



BACHELOR THESIS

Housing and Transportation in Dublin: A truly sustainable future?



Aidan McClements

S4382323

Supervised by Prof. dr. Johan Woltjer

June 16th 2023

Colophon

Bachelor thesis	Spatial Planning and Design
Title	Housing and Transportation in Dublin: A truly sustainable future?
Location	Groningen, Netherlands
Date	June 16, 2023
Version	Step 7, final version
Author	Aidan McClements - S4382323
Contact	a.j.mcclements@student.rug.nl
University	University of Groningen Faculty of Spatial Sciences Landleven 1 9747 AD Groningen
Supervisor	Prof. dr. Johan Woltjer
Number of pages	21 (excluding references)
Word count	6615 (excluding references)

Table of Contents

Colophon.....	1
Table of Contents.....	2
1. Abstract.....	3
2. Background.....	4
3. Research Problem.....	5
4. Hypotheses.....	6
5. Theoretical framework.....	7
6. Conceptual model.....	9
7. Methodology.....	10
8. Results.....	12
8.1. Climate Action.....	12
8.1.1. Built environment.....	13
8.1.2. Energy.....	13
8.2. Quality Housing & Sustainable Neighbourhoods.....	14
8.2.1. Social inclusion.....	14
8.2.2. Housing typology and mix.....	15
8.2.3. Homelessness.....	16
8.3. Sustainable Movement & Transport.....	16
8.3.1. Modal share.....	17
8.3.2. Infrastructure.....	17
8.3.3. Public Transport.....	18
9. Summary and recommendations.....	19
10. Conclusion.....	21
11. Bibliography.....	22

1. Abstract

With rapid urbanisation, environmental damage and climate change among the most important societal issues in the 21st century, cities must adapt to a new reality. Housing and transportation are two fields with important social and environmental effects, with many cities failing to deliver an adequate provision. Sustainable development is a term that is often used by governments but it is not always clear to what extent sustainability is implemented into policies. This research aims to analyse the incorporation of sustainability criteria into development plans in the fields of housing and transportation, focusing the case on Dublin, Ireland. This leads to the primary research question: *“To what extent is sustainability criteria implemented into the Dublin City Development Plan 2022-2028 within the key topics of transportation and housing?”*. It is expected that the plan will take sustainability into account through its policies, but the policies may be too vague to spur necessary action. To answer this question, a qualitative analysis of various chapters of the development plan was carried out using Atlas.ti. This study highlighted that sustainability criteria is incorporated across the topics of climate action, housing and mobility in varying degrees depending on the criteria. It helped to identify sustainability criteria that were lacking throughout the policies, namely inclusiveness and affordability for climate adaptation, affordability and action on homelessness for housing, and transportation inclusiveness. This allowed for a number of concrete policy recommendations to be formulated, which may be of use to other cities globally. Possible further research could investigate the quality of implementation of policy of the development plan, and whether the targets have been met successfully.

2. Background

With over half of the world's population living in cities and urban areas being responsible for over 70% of greenhouse gas emissions, the topic of urban sustainability is more important than ever before given the ongoing climate crisis. Not only does the way cities are planned and managed play a role in contributing to climate change, but urban policy makers must also find new ways to protect and retrofit from the impacts of ecologically damaging policies, including rising sea levels, air pollution and extreme weather events (Dasgupta et al., 2022). To counter this, local governments must incorporate sustainability into the policies that shape their cities. Sustainable development is defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987) and does not only relate to climate change, but to many different fields as well as social sustainability, relevant to public utilities, commodities, resources and management. Transport and housing are two themes that encompass both environmental sustainability and social sustainability, as both can function as a social good as well as having the ability to negatively impact the environment depending on the way they are managed. As planners move towards reducing carbon-based mobility and give urban public space back from cars to people, cities are also dealing with rising housing costs, long waiting lists for social housing and increasing homelessness (KPMJ, 2019).

It is imperative that policy is created to improve both of these sectors in order to achieve a more sustainable city. However there is currently a research gap regarding how sustainability is incorporated in development plans, especially on the topics of housing and transport. Existing literature on this topic showcases the difficulty in applying existing evaluation criteria such as the United Nations' Sustainable Development Goals (SDGs) on a global scale due to the variety of unique factors that influence policy on a local level (Klopp & Petretta, 2017). In addition, sustainability frameworks applied to general topics such as mobility and housing also require a shift to a more tailored and multi-faceted approach to dealing with sustainable development policy and also has implications for governance-related dynamics (Banister, 2008). Nevertheless, these criteria do permit one to better understand the topic at hand, and through applying a specific combination, can help analyse real-life policy. Furthermore, the UN SDGs also give space to the idea that cities are not just “problems” for the environment but are spaces of innovation in sustainability that can help solve these problems globally (Klopp & Petretta, 2017).

3. Research Problem

To better understand and analyse these issues on a smaller level, the Irish capital Dublin offers an example of a medium-sized city of roughly 590,000 inhabitants within the municipal boundaries confronted with a severe housing crisis and a transportation system running at over-capacity (Wickham, 2006; Lima, 2018). The local authority, Dublin City Council (DCC), is aiming to expand the provision of these services in a sustainable manner through policy implemented in the Dublin City Development Plan 2022-2028 (Dublin City Council, 2021). The aim of this research is therefore to analyse to what extent such criteria of sustainability is truly incorporated into DCC's policy and whether it aligns with what is considered to be best practice in terms of sustainable housing and mobility by organisations such as the United Nations (UN), the European Union (EU) and the OECD, as well as scientific literature and public debate. By focusing on the topics of transportation and housing, without forgetting the important role of land use planning and climate adaptation in interconnecting these two themes, the research can be better focused and delve deeper into the topic.

On this basis, the following research question can be formulated:

“To what extent is sustainability criteria implemented into the Dublin City Development Plan 2022-2028 within the key topics of transportation and housing?”

