

Connecting theories and practice of governance networks and sustainability policies in cities



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Abbreviations

ABBREVIATION	STAKEHOLDER	SECTOR
GCC	Glasgow City Council	Public
SDS	Skills Development Scotland	Public - agency
SE	Scottish Enterprise	Private
COC	Chamber of Commerce (Glasgow)	Third
GHA	Glasgow Housing Association	Public - agency
SPT	Strathclyde Partnership for Transport	Public - agency
SG	Scottish Government	Public
GCC	Glasgow City Council	Public
TS	Transport Scotland	Public – agency
TNT	Tenants	Private
UOS	University of Strathclyde	Third
COCP	City of Copenhagen	Public
CONC	Concito	Third
RAMB	Ramboll	Private
SKF	Social Kapital Fund	Private
UOC	University of Copenhagen	Third
DANF	Danfoss	Private
BOH	By og Havn	Public - agency
HOF	Hofoer	Private
ABB	ABB	Private
DTU	Technical University of Denmark	Third
G21	Gate21	Private
CLEN	Clean Cluster	Third
CSLAB	Copenhagen Solutions Lab	Public
C40	C40 Cities	Third
TN	Transition Now	Third
SHC	Sharing Copenhagen	Public

DEA	Danish Energy Agency	Public
C-KIC	Climate-KIC	Third
SUST	Sustainia	Private
UOG	University of Glasgow	Third
SUST	Sustrans	Third
SW	Scottish Water	Public - agency
GCPH	Glasgow Centre for Population Health	Third
UOS	University of Strathclyde	Third
SIR	Scottish Institute for Remanufacturing	Third
SNF	SNIFFER	Private
ZWS	Zero Waste Scotland	Public - agency
NHS	NHS Scotland	Public
CSIC	Construction Scotland Innovation Centre	Public - agency

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Abstract

This research analysed the effectiveness of governance networks on the design and implementation of sustainability strategies of two European cities – Glasgow and Copenhagen. European municipalities are actively developing strategies that require collaboration between a plethora of stakeholders, often found in networks. Stakeholder collaboration was examined through three features of governance network theory: inter-dependency, coordination and pluralism. The research explored network management and normative issues in relation to network leadership, power and accountability challenges in order to better understand the stakeholder interactions and their impact on sustainability decision-making.

The design of sustainability strategies was explored through a comparative analysis of governance networks and implementation was analysed through projects in each city. Data collection was informed by a literature review which was analysed to shape key themes. Qualitative data was collected through semi-structured interviews of network stakeholders. Interview questions directly correspond to key features identified. Social network analysis was then employed to categorise and standardise data into a schematic network diagrams by mapping and quantifying patterns of connection between stakeholders in each network. Qualitative data collected enabled an exploratory analysis of why patterns and relationships exist and how they impact the design and implementation of sustainability strategies.

Research has shown that the key features of governance networks are evident in Glasgow and Copenhagen, however, future studies could consider integrating more flexibility to reflect regional contexts. The ‘transition’ cities experience between formal and informal governance must be integrated. Networks can effectively enable municipalities to leverage stakeholder resources within decision-making. However, clarity on sustainability objectives and indicators is necessary, as well as more ambitious target setting in city’s sustainability strategies. There is no recipe for a ‘successful’ decision-making process; results identified elements that help

and hinder governance networks which must be addressed to accelerate the reduction of carbon emissions in 21st century cities.

CHAPTER 1: INTRODUCTION

1.1 Overview

1.1.1 Introduction to governance networks

Within the last half century, one of the more significant developments in the European political sphere has been the emergence of the concept 'sustainable development' as a key focus for both societal and government action (Meadowcroft 2011). The political salience of sustainable development issues has been largely driven by economic development trends and pressure on natural resources in urban areas, which have legitimated city led government intervention for sustainable development policy outcomes (*ibid* 2011). Municipal intervention has been accelerated in response to both national sustainability targets and pressure from international sustainability commitments (e.g., United Nations 'Agenda 21' in 1992, Sustainable Development Goals in 2016), which has put cities at the centre of the sustainability and governance debate (Beatley 2003). Thus, 21st century European municipalities are actively developing strategies to progress towards sustainable approaches to development as international treaties co-exist with market-based mechanisms such as indicators (Bevir 2011; Khan 2013). Such strategies are comprised of sustainable development indicators (hereafter SDIs) which help to identify past and present trends as well as shape policy outcomes (Boyko et al. 2012).

This research focuses on the effectiveness of a public management network in an urban context, based functionally on sustainable development policy. Drawing on network stakeholder perceptions, the research aims to further understand the role of governance networks on the design and implementation of municipalities sustainability strategies. The research utilises a comparative case study approach which explores both similar (e.g., governance networks for sustainability) and different features (e.g., sustainability strategies). Underpinning this research aim, is the exploration of the similar and different processes across various urban systems (cases) that can enable us to understand what helps or hinders the

effectiveness of the governance network approach; which furthers our conceptualisation of governance network theory (Savitch and Kantoor 2004). To this end, the research objectives focus firstly, on mapping stakeholders involved in within governance networks in order to clarify network structure. Secondly, the research then assesses the key features of governance networks (characteristics that distinguish the concept from other forms of governance): interdependence, coordination and pluralism. These characteristics are examined to identify relationships between stakeholders within a governance network and explain why they exist, in order to understand whether they help or hinder the effectiveness of policy outcomes in two case study municipalities in Europe: Glasgow, United Kingdom and Copenhagen, Denmark (Aars and Fimreite 2005). Thirdly, the research explores how governance network structure and the stakeholder interactions contribute towards designing (e.g., through networks) and implementing (e.g., through projects) sustainability strategies within these cities (Campbell 1996). This research specifically focuses on the Sustainable Glasgow network and RUGGEDISED project in Glasgow and the Copenhagen Climate Panel network and Energy Lab project in Copenhagen. The complexity of the sustainable development concept and governance changes at city-level necessitates collaboration between a plethora of stakeholders often found in networks: the public sector; private sector, and, third sector (e.g., higher education institutions, not for profit organisations and, charities) (Meadowcroft 2011; Khan 2013). Collaboration within stakeholders in networks enables knowledge exchange and sharing expertise and can encourage stakeholder buy-in for designing and implementing sustainability policy decisions in order to progress towards carbon emission reduction targets.

Through comparative case studies, this research explores normative governance network issues such as the relationship between accountability, leadership and governance, as the quality of leadership within a network affects the performance of the network and accountability contributes to the effectiveness of networks (Avolio and Luthans 2006; Denhardt and Denhardt 2011). In governance networks, accountability can be problematic as the participatory process results in outcomes being realised through close collaboration between stakeholders in processes where there is no sharp distinction between policy design and implementation as

well as who would be specifically accountable for such decisions. In governance networks, political accountability is blurred as there are various relationships between decision makers and stakeholders both within and out with the network (Klijn and Koppenjan 2016b). Accountability is explored further in the chapter two (literature review) in the context of network management (leadership and governance), as it can play an important role in the enhancing the effectiveness of governance networks.

Cities such as Glasgow and Copenhagen are actors themselves in the dynamics of global governance, playing an increasingly prominent role within the global policy agenda by lobbying, linking, planning and cooperating on sustainable development policies at a local, national and international level (Acuto and Rayner 2016). Municipalities represent a unique platform for academic investigation as global climate challenges are best expressed at city level and cities can offer a 'test bed' for the development of innovative scalable approaches and data required for this research is more readily available (Jacquier 2005).

The intersection between sustainability and governance defines an increasingly important area for academic investigation, as sustainability accounts for a large proportion of city diplomacy initiatives, inscribing a new type of politics into global governance (Gustavsson et al. 2009; Bevir 2011; Acuto and Rayner 2016). In the sustainability governance and urban studies discourse, the onus has increasingly been placed on two areas.

First, the municipal government's leadership, regulatory and coordination roles in governance networks (Tierney 2012). The role of leadership in networks has been relatively under researched, as networks primarily focus on non-hierarchical terms, contrary to the traditional 'top down' hierarchical terms where power and position are clearly evident (Denhardt and Denhardt 2011). However, the process of leadership has a significant impact on both the structure and outcomes of networks, thus, it is necessary to explore new types of leadership (e.g., fostering collaboration, resolving concerns through engaging citizens), as traditional approaches are ill-suited to the type of governance experienced in European cities today (*ibid* 2011). Governance networks requires municipalities to work across structures (e.g., levels of

government, sectors, countries), to find innovative ways of responding to complex political challenges (*ibid* 2011). The governance processes used by municipalities today necessitates new models of leadership and how they coordinate organisations within issue specific policy networks.

Secondly, improving metrics and knowledge in urban sustainability, such as indicators in a municipality's sustainability strategy, that are utilised in order to assess progress towards sustainability targets (Gustavsson et al. 2009). Municipalities are facing pressures which drive cross-boundary working created largely by centrally driven incentives to meet market driven targets and outcomes (Goss 2001). These targets and outcomes take the shape of indicators to highlight progress towards or away from common sustainable development goals, in order to advise and inform citizens, decision makers and other stakeholders (Parris and Kates 2003). Centrally determined indicators can accelerate progress towards both development and economic policy objectives as they contribute towards the building of sustainable self-regulated governance systems (Hiremath et al. 2013). Measurement is an increasingly critical dimension of governance for sustainable development; it can only be translated into a set of quantifiable objectives through analysis, value judgement and debate within a governance network (Gibson et al. 2005). Sustainable development indicators can be used as a mechanism for a participatory decision making in networks, a process designed to broaden consensus on outcomes and facilitating cross-boundary working across traditional political and institutional divides (Parris and Kates 2003). The use of indicators for city-level decision making are often based on central government created indicators, that provide the foundation for national level decision-making (Hiremath et al. 2013).

