to-work area. It is hence reasonable to assume that within this sub-region spatial spill-overs will occur through private consumption flows and supply chain relations. In

contrast, as shown in the territorial analysis, the Western Valleys are not part of the same travel-to-work area. With no analysis of the consumption flows and supply chain relations between the Swansea Urban Area and the Western Valleys, the strategy does not provide an explanation of how the investments will eventually spillover to the Western Valleys. This risks to consolidate or deepen further the spatial inequalities within the Swansea Bay Area.

B. Economic weaknesses.

A further problematic aspect of the Swansea Bay Strategy is the narrow focus of its economic policy. Influenced by the assumptions of the moderate approach to sustainability, the Swansea Bay Strategy focuses on trade-oriented development through expansion of high-tech sectors.

This is a sensible objective. The problem is that the Swansea Strategy proposes this line of intervention as a way to strengthen the whole local economy. Consequently, it excludes other sectors from economic policy. As shown in the previous section of this chapter, advanced enterprises constitute a small subset of the local employment base. The Swansea Strategy does not provide an analysis of the supply-chain of these enterprises. As a result, there is no evidence that the growth of the advanced sector can substantially strengthen the economy of the whole city region.

A realistic economic strategy should have considered that the local tradable sector is largely made of enterprises in the mundane economy. Furthermore, it should have considered the large foundational sector. However, the Swansea Bay Strategy leaves the economic sectors that account for most of the total employment across the City Region with no development policy.

C. Social weaknesses.

The Swansea Bay Strategy focuses on economic growth and increasing average income to produce collective wellbeing in the area. However, this policy seems inadequate to have the expected results given the socio-economic analysis of the area. As shown in the previous section, the Swansea Bay City regions has grown despite de-industrialisation. Yet relative inequalities have stagnated with peaks of 30 percent in some areas of the region. This suggests that the wage structure is incapable of diffusing welfare across the social body.

In this context, the Strategy proposes the upskilling of the workforce as a way to promote social cohesion. The idea is to link the new jobs in the advanced economy – assumed to be well payed – to the weaker section of the local workforce. This programme theory is highly problematic. Even assuming that the new jobs will go to underpaid workers which go through the up skilling programme, the advanced economy is very small in terms of employment. As a consequence, this will not substantially alter the unequal wage structure of the area and hence will have very limited effects in terms of social cohesion.

D. Environmental weaknesses.

The third crucial shortcoming of the Swansea Bay Strategy regards the residual treatment of the ecological question. As shown in the territorial analysis, the Swansea Bay City Region is highly unsustainable according to major indicators such as CO2 emissions and ecological footprint (Stockholm Environmental Institute-GHD, 2015). The region needs to reduce CO2 emissions from the current emission level of 10 tonnes per capita to 2 tonnes per capita. In addition, this territory needs to reduce its footprint from over 3 hectares per capita to 1,7 hectares per capita, which account for a reduction of almost 50 reduction. As pointed to in the previous chapter (chapter 4), CO2 emissions and ecological footprints express structural features of local economies. The ecological transition of the Swansea City Region would hence require structural changes in terms of consumption, production and transport patterns. As previously discussed, a number of actions outlined in the Swansea Bay Strategy aim at de-carbonising the housing stock and the production of energy. However, given the scale and structural nature of the challenges, these interventions seem too small and vaguely defined. The residual treatment of the ecological question in the Swansea Bay Strategy has led to another major weakness of the strategy. Unlike other urban regions in the UK, the Swansea Bay City Region covers a large rural area in the West. The Strategy conceptualises the assets of this area as tourist and recreational destinations. While the rural and natural areas of the Western Valleys may well exert this function, this conceptualisation dramatically underestimates their importance as environmental assets. Natural and rural lands enable reforestation and promotion of local food systems. From an ecological perspective, they are major environmental assets.

4. The limits of the moderate approach to urban sustainability

This chapter explored how the moderate approach to urban sustainability works in practice. As discussed in Chapter 2, this approach focuses on promoting inclusive and green growth through a set of strategic adjustments. These adjustments typically pertain a) expanding the tradable sector and improving its productivity, b) favour urban agglomeration, d) promote green energy, c) upskill the labour market d) and retrofit the building stock.

The moderate approach to urban sustainability has been applied in the Swansea City Region leading to an urban strategy. The Swansea Bay Strategy proposes the following main policies: a) property development in the main urban area of the region – that is the Swansea travel to work area; b) support to industries in the health and steel sectors through new research centres; d) facility for green energy production; c) a city-regional upskilling programme.

These policies can improve the sustainability of the Swansea Bay Area. However, they seem insufficient to address the deep spatial, environmental, social and economic challenges. As shown in the territorial analysis, the Swansea Bay Region has dramatic

ecological imbalances, a substantial spatial division between urban and rural areas and a structural incapacity to generate social cohesion, which dates back at least two decades. As shown in Chapter 3, most cities in the UK share similar development challenges.

The Wales Spatial Plan of 2008 – the first of the strategic documents – identifies most of these challenges. However, in the subsequent documents, the pursuit of economic growth becomes central, relegating social and the environmental challenges to secondary concerns.

As a result, the strategic planning process fails in two crucial ways. The first is quantifying and understanding the social and environmental challenges of the region. The strategy does not adequately explore empirically social cohesion, especially if compared to the in-depth analysis of the productivity problem of the Swansea Bay economy. Similarly, the strategic planning process does not entail an in-depth empirical analysis of the environmental impact of the area.

This feeds into the second major weakness of the Swansea Bay Strategy. This is not providing a convincing response to the development challenge of the region, beyond traditional and already tried policies and assumptions. The structural lack of social cohesion of the area and the dramatic environmental impact call for deep-reorganisation of the local economy, the welfare state, the spatial organisation and the transport infrastructure of the region.

However, the strategy constructs the problem of social cohesion as a conjunctural problem related to the transition of the Swansea Bay economy. Consequently, it proposes to solve the problem through a regeneration of few sectors of the economy with a negligible overall occupational impact. Similarly, it constructs the problem of the dramatic environmental impact of the region as solvable with techno-fixes in energy production and the housing stock.

This raises important questions about the capacity of the moderate approach to urban sustainability to work in contexts, which require structural change. This approach starts from the assumptions that urban sustainability in Europe is reachable with a set of strategic adjustments. As the case of Swansea shows, when confronted with a territory, which requires instead structural change, this approach dramatically underestimate the scale of the sustainability challenges. As a result, it proposes policies, which arguably will not solve the long-term problems of the area.

The main problem in this regard is the fixation with economic growth. The Swansea Bay – as most region in the UK and Europe – has reached a level of environmental impact, which requires a deep rethinking of what it means to grow economically. In this scenario, growth as we know it can only be possible in relation to selected services with low matter and energy consumption. In all other sectors, downscaling of production to a steady-state equilibrium is necessary. This will require structural re-organisation of the economy, the labour market and social policy.

The Swansea Bay Strategy shows that, in practice, notions like inclusive and green growth do not imply a rethinking of growth. They do not consider any serious shift from generalised economic growth to growth only in specific green and social sectors. They refer to a different way to *generate* economic growth, which tries to create better employment and limits environmental impact. This approach seems inadequate and misleading in the face of the deep sustainability challenges of British and European cities.

VI. THE RADICAL APPROACH TO URBAN SUSTAINABILITY: A POTENTIAL ALTERNATIVE?

The previous chapters analysed the application of the moderate approach to urban sustainability – which is today the mainstream approach across Europe – to the Swansea City Region. In this chapter, I will analyse how the radical approach to urban sustainability works in practice. As discusses in the chapter II, radical approaches to urban sustainability are emerging all over Europe.

The research strategy of this chapter is different than the strategy used in the previous chapter to analyse the moderate approach to sustainability. I will not analyse an urban strategy inspired by the radical approach to urban sustainability. Instead, I will do the following experiment. I will apply the radical approach to the regeneration of a neighbourhood and see to what strategy it leads. I will then critically discuss the resulting strategy. The reasons for this methodological choice are discussed in chapter III.

As discussed in chapter II, the radical approach to urban sustainability has many variants across Europe. Here, I will work by mixing 2 variants of the radical approach:

- The Foundational Approach, which focuses on improving welfare through high-quality and universal coverage of basic needs.
- The Ecological Approach, which focuses on improving welfare while radically diminishing human impact on natural systems.

The Foundational and the Ecological Approach have been firstly developed with reference to national economies. In this exercise, I will apply the two approaches to the local scale. The exercise is part of a broader research project on rethinking local development policy involving a team of researchers of the Foundational Economy Collective. The first results were recently published (Calafati et al., 2019).

The mixing of the Ecological and the Foundational approach and their policy-oriented application to the local scale creates a number of theoretical issues. The chapter will hence start with a discussion of the challenges of bringing together ecological and foundational thinking at work in places.