This encompasses the following subquestions:

- *“Do the policies account for both social and environmental sustainability?”*
- *“Does the development sufficiently address the challenges faced in Dublin and provide relevant solutions?”*
- *“What recommendations can be provided to further incorporate sustainability or improve the current policies in order to better meet targets?”*

4. Hypotheses

It is expected that Dublin City Council's policies underperform in terms of housing delivery and transport provision, especially in certain neighbourhoods. While this doesn't directly concern whether or not sustainability is incorporated into policy, not acting sufficiently on these issues negatively impacts the city, particularly in terms of social sustainability as the lack of affordability increases poverty among citizens and the lack of transport options reduces mobility and access to jobs and education. On the other hand, it can be expected that the council is taking sustainability seriously by providing detailed policy frameworks in housing and transport by, for instance, liveable housing design standards, as well as zoning plans with set building densities in accordance with existing or future transport services, as well as public transport and cycle lane network expansion. However, the policy may not be sufficiently binding and conflicts with different institutions and government layers may lead to the policies becoming nebulous. Implementation of these measures may also be lacking compared to the objectives, as some policies may perhaps be overly ambitious depending on the circumstances, or lack detailed complementary policies to be able to accomplish targets.

5. Theoretical framework

Defined as “development meeting the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987), sustainable development is a global focus affecting all scales of government. Supranational organisations have developed frameworks to influence policy to incorporate targets, and evaluate this policy based on its meeting of the targets. These targets include indicators to better evaluate policy across jurisdictions. On a global scale, the United Nations’ Sustainable Development Goals provide seventeen criteria across all topics (United Nations, 2015). The most useful for analysing urban sustainability is the eleventh SDG, which aims to make cities “inclusive, safe, resilient and sustainable.” This SDG includes ten sub-targets which each include one or two indicators to measure policies according to the criteria. In addition, the SDG includes several primary themes, including “disaster risk reduction”, “sustainable transport” and “sustainable cities and human settlements”, with the last two being particularly relevant for this research (United Nations, 2021). Nevertheless, the SDGs pertain to a global scale and cannot be easily applied directly to local policy plans (Klopp & Petretta, 2017). The same goes for EU criteria, separate for each policy subject (climate adaptation, trade, mobility, etc.) but is mixed with EU-wide policy goals and therefore not best suited as an evaluation indicator. For the OECD, sustainability is one of six main component criteria used to evaluate policy (OECD, n.d.). Addressing sustainability, the SDGs are incorporated into its framework, as well as Agenda 2030 which sets out the criteria of:

- Universal access to the benefits of development
- Inclusiveness, particularly for those at greatest risk of being left behind
- Human rights, gender equality and other equity considerations
- Environmental sustainability, climate change and natural resource management
- Complexity of context and of development interventions
- Synergies among actors engaged in the development process.

Transport-related SDG criteria is covered by Target 11.2, which states “by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons”. This is measured by determining the “proportion of population that has convenient access to public transport, by sex, age and persons with disabilities” (United Nations, 2021). There is therefore a focus on safety, affordability, accessibility and inclusiveness of different groups, and a requirement that policy commits to expanding existing services. On the other hand, the EU’s key action areas in sustainability as part of its Mobility Strategy characterise sustainability more in the environmental dimension, setting targets towards improving emissions, reducing carbon-based modes of transport, and promoting healthy active travel choices (European Commission, n.d.). Scientific literature on the topic, such as Banister’s (2008) “sustainable mobility paradigm”, provides four key principles of sustainable mobility, including technological optimisation (especially regarding emissions), regulation or costing reflecting external costs of transportation,

integrated land use development, and public awareness. Research is also provided on the incorporation of citizens into policy making, as well as land use policies, which becomes the intersection of the themes of housing and transportation. Increasing densities, mixing building uses and encouraging development in tandem with public transportation are the primary recommendations, including that if the building stock is increased by, per se, 2% annually, then sustainable mobility options should also be increased to the same proportion.

The SDGs pertain to a wide, global context and also provide criteria on the topic of housing. The primary target from SDG 11 is 11.1, pledging to “by 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums”, with the key evaluation indicators being the proportion of people living in informal settlements or inadequate housing. EU and OECD criteria is focused on specific countries and regions, and defines sustainable housing from both a social standpoint of affordability and livability, as well as an ecological standpoint with special attention given to energy-efficiency and design of homes. In addition, it also provides indicators relating to land use, such as the proportion of homes built in a location with public transport connections (European Commission, 2023).

6. Conceptual model

The Conceptual Model (see Figure 1) portrays the criteria used to develop a framework in which sustainability can be evaluated, including general criteria set by large international organisations, namely the UN SDGs and the European Union's sustainable development criteria, as well as scientific literature focusing on the main themes of the research. This allows for a more flexible criteria that can be more easily used to evaluate policy based on local factors. The key components of the development plan evaluated are transport and housing, and the interconnection between the two regarding land use planning. From this evaluation recommendations can be formulated in order to bring the plan in line with the sustainability framework.