This research contributes towards both areas within the mainstream sustainability governance discourse and is based on the observation that governance networks play an important role in designing and implementing sustainability strategies for municipalities (Djalante 2012). With this in mind, the 'city' is the main subject of this research. Various European municipalities have adopted the network approach to draw on stakeholders' expertise, skills and resources that are not available in-house. This research compares and contrasts the roles of Glasgow

and Copenhagen municipalities within their networks in relation to leadership. Municipalities have democratically elected politicians and the ability to make city-wide legislative decisions; therefore, their role is widely perceived to be leading the city. This has been reinforced further with new legal powers to promote 'social, economic and environmental well-being' (Goss 2001). The role of municipal leadership in governance networks is an area given little attention within the literature, but which nonetheless affects the coordination of societal stakeholders, thus the effectiveness of the network itself (Rhodes 1997; Bevir 2011). The research explores Ansell and Gash's (2008) 'facilitating leadership' style within governance networks, that the leader 'mediates between actors and empowers the collaboration process' (Ricard et al. 2017:139). The leadership style incorporates key features of governance networks: facilitating negotiation, coordinating stakeholders and enhancing collaboration for policy implementation (*ibid* 2017). Additionally, the type of leadership selected aligns with Denhardt and Denhardt's (2011) leadership model necessary for governance networks (as mentioned previously), which focuses on the role of the leader as fostering collaboration between organisations, building adaptive capacity and the ability to resolve concerns through dialogue and citizen participation. The leadership style selected aligns with governance network theory, as the municipality facilitates and mediates between stakeholders, offering a meaningful contribution to the research findings which can be applied in the governance networks and sustainability context. It is important to note that this leadership style can create various challenges in a governance network. The mediation role of the network leader can, for example, favour stakeholders where leaders have strong relationships, ignoring weaker ties. This collaborative process can disperse power for decision-making between stakeholders, which may dilute the network leaders' ability to make key decisions.

Governance in European cities does not occur in a void, as multiple factors influence a city's ability to design and implement effective sustainability policies. In practice, both economic and political global shifts have resulted in cities filling the 'governance gap' identified by Hale et al. (2013) in that cities are fast becoming the main players in global decision-making as state-to-state negotiations and collaboration has disintegrated (*ibid* 2013). This has resulted in the

development of city networks, as seen in Glasgow and Copenhagen, that offer alternative pathways for collaboration both in the city's themselves (with local stakeholders and citizen engagement) as well as national and transnational organisations and networks. Many cities fulfill equivalent functions (on a smaller geographic scale) of both trans and sub-national regions; therefore, cities must collaborate as new forms of growth are (in part) the results of these networks within cities (Sassen 2002). There is no such entity as a single global city as they leverage expertise, knowledge and resources from organisations both within and out-with the city periphery (boundaries). Although this research focuses on the internal workings of each network and project, such as stakeholder interactions and resulting sustainability strategies, it draws on wider external political and economic powers where appropriate. Thus, the research is situated within this wider context of global political changes, with the results and analysis chapters exploring city governance networks with international networks and organisations. The next section provides an overview of the policy process at city-level which contextualise the emergence of governance networks.

1.1.2 Policy processes within city-level governance

The research uses the term governance network to describe the policy process (e.g., design and implementation), through a series of interactive relationships between diverse organisations with the aim of addressing a specific problem (Klijn and Koppenjan 2016a). The governance network perspective utilises network management approach: coordinating stakeholders, organising information and resource flows, creating process rules and so forth. Within the governance network policy process, policy goals (e.g., sustainability targets such as carbon emissions reduction) are developed and negotiated. Though frequently there is little distinction between the policy design and implementation and then the delivery of such policies 'on the ground' (Bevir 2011). Political leaders involved actively participate within all of these processes, as evidenced through both Glasgow's and Copenhagen's governance networks. However, there is a distinct lack of clarity on specific policy design and implementation processes as within different urban systems they play out differently. Therefore, the

comparative case study approach further refines and develops our understandings of the different urban systems and their political processes, which can help to further refine and develop governance networks theory. Within the new governance approach, political leaders facilitate relationships to improve the inter-organisational coordination, with the intention to improve the quality of decision-making, and not necessarily to breakdown political processes into specific linear steps, per se (Goss 2001). It is necessary to identify how this policy process influences the effectiveness of such governance networks.

This research examines both governance networks and projects as separate entities (though with the same focus on 'key features' respectively, as projects offer similar characteristics as networks but with different objectives) to understand the policy processes inherently within each entity and city (though the research is not limited to focus solely on this self-enclosed entity, but rather, explore it in relation to other levels of governance). Both governance networks in Copenhagen and Glasgow have closely linked projects where multiple network stakeholders actively participate. Within each city, governance networks are deliberate attempts by the municipality to engage stakeholders within the city on key sustainability challenges in order to leverage knowledge, expertise, finance and insight (Ricard et al. 2016). The networks themselves do not have jurisdiction to make legal decisions, per se, but they do provide a forum for discussion, negotiation and provide direct access to decision makers who could potentially be influenced. In contrast, projects are not necessarily led by the municipality, despite their role widely perceived by stakeholders involved to be instrumental in the success of the projects. The projects were selected as they are large scale, cross-sectoral flagship projects within each city, both of which have direct links to each respective city governance network (e.g., various stakeholders are involved in both the networks and projects). In addition, both projects align with the key thematic areas outlined within each city's sustainability strategy (e.g., 'smart street' concept in both Copenhagen Glasgow, focusing on new energy efficiency technologies, big data and district heating). The distinction between networks and projects includes the lack of policy development discussion within projects and the focus on practical implementation of ideas, whereas networks are a discussion forum in which to discuss the

feasibility of policies and how they may be implemented. The research examines governance networks and projects as separate entities but not mutually exclusive of one another, as the symbiotic relationship between both entities, though may offer insight on the policy processes at city level. Furthermore, the research aims to provide insight on the key features examined within each entity and identify how urban sustainability policies could be improved in the future.

Governance networks mostly emerge from efforts to increase the effectiveness of public policies and service delivery in situations of interdependencies (Klijn and Koppenjan 2016a). Within this context, this research adopted Provan and Kenis's (2007:2) definition of 'network effectiveness' as 'the attainment of positive network level outcomes that could not normally be achieved by individual organisation's [stakeholders] acting independently.' Network effectiveness is viewed at the network-level, despite individual stakeholders potentially benefitting from participating in the governance network itself. The specific type of network-level outcome considered within this research is defined as meeting the carbon emissions reductions targets within each city which is a 30% carbon emission reduction target in Glasgow by 2020 and a target of carbon neutral by 2025 in Copenhagen, based on 1990 carbon emissions base levels (City of Copenhagen 2009; Glasgow City Council 2014). Specifically, the priority when examining the governance networks is the *progress towards* each target mentioned above within each city and evaluating progress against the key features of governance networks within both networks and projects¹. Provan and Kenis (2007) claim that specific forms of governance networks are more likely to be effective than others, much of this depends on a variety of structural and relational contingencies: network structure, objectives and tasks. Although not an exhaustive list, this research considers these and identifies any new themes that have not been accounted but may influence the effectiveness of the governance network. Within the policy process, the next section explores the theoretical approaches used to explore governance networks within this research study.

¹ Further justification is provided in chapter two (Literature Review).

1.1.3 Theoretical approaches

Theoretical approaches to governance networks vary, and, as such, there is no distinct theory applied within the sustainability and governance discourse. In this research, the theoretical concept of governance networks incorporates various stakeholders which are involved in the decision-making processes at municipal level (Koimann 2003; Bogasson and Musso 2006). The transition to a network of societal stakeholders involved within local governance processes has become mainstream practice in recent years (Goss 2001). Governance network theory seeks to encapsulate this transition in practice, from traditional hierarchal governance forms, where the role of the state was to 'regulate' towards newer forms of governance, where private stakeholders and third sector organisations increasingly participate within the decision-making process (Koimann 2003; Bogasson and Musso 2006).

Within this research, the theoretical perspective of governance network itself is employed as an organising framework and the key features (characteristics) that distinguish the concept from other modes of coordination, such as: interdependence, coordination and pluralism, are applied as an theory that will be analysed through sustainable development decision-making process in Glasgow and Copenhagen. To be considered in the network, stakeholders must actively participate in, or contribute to each governance network with the aim of developing and implementing the municipalities' sustainability strategy. Within the context of this research, 'active' participation or contribution is attending the majority of meetings and providing resources (e.g., time, funding, contacts, knowledge). The framework intends to evaluate the process of complex decision-making in governance networks within the public sector (Klijn and Koppenjan 2016a).

Despite the lack of a distinct theory for governance networks, on the basis of empirical and secondary data, this research examines various theoretical and normative assumptions that underlie the governance network approach. The assumptions identified correspond to the key features of governance networks, interdependence, coordination and pluralism: resource dependencies between stakeholders can affect durable interaction patterns; stakeholders'

influence can impact the level of cooperation; the 'closeness' of the network and exclusivity can alter policy outcomes; stakeholders' background and perception influences interaction within the network, for example, stakeholders definition of sustainable development can affect discussions (Klijn and Koppenjan 2016b). Drawing on the empirical and secondary data, the objective of the governance network perspective is to improve inter-organisational coordination and the quality of decision-making that supports integral problem solving within the public sector. The justification for governance network theory necessitates the brief exploration of other theoretical perspectives (e.g., actor network theory) detailed in the research methodology chapter (section 3.2). This research explores governance network theory and also the practical application of this policy process within European cities.

The transition within local governance processes is no longer a theory - it has become practice (Goss 2001). The key features of governance network theory have been selected as they distinguish the approach from other modes of coordination in practice and not just in theory, thus they contribute to the research question by examining the effectiveness of governance networks through empirical observation. The empirical evidence from governance networks within both Glasgow and Copenhagen will contribute towards theory development and test the theoretical and normative assumptions outlined above. The small sample of cities selected (two), necessitates a convincing theoretical justification to explicitly state the basis of each case. The governance network organising framework is intended as a frame of reference for both policy makers and practitioners within the public sector, enabling them to enhance the development and implementation of sustainability strategies and the complexities that arise in addressing climate change within a governance network (Klijn and Koppenjan 2016a).