The chapter will than continue with a discussion of the system-based approach to policy. In the exercise, I will analyse Morriston and then outline a development vision and a policy strategy. Epistemologically and methodologically, this step is problematic. I will hence dedicate a section to discuss the epistemological and methodological assumptions that underline my approach to policy design.

The exercise of this chapter cannot be a full application of the radical approach, which would be beyond the scope of this work. It is rather a way to explore insofar the radical approach to urban sustainability leads to different understanding of places and development strategies.

1. Operationalizing the radical approach to places

The Foundational Approach – also Foundational Economy Approach – is an emerging approach to development, which situates within the family of the radical approaches to sustainability. It has started with a concern for national economies focusing on 'foundational economic sectors' (Bentham et al., 2013), that is economic activities directly concerned with the provision of welfare-critical goods and services such as housing, transport, education, food, energy, water and healthcare.

The Foundational Approach has developed from a critique of the neoliberal re-organisation of welfare-critical provision systems, looking at public utilities, health-care, transport and food provision. The critique is that the neoliberal re-organisation of welfare-critical systems has prioritised financial extraction at the expenses of consumers and workers. This resulted in higher profits, yet also lower quality in the provision, bad working condition and exploitative relation among suppliers. In contrast, the Foundational Approach proposes a systemic re-organisation of those sectors centred around a) quality and accessibility of the good or service and b) fair working condition across the supply chain.

Over time, the Foundational Approach has progressively moved into the realm of regions, cities, and local development (Earle et al., 2017; Engelen et al., 2016; Engelen et al., 2014). Furthermore, it has started to dialogue with the ecological perspective (D'Alisa et al., 2015; Hickel & Kallis, 2019; Kallis et al., 2018; Raworth, 2017; Wackernagel et al., 2006; Wackernagel & Rees, 1996). An approach, which fully integrates Foundational and Ecological thinking at the local scale is still work in progress. The present research is part of a series attempts to build such approach (Calafati et al., 2019; Froud et al., 2018).

In this section, I will systematise and develop the current discussion on places, the foundational economy and the environment. The aim is operationalizing a new policy approach to local development. The discussion revolves around 3 main themes: a) what makes places work, b) how to fix and develop places and c) how to embed ecology into foundational thinking. Let us look more closely at these questions.

The first theme – what makes places work – regards the capacity of a place to provide welfare and quality of life to its inhabitants. Foundational thinking is critical of the mainstream understanding of places, that considers GDP and income as the key variables to assess if a place works or not. Furthermore, it also recognises the limits of the foundational economy in producing local welfare.

The foundational economy is typically the basis of local welfare in terms of consumption and employment in most European cities and towns. However, local welfare in affluent societies does not only depend from the consumption of foundational goods and services. Many non-foundational services – such as sport, recreation and cultural consumption – are key for welfare in European countries. Furthermore, in most cities and towns, the foundational economy is just one – although relevant – part of the economic base.

Building on this consideration, foundational thinking proposes an alternative understanding of places centred on four key infrastructures (Calafati et al., 2019):

a) The foundational infrastructures, which comprises all the fixed resources essential for livelihood from supermarket to clinics to affordable housing.
b) The mobility infrastructure, which comprises the resources that make people move, from cars to bikes lanes.
c) The income infrastructure, which comprises all the resources that generate income, from jobs to pensions.
d) The social infrastructure, which comprises all the resources which are not essential for livelihoods, yet relevant for individual and collective wellbeing, including parks, libraries, cafes, concerts halls and so on.

From this perspective, a place works when it provides quality access to the 4 infrastructures to all its inhabitants.

A second key theme in the development of a Foundational thinking is how to fix and develop places. The starting idea is that places do not improve when their GDP increases. Places improve when the 4 infrastructures outlined above work better and hence basic and non-basic needs are better satisfied.

In this regard, Foundational thinking embraces a wide few of what it means to improve material conditions in a place. Such perspective looks beyond mainstream social and economic policy and their fixation with private firms and wages as the main drivers of wellbeing. So far, foundational local development policy has included proposal as varied as: a) changing the business model of firms in the foundational economy so to provide services more effectively to all; b) growing grounded firms – that is firms rooted in a territory which act responsibly – in traditional manufacturing sectors such as furniture; c) re-organise the supply chain of foundational sectors – for instance of food distribution – to stabilise employment across the supply chain; d) reform local taxation – through a tax on property appreciation – to strengthen the economic base of local councils.

In the discussion on how to develop a new approach to place-development a main issue in Foundational thinking has been avoiding the so-called 'local trap' (Purcell, 2006). The expression local trap refers to the assumption that the local scale is the best scale for enacting progressive policies. In nationally organised countries – embedded in world- economies and trans-national political systems – cities and regions are often

distribution nodes or terminals of nationally and transnationally organised provision systems. In some cases, at the local scale – as for energy or food for instance – substantial re-organisation is possible. However, in other cases – such as health care – is necessary to work at national scale to achieve system change.

A last key theme in the development of Foundational thinking has been embedding Ecological thought. Modern ecological thinking developed in the 1970s and 1980s (see for instance Meadows et al., 1972; Schumacher, 1973), but, in the context of Europe, its roots can be traced back to early 20th century in the work of urban planners such as Patrick Geddes (1915, 1998). In the face of increasing awareness of the environmental crisis, ecological thinking has regained momentum over the last few years (see for instance D'Alisa et al., 2015; Hickel, 2019; Raworth, 2017).

Modern ecological thought developed from a critique of post-war productivism and consumerism. On the one hand, it denounced productivism – both in its socialist and capitalist variant – for its destructive impact on natural systems. On the other hand, it criticises consumerism – defined as an unreasoned tendency to increase consumption – as a way to generate collective welfare.

In contrast, ecological thought proposes to redesign economic system from growth to 'enoughness'. Furthermore, it proposes to shift from quantitatively growing consumption to improving consumption in quality. At last, it proposes to profoundly redistribute wealth to guarantee decent levels of welfare to all.

Combining Foundational and Ecological thinking generates a solid vision of sustainable development as re-organisation of production and consumption, beyond simplistic pro-growth and degrowth approaches. The starting point is the varying impact in terms of environmental impact and social wellbeing of different categories of products.

Goods and services have different environmental impact in relation to how their provisioning is organised. According to a recent study of key members of the Footprint Network (Baabou et al., 2017) at present the consumption categories with the highest ecological footprint are food, transport, consumer goods and housing. In comparison, services have a negligible environmental impact.

Similarly, goods and services have different impacts on welfare in relation to how the contribute to people's wellbeing. Some – like appropriate housing and healthy food – have a decisive effect on our quality of life. Others, like cheap electronics or fast fashion, contribute much less to individual wellbeing.

Combining these insights – and considering a reduction in matter and energy intensive products and services unavoidable (Hickel & Kallis, 2019; Kallis et al., 2018) the perspective developed here proposes a matrix of degrowth and growth in relation to different economic sectors. It proposes degrowth in sectors with high ecological footprint yet limited contribution to wellbeing. Furthermore, it proposes ecological conversion of sectors with high contribution to wellbeing and high ecological footprint (food, transport and energy production). At last, it proposes growth in sectors with

limited ecological footprint and high impact on wellbeing, like healthcare.

Table VI-1 - Ecological footprint and wellbeing

	Low ecological footprint	**High ecological footprint**
Low contribution to wellbeing	Betting, advertising	Disposable consumer goods (fast fashion, cheap electronics)
High contribution to wellbeing	Health services, education, public parks	Food, transport, energy

2. The system-based approach to policy

Public policy – as any kind of intervention – can be done within different approaches. In this exercise I will work with a particular approach, called 'system-based approach to policy'. This approach is less known than mainstream approaches to public policy design, which typically start from positivistic assumptions about the social world. In this section I will focus on the key ideas of the system-based approach to policy and on contrasting this approach to the positivist approach.

The key concept of the system-based approach to policy is indeed the concept of system. A system is a set of factors, which – by interacting together – produce patterns or regularities (Meadows, 2009, p. 11). In this sense systems are qualitatively and fundamentally different from a 'set of causes'. A set of causes is an a-contextual list of factors which might influence a certain pattern. In contrast, a system is a connected set of mechanisms, which produces certain effects exactly because they are bound together and unleashed in a specific context. This is the sense of the famous phrase that a system is 'more than the sum of its parts'.

Influenced by positivism and reductionism, over the past decades public policy has privileged an atomistic approach to policy over a system perspective (Meadows, 2009; Nelson & Stolterman, 2012; Pawson & Tilley, 1997). Following the atomistic view, applied policy research has focused on a) identifying the different causes of a specific social phenomenon and on b) and trying to weight the relative effects of those causes to identify the most important causes against less important causes.