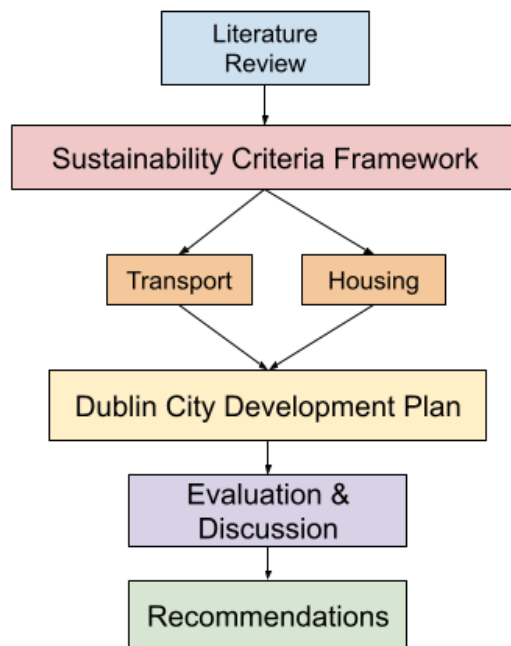


Figure 4: Conceptual Model

7. Methodology

The Dublin Development Plan 2022-2023 is primarily a guiding document underpinning the general vision of development in the city. According to the executive summary, its purpose is to “guide growth and development, provide a strategy to achieve proper planning, and show how [DCC] will achieve sustainable development” (Dublin City Council, 2021). Costs and budgeting are almost fully absent from the plan, and policies tend to be unspecific with regards to exact aims and timeframes. The targets and policies written into the development plan therefore guide future projects, initiatives, and planning applications. This plan is then divided into sixteen chapters, each detailing the vision in relation to a specific subject such as culture, economy, built heritage, etc.

In order to evaluate the development plan on the basis of sustainable housing and transport, three of the sixteen chapters have been selected to be included in the analysis, as the rest were not necessarily relevant to the topic or pertained to other themes. The three chapters analysed are Chapter 3: Climate Action, Chapter 5: Quality Housing & Sustainable Neighbourhoods, and Chapter 8: Sustainable Transport & Movement. These three chapters are the most pertinent to the theme at hand as they cover both the council’s housing and mobility visions and policy, as well as their climate action plan and its relation to Chapters 5 and 8. There are also several appendices of the development plan relating to the chapters studied, however they are not included in the Atlas.ti analysis. Although useful for the research, Chapter 14: Land Use Zoning, which pertains to land use and the intersection of housing and transport, was not included in the Atlas.ti analysis as it is not text-based.

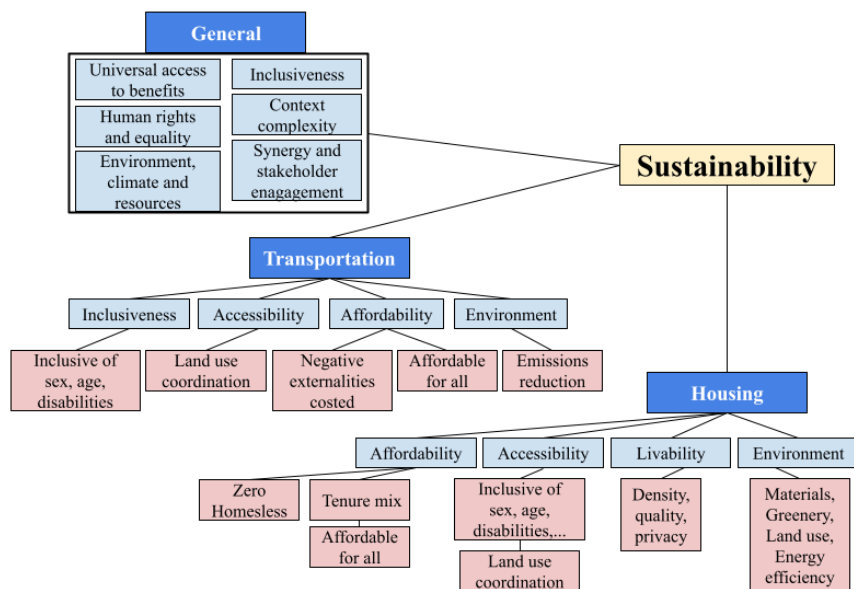


Figure 2: Sustainability Criteria Framework

A Sustainability Criteria Framework (see Figure 2, p.9) was developed as part of the Data Collection Instrument. It highlights the two main components of transportation and housing, and which code terms are most relevant for each. On the basis of this framework, a coding scheme (see Figure 3 below) was created to analyse the imported chapters through Atlas.ti. The light blue terms noted inclusiveness, accessibility, affordability, environment and livability form the main five code groups, with the general criteria used to aid the discussion of the analysis.

- | | | | | |
|--|--|---|--|--|
| <ul style="list-style-type: none"> ◀ ○ ◆ Affordability ○ ◆ Affordable ○ ◆ externalities ○ ◆ Homeless ○ ◆ Homelessness ○ ◆ Negative externalities... ○ ◆ social housing ○ ◆ Tenure mix ○ ◆ Zero homeless | <ul style="list-style-type: none"> ◀ ○ ◆ Accessibility ○ ◆ 15-minute-city ○ ◆ Accessibility ○ ◆ Accessible ○ ◆ coordination ○ ◆ ease of use ○ ◆ Land use ○ ◆ user-friendly | <ul style="list-style-type: none"> ◀ ○ ◆ Environment ○ ◆ carbon ○ ◆ Climate ○ ◆ emissions ○ ◆ Energy efficiency ○ ◆ Materials ○ ◆ particles ○ ◆ pollution reduction ○ ◆ Retrofit | <ul style="list-style-type: none"> ◀ ○ ◆ Inclusiveness ○ ◆ Age ○ ◆ Disability ○ ◆ Gender ○ ◆ Inclusive ○ ◆ Inclusiveness ○ ◆ Inclusivity ○ ◆ Race ○ ◆ Sex | <ul style="list-style-type: none"> ◀ ○ ◆ Livability ○ ◆ Density ○ ◆ Housing quality ○ ◆ Livability ○ ◆ privacy ○ ◆ quality of living envir... ○ ◆ Urban quality |
|--|--|---|--|--|

Figure 3: Coding scheme list

The results of the coding are then analysed by referring to the sustainability framework, further literature, development plan and current relevant commentary and debate around the policies and subjects concerned in the different chapters. This then provides a balanced assessment of the extent and quality to which the development plan adheres to sustainability, and what can be done to improve the plan and its effectiveness in this regard. On this basis, a series of policy recommendations are formulated on how the development plan can be closer aligned to the sustainability criteria as well as how the council can attempt to better implement their policies.