To summarise, the governance network theory has evolved as a result of the wider economic, political, social and cultural shifts within cities in the last 20 years. The number of governance networks created by European municipalities within this time, has increased significantly, with most European cities fostering collective action on complex sustainability policy challenges. This research challenges the governance network theoretical and normative assumptions to

enhance and refine the understanding of the concept. Within the sustainability and governance discourse, the governance network theory must account for the challenging relationship between the municipality and external stakeholders involved as they play important roles in maintaining, influencing and recasting the relationships that make up the process of governance itself (Goss 2001). The next section applies the theoretical concept of governance networks within two case studies.

1.1.4 Comparative case studies: Glasgow and Copenhagen

Governance networks in Glasgow and Copenhagen warrant in-depth comparative case study analysis with respect to the themes identified from the literature review analysis: governance networks features, sustainability strategies and leadership within each network. Glasgow and Copenhagen are cities of a similar scale and size, with mature representative democracies through which their national governments both express a clear and ambitious commitment to addressing climate change (Scottish Government 2009; Danish Energy Agency 2010). Both cities are well known port cities that have experienced a post-war transition away from heavy industry, which has led to a significant growth in the commercial and financial sectors. Within the last 20 years, each city has developed sustainability strategies to address climate change, evidencing a willingness to invest in low carbon projects and technologies so as to become leading sustainable cities in Europe.

Within each sustainability strategy, both Glasgow and Copenhagen have stated the continued need for partnerships and networks with various stakeholders within each city. The aim of such stakeholder interaction is to further refine their sustainability strategies and develop ambitious localised climate goals that align with the European Union's carbon reduction targets (EU 2014). Glasgow and Copenhagen have adopted governance networks to draw on external stakeholders' expertise on climate change, a key characteristic of both networks is the cooperation between 'like-minded' governments, a 'coalition of the willing' as expressed in each of the city's sustainability strategies.

Whilst both Glasgow and Copenhagen have similar networks and projects (e.g., topic, duration, number of stakeholders, etc.) largely led by the municipality, this research study analyses their respective functionality in the policy process, focusing on two areas: the policy design and policy implementation process (Martens 2007). The research does not address the advocacy functionality as secondary data has clarified that advocating for sustainable policies is not within the remit of governance networks in Glasgow and Copenhagen. Secondary data also confirms that both networks cannot legally create their own policies and implement them per se (they are not legal entities and most stakeholders do not have a democratic mandate to make such decisions). However, stakeholders within the governance networks can strongly 'steer' the policy process, thus their influence within decision making can be significant. The 'steering' can be achieved by primarily non-hierarchical and soft forms of influencing (e.g., such as bargaining, persuasion, withholding resources) rather than direct legislation and litigation (Backstrand 2008).

Comparative case study approach

Critical research questions in both governance network theory and practice can be answered through international comparative analysis of European cities. The approach offers an empirically supported theory of the governance network concept in order to identify fundamental similarities and differences that further our understanding of the role of governance networks on decision-making process and applying these findings to other European cities (Azarian 2011). In order for the findings from the case studies cities selected to contribute to the cumulative development of theory and knowledge, the research design has examined the same research goal, methodologies, standardised questions, theoretical focus and variables in each city (Esser and Vliegthart 2017).

This research uses a comparative case study approach as a field of enquiry. The approach brings insights from different kinds of urban contexts together into the same analytical framework as it examines governance network theory by enabling conversations beyond a single case (Robinson 2016). Comparative case studies enable the researcher to control

contextual variables (e.g., governance network features) in order to understand casual patterns of explanation (e.g., different network outcomes). The comparative case study approach seeks to further theorization by fostering a diversity of theoretical starting points and perspectives through critical case studies.

This approach has been critiqued by various scholars who have claimed that it: simplifies urban complexity (Sellers 2002; Pierre 2005; Ward 2008); takes for granted the geographical scalar context often treating geographical levels as 'fixed' (Savitch and Kantor 2002; Denters and Mossberger 2005); treats the city as a discrete and self-enclosed object (Brenner 2004; Robinson 2005); and, focuses on government as the primary means through which to examine politics (Denters and Mossberger 2005; Ward 2008).

This research seeks to address such criticism and has proactively considered these factors within the research design process by firstly, developing a robust analytical framework for defining the variables to be compared and adopting a qualitative research approach that can provide exploratory narrative as well as scientific data to explain key differences within each urban system (Sellers 2002; Pierre 2005; Ward 2008). Secondly, although the research explores each city network and project as an individual entity and clearly defines research boundaries, other levels of governance are considered from neighbourhood level to international linkages in order to situate the research findings. Specifically, the 'interconnectedness' between cities and other levels of governance as noted by Robinson (2016) are explored to contextualise and situate the case study findings within the broader urban political sphere. Thirdly, within city networks and projects the predominant focus is on the governance network theory features that form the basis of the analysis, however, the research is not limited to focus on the social relations between actors that are solely within this entity, as they are not 'self-enclosed discretely bounded territorial container' as defined by Brenner (2004:38) but rather, are inter-linked making way for a more relational conceptualisation of cities (Massey 2007). Thus, the research focuses on the city perspective but explores the city in relation to other levels of governance, stretching beyond the physical

extent of the city (Robinson 2005). Lastly, although municipal government is a primary stakeholder within this research for the formation of networks and projects examined, albeit an important one in many cases (but not all), it is only one of a number of different stakeholders involved in urban governance. Further justification for the comparative case study approach is provided in chapter three, section 3.4.

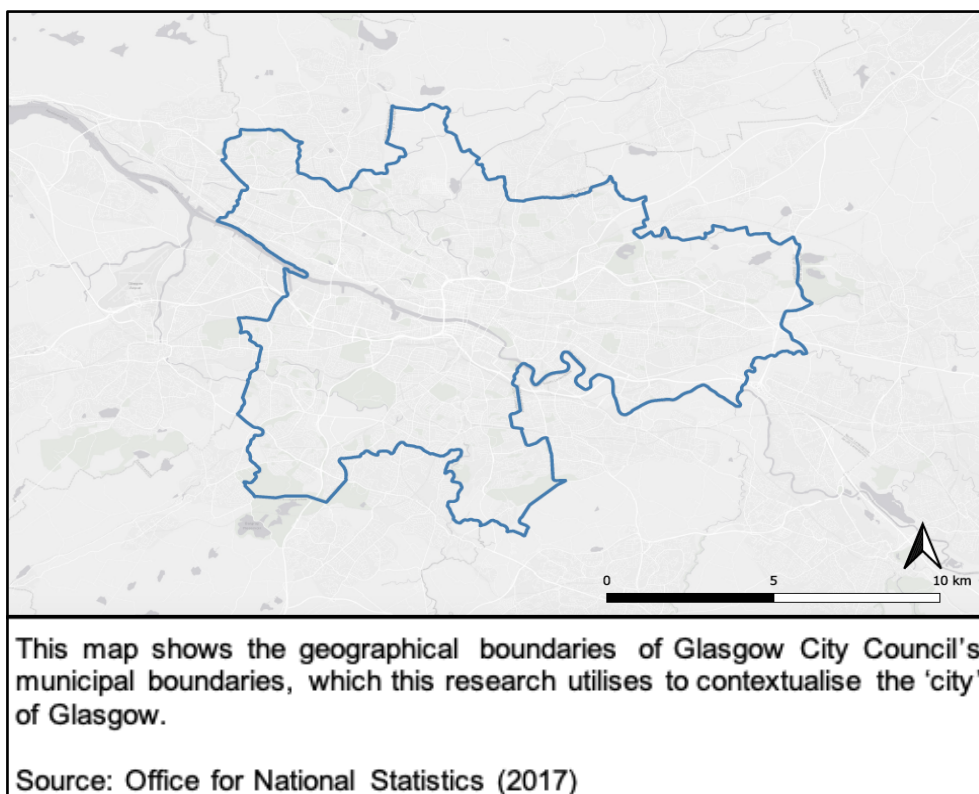
Glasgow and Copenhagen context

This section provides an overview of sustainability governance within each city. By 2020, Glasgow aims to be one of the greenest cities in Europe, as outlined in the city's Energy and Carbon Masterplan (2014). Glasgow City Council aims to reduce its carbon emissions by 30% by 2020 aligning with Scottish Government targets. In 2014, Glasgow became one of the first members of the Rockefeller Foundation's 100 Resilient Cities network. Sustainability planning in Scotland dates back to the Environment Act (1995), which focused on prevention and control of pollution. In 2009, the Climate Change Act (2009) provided a legislative framework to invest in low carbon technologies. Glasgow City Council introduced its own Climate Change Action Plan in 2010 - the first urban strategy for sustainable development. From this, various other plans have developed focusing on different issues (e.g., climate resilience). Since 1998, Scotland has acquired devolved powers from Whitehall specifically planning and the environment, agriculture and local government, but not energy (e.g., coal) and aspects of transport (e.g. railways) which are managed by the UK government. Thus, various tiers of governance are as follows: UK government, Scottish Government and 32 local authorities which act as administrative units. Since 2015, new powers were ceded to Scotland make it one of the most fiscally decentralised sub-central governments in the world by reducing the amount of 'ring fenced' funding councils receive (Parliament UK 2015). Glasgow City Council is a single-tiered local authority, formed in 1996; and it is accountable for over 603,000 inhabitants (the largest in Scotland). The population in Glasgow is rising steadily, following a decline in the 1960's and 70's due to poor inner-city conditions and relocations to new towns around Glasgow. The municipality's boundaries are shown in the diagram 1 below (comprised

of 13 wards from Drumchapel in the west to Ballieston in the east). Diagrams 1 and 2 provide a clearly defined visual geographical representation of the city's jurisdictional boundaries and clarify what is meant by the concept 'city' within this research. The maps provide an economical visual description of the limits of the 'city', in that the municipality boundaries shown differ from the geographic boundaries that extend outwards.

The Sustainable Glasgow initiative (non-incorporated association) formed in 2010 aims to demonstrate the Council's commitment to engaging stakeholders to implement sustainability strategies and collaborate on projects. Linked to the Sustainable Glasgow network is the city's flagship 'smart street' project RUGGEDISED, that started in 2017 and finishes in 2020. The project aims to bring together stakeholders in order to develop a blueprint energy efficient system that can be upscaled and replicated elsewhere.