Two methods are mostly employed in this endeavour. On the one hand, there is

the statistical method, which is not to be confused with quantification. Using regression analysis, researchers compare the effects of a set of causes on a large number of cases to identify mean effects. They then proceed to compare these mean effects to decide which cause is in average the strongest compared to others.

On the other hand, there is the experimental method, which recently has become again the gold standard in mainstream policy research despite a long history of failings dating back to the 1970s (Pawson & Tilley, 1997). This approach uses quantitative measures yet is not statistical in nature in the sense that it uses only two cases – instead of a large number of cases – to estimate the influence of a cause. These two carefully selected cases are the experimental case – where a specific causing force is unleashed in a system to estimate its effects; the other case is the control case, where an identical system is observed in its development without the introduction of the causing force. From the study of the eventual differences between the two systems, the strength of a cause is estimated.

The problem with positivistic approaches to causality is that they dramatically fail to understand the systemic nature of the social world and the interdependences among the mechanisms that shape its evolution (Meadows, 2009; Pawson & Tilley, 1997). Social drivers and mechanisms are not important in itself because they cause certain patterns of behaviour. They acquire relevance exactly because they are fused, connected or assembled together to other mechanisms in systems, which then create certain patterned outcomes.

Once a set of drivers fuses into a system, it may be difficult to isolate and quantify the contribution of a specific driver in the production of certain social patterns (Meadows, 2009, p. 17). In a functioning system, a certain component may be directly irrelevant in the production of an observed outcome. Yet it may have been critical to solidify that set of factors in a way that produces a certain outcome. In a functioning system that component may not exert any influence to cause certain outcomes, yet its absence would not make the system work at all.

Building on this theoretical consideration, system-based public policy adopts a radically different standpoint than positivist public policy (Meadows, 2009; Nelson & Stolterman, 2012; Pawson & Tilley, 1997). This approach is not concerned with strictly quantifying and comparing different causes of a social phenomenon. In contrast – adopting a holistic perspective –, it is concerned with describing and understanding how specific systems work.

This applies both to diagnosis – the practice of understanding the policy problem in a given context – and prognosis – the practice of proposing a policy solution. In system-based public policy, diagnosis focuses on identifying a manageable number of factors that – in interaction – may have generated the system that produces the current patterns of behaviours. When then it comes to prognosis and policy advice, the systemic approach to policy focuses on redesigning systems to consistently incentive the social patterns that a policy wishes to promote.

The following policy exercise borrows from the assumptions of system-based policy. This is especially the case with section 4 – A development strategy for Morriston from a radical sustainability perspective –, where I outline a set of strategic interventions to make Morriston sustainable.

3. Understanding Morriston from the perspective of radical sustainability

In what follows I shall apply the Radical Approach to urban sustainability to Morriston, a neighbourhood of the City and County of Swansea of 16,500 inhabitants located in the north of the county. The project 'Regeneration Morriston' provided the opportunity to work on this neighbourhood.[13] Supported by a coalition of public, private and third sector organisations, the project promotes a public discussion on the regeneration of the area with a particular focus on Woodfield Street, the main street of the settlement.

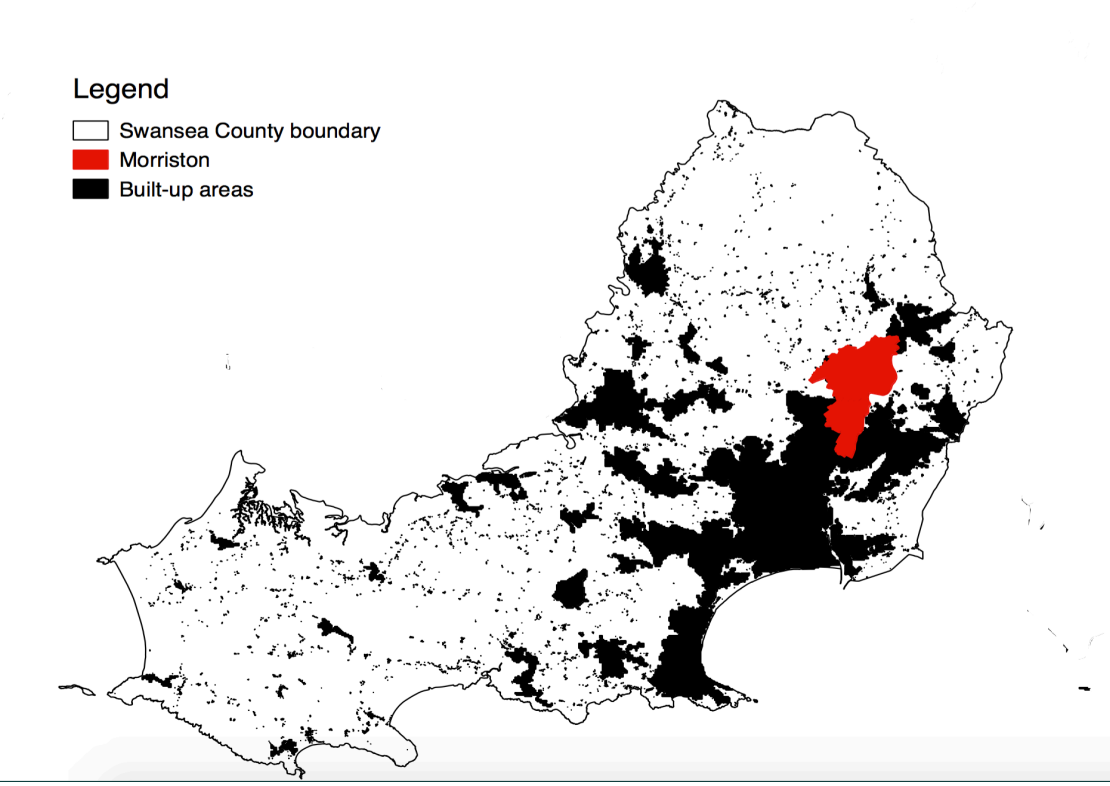
The Radical Approach will be applied in two ways. Firstly, it will be applied to understand the place. Secondly, it will be applied to think about its development strategy.

Territorial profile

Morriston is an ordinary suburb. Similar suburbs can be found in many European cities. Once a separated town, Morriston was integrated in the Swansea urban fabric as a consequence of the city's growth. The core of the settlement was developed in the late 1780s to house workers in the copper-smelting industry of the lower Swansea Valley. During the 20th century the area went through repeated waves of de-industrialisation. To address economic downturn, in the 1980s the industrial area of Morriston was turned into and largest Enterprise Zone in the UK.

[13] https://www.swansea.gov.uk/RegenerationMorriston

Figure VI.1 - Built-up areas in the Swansea County boundaries
(Source: CDRC 2011 Census Geodata pack)