This research does have several clear limitations. The coding scheme is not foolproof as a representation of sustainability as the matches are subject to the term inputs which are not exhaustive. Furthermore, cannot determine the quality of the inclusion of sustainability within the development but rather demonstrates the frequency of terms referring to the sustainability framework. In addition, certain topics and policies referred to in the framework may not be represented in the development plan as it is not in the control of the local council. Furthermore, as much of the framework is adapted from general and international literature, it does not always align with specific contexts. There is no primary data research conducted which may lead to inaccuracies or obscuring of the full picture. As the development plan consists of an upcoming period, the success and quality of the implementation of the plan is not studied. However, this could be an interesting basis for conducting further research.

8. Results

After matching the terms of the coding to words in the documents, Atlas.ti provided an output showing the frequencies of matches for each of the code groups separated for the three different chapters (see Figure 4 below).



Figure 4: Visualisation of code matches and key concepts generated by Atlas.ti per chapter

These results give an idea of how well represented and taken into account the different elements of the sustainability framework are taken into account and highlight which criteria is focused on, and which criteria is lacking for each chapter analysed. In general, the graphs show that the environment code group is typically well represented in each chapter. The codes focusing on social sustainability, particularly livability and affordability are less well represented across the board. The word clouds show that the concepts of community, development and facilities are common across each chapter.

8.1. Climate Action

For Chapter 3 (Climate Action), matches for the environment code were highly dominant, reaching 184 matches, compared to 13 matches for the accessibility code and one or two each for the affordability, inclusiveness and livability codes. This chapter has an overall focus on energy and decarbonising the city's emissions by relying on renewable sources of energy, retrofitting buildings to be more energy efficient, as well as a focus on climate adaptability, particularly flood resilience.

8.1.1. Built environment

Regarding sustainable housing, the chapter emphasises the need for retrofitting Dublin's housing stock to enhance energy efficiency and constructing new homes with high insulation standards, heat pumps, and solar panels. However, there is limited mention of water efficiency or adaptation to heat stress in retrofitting efforts. In terms of sustainable mobility and land use, the plan encourages a shift away from combustion engine cars towards public transport and active modes of transportation. It aims to establish a 15-minute city concept to minimise travel needs and highlights the benefits of electric vehicles (EVs) in reducing carbon emissions. The plan intends to modify parking and public spaces to accommodate EV infrastructure and emphasises land use changes for creating people-centric public spaces, incorporating green infrastructure such as “Sustainable Drainage Systems” (SuDS), and addressing the urban heat island effect. While flood risk reduction and coastal protection are addressed, the chapter lacks specific examples and project details, especially regarding coastal flood defences.

8.1.2. Energy

Inclusiveness, affordability and livability are three codes that are underrepresented in Chapter 3. These are important concepts to ensure the social sustainability of policies, to guarantee that measures to protect citizens from the impacts of climate change are inclusive and far-reaching regardless of their background, and that all necessary citizens are targeted in efforts to improve energy efficiency and the insulation of their homes. This chapter was written before the Russian Invasion of Ukraine which began in February 2022, and led to a large increase in the number of inhabitants suffering from energy poverty. This may explain why these socio-economic factors are underrepresented. However, since many inhabitants from lower socio-economic backgrounds live in lower quality, less well insulated homes, this was an issue that already existed prior. As most of the city's homes are privately-owned, council and national government initiatives have less power to retrofit the privately-owned housing stock compared to DCC-owned social housing or public housing owned by Approved Housing Bodies (AHBs) with whom the public sector has agreements. In order to combat energy poverty since the war, the new Energy Poverty Action Plan has been voted into law on the national level, aimed at helping to retrofit low-income homes (Department of the Environment, Climate and Communications, 2022). This provides councils with extra funding for their retrofitting schemes but mostly leaving out privately-owned homes, which are subject to national policy regarding private initiative subsidies. Policy initiatives to aid this key demographic to improve energy-efficiency is underrepresented in the development plan, considering how large it is.

The focus on decarbonizing energy production and consumption in the city is described rather than accompanied by concrete action plans, given the limited direct influence of the council in leading the energy transition. However, the council can play a role in influencing national energy policy and collaborating with operators at a local level. District heating schemes, which convert household waste into energy locally, are emphasised in the development plan due to their

sustainability benefits, such as reducing reliance on fossil fuels, increasing energy production, and recycling waste. The plan relies on the Poolbeg Incinerator, constructed in 2017, to support this scheme by providing electricity for up to 80,000 homes and district heating for up to 50,000 homes. An Taisce, an environmental NGO, challenges the sustainability of the incinerator, highlighting its high carbon footprint and negative environmental and economic impacts (McCárthaigh, 2019). However, DCC disputes these claims, considering them to be unfounded.

Opportunities for diversifying the Irish grid with renewable energy, specifically solar panel capacity, are currently limited, as Ireland has one of the lowest capacities in Europe (Gain, 2022). Dublin City Council (DCC) has the potential to leverage its influence to advocate for the construction of new solar plants within its territory, not just limited to retrofitting roofs of its own housing stock. This applies to other forms of renewable energy production facilities as well. While the national level holds decision-making power over climate and energy policies, DCC, as the capital city, should utilise its significance to shape national policies and infrastructure development within its jurisdiction, thus generating a broader impact.

8.2. Quality Housing & Sustainable Neighbourhoods

For Chapter 5 (Quality Housing & Sustainable Neighbourhoods), the code match indicators are generally more consistently represented. The accessibility code stands at 30 matches, affordability at 46, and inclusiveness also at 46. The environment and livability codes are represented to a lesser extent at 17 and 4 matches respectively. The core policy of the council revolves around the regeneration of neighbourhoods by promoting community-led initiatives, urban consolidation by densifying strategic areas, reducing vacant and derelict sites and bringing the underutilised upper floors of buildings into residential use by engaging directly with property owners and other stakeholders.