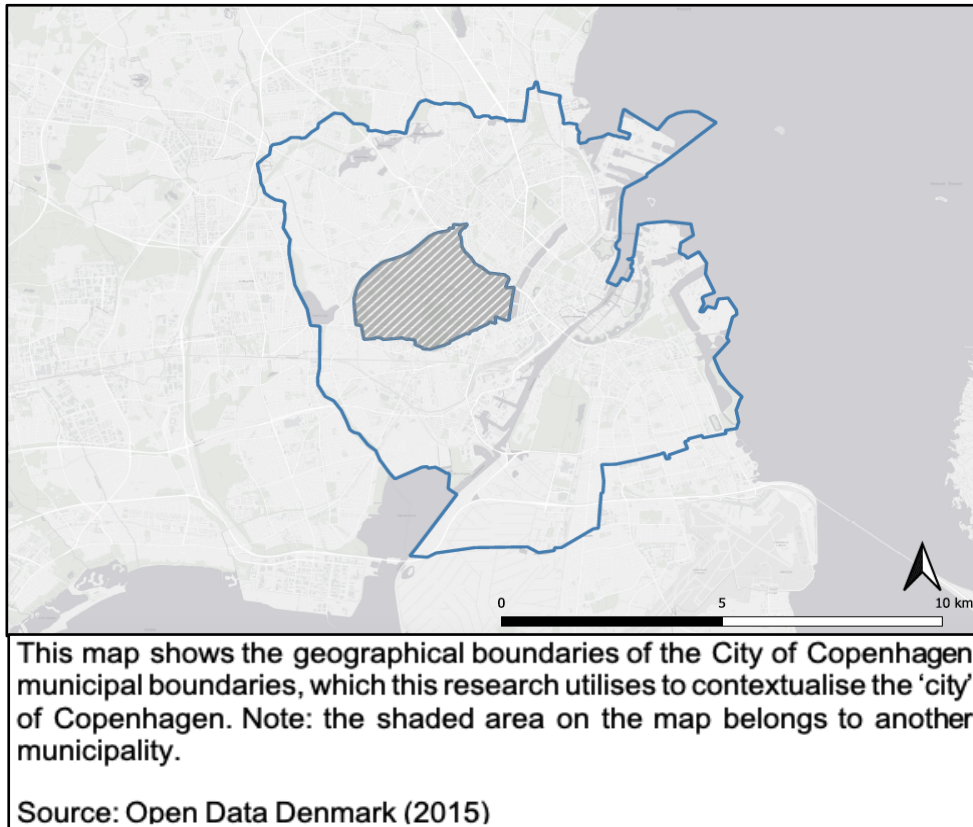
Diagram 1. Glasgow City Council Municipal boundaries



In 2016, the Copenhagen Municipal Council developed the Copenhagen 2025 Climate Plan that outlined Copenhagen's aim to become the world's first carbon-neutral capital by 2025. The city's targets exceed the national targets set by the Danish Ministry of Energy, Utilities and Climate. In 2014, it has been awarded title of 'European Green Capital' by the European

Commission. Sustainability planning itself dates back to the 1940s in Copenhagen, with the publication of 'The Finger Plan' - a comprehensive urban growth plan. Following this, in 1970s the publication of 'The Environmental Protection Act' provided Denmark with legislative foundation to make advances towards sustainable development. Copenhagen has continued to develop strategies and has a track record of comprehensive long-term planning and regulation for climate change. There are various tiers of governance: the Danish Government; 5 Regional councils (these councils do not have municipal powers and cannot levy taxes, their main remit is healthcare as they have less power to develop transport and environment policies); and, 98 municipalities. Given decentralisation that has shifted the onus to local government, the City of Copenhagen is a relatively strong metropolitan government (compared to national government), and, with higher taxes, it can provide the revenue for large-scale projects – more so than its Scottish counterpart (Anderson 2008). Since 2007, new reforms in Denmark have reduced the number of municipalities from 257 to 98 within five regions, to enable local government to address complex global issues by increasing their size, giving them more power and budget to develop policies (*ibid* 2008). From this, the Copenhagen municipality was formed and is currently the largest of four municipalities that constitute the City of Copenhagen (over 602,000 inhabitants) and the largest in Denmark, as detailed in the diagram below which stretches from Osterbro in the north to Amager Vest in the south (note: shaded area is a separate municipality). The population in Copenhagen has been rising since the 1990's, following steep decline in the 1970's following poor inner-city regions, the oil shock and relocating out to the suburbs. There has been a broad political commitment for sustainability within Copenhagen for quite some time, though it was only in 2015 that the municipality developed the 'Copenhagen Climate Partnership' (non-incorporated association) that consist of stakeholders that both design and implement the 2025 Climate Plan. The plan mentions a key integrated energy street project within the city, the Energy Lab, that was delivered between 2016 and 2019. The project is a cross sectoral collaboration to showcase how the development of the harbor area of the city can be transformed into an energy efficient street.

Diagram 2. City of Copenhagen Municipal boundaries



Case study limitations

It is necessary to justify case study limitations and associated research boundaries. For each case study, the research maps local stakeholders within the sustainability sector (including those involved in the networks and projects). To be included within the maps, organisations must be mentioned by at least two other stakeholders interviewed (to avoid complex maps with little focus on depth of relationships between key stakeholders). Though a complex process, all stakeholders are part of the wider 'environment' within which local decision-making takes place, thus it is a necessity to explore the landscape and how stakeholders within both city networks and projects are situated within each (Goss 2001). The term 'municipality' in this research specifically refers to the jurisdictional and geographical boundaries allocated to a specific city region and are explored as an 'entity' within this research (e.g., see diagrams above for a physical description). In this sense, municipalities possess both political and fiscal powers and assumes a degree of networked governance occurring in each city (based on

empirical evidence of networks and projects). However, this is not to say for certain, that other municipalities will be experiencing the same changes simultaneously, but from initial research it appears that many European municipalities are experiencing this transition. The implementation of Glasgow and Copenhagen's sustainability strategies are not designed or implemented in isolation from the actions of a wide range of other stakeholders. Therefore, governance networks cannot be examined from the standpoint of any single organisation (e.g., solely the municipality), with other stakeholders seen as the 'environment' (*ibid* 2001). Although this research study explores the municipalities leadership role within governance networks, it simultaneously explores other stakeholders within the sustainability sector, to fully understand the how policy outcomes are influenced by them and to confirm or deny the perceptions of governance network stakeholders within Glasgow and Copenhagen. The following section details the research boundaries and situates each governance network within the wider sustainability decision-making process.

1.1.5 Research boundaries

The research question necessitates the establishment of clear research boundaries coupled with an analysis of how they may impact the research findings. This section focuses on: the international links in governance networks (e.g., to global networks) and the internal composition of networks (e.g., history; members boundaries); sustainable urban governance boundaries (scale of governance; sites and levels of governance within cities); and, issues of power within governance networks (e.g., power and resource dependency).

This research is primarily concerned with city-level sustainability focused governance networks but also considers relations with national and international networks with a similar remit and function, through the context of resource dependency and concepts of 'power'. Cities can enhance their capabilities by working with other formal city networks, national government networks and international networks (e.g., C40 Cities; Rockefeller Foundation's 100 Resilient Cities), collaborating on projects, fostering knowledge exchange, sharing resources and best

practice and forging new partnerships across the globe (Acuto 2016). This area of research is particularly pertinent as recent years have witnessed the decline of the nation-state model as well as trans-national diplomacy, opening up space for municipal governance to play a larger role on the global stage (Goverde et al. 2000). City-level governance networks now play into the wider governance agenda at a national level and an international level however, they are integrated poorly into multi-lateral diplomacy - this limits their powers and budgets, 'threaten[ing] their effectiveness as global change-makers' (Acuto 2016: 611). Leveraging such resources could enable city governance networks to acquire more resources and integrate more effectively into multi-lateral processes, which in turn could accelerate the design and implementation of tried and tested sustainability policies and projects.

There are clear research boundaries regarding the internal composition of city governance networks based functionally on sustainable development policy. The research is predominantly concerned with stakeholders that have been actively involved within the governance networks in Glasgow and Copenhagen within the last five years (e.g., attended meetings, contributed resources, offered advice, named by at least two other stakeholders). Although members of each network have changed within this time period, the research aims to examine the relationships between these stakeholders and each city's sustainability policy outcomes (as outlined in the city's most recently sustainability strategy, also published within the last five years). Beyond the five-year time frame, this research may account for any significant member change within each network but only if it is deemed necessary to justify or explain a research finding and directly contributes towards the research question.

This research is interested in all stakeholders that play a part in the wider regional 'environment' within which local sustainability decision making takes place in cities but is particularly interested within the role of municipalities. The research defines the municipality as a single stakeholder, despite popular academic arguments that the significant number of local agencies within local government challenges the assertion that municipalities are indeed 'single' organisations (Rhodes 1997; Stoker 1999; Goss 2001). This research argues that

municipalities are only one stakeholder among a network of agencies, but only when each stakeholder is examined independently is it possible to explore how the stakeholders interact within city-level governance networks. The concept of governance is used to describe emerging new forms of collective decision-making at city-level, facilitating the development of new partnerships and relationships between the public sector (the municipality and public sector agencies), the private sector and the third sector simultaneously (Goss 2001). The research captures data from all sectors as all stakeholders are working across organisational boundaries and each stakeholder must be examined separately to fully understand how interaction and relationships can be made more effective for future sustainable development decision making (Rhodes 1997; Goss 2001).