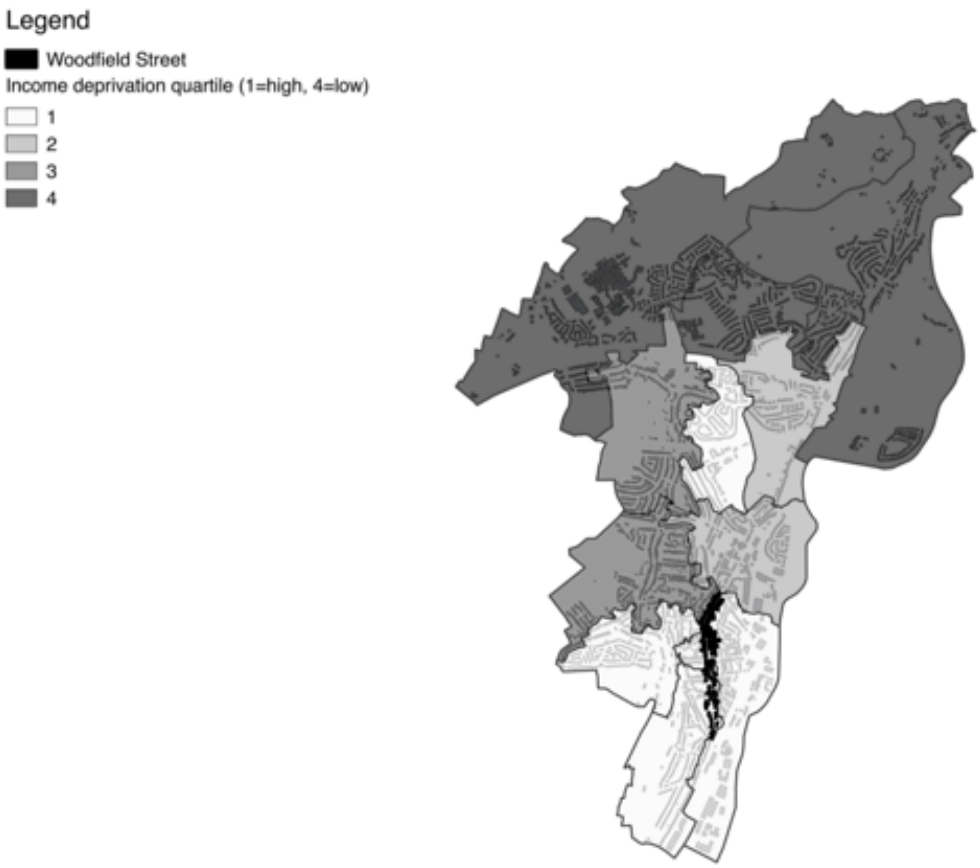


From 2006 to 2016 the population of Morriston declined by 400 people. This accounts for a 2 percent decline. Its social composition is mixed and reflects the social profile of Swansea demographically, socially and ethnically. 27 percent of Morriston residents have managerial, administrative and professional occupations. Household income is 13 percent below Swansea household income. This is due to a tail of deprivation spatially concentrated in some LSOAs.[14] According to the Welsh Index of Multiple Deprivation, 3 out of Morriston's 11 LSOAs are in the bottom 10 percent of Wales I terms of income. All this configures Morriston not as a deprived suburb. The neighbourhood is rather a moderately middle-class district with pockets of poverty.

[14] Lower layer super output areas (LSOAs) are a statistical unit for territorial analysis. The mean is 1,500 inhabitants.

Figure VI.2 - Morriston in 2014

(Source: CDRC 2011 Census Geodata pack, Stats Wales)



The neighbouring ward of Llansamlet needs to be considered to understand the employment structure of the area. The Swansea Enterprise Park is situated 3 kms from the centre of Morriston and offers employment to the resident of Morriston. The Park is formally located in the ward of Llasnamlet.

Unlike most suburbs, Morriston has a complex economy. As Table VI.2 shows, Morriston has employment in foundational services, high-end services, manufacturing and retail. The two main public employers are the Driver and Vehicle Licensing Agency (DVLA from now on) and the Morriston Hospital.

Table VI-2 - Morriston's economy

Sector	Count	Percentage	Cumulative percentage
Foundational services	7245	77%	77%
Mundane services	1.580	17%	94%
Mundane manufacturing and construction	105	1%	95%
High-end services	365	4%	99%
High-end manufacturing and construction	135	1%	100%
Total	**9.430**	**100%**	**100%**

Source: Nomis 2011

Analysis of foundational consumption

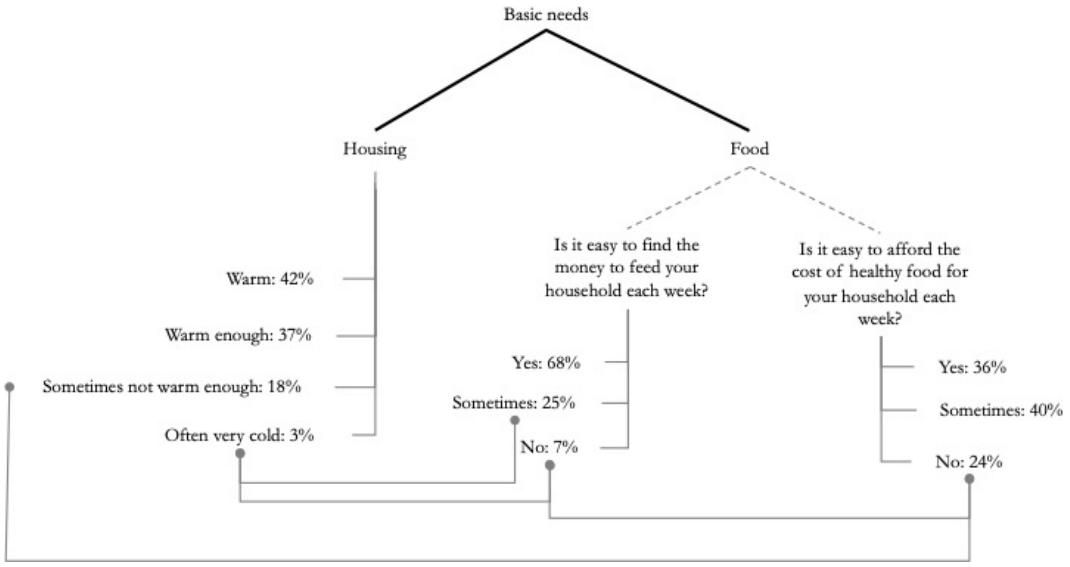
Let us now turn to the analysis of foundational consumption. The evidence base was gathered from a range of sources including secondary data, a survey of 200 residents and a one-week field visit. The survey sample is balanced by age and less balanced by gender. 2/3 of the respondents are women.

The analysis focuses on a set of goods and services, which undisputed relevance for wellbeing. These goods and services are housing, food, transport and social infrastructure (figure VI.3).

Let us start with housing. Housing in Morriston is accessible for all social groups. As a related study on Morriston shows, the ratio of median house prices to income is sustainable for most households (Froud et al., 2018, p. 24). For those on low incomes a fraction of the housing stock – roughly 17 per cent – is available as social and public housing.

If accessing the house does not constitute a problem for most households in Morriston, adequate heating and eating is an issue. Adequate heating is sometimes or often a problem for 20 percent of the population. Food represents an even bigger issue. Finding the money for feeding the household is sometimes or often a problem for over a third of the residents. When it comes to healthy food, this percentage raises to 64 percent.

Figure VI.3 - Consumption of basic goods in 2018 (Source: Morriston Survey)



Let us now turn to transport. Like most suburbs in the UK and Europe, Morriston is a car-dependent settlement. 77 percent of the residents own a car and roughly another 20 percent has access to a car (table VI.3). Car is central for travelling to work. In 2011, 60 percent of commuting is done by car. This is despite the fact that 30 percent of commuting distance is less than 5 km.

Table VI-3 - Mobility by car in 2018 (Source: Morriston Survey)

	Yes		No	
Owing a car	146	77%	43	23%
Having the possibilty to have access to a car or get a lift			15	35%
Having occasionally the possibilty to have access to a car or get a lift			15	35%
Never using a car			13	30%

The survey suggests that cars dominate also non-tabled activities like shopping, leisure and visiting friends/family. Almost all respondents use the car for shopping. Around 90 percent report using the car for visiting friends and reaching out leisure activities. Children-related transfers are less car-intensive. Over 50 percent of the

respondents report not the car for taking the children to nurseries, schools or child-minders. This is because these basic healthcare and educational services are present in the area.

Table VI-4 - Commuting: travel-to-work distance and method

	Morriston		Llansamlet	
Distance travelled to work of resident population	Count	Percentage	Count	Percentage
All categories: Distance travelled to work	3,468	.	3,384	.
Work mainly at or from home	180	5%	221	7%
Less than 2km	1,048	30%	580	17%
5km to less than 10km	1,517	44%	1,806	53%
10km to less than 30km	267	8%	353	10%
30km to less than 60km	157	5%	151	4%
60km and over	82	2%	95	3%
No fixed place	217	6%	178	5%
Method of travel to work of resident population				
All categories: Method of travel to work	3,468	.	3,384	.
Work mainly at or from home	180	5%	221	7%
Train, underground, metro, light rail, tram, bus, minibus or coach	311	9%	188	6%
Driving a car or van	2,154	62%	2,418	71%
Bicycle	36	1%	32	1%
On foot	401	12%	155	5%
All other methods of travel to work	386	11%	370	11%

Source: Nomis (2011 census), ONS

Public transport has a secondary integrative function in Morriston. Nonetheless, busses acquire relevance in relation to specific types of journeys. The Bus is the main public transport infrastructure of the area (tableVI.5). Two major bus lines connect the settlements with the city centre with stops in Woodfield Street, Morriston's main road. Yet, according to our sample, 40 percent of respondents never use the bus. Among bus users, buses are more important for non-tabled activities than commuting. Only 18 percent of the bus users go to work by bus. In contrast over 60 percent use the bus for shopping and leisure. Furthermore, over 40 percent report using the bus for visiting friends and family.

Table VI-5 - The use of car and buses in 2018
(Source: Morriston Survey)

	By car				By bus			
	Yes		No		Yes		No	
Work	88	54%	74	46%	17	18%	76	82%
Shopping	157	97%	5	3%	79	69%	35	31%
Visiting friends or family	145	90%	17	10%	44	44%	57	56%
Leisure	141	87%	21	13%	70	62%	43	38%
Taking children to nursery, school	73	45%	89	55%	10	9%	102	91%

The large use of cars reflects into shopping patterns. The percentage of Morriston residents in the sample that declare to shop at least once a weak at the local shopping street (Woodfield Street) is 60 percent (table VI.6). This is just slightly higher than the percentage of Morriston residents shopping at the Llansamlet retail park. The Llansamlet retail park is 3 km from the centre of the settlement at the edge of the Swansea Enterprise Park. It is strategically located at the exit of the speed road connecting Morriston to the Swansea centre. It is also important to note that 25 percent of weekly shopping spend leaks to the city of Swansea.