8.2.1. Social inclusion

The relatively high number of matches for the accessibility and inclusiveness code groups highlight the aims of social sustainability. The document emphasises social inclusion as a key aspect of this. It includes a detailed subchapter on social inclusion, focusing on various groups such as the elderly, youth, people with disabilities, victims of domestic violence, ethnic minorities, and Irish Travellers. The aim is to enhance facilities and infrastructure targeted towards these groups and promote community integration. Housing policies and design principles are aligned with providing safe, accessible, and affordable homes for the disabled and elderly. The Dublin City Council (DCC) supports the reconfiguration of existing family homes to accommodate elderly and/or disabled residents and promotes intergenerational housing models. They also encourage the provision of purpose-built accommodation, such as retirement residences, and the option for elderly residents to choose housing options suited to their needs later in life. To address social needs alongside new housing, DCC requires housing applications

with over 50 units to assess the availability of community facilities and infrastructure nearby. If found inadequate, developers are encouraged to include specific facilities to obtain planning permission. For instance, a recommendation is to include one childcare facility for every 75 units, while ensuring they are located away from air pollution sources or designed to mitigate the impact. Phased development is preferred to allow sufficient time for the construction of physical, social, and community infrastructure, accommodating population growth and minimising pressure on existing facilities.

8.2.2. Housing typology and mix

Dublin is currently facing a severe housing shortage, particularly in terms of affordable units. In Ireland, social housing constitutes 8.9% of homes, while owner-occupied homes account for 71% and private rentals make up the remaining 20% (Central Statistics Office, 2018). This differs from many European counterparts, where the distribution of tenure types is more balanced. To address the issue, DCC aims to increase the number of social housing units and implement affordable housing schemes, including cost-rental units and homes sold below market rate. The development plan aligns with the Part V clause of the Affordable Housing Act (2021), which mandates that 20% of new housing units should be designated as public housing, with at least 10% allocated for social housing and the remainder categorised as affordable housing. Collaboration with the national Land Development Agency is also emphasised to enhance housing delivery on existing council-owned lands. However, the development plan lacks detailed numbers or targets for housing output, and development on council-led sites has been slow. Some council-led sites predominantly consist of social housing, leading to limited tenure diversity and social mix, which contradicts the council's objectives and is not socially sustainable (Corrigan, 2020; Bolt & Kempen, 2013).

DCC also regulates the construction of Build-To-Rent (BTR) rental apartments, aiming to control their prevalence in certain areas to avoid overconcentration and promote sustainable communities (Dublin City Council, 2023). National guidelines exempt these units from strict minimum size and dual aspect ratio standards set by councils. However, there is concern that the high prevalence of BTR developments, attractive to institutional investors, could lead to unsustainable communities. Generally, new developments are expected to limit BTR units to a maximum of 40%, except in areas of specific need such as major employment centres or main transport hubs. This approach allows for a balanced tenure mix and gradual changes in social composition, discouraging rapid gentrification and fostering social sustainability.

These measures have faced criticism from the national level, the Office of the Planning Regulator, private developers, and builders (Kelly, 2022). They argue that these regulations could significantly impact housing output in Dublin, given the already high construction costs and the significant demand for smaller apartment units such as studios and one-bedroom flats. Minimum non-BTR unit sizes in Ireland are among the largest in Europe, with studios requiring a minimum

size of 40.7 m² compared to 25 m² in Paris and Berlin, and 30 m² in Amsterdam (Hines Ireland, 2020). BTR unit sizes are relatively lower but still higher than the minimum unit sizes in other European cities. DCC must carefully consider the balance between larger housing units' positive impact on quality of life and local communities and the potential negative consequences for social sustainability, including reduced housing output during a housing crisis.

8.2.3. Homelessness

Homelessness is a pressing issue in Dublin, with approximately 8,500 people residing in temporary homeless accommodation in the urban area. This figure excludes rough sleepers and asylum seekers, making it difficult to quantify the complete extent of the problem (Holland, 2023). The city is facing a housing crisis, resulting in a shortage of both permanent and temporary accommodations. The conversion of hotels into temporary homeless shelters and asylum seeker centres exacerbates the room shortage and negatively impacts the tourism industry. In response, DCC supports national-level initiatives to address homelessness. However, the chapter lacks specific policies outlining the council's own actions to alleviate homelessness and provide additional shelter. Instead, the council focuses on regulating proposals for additional shelter units to prevent overconcentration in specific areas. This approach considers the impact of shelters on local economies and communities, emphasising the social sustainability of neighbourhoods. There is a general presumption against converting existing hotels and hostels into homeless accommodation, particularly in Dublin 1, 7, and 8, where there is perceived overconcentration. While the plan acknowledges the council's humanitarian obligation to provide emergency accommodation, it does not clearly outline the council's specific strategies to combat homelessness.

An effective example of addressing homelessness and improving the lives of those in need is Finland's Housing First approach. By directly providing permanent housing to individuals in need, rather than temporary shelters or requiring sobriety, Finland has successfully reduced the number of long-term homeless individuals by 35% (Henley, 2019). This achievement resulted from close coordination among different levels of government and a significant increase in the number of housing units, especially small units, for long-term homeless individuals. Helsinki, for instance, used its own construction company to meet housing demand. This model has inspired Ireland's national-level Housing First Plan. However, DCC has not taken up this initiative, instead relying on national-level efforts, NGOs, and the private sector. By learning from Finland's institutional dynamics and taking a more proactive approach to homebuilding, DCC could effectively and sustainably address homelessness in the city.