Within cities, sustainable governance occurs across numerous sites and scales. Many cities in Europe have developed local sustainability targets, making city-level governance an important political arena for sustainability governance (Bulkeley and Betstill 2003; Bulkeley et al. 2011; Khan 2013). Municipalities are dependent on other stakeholders to advance their long-term sustainability policy goals at the urban level (Betsill and Bulkeley 2007). Therefore, this research focuses on governance networks through an urban lens referring to multi-level governance relations where appropriate as complex policy problems at city-scale cannot be analysed in isolation from national and international scales (Bache and Flinders 2004; Aall et al. 2007). The capacity of municipalities such as Glasgow and Copenhagen, to implement sustainability policies and projects depends on national government and other administrative levels in terms of legislation, resources and the institutional framework within the UK and Denmark (Khan 2013). City-level governance is a complex system, defined by some as a 'site of struggle' consisting of different stakeholders with complicated set of relationships both internal and external and is particularly emphasised within governance networks (Goss 2001). The research considers other levels of networked governance (at the national and international level as mentioned previously) as municipalities are not the only 'sites' of governance networks, which is multi-layered and fragmented, characterised by a mix of private and public stakeholders (Goss 2001; Backstrand 2008).

Although this research examines city-level decision-making through an urban lens (perspective), there are multiple 'sites' of governance, with an emphasis placed on collaboration and developing partnerships. These 'sites' emphasise the interconnectedness of between cities and other levels of governance (e.g., multi-level governance approaches) as noted by Robinson (2016) and are explored to contextualise and situate the case study findings within the broader urban political sphere. The horizontal nature of (networked) governance has challenged the notion of city boundaries, as the complexity of a multitude of decision-making structures, interests and multi-level policy domains have resulted in a plethora of stakeholders involved at the city-level (Benz and Eberlein 1999; Kearns and Paddison 2000; O'Sullivan et al. 2014). Thus, the city as a strategic site, is inherently linked to regional, national and international entities for the theorization of a broad range of social, economic, environmental and political processes (Sassen 2002). The variety of multi-scalar stakeholders operating within the urban arena have encouraged sectoralisation to address urban issues such as sustainable development – which has created siloed working (specific sectors working internally and not collaborating) and has led to a failure in effectively linking city, regional, and national initiatives within a coherent framework (O'Sullivan et al. 2014). To address this, this research, through an urban lens (defined through the political municipalities geographical boundaries), is conceptualized as a governing space and explores the relationship between the city and regional, national and international policy domains. Thus, the city emerges as a spatial unit that can integrate various sectoral and spatial policies to address sustainable development (Segbers et al. 2007; Harrison 2010). However other sites of governance are briefly explored within this context as they can influence the cities long-term sustainability decision-making. There have been critiques of this approach, as it is perceived to focus more on governance and decision-making than with the communities, places and environment within which they are situated (O'Sullivan et al. 2014). However, the governance network approach justifies the urban 'lens' as the focal point of sustainability decision-making as the research question is primarily concerned with the horizontal governance approach within cities and secondly, with the effect of multi-level governance within the 'site' of the city.

The concept of power is situated within the governance network perspective, focusing on the power relations within inter-dependent stakeholder interactions, specifically relating to resource dependency (Goverde et al. 2000). Although power frequently refers to the capacity of stakeholders to maintain stable patterns of connections, the research contextualises power in the resources which underpin this capacity (e.g., knowledge, funding, partnerships). Therefore, power defines what counts as rationality and knowledge, creating social realities within each context dependent governance network (Flyvbjerg 2003). The ability for each network to achieve its sustainability policy outcomes is highly dependent on the relations of autonomy and resource dependency among stakeholders, therefore utilising power as a unit of analysis is critical to the research question of enhancing effectiveness of governance networks and the concepts theorisation. The nature of the governance network process and its key features (inter-dependency, coordination and pluralism) all refer to city networks (municipalities) need to share resources and knowledge with local stakeholders (e.g., public sector, private sector and third sector organisations).

Power relations between stakeholders are dynamic and reciprocal, constantly being reproduced (Flyvbjerg 2003). That being said, the inter-dependent nature of networks where stakeholders are mutually dependent on each other, can create stable patterns of relations, to maintain a network over a period of time. However, power dynamics within these relations can shift. Within a governance network, different types of stakeholders can seek to influence or manipulate power by providing or withholding resources (this research uses the term power relations and dynamics interchangeably). Power within the governance networks does not always directly equate to leadership of the network, but it does enable the researcher to identify powerful stakeholders that have the capacity to provide or withhold resources to the benefit or detriment of the network and thus influence policy outcomes (Backstrand 2008). This research explores power in the context of resource sharing (and withholding) but also recognizes the power dynamics at play in other features of governance network theory (namely pluralism and coordination). This is explored further chapter two, section 2.1.

The next section provides a context on the sustainability governance research themes within this study: governance network within cities, sustainability development definitions and measurement indicators within sustainability decision-making.

1.2 Context

1.2.1 Governance networks within cities

This section contextualises governance networks and their sustainability approaches, by measuring the two in an urban context. The section clarifies key definitions and concepts that provide the basis for the research study which is built upon within the literature review chapter. Many scholars agree that governance and networks are closely intertwined, specifically in the public sector (Kooiman 1997; Rhodes 1996). In this research, the governance network concept is utilised to describe public policy design and implementation through a series of coordinated interactions between pluralistic and inter-dependent stakeholders, such as public, private and third sector organisations. This research employs Klijn and Koppenjan's (2016:11) definition of governance networks in the public sector (parentheses added by researcher):

'...More or less stable patterns of social relations between mutually dependent actors [pluralism], which cluster around a policy problem, a policy programme, and/or a set of resources [inter-dependency] and which emerge, are sustained, and are changed through a series of interactions [coordination].'

The relationship between state and society has shifted significantly from traditional public administration to collaborative horizontal informal forms of governance. New practices of governance within cities in particular, increasingly share the activity of governing with various societal stakeholders. As such, the governance network definition was employed as it focuses on the interaction between stakeholders within networks with the aim of addressing a specific policy problem, such as carbon emission reduction within cities and identifies the three key features (characteristics) widely discussed in the literature (Klijn and Koppenjan 2016a). Alternative definitions of governance networks do not refer specifically to the interactions and

mutual dependency features between stakeholders. This is a key component of the research question, as stakeholder interactions directly influence sustaining relations and thus potentially the effectiveness of network (Jones et al. 1997; Torfing 2005; Sorensen and Torfing 2007).

Governance networks offer a conceptual approach to characterise contemporary new patterns of collective decision-making (Bas Denters 2014). This approach has been widely adopted by cities who have forged networks as they require resources and expertise from external stakeholders to address sustainability policy challenges. Governance networks utilise new features and processes that distinctly separate the concept from other forms of governing. These key features (characteristics) are referred to in the research definition and include interdependence, coordination and pluralism. Governance networks rely on relational links and interactions between stakeholders who are interdependent and cannot carry out their decisions alone - these calls for consensus to reach agreed upon solutions (Klijin 1997). Within governance networks, inter-dependency is necessary for sustainable development as it exemplifies the kind of policy problems that require collaboration and resource 'pooling' among stakeholders, as traditional modes of governance are deemed ill-equipped to address them (Kooiman 2003). In this research, inter-dependency is associated with mutual resource dependence, as stakeholders (including the municipality) within the governance network, are believed to be dependent on each other's resources, in order to achieve their sustainability targets (Enroth 2011). Klijin (1997a:31) suggests that inter-dependencies between stakeholders create interactions which 'create and sustain relation patterns' in networks. Furthermore, current policy problems rarely fall neatly into the jurisdictions of specific agencies, cities or even states, thus often require resources sharing with national and international networks.

Within this research, a degree of cooperation and conflict is implied in the very notion of inter-dependency. Coordination is a distinct feature of governance networks and occurs when two or more stakeholders pursue an agreed outcome and cooperate in order to achieve it (Rossi et al. 2000). The coordination of stakeholders requires active and deliberate network management strategies, a role frequently placed on the municipalities to steer collective action

(Klijn and Edelenbos 2007). Managing discussions as well as formulating roles for various stakeholders can potentially infl sustainability policy outcomes. Facilitating the coordination of stakeholders has been broached in terms of conflict and consensus - there is always a risk that network stakeholders will negatively impact the self-regulating capacity of a governance network (*ibid* 2007). Coordination of governance networks requires managerial strategies in order to reach consensus and produce policies. Thus, the role of the municipality in the city's decision making has changed to a largely coordinating and 'facilitating' role, as directed by Rhodes (1996:655), who claims, 'less governments, more governance'.

Another key feature of governance network theory is pluralism - the variety of stakeholders that are engaged in the city's decision-making processes (Stoker 2000). The pluralist approach requires all stakeholders to play 'by the horizontal rules inherent in network governance' (Sorensen and Torfing 2007:170-1). Contemporary urban governance is made up of a network of governmental and societal stakeholders at the boundary of state and society. This network is comprised of selected members that do not normally constitute an entire industry, but rather, represent an industry (Jones et al. 1997). Stakeholders are largely selected by the municipality (though members of the network have been known to make recommendations to invite other organisations if they are perceived to add value). City-level governance networks tend to be directly connected to municipalities to be seen as having any meaningful influence over policy, therefore municipalities have the power to determine which stakeholders have access to the network. This access enables stakeholders to influence decision making, thus networks remain relatively closed to stakeholders that are not invited to join (Pierre and Peters 2005). The pluralist approach refers to autonomous stakeholders from different sectors that each use a variety of mechanisms and processes to meet their own objectives as well as collectively agreed objectives within a governance network. All three key features of governance networks require academic investigation to examine how they each help or hinder city-level decision-making and therefore shape sustainability policy outcomes (Pierre and Peters 2000).

The emerging governance network of sectoral stakeholders involves negotiations and discussions between stakeholders with different power relations. Within this research, power

is affiliated with the possession of resources coupled with the asymmetry of the dependency relations between stakeholders, in other words, resource dependency (Crozier and Friedberg 1980). Therefore, power is an important concept in the context of resource dependency within governance networks. Stakeholders can attempt to influence interdependency by acquiring resources necessary for decision making, finding alternative resources or acquiring and/or exercising political power to influence other stakeholders or changing policy outcomes (Aldrich 1979). Within the governance network discourse, municipalities play a central role in the power relations between stakeholders as they have the ability to create policy orientated networks to address societal challenges, however, they rely on these stakeholders as they have experienced a reduction in finance and resourcing themselves (from national government). As a result, municipalities that have sought (out of necessity) collaboration with external stakeholders to draw on resources (e.g., finance, expertise, people's time) also experience power dynamics as they too are somewhat dependent on stakeholders (Goverde and Tatenhove 2000). The concept of power within policy orientated networks is under researched, therefore the power analysis only partly explains changes within decision-making at city-level and thus is explored within the context of the other key features of governance networks as outlined above.