Table VI-6 - Shopping practices in 2018 (Source: Morriston Survey)

	Morriston, Woodfield Street		Swansea		Llansamlet		Other	
At least once a week	117	*65%*	43	26%	94	60%	15	41%
Once or twice a month	25	*14%*	53	32%	27	17%	4	11%
Occasionally	25	*14%*	61	37%	20	13%	15	41%
Never	13	*7%*	7	4%	15	10%	3	8%
Total	**180**	**100%**	**164**	**100%**	**156**	**100%**	**37**	**100%**

At last, let us consider social infrastructure. Although not essential for livelihood, social infrastructure is essential for quality of life. The social infrastructure is the area of provision where Morriston residents consistently manifest discontent. According to over 1/3 of adults and old local residents, Morriston does not offer adequate meeting places, including clubs, cafés, pubs and community centres. The percentage rises to almost 50 percent when looking specifically of the social infrastructure for young people. The dissatisfaction with the local social infrastructure is reflected in the high use of cars and buses to reach social activities located in other parts of the city.

A development strategy for Morriston from the perspective of radical sustainability.

The analysis of foundational consumption suggests that Morriston is a liveable place. The settlement provides its population with a quality of life way above deprived metropolitan districts. Nonetheless, Morriston presents a number of development challenges. These challenges are already undermining the liveability of Morriston and will do more if policy does not intervene.

Let us start with the social challenges. The research has identified three major social challenges. The first is food and fuel poverty, which at present regards roughly a third of the population. The second is the dying out of the pensioners. Pensioners socially and economically stabilise Morriston. Their purchasing power and localised consumption pattern sustain Woodsfield Street economically, enabling the high street to fulfil its broader social function. This generation of pensioners will eventually disappear and is uncertain if the next generation will have similar stabilising effects.

The third is the decaying social infrastructure. There is a general discontent with the social infrastructure of the area. In this regard, of particular concern is the decline

Table VI-7 - Social infrastructures in 2018 (Source: Morriston Survey)

		Good choice of local places (*) to meet friends and family			
		Yes		No	
For	Young people	75	*51%*	73	*49%*
	Adults	116	*73%*	42	*27%*
	Old preople	104	*69%*	46	*31%*

(*) café, community centre, clubs etc.

of Woodfield Street, the main street of the settlement. Once the beating heart of the community, Woodfield Street has undergone a decline for a number of reasons, including a) mismatch between offer and demand; b) perceived presence of anti-social behaviours; c) consolidation of a low-income households in the surrounding areas; d) mobility patterns of its residents which diverts consumption from Woodfield Street.

Switching to the economy of the area, the main challenge regards the development of the Swansea Retail Park. Situated at the edge of Morriston, the Retail Park provides substantial employment at present. However, employment in this sector could decline as home delivery replaces shopping malls. This opens the question of the next generation of employment in the area.

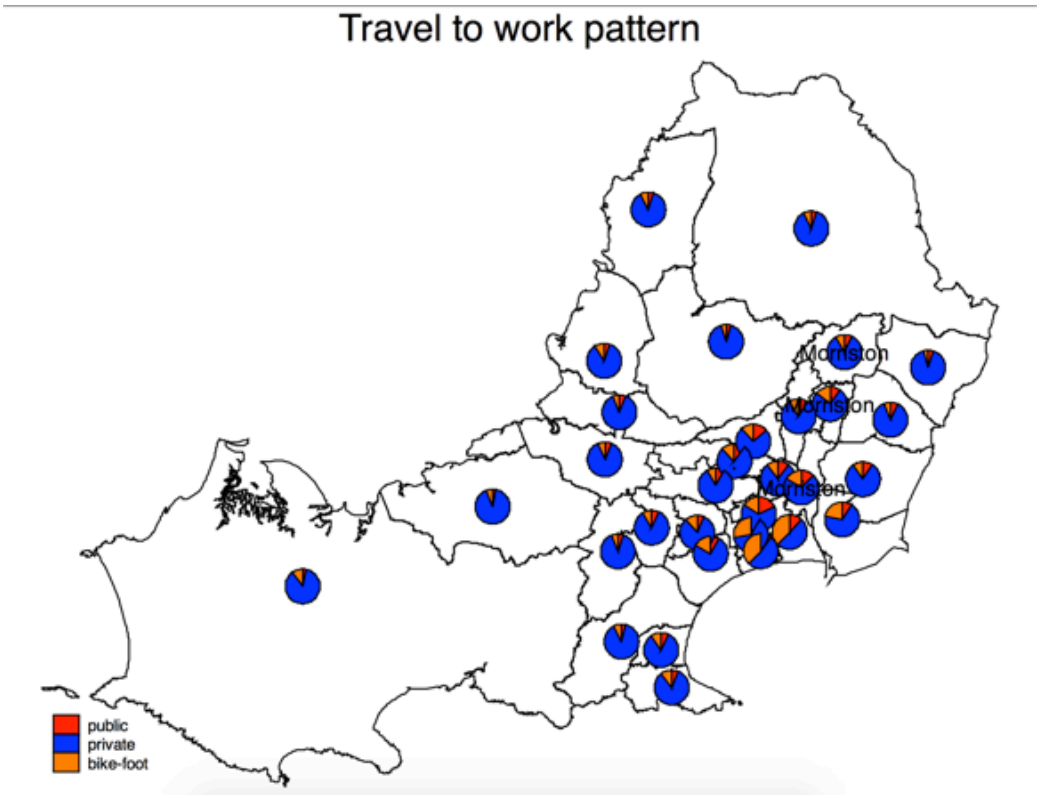
A third crucial challenge regards the environmental impact of the neighbourhood. Aggregate data at Swansea level suggests that Morriston – being a sub-unit of it – presents the same structural sustainability issues. Nonetheless, there are reasons to believe that Morriston is particularly unsustainable given its high rate of car-based

transport. As the map below shows (figure VI.4), Morriston has a percentage of car-usage much higher than the central Swansea downtown. This suggests that the neighbourhood produced higher CO2 emissions than average.

Action at the regional scale is required to fully address most of the outlined environmental, social and economic challenges. Yet, at the scale of Morriston the re-organisation of the spatial form of the neighbourhood could greatly contribute to address some of these challenges. Morriston has great potential to be transformed in a self-reliant neighbourhood where working, shopping and socialising is done on foot, by bike and through public transports. This would create the potential condition for:

- Less CO2 emissions.
- Faster and cheaper commuting.
- Increase demand for retail and leisure in Woodfield Street.
- Attract new demographics.

Figure VI.4 - Travel-to-work pattern in 2011



Promoting mixed-use is crucial for converting Morriston in a self-sufficient neighbourhood. Where economic, social and private life overlap walking, cycling and use of public transport tend to be higher. Swansea is not an exception in this regard. As figure VI.4 shows, the use of bikes, on foot mobility and public transport for travel to work are higher in Swansea downtown. Swansea downtown concentrates shops, leisure amenities and employment opportunities. In contrast, in the residential suburban areas, car-usage (called in the map 'private') is substantially higher.

The spatial analysis of Morriston shows that – unlike other suburbs – the neighbourhood has potential to become self-sufficient.