8.3. Sustainable Movement & Transport

For Chapter 8 (Sustainable Movement & Transport), the codes groups of accessibility and environment are heavily represented at 32 and 30 matches respectively. The code groups

livability and inclusiveness are less widely represented with just 5 and 2 matches respectively, and the affordability code group had no matches attributed to it. The chapter has an overall focus on modal shift away from motor vehicles, pedestrian/cycling provision, parking management, and engaging with the national level regarding public transport projects.

8.3.1. Modal share

The chapter emphasises the proposed modal shift, with Dublin already exhibiting high public transport usage compared to its European counterparts, despite the absence of a metro and a relatively small light rail and commuter rail network. Currently, public transport holds a mode share of 54%, followed by walking at 11%, cycling at 6%, and private vehicles at 29%. The plan sets targets for 2028, aiming for a slight increase in walking to 13%, a substantial increase in cycling/micro mobility to 13%, a slight increase in public transport to 57%, and a significant decrease in private vehicles to 17%. These targets reflect a progressive approach to sustainable mobility, considering the emergence of electric vehicles (Müller & Reutter, 2021).

It is important to note that the measurements taken only account for journeys crossing the canal cordon, which serves as the outer border of the city centre. Therefore, these mode shares do not accurately represent trips between different suburbs or short trips within the city centre. Many of these journeys are commutes or leisure trips from the suburbs to the centre. Consequently, public transport usage may be overrepresented compared to the entire city, where transport coverage is less extensive, and there is less pedestrian/cycling provision. As the 15-minute city concept gains prominence and remote work means more time spent in the suburbs, it is essential to focus on achieving a sustainable modal share outside the city centre (Molla, 2021).

8.3.2. Infrastructure

The council's authority in planning and fund allocation for roadworks and public realm improvements necessitates a detailed approach. Development plans enforce the construction of new road links, bridges, cycle paths, and connections, all of which must include provisions for active travel. The design of this infrastructure must adhere to policies outlined in the plan, including traffic calming, reduced speed limits, segregated cycle paths, school zones, and accessibility for people with disabilities. These policies contribute to social and environmental sustainability by promoting modal share targets and integrating mobility with land use. New developments require studies demonstrating sufficient mobility provisions in the surrounding area, and higher densities are encouraged in well-connected locations, exemplifying sustainable transport-oriented development (Hoymann & Goetzke, 2016).

To discourage car usage, particularly in the city centre, the council aims to limit the availability of parking spaces. On-street parking spaces will either be charged for or replaced with green spaces or cycle lanes. Implementing charges instead of free parking offers environmental benefits by reducing car pollution caused by vehicles searching for parking spots (Čuljković,

2018). The council plans to replace some parking spaces with other uses while maintaining an adequate number of paid parking spaces. Accessible parking for people with impaired mobility will generally be preserved. Efforts will also be made to repurpose large multi-story or surface car parks for cultural venues, bicycle parking, or shared mobility hubs through collaboration with public bodies. Although this parking policy aligns with sustainability goals, it is important to ensure the availability of sufficient alternatives to maintain general mobility (Weinberger et al., 2009).

8.3.3. Public Transport

In Ireland, the development of public transport and related infrastructure is overseen by bodies at the national level of government, including the Department of Transport, National Transport Authority (NTA), and railway operator Iarnród Éireann (IÉ). While individual municipalities don't have direct control, they can support and influence decisions within their jurisdiction. Dublin City Council (DCC), for example, collaborates with the NTA and IÉ to develop a new transport interchange at Cross Guns, connecting existing railway lines with the future metro line. DCC also seeks the provision of new stations and interchanges along existing transport lines as needed, in line with their local area plans. Additionally, DCC, responsible for road design, coordinates the implementation of bus lanes along routes determined by the NTA. The council's sustainable mobility initiatives include incorporating green roofs on bus shelters to enhance biodiversity and promoting park and ride facilities within and outside DCC limits to discourage private vehicle usage when alternative options are available.

However, one crucial aspect missing from the Atlas.ti output is "Affordability." Affordability is a significant factor for sustainable transport, both socially and environmentally, as it strongly influences usage and accessibility for different population groups. The absence of affordability in the analysis may be due to it being beyond the council's control, but it remains a vital factor in achieving sustainability. Recently, Dublin was ranked as the "worst for public transport in Europe" in a study conducted by Greenpeace across 30 European cities (Lynch, 2023). The city's poor ranking primarily stems from issues with inclusiveness and affordability of the ticketing system. Unlike other cities, Dublin lacks a fixed-price long-term subscription covering all transport modes, and the system is considered inconvenient, expensive, and doesn't support contactless payment. Although DCC's influence is limited in this area, there is an opportunity for the council to advocate for necessary changes and work with relevant agencies to establish a more sustainable and affordable public transport network.

9. Summary and recommendations

Overall, the three chapters of the development plan analysed do a good job of including sustainability into the policies and vision for Dublin. Chapter 3 (Climate Action) incorporates environmental sustainability by focusing on decarbonisation and energy efficiency, as well as social sustainability through the retrofitting of lower-income households. On the other hand, it lacks clarity on how flood mitigation is to be achieved, particularly in relation to coastal defences, as well as a retrofitting plan that benefits the entire housing stock. Chapter 5 (Quality Housing & Sustainable Neighbourhoods) emphasises social sustainability through inclusion, community interests and tackling the social housing shortage. Policies exist to ensure a minimum percentage of social housing within private housing developments leading to a social mix but trade-offs need to be assessed with regards to affordability when regulating minimum unit size standards and housing the homeless. Finally, Chapter 8 (Sustainable Transport & Movement) combines environmental sustainability through modal shift and decarbonisation with social sustainability by improving mobility and accessibility for citizens. Work needs to be done to improve collaboration between stakeholders to increase coverage and implement an improved ticketing system.