There are diverging views and academic debates regarding the effectiveness of both designing and implementing sustainability policy objectives within governance networks in European cities. Many proponents argue that networks are legitimate governance tools due to their decentralised structure, collaborative nature and representation of a diverse set of views from the public, private and third sector stakeholders that otherwise may not have had direct access to government to influence policy development and implementation (Backstrand 2008). However, critics of governance networks claim drawbacks to this approach, as the shift to horizontal governance has the potential to 'hollow out the state' with no one stakeholder accountable for steering the network and managing other stakeholders (Martens 2007). Additionally, this shift can increase private sector influence within sustainable development governance and lead to a skewed representation of both stakeholders and policy outcomes

that interest of such groups (Backstrand 2006b). With this, critics argue there is a risk that policies developed will be more likely to underrepresent specific stakeholder groups who are not directly participating within the network (*ibid* 2006b). Academic debates around the effectiveness of governance networks to both design and implement sustainability policies within cities is examined within this research. However, this research does not assume that governance networks within cities inherently help or hinder the effectiveness of reaching sustainability policy targets, but rather, aims to present empirical data collated from a comparative analysis of governance networks in two European cities (Glasgow and Copenhagen) and then make an informed judgement based on the key features and characteristics selected.

1.2.2 'Sustainable Development' definitions

There are variations in how governance networks within municipalities both define sustainable development and the types of strategies they develop as a result (Rossi et al. 2000). This is largely due to the lack of a universally agreed definition of what a sustainable city should be, as well a lack of a paradigm for which components (e.g., thematic objectives, such as economy, environment and society) should be included in a definition (Chiesura 2004). As such, within a governance network, this can cause challenges as a lack of agreement on the concept can result in problems when attempting to implement the concept. The lack of a defined concept or established theory, leads some scholars to question whether new policies will create environmentally sound urban development (Lele 1991). Whilst many scholars take the view that the all-encompassing nature of the concept gives it political strength, in its current formation the mainstream sustainable development discourse highlights significant weaknesses (Lele 1991). The definition of sustainable development creates some fundamental problems when attempting to not only define the concept, but operationalise it and implement it within politics and society - this problem is magnified within governance networks (Klauer 1999). As a result, there is no coherent vision of just how 'sustainability' would translate into practice (*ibid* 1999). This research has utilised an urban comparative case study approach with two different municipalities, to allow exploration of the dynamics between stakeholders from

how they define sustainable development to how they negotiate sustainability challenges and influence the types of policies developed and implemented within a governance network (Zartman 2005). Within this research, stakeholders' definitions of sustainable development in the network are examined, however in projects, which focus on specific sustainability thematic areas, other factors are used to understand stakeholder perceptions of the concept (e.g., project contribution towards carbon reduction targets). This provides insight into stakeholder perceptions of the concept and its application as explored further in the literature review.

Although the concept of a sustainable city has been critiqued, it has proven relatively resilient as it reflects a dilemma in modern society. It has led scholars to question: can development continue in a context where basic human needs are not met and where resource degradation is having consequential impacts on the environment? With this in mind, the research will employ the UN Sustainable City Programmes (1992:42) definition of a sustainable city as:

'...One that is able to retain supply of natural resources while achieving economic, physical and social progress and remaining safe against environmental risks that can undermine development achievement.'

This definition encapsulates a sustainable city as a broad normative objective, understood to be an open, dynamic process and envisions a city in transition to becoming sustainable (Neuman 2005). This transition implies transforming existing institutions and fostering collaboration among various societal stakeholders, in order to reduce climate risks that hinder development (*ibid* 2005). Municipalities that aim to be sustainable must learn to balance and effectively govern the three pillars of sustainable development outlined in the definition above: economy, environment, and society (Sahely et al 2005; Kemp and Martens 2007). However, there are doubts as to their role within governance networks as scholars argue if municipalities do not take a leading role within these networks, accountability cannot be maintained, which may hinder progress towards local city-level sustainability targets (Kooiman 2003).

The research study has adopted the UN's (1992) definition of a sustainable city as it implies a defined boundary of a city (unlike other broader definitions of a 'sustainable development' that

do not just apply specifically to cities), which is applicable to this study as municipalities within each city case study have direct jurisdiction over city-level sustainability policies. Furthermore, the definition encapsulates the city as its own geographical and spatial 'entity' that possesses a concentration of social, cultural, economic and political facilities; a node of intense exchange among individuals that also views the city as an ecological entity (Rees 2000).

The UN's definition focuses on 'retain[ing] supply of natural resources' within a city, in other words, the self-sufficiency of urban areas and the pre-requisite necessary for a sustainable city, which is a sustainable hinterland. Municipalities are increasingly aware of the sustainability challenges associated with climate change and the need to 'remain safe against environmental risks' whilst 'progressing' society, in other words, fostering development. Sustainable city definitions are frequently perceived through an anthropogenic lens, focusing on 'economic, physical and social progress', which is legitimate as urban areas are an ultimately human phenomenon, and humans are an integral component of the ecosystem(s) that sustain them. However, the impact of such geographical agglomerations has a significant effect on the surrounding environment and thus should consider non-human species (Redclift 2006). This research proposes a counterargument to this statement, as the sustainable city concept implies a relationship between the human sub-system and the rest of 'nature' and the need for the measurement of natural resources (material, information, energy) between both systems (Rees 2000). Ultimately, a city cannot be sustainable if its inhabitants live unsustainable lifestyles, thus, the concept of sustainable development itself is inherently humanistic and the two concepts (sustainability and development) cannot be completely separated from one another (*ibid* 2000).

Importantly, the definition selected addresses the three pillars of sustainable development concept which are frequently cited by various stakeholders within the political sphere: environment, economy and society (Redclift 2006). Rossi et al. (2000) captures the different conceptions of sustainability from the private, third and public sector, examining their influence on setting the sustainability agenda. Within a city context, stakeholders' influence can influence sustainability strategies and thus how progress towards such targets are measured. Thus,

definitions that capture the broad concepts (or 'pillars') applicable to all stakeholders within a governance network, provides a foundation from which to assess how such conceptions fit into the definition and city objectives more broadly, and potentially identifies the reasons for differing approaches and targets (*ibid* 2000). The UN definition aligns with governance network theory adopted in this research which focuses on stakeholders' and their roles within a public sector network.

Alternative definitions of sustainable development are not necessarily applicable to cities. For example, the first two UN Habitat's gave cities the 'short shrift' when discussing how to address sustainability and the World Conservation Strategy (1980) which was the first to use the term 'sustainable development', gave no special attention to urbanisation (Redclift 2007). Similarly, the Brundtland Commission's (1987) definition does not explicitly mention cities, however within the report it does discuss urbanisation but emphasises the urban crisis in developing countries (not European cities, *per se*) thus was deemed inappropriate for this research study. As the sustainable cities concept becomes more mainstream in politics, attention is shifting towards how to measure progress towards sustainability within an urban context and drawing on external stakeholders for advice and guidance on practical ways in which sustainability could be built into existing and new policies and practices (Rydin 1996).

1.2.3 Measurement indicators within sustainability policy

The onus on municipalities to lead the design and implementation of effective sustainability strategies has increased exponentially since 1987, when the Brundtland Commission situated the concept of sustainable development firmly within the international political agenda (WECD 1987). In 1992, the Rio de Janeiro 'Earth Summit' made sustainable development a top priority on the United Nations agenda and created a blueprint of action, 'Agenda 21' to be taken for implementing sustainability at local level (United Nations 2002). Each local authority has to develop its own 'Agenda 21' strategy engaging with societal stakeholders and developing relevant indicators to progress towards sustainability targets. Two-thirds of actions proposed in Agenda 21 require the involvement of municipalities and the strategy offered a framework

for the practical implementation of sustainable development at city-level (Eurofound 1998). Following this, the second UN Conference on Human Settlements (1996) 'Habitat II' prioritised 'sustainable human settlements development in an urbanising world'. This emphasised the role of municipalities in both engaging with various stakeholders and experimenting with strategies to develop innovative ways to meet commitments (United Nations 1996:7). The transition from the Millennium Development Goals (MDGs) in the 2000s acknowledged responsibility of municipalities to deliver agreed goals, to the Sustainable Development Goals (SDGs) in 2015 that placed further demands on municipalities to achieve universal provision of all services as well as monitoring performance and costs (Satterthwaite 2015). However, within the SDG commitments there was little mention of support and funding for municipalities to deliver sustainability objectives. One result of this omission has been the exponential growth of city networks as municipalities seek to leverage guidance, advice and resources from external stakeholders within the city. These governance networks have become a vehicle for stakeholder interaction, an opportunity for municipalities to co-develop the sustainability agenda and set ambitious sustainability targets for their cities. The publication of the 'New Urban Agenda' from Habitat III in 2016, has reinvigorated and strengthened the role of local level governments in the future urban agenda. The new agenda merges urbanisation and development as both are deemed parallel vehicles to sustainable development and signifies the importance of measuring progress towards sustainable cities.