At current Morriston has (cf. figure VI.5):

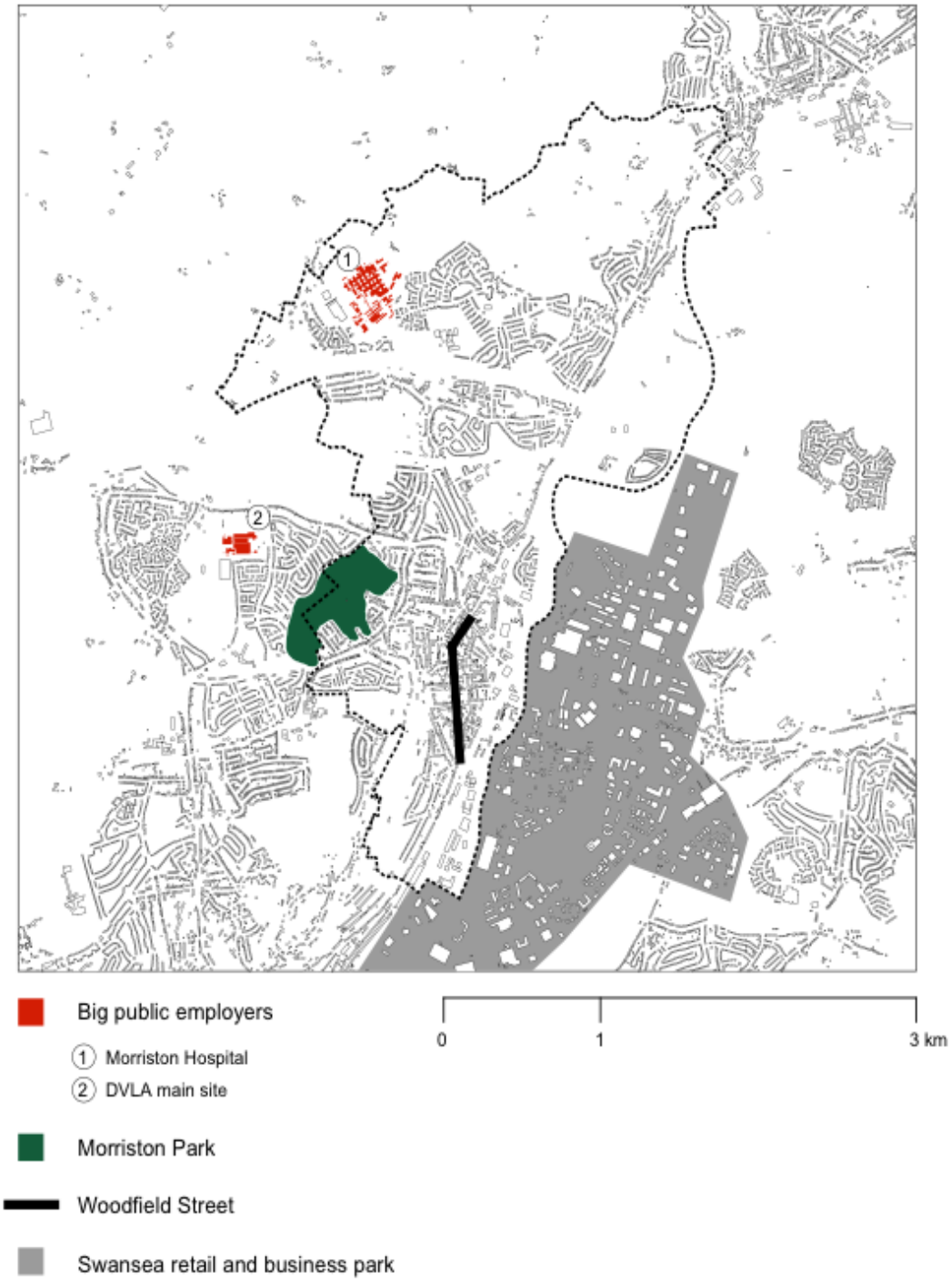
- A substantial income infrastructure: two big public employers – the DVLA and the Morriston hospital – and a large enterprise park are located within 3 km from the town centre. This distance can be covered on foot or by bike with the right mobility infrastructures.

- A substantial foundational infrastructure: within a 3 km from the town centre, Morriston provides access to most basic services, including food retail, primary schools, banks and post offices. Many of those services are concentrated in Woodfield Street. Some of the resident already access these services on foot.
- A substantial social infrastructure: within a 3 km from the town centre, Morriston provides a dense social infrastructures, including a) Morriston's main street Woodsfield Street (500 meters long road at the centre of the settlement with cafes, pubs, restaurants, public spaces and meeting spaces) b) a community hall and a chapel, c) a park, d) a public library and sport facilities.

The area surrounding Woodfield Street is strategic to convert Morriston into a self-sufficient neighbourhood. An imaginative regeneration of Woodfield Street and its surroundings could substantially contribute to transform Morriston in an attractive and sustainable place.[15] Based on the fieldwork, I propose the following interventions.

[15] The following strategic interventions are based on the assumptions of system design (Meadows, 2009; Nelson & Stolterman, 2012). The main idea of system design is that – to make certain behaviours happen – one should design systems where that behaviour is consistently incentivised in a plurality of ways.

Figure VI.5 - Main employment and social infrastructures



Diversify the economic structure

A first crucial intervention is diversifying the economic structure of the Woodfield Street area. Today, Woodfield Street hosts mainly retail activities. It would be beneficial to attract other economic activities, especially business in the service sector. Their employees would be well placed to use the street for lunch breaks and weekly shopping. This could increase the demand on the shops of Woodfield Street, reduce car-based shopping and the personal time associated to this activity. In this regard, the DVLA and the Morriston Hospital are assets. Some of their offices, like ICT departments, could be potentially relocated into Woodfield Street.

Expand the social and cultural infrastructure

A second crucial intervention for a sustainable regeneration of Woodfield Street is expanding the social and cultural infrastructure. Besides commercial offer, cultural and social events make a street attractive. Improving the social infrastructure would hence increase the attractiveness of Woodfield Street.

Adapting the social infrastructure to the younger generations is key. The survey suggests partial satisfaction by adult and old people for the availability of meeting places. In contrast, almost 50 percent of the respondents declare that young people do not have good places to meet friends and family in the area.

Local associations and community groups are an important asset for the regeneration of the social infrastructure. These groups organise socio-cultural activities independently. Increasing the amount of accessible meeting space could support the growth and consolidation of community groups in Morriston.

Localise the workforce

A third strategic intervention is localising the workforce. Short commuting makes shopping locally and on foot convenient. Increasing the number of people that live and work in the Morriston area is hence crucial to make the neighbourhood sustainable. This requires space for apartments in and just off Woodfield Street. In this regard, the promotion of social mix is important. There is a need to attract young individuals and families to reduce the share of pensioners in the area. Morriston's major employers – the DVLA and Morriston Hospital – are critical assets also in relation to this objective. Their employees could be encouraged to live in the area.

Increase public transport use

A fourth key intervention is increasing public transport. The major bus lines, which connect the Morriston to downtown Swansea, run through and stop in Woodfield Street. Rising the number of people taking the bus to work would increase the number of people for which shopping in Woodfield Street by public transport is potentially convenient.

4. Strengths and limits of the experiment

In this chapter I applied the radical approach to urban sustainability to the regeneration of a neighbourhood in the City of Swansea called Morrison. I worked mainly with 2 variants of the radical approach, that is the Foundational Approach and the Ecological Approach. These approaches focus on satisfying basic needs in environmentally sustainable ways through structural re-organisation of urban settlements.

The entry point was to look at places through 4 infrastructures: the income infrastructure, the foundational infrastructure, the mobility infrastructure and the social infrastructure. A place works when its inhabitants have full access to the 4 infrastructures. Furthermore, a place works when the four infrastructures are environmentally sustainable.

In this experiment, I applied the radical approach to urban sustainability on a very small scale, that is the neighbourhood of a city. The scale was chosen for pragmatic reasons as explained in the methodological chapter (chapter 3). This choice had major limitations. As discussed in Chapter I and at the beginning of this Chapter, European cities are embedded in nationally and international urban provision systems. Within these systems, neighbourhoods are terminals of consumption.

This configures the neighbourhood as a productive scale for analysing the consumption of foundational goods and services. It enables to understand in detail foundational deficiencies. Yet, the neighbourhood scale is not ideal for thinking about the redesign of provision systems. Most provision systems cannot be re-organised at this scale through local initiative.

Nonetheless, the case study sheds light on the potential of radical approaches to urban sustainability to generate imaginative development strategies, even at small scale. Radical approaches prioritise a) structural change, b) basic needs and c) environmental sustainability. Working with this conceptual frame, led me to think about what structural changes could be enacted at the scale of Morriston to improve access to foundational resources and decrease environmental impact. This eventually led me to the development vision of converting Morrison from a car-dependent suburb to a self-sufficient neighbourhood.

The case study has relevant implication for urban policy in the context of Europe. As argued in chapter 4 and chapter 5, European cities require a structural re-organisation of their development model to become sustainable. This includes also the re-organisation of the spatial structure of the city. Radical approaches are designed for thinking about structural re-organisation of different aspect of the city. Therefore, they seem to have great potential in assisting urban strategic planning in Europe.

VII. Conclusion

In this conclusion I will try to accomplish four tasks:

1. Recap the problem, aim and goal of the research.
2. Summarise the main empirical results.
3. Discuss the implication of the empirical results for the research problem.
4. Point to further area of development of this research.

1. Problem and aim of the research

The broad problem I addressed in this research is how to transition European cities to environmental and social sustainability. European cities are often presented as a model of urbanization for their capacity to combine growth and social cohesion. However, over the past decades social inequalities have consolidated and sometimes augmented, while growing knowledge of the environmental impact of cities shows that their development model is not sustainable in terms of natural resource use.