The development plan is not a binding list of projects that must be completed by the end of the time period. In many cases DCC is limited by what powers it is given by the national level and how much advanced funding it possesses to set its own pipeline of projects. This explains why the section of housing targets, for example, is relatively vague in terms of implementation of the goals. The mandated DCC Housing Action Delivery Plan does feature targets and financial allocation over a specified time period, although targets for housing output are set by the national level and are nevertheless low (~10,000 units over 5 years) (Dublin City Council, 2022).

The Irish institutional landscape plays a role. Dublin City Council only covers a part of Dublin's urban area and there is no administrative level between the national and municipal level. This means the national level takes control of many matters affecting the city and region as a whole (ex: public transport). Municipalities are typically weaker than in European counterparts but nevertheless lead the planning process, which explains why many policies in the plan involve regulations rather than initiatives. Furthermore, tensions between state bodies and agencies often negatively impact collaboration on topics such as housing and transport. In general, all stakeholders need to take on a collective responsibility to meet their common goals, and DCC should take the opportunity to use its influence to take more initiative on certain matters in order to achieve its vision.

On the basis of this research a series of policy recommendations for DCC are devised, many of these on the condition of increased funding being made available as well as changes to institutional dynamics:

- Set energy rating standards for all newly built housing and mandate the inclusion of solar panels in new developments when possible
- Devise a plan to include privately-owned homes with poor energy labels in the retrofit scheme
- Add solar farms to zoning plans, and allocate land for this type accordingly, potentially through public-private-partnerships
- Create a detailed plan to take larger initiative on council-led housing construction/acquisition with higher targets
- Ensure that a balanced tenure mix is respected in each new council-led development
- Reasonably reduce minimum unit size standards, particularly for smaller units in high demand areas
- Take greater initiative on homelessness, and focus on permanently housing in turn-key accommodation rather than shelters
- Devise modal share targets for various different journey types and journeys in different locations, especially various suburbs, using these targets to justify physical interventions in these areas
- Owing to low car mode share in the city centre, rapidly pedestrianise and make adjustments to the road system in this zone. Consider enacting a circulation plan/ low-traffic neighbourhood (LTN) system, or a congestion charge inside the canal cordon
- Lobby authorities to introduce a simplified smart integrated ticketing system for public transport, including long-term subscriptions
- Introduce a directly-elected mayor with executive power in order to help exert influence on higher levels of government, fast-track decisions, as well as improving citizen accountability

10. Conclusion

The thesis examines the incorporation of sustainability criteria into the Dublin City Development Plan 2022-2028, specifically focusing on transportation and housing. It aims to answer the main research question: “To what extent is sustainability integrated into the Dublin City Development Plan 2022-2028, particularly in transportation and housing?”, and the sub-questions: 1. How does the plan address social and environmental sustainability?, 2. What are the challenges faced by Dublin in terms of sustainability?, and 3. What policy recommendations can enhance sustainability within the plan?

Firstly, The findings reveal an integration of sustainability principles within the analysed chapters of the development plan. “Sustainability” as a term is referenced throughout, and the criteria indicators are relatively well represented throughout the chapters, with a few exceptions such as inclusiveness and affordability for climate action, affordability for housing and inclusiveness for transport. Elements of policy that are vague or contradict the sustainability criteria are also present and addressed through the policy recommendations.

Secondly, the research focuses on transport and housing, two topics which are considered challenges by DCC not only in terms of sustainability, but also ensuring a sufficient provision. The research acknowledges the limitations imposed by national-level powers and funding constraints on the development plan. The institutional landscape in Ireland, with limited administrative levels and tensions between state bodies, affects collaboration on housing and transport issues. This highlights the importance of overcoming institutional barriers and fostering cooperation for effective sustainable urban planning. It is therefore recommended that Dublin City Council (DCC) take a more proactive role in this and assert its influence to meet its own goals.

Thirdly, based on the research findings, several policy recommendations are proposed for DCC. These recommendations provide insights and guidance globally They include energy standards, mandating solar panels, incorporating privately-owned homes into retrofit schemes, introducing solar farms, increasing council-led housing construction and tenure mix, addressing homelessness through permanent housing solutions, improving modal share targets and pedestrianisation, advocating for simplified transportation ticketing, and introducing a directly-elected mayor with executive power. These recommendations can equally serve as a starting point for other cities seeking to enhance sustainability in transportation and housing.

In conclusion, the thesis highlights a relatively high integration of sustainability within the Dublin City Development Plan 2022-2028 and provides relevant findings and recommendations for other cities around the world. By considering social and environmental aspects, collaborating with stakeholders, and implementing policy initiatives, cities can learn from Dublin's strong points and weak points in creating policy towards a more sustainable and resilient urban future.

11. Bibliography

Banister, D. (2008) The sustainable mobility paradigm. *Transport Policy*, 15(2), pp.73-80.

Brundtland, G. (1987). Report of the World Commission on Environment and Development: Our Common Future. United Nations General Assembly document A/42/427.

Bolt, G., & Kempen, R. (2013). Introduction Special Issue: Mixing Neighbourhoods: Success or Failure?. *Cities*.

Corrigan, D. (2020). Councillors Vote Against Big Deal with Private Developer for Public Land. [online] *Dublin Inquirer*. Available at: <https://dublininquirer.com/2020/11/18/councillors-vote-against-big-deal-with-private-developer-for-public-land/> [Accessed 15 May 2023].

Čuljković, V. (2018). Influence of parking price on reducing energy consumption and CO₂ emissions. *Sustainable Cities and Society*.

Dasgupta, S., Lall, S. and Wheeler, D. (2022). Cutting global carbon emissions: where do cities stand? [online] *blogs.worldbank.org*. Available at: <https://blogs.worldbank.org/sustainablecities/cutting-global-carbon-emissions-where-do-cities-stand>.