The international political agenda has shifted the responsibility of sustainability on to municipalities, with their role largely seen as developing sustainability targets and mechanisms to measure and achieve them (Klauer 1999). Within cities, governance networks have been utilised in order to draw upon expertise and resources from external stakeholders, given that support to measure and deliver sustainability targets is largely unaccounted for within international political commitments. Despite the development of European-wide non-legally abiding sustainability targets, each municipality has to find its own individual path towards sustainable development, appropriate for the local and national context (Eurofound 1998). As such, developing coherent sustainability policies is a necessity as it must be possible to

measure whether they city is moving away from or towards set sustainability targets. The application of indicators to measure progress towards such targets can be useful tool for policy making (prospective) and assessing policy implementation (retrospective) (WRI 1994). Tools used to measure sustainable development tend to align with the city's definition and take the shape of thematic indicators that complement the definition (e.g., such as economy, environment and society). Such targets for thematic indicators are defined at city-level according to the priorities of each city (Eurofound 1998). However, municipalities face challenges when developing tools to measure sustainability progress: developing indicators requires an agreed definition and shared vision of sustainability amongst stakeholders, which is not always possible within a governance network (Yvon 2013).

Stakeholders within governance networks can influence both sustainability policy development and implementation, outlined in the city's sustainability strategy. Sustainable development indicators (SDIs) incorporated into such strategies can simplify complex information for a variety of stakeholders within such networks and can help gauge the general status of a system (Brandon and Lombardi 2011). However, the process of developing SDIs within a governance network can create challenges with stakeholders' different perceptions influencing the indicators selected, thus determining how sustainability is measured at a city-wide scale. SDIs indicate the comparative values and progress between Glasgow and Copenhagen and provide a direct link between high-level sustainability policy outcomes and the governance network processes behind such outcomes and whether this can be made more effective (*ibid* 2011). The policy framework within each city (e.g., the sustainability strategy) is necessary to situate the SDIs in a wider context and provide clearly specified objectives (Eurofound 1998).

Municipalities tend to define sustainable development and create their own thematic priorities prior to engaging with external stakeholders (e.g., by creating the political framework for policy development and implementation). Within a governance network, stakeholders may be disengaged in policy implementation if they are not part of the policy framework development, as policy design and implementation stem from the core vision of sustainability which needs to be agreed between stakeholders (Yvon 2013). Brandon and Lombardi (2011) state that city-

level SDIs should be developed by multiple stakeholders in order to be transferrable and meaningful for different sectors and localities. Participation in the SDI formation process demonstrates a political commitment to sustainable development as well as buy-in from stakeholders (through governance networks) as well as ownership and accountability of policy outcomes. Indicators provide benchmarks for all sectors to evaluate the climate policy and enforces a level of accountability in meeting policy targets (Greaker et al. 2013). Whether municipalities engage stakeholders on their sustainability definitions, thematic priorities and SDI formation, they are required to endorse a particular approach so that the stakeholders will follow their lead (Brandon and Lombardi 2011). This research explores the challenges of SDI formation and examines stakeholder interaction throughout the decision-making process.

The literature review chapter builds on the key definitions and concepts that are covered in the context and expands on the key themes and arguments within the sustainability and governance discourse, contextualising the research study and contribution to the literature.

CHAPTER 2: LITERATURE REVIEW

This chapter is structured into three sections. The first section (2.1) explores the governance network concept within cities, exploring its theorisation in relation to power, leadership and other normative issues associated with the concept. This approach provides a theoretical and practical understanding of governance network characteristics, how they are formed, managed and evaluated within the two case study cities. The second section (2.2) explores the definition of sustainable development, illustrating the different conceptual perspectives from stakeholders within two case studies. This section provides insight into stakeholder perceptions of sustainability and how this may influence their interaction within governance networks. Lastly, the third section (2.3) marries the two previous concepts, focusing on the design and implementation of a city's sustainability strategies governing through measurement indicators. This section provides an overview of sustainability strategies which outlines the objectives and provides the basis for discussions within governance networks as each case study city aims to reach their sustainability targets. Each section synthesizes key themes and identifies gaps within the discourse, highlighting how this research addresses these and contributes towards academic debate going forward.

2.1 Governance networks: theoretical position and practical application within cities

2.1.1 Governance transition within cities

Central to this research is the concept of governing sustainable development within an urban context. This section contextualises the governance transition within cities (network formation), detailing the theoretical approach (features) and key concepts such as power and leadership are explored in tandem. The following two sections then explore the definition of sustainable development within governance networks (2.2) and measuring the two in an urban context (2.3).

The concept of governance stands in contrast to the 'traditional' concept of government in the 19th and 20th century, that was understood as a monolithic, top-down and formal institution as argued by Sorensen (2005), Bevir (2011) and Klijn and Koppenjan (2016b). Such hierarchical governance forms have transitioned the state from a regulating institution towards new modes of governance where the state plays a 'steering and coordinating' role, fostering collective action between non-elected stakeholders (business, NGOs) who are increasingly participating in urban decision-making (Rhodes 1996:659; Bogasson and Musso 2006; Khan 2013). The shifting dynamics between the state and society is an increasingly international phenomenon, prominent among new sustainability policy design and implementation within European cities.

Within the literature, there are various attempts to conceptualise the meaning of governance. Current debates centre on four alternative meanings: good governance (solely focusing on the components of a properly functioning municipality); new public management (improving performance utilising market proxies) (Kettl 2000; Fenger and Bekkers 2007); multi-level governance (focusing on various governmental levels) (Agranoff and McGuire 2003); and, governance networks (interaction process between stakeholders in a network setting) (Rhodes 1996; Sorensen and Torfing 2007). These four conceptualisations although different, focus on the process of governing and support Bevir's (2011) claim that governments dealing with complex issues shift from a government to governance approach (outcome orientated). This research conceptualises governance within networks for two reasons as argued by Klijn and Koppenjan (2016a): Firstly, good governance and new public management are predominantly concerned with improving the functionality of traditional government approaches and do not contribute to the study of governance in networks. With new public management specifically, the integration of corporate governance principles into public governance and the development of 'rules of the game' that guide stakeholders' interaction, does not align with the governance network concept in theory or practice (Bovaird and Löffler 2003:20). In such networks, horizontal relations and coordination are inherently 'fuzzy'. Secondly, multi-level governance is unable to provide explanations of outcomes in the governance process and assumes governmental levels have prominent positions within networks which alone does not contribute

much to the study of governance in network (Bache and Flinders 2004). As such, the key components of governance and networks are closely inter-linked as governance takes place in complex policy problem networks through mutually dependent multi-stakeholder interaction processes that are sustained over time (Kooiman 1993; Agranoff and McGuire 2003).

Within this research, governance is associated with a broad range of institutions and practices in an urban context, such as networks (Bogasson and Musso 2006). Networks are 'emblematic' of the shift from 'government' to 'governance' and have featured heavily in the sustainability and governance discourse, where multi-stakeholder processes have been at the centre of local and national initiatives (Backstrand 2008; Smith and Fischlein 2010). States and international organisations increasingly share the activity of governing with other societal stakeholders (Scott 2015). This non-hierarchical steering is based on the participation of external stakeholders in both the design and implementation of sustainability policies. Kooiman (2003) argues that this is necessary for sustainable development as it cuts across established ministerial mandates, blurs jurisdictional borders and successful resolution involves collaboration between several of societal stakeholders. As such, this research examines whether governance networks within Glasgow and Copenhagen have designed and implemented sustainability strategies through the three key features of governance networks as outlined in Klijn and Koppenjan's (2016a:11) definition of governance networks as detailed in the Introduction chapter.

There are various attempts to conceptualise the meaning of urban within the literature. In this research, the term 'urban' is defined by the boundaries that are relevant to political decision-making; that is, areas covered by a local government (Kantor 1997). In other words, a unit of political analysis exploring specific urban governance processes, given this research examines new modes of governance within two cities through the lens of sustainable development. The research focuses specifically on governance network theory as municipalities engage with other public, private and third sector organisations to design and implement sustainability strategies. The research acknowledges the principles of transformation implicit in the 'urban'

way of life, which largely come from human activities mediated politically – understanding that the order of the city is temporary and localised (Davies and Imbroscio 2009). Utilising the research study's definition of 'urban', the city can be seen as an 'actor' in its own right, largely understood as the intersection of horizontal and vertical coinciding resources and positions that influence how we create and understand human experience (ibid 2009). However, the limitations of this definition are acknowledged; the urban can also be conceived not as an isolated space, frozen in time within the political economy, but rather, composed of multiple identities with intangible boundaries, in a state of 'process' (Massey 1991). As such, their reach extends beyond the geographical boundary, as they participate in global diplomacy, specifically with regards to complex policy challenges that transcend jurisdictional boundaries such as climate change. Furthermore, conceptualising the urban as a distinct spatial and political entity can ignore the impact of the non-urban space on the city; within the sustainable development context this could create challenges as the 'urban' relies on hinterlands for resources. However, the research definition is utilised as it provides a unit of analysis for a detailed exploration of cities approaches to governance networks, detailed below.

Cities approach to governance networks

Municipalities are increasingly experimenting with new forms of governance networks such as partnerships with stakeholders as they have limited control and resources to design and implement sustainability policies (e.g., they also lack the authority to enforce stakeholders to comply with such policies) (Betsill and Bulkeley 2007). Coupled with this, municipalities face challenges with internal budget constraints and lack of adequate human resource (and in turn, climate knowledge and expertise) as well as finance and investment for implementing projects within the city. The implementation capacity of municipalities is largely dependent on national government and other administrative levels, specifically regarding legislation, resource allocation and the national and local institutional framework (Aall et al. 2007). Therefore, this form of governance necessitates forging consensus among different city stakeholders on progressive sustainability policy goals in order to attain stakeholder 'buy in' and leverage the

financial support to deliver effective sustainability-orientated projects (Khan 2013). Thus, there is a need to find a broad consensus of progressive sustainability policy targets that can bring together support from both the public administration and from city-level stakeholders. Governance networks proffer a new approach to implement such policy measures given that municipalities tend to lack the capacity and authority necessary to enforce local stakeholders to comply with sustainability policies (e.g., such as low carbon transportation, energy efficiency measures) (*ibid* 2013).