Across academia, policy-making and civil society there is a shared feeling that the European city will have to change and adapt to respond to the social, economic and environmental challenges of the future. However, there are a lot of open questions regarding what it means to be sustainable and how to get there. This research tries to address some of those key policy questions focusing on a number of key theoretical and empirical problems.

The first theoretical problem addressed in this research is orientation in the field of sustainable urban development in Europe. As a response to environmental, social and economic challenges, sustainability has gone mainstream since the 2000s. At the same time, radical projects kept identifying in the term 'sustainability'. As a result, the terms urban sustainability and sustainable urban development accommodate very different development strategies, policies and projects. They propose fundamentally different views on how to identify, interpret and respond to the strategic challenges of European cities.

This work proposed a distinction in the field of sustainable urban development between radical and moderate approaches to urban sustainability. Moderate approaches look at improving the economic, social and environmental efficiency of European urban systems through strategic adjustments. These approaches focus on greening and making inclusive urban economic growth to create wellbeing sustainably.

They look at de-coupling energy and matter use from economic growth through green technologies and believe in the capacity of reconnecting the economy to society through good employment in innovative industries.

In contrast, radical approaches look at structurally re-organising the way European cities work. These approaches focus on covering basic needs for all within a re-organised political economy, where matter and energy intensive activities degrow. They experiment with new business models, new institutions and new spatial structures beyond urban capitalism to achieve sustainability.

Consequently, the empirical problem this research has addressed is choosing between these two main types of sustainable urbanism currently present in Europe. Its goal is to evaluate which of the two approaches to sustainable urban development bears the best promises for addressing the future development challenges of European cities. Despite political believe, there is no *a-priori* reason why one should choose moderate over radical approaches to urban sustainability. The choice of the 'right' approach is instead a matter of empirics, pertaining the issue of understanding which one of the two approaches works better given the specific characteristics of the European urban system.

To answer these questions, I focused on the UK taking advantage of the collaboration with the Foundational Economy Collective. As explained in Chapter III, the research strategy consisted in producing empirical knowledge around three key themes.

- The first one concerns the state and trends in environmental impact, social cohesion and economic development of the UK.
- The second one is how moderate approaches to urban sustainability work in practice.
- The third one is how radical approaches to urban sustainability work in practice.

The idea was to develop an integrated empirical understanding of a) the depth and scale of the sustainability challenges of British cities, b) the type of urban strategies produced within the conceptual frame of the moderate approach to urban sustainability and c) the type of urban strategies produced within the coordinates of a radical approach to urban sustainability. This allows to discuss in empirical – not just theoretical – terms the pros and cons of moderate and radical approaches to urban sustainability in the context of Europe.

To build the empirical base, the research analysed national trends in natural resource consumption, socio-economic trajectories of regions, the development strategy of the Swansea Bay City Region and included a policy-experiment in a neighbourhood at the outskirt of Swansea called Morriston. In what follows, I will sum up the main empirical results and then discuss their implications for the research problem.

2. Main empirical results of the research

The three research questions outlined above were addressed in three distinct chapters – chapter 4, chapter 5 and chapter 6 –, which compose the empirical core of this research. In chapter 4, I focused on the environmental and social challenges of British cities. The objective was to put numbers on these challenges and empirically understand state and trends. I did that by looking at national trends in natural resource consumption and through a comparative analysis of the socio-economic trajectories of British cities looking at GDP growth and relative poverty.

The main empirical results of this chapter are the following. The first one is that British cities are currently highly unsustainable in terms of environmental impact and, *ceteris paribus*, will stay so in the future. Here is crucial the distinction between environmental impact of consumption and production. The production perspective looks at the environmental impact generated in the UK by firms, households and buildings. In contrast, the consumption perspective considers also the goods and services imported from other countries, net of the exports.

From a production perspective, over the past two decades the UK – as other European countries – has improved its efficiency in terms of material resources use and pollutant emissions. Between 2000 and 2016, the UK economy has become twice as efficient in terms of resource productivity. From the 1990s, ghg gasses emitted per capita in the UK have dropped from 14 to 8 tonnes per capita, which corresponds to a 35 percent reduction, the highest among European countries.

A more modest yet noticeable improvement regards the circular material use rate. In 2004, 15.6 percent of the material input of the UK economy came from recycled material. In 2016 the figure had grown to 17.2 percent.

Yet, economic growth has largely outweighed those advancements, once non-domestic impact is considered. As a result, from a consumption perspective the UK economy has hardly improved. This is common to other European countries. The ecological footprint of British consumption has remained since the 1990s roughly at the same level of 6 global hectares till 2008. This is almost 3 times more than the global sustainability level. A reduction has started after 2008, but this seems related more to recession than environmental policy. All this suggests that domestic efficiency improvements are too little to substantially reduce the global environmental impact of the growing British economy.

A second main result of the research is that British regions have been unable to promote inclusive growth. British regions display deep material inequalities, which will *ceteris paribus* remain the same in the near future. Over the period 1997-2018, all UK regions have experienced significant economic growth with 75 percent GDP increase in almost every region. However, the percentage of households in poverty has barely diminished over the same period. In 2018, still most British regions had over 20

percent of their households in poverty after state transfer, with a peak of 28 percent in London, ironically the richest and most growing region.

The analysed poverty rate is relative. Given that the economy has grown, this means that the income of those categorised as 'poor' might has grown. Nonetheless, the persistence of inequalities shows the limits of the redistributional mechanisms at work in the UK over the past two decades. Despite a growing overall wealth, wage structure and the state transfers were unable to make the country more equal.

Coupling economic growth to social cohesion will require major structural changes in the economy. In 2011 – before state-transfers – almost all UK regions had an alarming poverty rate of over 30 percent with peaks of 40 percent in the North East, North West, Yorkshire and Humber and the West Midlands. This shows a British economy that is fundamentally incapable of generating inclusive growth and, consequently, dependent from state intervention to produce acceptable levels of collective welfare through redistribution.

In chapter 5, I focused on the strategic planning process of the Swansea Bay City Region. This region had conducted a 10-year process of strategic planning within the coordinates of the moderate approach to urban sustainability. The process resulted in a legally binding urban strategy supported by the British and the Welsh government. The goal of the chapter was understanding how the moderate approach to urban sustainability works in practice and to what strategies it leads.

The core of the chapter was structured in two parts. In the first part, I analysed the main economic, social and environmental trends of the city region and its spatial structure. In the second one, I focused on the strategic planning process, analysing in detail the Swansea Bay Strategy, from the strategic documents to the main action-plan.

The main empirical results of this chapter were the following. A first set of results pertains the structural condition of the city region. As most urban regions in the UK, the Swansea Bay City Region faces deep economic, social, spatial and environmental challenges. They include rebuilding an economic base after de-industrialisation, drastically reduce the environmental footprint, increase social cohesion and spread development across rural and urban areas.

The region is currently highly unsustainable in terms of natural resource use. Levels of ecological footprint exceed the global threshold by 3 times. However, despite using so many global resources, the region is still not capable of ensuring welfare to all. GDP has increased over the past two decades, yet relative poverty at household levels is at 20 percent with peaks of over 30 percent in some areas of the region.

The second main set of results pertains the Swansea Bay Strategy. This strategy has stemmed from the application of the moderate approach to urban sustainability. The strategy proposes a set of key adjustments to cope with the development challenges of the Swansea Bay City Region. The main interventions include a blue-power station, an upgrade of the building stock, a city-regional skill programme and improvements in the transport infrastructure to integrate the labour market.

As good as they can be, these adjustments seem inadequate. The Swansea Bay City Region faces structural challenges, yet the Swansea Bay Strategy fails to envision them as such. This raises doubts about the capacity of the moderate approach to urban sustainability to work in contexts that require structural transition.

In chapter 6, I turned to the family of the radical approaches to urban sustainability. I applied the radical approach to the policy problem of regenerating the neighbourhood of Morriston in Swansea. The goal was understanding how radical approaches work and to what kind of development strategies they lead.

This chapter started with a discussion of how to operationalize the radical approach to urban sustainability to places. It then continued with a set of empirical analyses with the goal of understanding Morriston and its development challenges. This included a spatial analysis of the neighbourhood, an analysis of its social profile, an analysis of the economy and an analysis of the consumption of the welfare-critical goods and services.

The research found that Morriston is a socially mixed neighbourhood, with some tails of deprivation. Nonetheless, access to welfare-critical goods and services is largely covered in transport, basic services and housing, with food and fuel poverty issues for a minority. The only area of consistent discontent was beyond the foundational, namely in relation to social infrastructures.