Department of the Environment, Climate and Communications (2022). Energy Poverty Action Plan. [online] Available at: <https://www.gov.ie/en/publication/159cb-energy-poverty-action-plan/>.

Dublin City Council. (2021). Development Plan 2022 - 2028. [online] Available at: <https://www.dublincity.ie/residential/planning/strategic-planning/dublin-city-development-plan/development-plan-2022-2028>.

Dublin City Council (2022). Dublin City Council Housing Delivery Action Plan Overview. [online] Dublin City Council. Available at: <https://www.dublincity.ie/sites/default/files/2022-07/dublin-city-council-housing-delivery-action-plan-july-2022b-web.pdf> [Accessed 28 May 2023].

Dublin City Council (2023). 15.10 - Build to Rent Residential Developments (BTR) | Dublin City Council. [online] *www.dublincity.ie*. Available at: <https://www.dublincity.ie/dublin-city-development-plan-2022-2028/written-statement/chapter-15-development-standards/1510-build-rent-residential-developments-btr> [Accessed 1 Jun. 2023].

European Commission (n.d.). Mobility Strategy. [online] transport.ec.europa.eu. Available at: https://transport.ec.europa.eu/transport-themes/mobility-strategy_en.

European Commission (2023). Urban Data Platform Plus. [online] Europa.eu. Available at: <https://urban.jrc.ec.europa.eu/?lng=en>.

Gain, V. (2022). Ireland ranked lowest in Europe for renewable energy readiness. [online] Silicon Republic. Available at: <https://www.siliconrepublic.com/innovation/ireland-renewable-energy-readiness-index-evs>.

Henley, J. (2019). ‘It’s a miracle’: Helsinki’s radical solution to homelessness. [online] the Guardian. Available at: <https://www.theguardian.com/cities/2019/jun/03/its-a-miracle-helsinkis-radical-solution-to-homelessness>.

Hines Ireland (2020). EXECUTIVE SUMMARY Ireland Apartment Sizes among largest in Europe. [online] Hines Ireland. Available at: <https://irp-cdn.multiscreensite.com/4065c16c/files/uploaded/Comparison%20of%20Minimum%20Apartment%20Sizes%20final.pdf> [Accessed 23 May 2023].

Holland, K. (2023). Homelessness in Ireland hits record peak of more than 11,700. [online] The Irish Times. Available at: <https://www.irishtimes.com/ireland/social-affairs/2023/02/24/more-than-11700-people-homeless-in-ireland-in-new-record-high/>.

Hoymann, J., & Goetzke, R. (2016). Simulation and Evaluation of Urban Growth for Germany Including Climate Change Mitigation and Adaptation Measures. ISPRS Int. J. Geo Inf..

Kelly, O. (2022). Dublin City Council defies planning regulator over build-to-rent rules. [online] The Irish Times. Available at: <https://www.irishtimes.com/ireland/dublin/2022/11/01/dublin-city-council-defies-planning-regulator-over-build-to-rent-rules/> [Accessed 23 May 2023].

Klopp, J. & Petretta D. L. (2017) The urban sustainable development goal: Indicators, complexity and the politics of measuring, *Cities*, 63. pp.92-97.

KPMJ (2019). A report to Greener Journeys || 0. [online] Available at: https://greener-vision.com/wp-content/uploads/2019/02/20190213_KPMG-Sustainable-Transport-and-New-Housing-Report-for-TKH_FINAL....pdf [Accessed 2 Mar. 2023].

Lima, V. (2018). Delivering Social Housing: An Overview of the Housing Crisis in Dublin. *Critical Housing Analysis*, 5(1), pp.1–11. doi:<https://doi.org/10.13060/23362839.2018.5.1.402>.

Lynch, A. (2023). Dublin’s public transport has been ranked the worst in Europe – how can we get it on the right track? [online] *Independent.ie*. Available at: <https://www.independent.ie/regionals/dublin/dublin-news/dublins-public-transport-has-been-ranked-the-worst-in-europe-how-can-we-get-it-on-the-right-track/a219437691.html> [Accessed 25 May 2023].

McCárthaigh, S. (2023). An Taisce in heated row over true cost of ‘monster’ incinerator. *www.thetimes.co.uk*. [online] 2 Jun. Available at: <https://www.thetimes.co.uk/article/an-taisce-in-heated-row-over-true-cost-of-monster-incinerator-sv68skd26> [Accessed 10 May 2023].

Molla, R. (2021). Remote work is bringing the city to the suburbs. [online] *Vox*. Available at: <https://www.vox.com/recode/22714777/remote-work-from-home-city-suburbs-housing-traffic>.

Müller, M., & Reutter, P. (2021). Course change: Navigating urban passenger transport toward sustainability through modal shift. *International Journal of Sustainable Transportation*.

OECD (n.d.). Home. [online] *www.oecd-ilibrary.org*. Available at: https://www.oecd-ilibrary.org/sites/543e84ed-en/1/3/3/index.html?itemId=/content/publication/543e84ed-en&_csp_=535d2f2a848b7727d35502d7f36e4885&itemIGO=oecd&itemContentType=book [Accessed 9 Mar. 2023].

United Nations (2015). The 17 Sustainable Development Goals. [online] United Nations. Available at: <https://sdgs.un.org/goals>.

United Nations (2021). Goal 11 | Department of Economic and Social Affairs. [online] United Nations. Available at: <https://sdgs.un.org/goals/goal11>.

Weinberger, R., Seaman, M., & Johnson, C. (2009). Residential Off-Street Parking Impacts on Car Ownership, Vehicle Miles Traveled, and Related Carbon Emissions. *Transportation Research Record*.

Wickham, J. (2006). *Gridlock: Dublin’s transport crisis and the future of the city*. Dublin: TASC at New Ireland.