The research also found that the area had a complex economy. Two big public employers – a research hospital and the DVLA – are located in the area. Furthermore, the Swansea Enterprise Park is located just off the Morriston settlement in the bordering area of Llansamlet. The Park offers substantial employment in retail and manufacturing.

The place analysis from the perspective of radical urban sustainability revealed four main place-specific development challenges. An economic challenge related to the expectable job loss connected to the decline of big box retail; two social challenges related to the decline of the social infrastructure and the dying out of the current generation of pensioners (pensioners at present stabilise the neighbourhood economically); one environmental challenge related to high car-reliance.

Shifting from diagnosis to policy posed some problems, as neighbourhoods are not the ideal scale to design transition paths of foundational, retail and industrial systems in nationally organized countries connected to world-economies. Nonetheless, the use of the radical approach to urban sustainability enabled the identification of a fundamental change at that scale, namely the re-organisation of the spatial structures.

Morriston is currently car-dependent, yet in strategic position to transition towards a self-sufficient neighbourhood, which minimises car-usage. Within a 3 km range, the neighbourhood possess employment in the private and public sectors, basic services and leisure facilities.

A self-sufficient neighbourhood is more environmentally sustainable. It reduces CO2 emissions and, more broadly, the need for cars in future decades. Furthermore, it is more socially sustainable, as it reduces time and cost of commuting. Building on

this place-analysis, the research produced a strategic vision for the regeneration of the area. The vision focused on increasing mixed-use in the main street, renew the social infrastructure and connect employment to residence in the area.

4. Discussion of the results

This research has produced a large and nuanced empirical base. It offers a wide range of information at different spatial scales to discuss the transition of European cities towards sustainability. Here I will discuss the implications of the empirical results for the research problem.

In particular, I will focus on the implications of those results for: a) the conceptualisation of the development problematic of European cities, b) the identification of the nature and scale of the policy challenges of European cities and c) the question of choosing between moderate and radical approaches to sustainability in this specific regional context.

Since post-war, the problematic of European urban development has been structured around the idea of coupling social cohesion to economic growth. The left and the right interpreted this problematic differently. With urban entrepreneurialism, the right emphasised economic growth over other objectives. The underlying idea was that economic growth would create shared wellbeing by increasing wages. With urban managerialism, the left emphasised redistribution through spatial and social policies giving urban growth for granted. Despite those differences, ultimately both urban entrepreneurialism and managerialism were forms of growth-centred urbanism.

This research shows that the introduction of the environmental variable fundamentally redefines the European urban development problematic. Considering state and trends in environmental degradation, a growth-based urbanism in Europe is not sustainable any longer. The current Western standards of economic development imply levels of energy use, matter use and emissions of pollutants that are far beyond the regenerative capacity of the biosphere.

Over the next decades, European cities cannot afford to generate wellbeing through economic growth redistributed by wages and the welfare state. To be environmentally sustainable, economic development needs to have zero impact on natural ecosystems. This will imply major economic re-organisation, as areas of the economy have to be adjusted for steady state and others for degrowth. Furthermore, it will require a bolder approach to social justice to achieve social sustainability.

Given this context, the transition towards sustainability of European cities can hardly be achieved within the mainstream approach of strategic adjustments. The empirical analysis of this research shows that the fine-tuning of the current development model is insufficient given the scale of the problem. In contrast, it

suggests that European cities will require a structural transition to achieve sustainability.

They will indeed require a deep reorganisation of their political economy. This will imply changes in many areas.

- Transformation of foundational systems: from a life-cycle perspective, foundational systems such as energy, food, transport and housing are the main sources of environmental impact. These systems require major reorganisation to be sustainable in the future. How energy is produced and distributed, how food is harvested and how far it is shipped, from which materials are new houses built will be key policy questions in the near future.
- Transformations of spatial structures. Present spatial structures, developed around car-based mobility, favour the use of cars for work, foundational consumption and leisure. European cities have to re-design their spatial patterns to create multi-centric urban areas where people work, live and can access basic services and social infrastructures in the same area. This would reduce the environmental impact associated to car-based transport. Furthermore, it would reduce the environmental impact associated to producing cars in the future and the impact associated to maintaining the related transport infrastructures.
- Transformation of the productive structure: to limit environmental impact associated to producing new goods, manufacturing firms will have to reduce production, improve the durability of goods and increase the use of recycled materials.
- Transformation of trade-patterns: to limit the environmental impact associated to freight transport and infrastructures, cities will have to re-organise their trade relations so to minimize the amount and distance of imported/exported goods.
- Transformation of consumption-patterns: to limit the use of natural resources and maximising wellbeing, consumption patterns will have to change to favour long-use, shifts from matter-intensive consumption to less matter intensive consumption and maximise sharing.
- Transformation of redistributional mechanisms. With an economy partially in steady state and partially degrowing, European cities have to become much more efficient in generating collective welfare and wellbeing. A bolder approach to social redistribution will be required to ensure decent welfare to all especially at the bottom of the social structure. Arguably, this will imply a shift from the liberal, after-the-fact approach to social and spatial justice to more radical, pre-distributional approaches (Imbroscio, 2013; Young, 1990).

Given these policy problems, moderate approaches to urban sustainability are not suited to support the design of sustainable urban strategies in Europe. As the case of

the Swansea Bay Strategy shows, moderate approaches to urban sustainability underestimate the structural nature of the sustainability challenge of European cities. As a consequence, they led to strategies that are inadequate to solve the development challenges of European cities over the next decades.

Radical approaches to urban sustainability seem better equipped to address the challenge of structural transition. They are designed for systemic change. As the Morriston case shows, the radical approach to urban sustainability enabled imaginative thinking about structural transition even at the small scale of the neighbourhood. This suggests that radical approaches to urban sustainability could be a better policy frame for transitioning European cities towards sustainability over the next decades.

In this regard, the Foundational Approach offers a compelling entry point for the path of adjustment of European cities. Foundational systems – such as healthcare, energy provision, the food system and transport – are the basis of civilised life. Sustainable foundational systems would greatly increase the resilience of European cities. In case of socio-ecological shocks those systems would ensure the satisfaction of basic needs protecting against social breakdown.

5. Further areas of research

The further development of this research can take different directions. The first one is about consolidating and expanding the current empirical results. This research produced an informative yet untidy collection of data. The empirical base functions for shedding lights on macro-trends and discuss strategic policy. However, it could be improved in precision and consistency. This would make the present work a more compelling piece of policy research.

For instance, the analysis of the environmental and socio-economic trends could be consolidated and expanded. In this work I reframed the efficiency of an economic system in terms of producing material welfare to all net of the natural resources it consumes. This research has started to investigate this phenomenon looking on past trends. However, with system modelling, the outlined structural trends could be projected in the future. This could be used to identify different scenarios and provide targets for urban strategy.

Another empirical area that could be consolidated and expanded is the environmental impact of cities. In this work, I used the ecological footprint to investigate this aspect. The ecological footprint provides an aggregate measure of environmental impact. The disaggregation of the ecological footprint by sectors sheds some light on how some areas of the city – for instance transport or the business sector – might impact natural ecosystems. Deepening this line of research could provide a detailed understanding of how cities impact the environment. This could support policy in the ecological reconversion of urban provision systems.

A second direction of development of this research is implementation of radical sustainability projects. This research made the case for structural transition of European cities towards sustainable development models. In the last section, I listed a number of transition areas – from redistribution to manufacturing. Furthermore, I pointed at some of the required re-organisations in each sector.

The research could continue by investigating transition in specific sectors and contexts through action-research. Such a study would include a systemic analysis of the sector of reference – for instance the health sector – with the aim of understanding a) the ecological impact and b) the changes required to minimise the ecological impact and maximise the social impact. Furthermore, it would include an action-plan for transition in that sector.

The subject of implementation relates strictly to a third direction of development of this research. This is understanding the political and social conditions of transition. Transitioning European cities to sustainability is a technical-organizational problem of finding the appropriate technologies, business models, spatial structures and production infrastructures. Nonetheless – as political ecology rightly emphasises – it is also a socio-political problem.

Major political and economic interests sustain the current socio-ecological settlement. Furthermore, most Europeans have low ecological literacy. As a result, there is a general underestimation of the social consequences of environmental degradation. How to create a democratic transition in this context is an open yet compelling question.

In this regard, a promising research agenda is studying transition communities. As emphasised at different points in this work, in many European cities there are communities involved in transition, from energy democracy, to local food systems to fair credit. In some cases – notably Spanish and British cities – local governments have supported these projects, creating new political arenas and institutions.

These communities offer a blueprint of how to transition places to sustainability from the bottom-up. A comparative research could study the institutional, political and organizational drivers of transition and extract general principles. These principles could be then applied to other cities to create transition initiatives. This type of knowledge is relevant for a democratic transition of European cities towards sustainability.

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