Municipalities within Europe have experimented with different approaches to governance networks within sustainability decision-making (e.g., networks and projects). As such, there is no coherent or standardised method for engaging with stakeholders (Rutland and Aylett 2008). Many scholars argue that governance networks tend to focus on the policy design rather than implementation, and as such, they question if networks are actually decision-making entities on their own, or if they instead contribute to traditional representative decision-making like individual organisations (*ibid* 2008; Khan 2013). This argument necessitates exploration within the research as scholars debate how the role of the governance networks as an entity itself can influence policy design and implementation. Therefore, this research explores both perspectives in order to fully understand their role within sustainability decision-making in cities and how this mode of governance could be made more effective to ensure a city can deliver on its sustainability targets. Cities have approached the governance network process in different ways, which has led to different types of stakeholder interaction. For example, in some cities there have been formal interactions between sectoral stakeholders and the municipality within the governance network (e.g., formal agreements to participate in networks with specific roles and responsibilities, such as the Leeds Climate Commission). In other networks, there have been informal interactions based on personal relations between individuals in stakeholder organisations (Khan 2013). Although most countries have ambitious carbon emission reduction targets, such as the UK and Denmark, who have both developed low carbon roadmaps and ambitious sustainability policies, sustainability governance takes different forms due to the local (city-level) and national contextual factors. It is necessary to examine both

types of networks as there are differences in the type of stakeholders participating and the type of engagement, the remit of the network and thus how this impacts network functionality.

Therefore, this research explores Glasgow and Copenhagen municipalities' approaches to governance networks in order to deepen the understanding of both the formalised and informal interactions that constitute the policy process at city level and assess the effectiveness of both policy design and implementation approaches in contributing towards each city's carbon emission reduction targets.

Stakeholder motivations for city network participation

Governance networks for sustainability decision-making bring to the table diverse stakeholder views and perspectives on goals, processes, and outcomes as defined in chapter one, the Introduction (Klijn and Koppenjan 2016a). Stakeholders in this research study are public sector agencies, private and third sector organisations. They each have various motives for joining networks and often have differing opinions on both the network objectives and preferred outcomes (Bulkeley and Kern 2006; Provan and Kenis 2008). The collaborative nature of governance networks can be a motivating factor for stakeholders to participate, as they may wish to develop partnerships with other local stakeholders (Ansell and Gash 2012). This has led many scholars to argue that stakeholders perceive networks as an opportunity to share knowledge and engage in productive discussions with other stakeholders (*ibid* 2012). The network approach can benefit the municipality by supporting their policy objectives as they possess the democratic mandate to set ambitious sustainability targets. Huxam (2003) elaborates, stating that decision-makers participate in governing networks as it can enable them to develop more fruitful relationships with stakeholders. Whereas Khan (2013) argues the collaborative approach of networks fosters collective learning and problem solving, gaining political intelligence that would not necessarily be available outside the network.

There are various stakeholder motivations in sustainability governance networks, such as access to key decision-makers (e.g., the TE Mayor), as they may seek to lobby, pressure or influence public sector agencies (Bulkeley and Kern 2006). The ability to influence city stakeholders in this way can ensure stakeholders' that their perspective(s) are not neglected within the policy discussions (Ansell and Gash 2012). As such, networks provide stakeholders with a vehicle to push their own organisational agenda and goals and potentially influence the networks processes and outcomes (Monge and Contractor 2003; Powell et al. 2005). Private and third sector stakeholders (e.g., businesses and NGOs) are not passive recipients in this governance process, but rather, tend to promote their own organisational agenda and independently review policy development and implementation (Rossi et al. 2000). Torfing (2019) elaborates on this, claiming that for private sector organisations, network participation can be for stakeholders' own organisational benefit, such as identifying new funding streams or opportunities to push a commercial agenda (e.g., test out new products or services).

Given that conformity to network rules and procedures is purely voluntary, Monge and Contractor (2003) argues that there are elements of stakeholders' altruism, as they seek to donate time and resources in order to play a part in the transition to a sustainable city and global profile. Many stakeholders perceive involvement in the network as a 'civic duty' and an opportunity for them to build their networks and expand their profile within the sector as well as develop scalable solutions that contribute directly towards reducing carbon emissions (Ostrom 2001).

2.1.2 Governance network theory

The key features (characteristics) of governance network theory are employed as research themes for the practical comparison of Glasgow and Copenhagen. To assess the effectiveness of this type of governance networks in an urban context, this research examines these key features: interdependence, coordination and pluralism. The features are evidenced by ties and relations between stakeholders that will mapped and explored in order to assess how this affects a city's sustainability strategy. These features distinguish networks from two modes of

governing: hierarchies, that focus on creating a steady environment by maximising efficiency and productivity, emphasising the role of the traditional and top-down mode of governing (Rhodes 1996), and markets, that offer an institutional mechanism to centralise functions in systems that are otherwise decentralised (Coglianese and Lazer 2009). Markets largely focus on competition and profit, whereas networks rely on negotiation, reciprocity and consensus (*ibid* 2009). Within the sustainability decision-making context in European cities, this research focuses on the concept of networks through the key features mentioned previously, however, utilising the term 'networks' in the wider sense does not necessarily mean that the key features above are present in all networks.

Inter-dependence

Within governance networks, interdependence is commonly construed as mutual dependence where societal stakeholders rely on each other for their resources (Klijn and Koppenjan 2016b). Interdependence is required to gather expert advice and draw on local organisations to develop a strategy that would be relevant for a city as each stakeholder alone cannot possess all knowledge required (Head 2008). All stakeholders cannot carry out their decisions in isolation, therefore this feature calls for negotiation to reach consensus (Rossi et al. 2000). Resource dependence is particularly pertinent within sustainability decision-making, regarding both resources provided to the network by the stakeholder (e.g., sectoral expertise, knowledge, their own contacts and networks) and what resources they receive in return from the network (e.g., knowledge exchange, funding, political intelligence) (Bevir 2011). Inter-dependency between stakeholders is examined within this research as stakeholders participating in the network may have vested interests (Head 2008). Scholars claim that the development of the perceived need of networks that enable stakeholders to reach an understanding and pool resources together can be to implement a policy for their own interests (Scharpf 1997; Bevir 2011). For example, private sector organisations that tend to focus on increasing shareholder value could withhold vital resources (e.g., expertise) or form sub-groups with other stakeholders that share their organisational objectives, if negotiated decisions hindered any of their business goals. Within political discourse, interdependence is deemed essential to keep

networks together, as Klijn (1997a:31) suggests, it ‘...causes interactions between actors, which create and sustain relation patterns’ in governance networks. Stakeholders within a network commit themselves to cooperate in order to sustain the performance of the network and achieve sustainability objectives. However, conflict can arise when what is deemed appropriate for the whole network may not be best for each stakeholder. In such cases, this can result in a stakeholder focusing on their organisations objectives and behaving opportunistically, to the detriment of the network as a whole (Hoff 2003; Crook and Combs 2007).

Coordination

The coordination of stakeholders within a governance network requires empirical analysis of stakeholders setting sustainability goals and targets through negotiation and compromise (Sorensen and Torfing 2007). Coordination is required to some degree as there are widely differing preconceptions of the relative roles of private firms, the public sector, and, third sector organisations in setting the sustainability agenda (Rossi et al. 2000). Should all stakeholders within the network interact with the goal of reaching consensus, less network management and leadership would be required – however, practically, this is not always as straight forward. Bevir and Rhodes (2011) argue that negotiation within governance networks is predominantly to reach an agreement or work towards common goals, however municipalities can adopt even more informal modes of ‘steering’ within networks. For example, stakeholders involved have a degree of autonomy from the state, thus the state cannot govern them solely by utilising instruments that work in bureaucracies, therefore ‘negotiation’ is perceived as too formal for some discussions within networks (*ibid* 2011).

However, Torfing (2007) argues that there is always a permanent risk of conflict within a network, when stakeholders sever ties or relationships with other organisations. This hinders the self-regulating capacity of the network. Pierre and Peters (2000) support this, suggesting that too much conflict can lead to network disintegration. This research explores the role of leadership in reducing conflict and enhancing the effectiveness within governance networks.

Network coordination and leadership from a reputable (or legitimate) stakeholder is key to ensuring all stakeholders communicate effectively and deliver legitimate and democratic policy outcomes (*ibid* 2007). However, Koppenjan (2007) argues that consensus can have a negative effect on governance networks as it can lead to the suppression of important problems and interests if the stakeholder has not developed relations with key players within the network. This can be the expense of the group's objectives and must be considered when assessing the effectiveness of a governance network. Coordinating a governance network to reach consensus opens up a whole host of potential opportunities and constraints in terms of how this affects both the design and implementation of sustainability strategies.

Pluralism

In contemporary governance, the state becomes a collection of inter-organisational networks made up of relations between various governmental and societal stakeholders - a pluralist form of governing. In this research, stakeholders are specifically: private firms; the public sector; and, not for profit organisations (e.g., charities and higher education institutions). Fischer et al. (2007) states that many stakeholders within governance networks are from different sectors and are not necessarily 'natural partners', thus have different approaches toward collaborating and how they feed into the policy process. As such, the municipality is only one of many stakeholders participating in the governance network - this challenges the states' capacity to impose its will on society, as within networks it has resulted in no single sovereign stakeholder able to 'steer or regulate' (Levi and Stoker 2000). Many scholars argue that for networks to be effective, and have any real influence in policy, the municipality needs to play a steering role - this assertion is explored through an empirical analysis of two cities Glasgow and Copenhagen (Pierre and Peters 2005). Kooiman (1993) states that municipalities must play a leading and coordinating role between stakeholders (such as assigning either formal or informal roles to individuals or organisations) in order to ensure policy objectives are achieved and retain accountability for decisions made. This research is specifically interested in whether municipalities play the leadership role, given that they tend to be accountable for both developing the network itself as well as gathering the information for the city's sustainability

strategy (Borzel and Panke 2007). Networks comprised of stakeholders from various sectors require academic investigation to analyse what characteristics enhance or constrain the democratic qualities of decision-making and how they affect policy outcomes (Pierre and Peters 2000).

2.1.3 Power within governance networks

In order to analyse the effectiveness of governance networks in an urban context, this research explores the cross-cutting concept of power as an element of the analysis in relation to network formation (e.g., structure and stakeholders), the three key features of governance networks and the role of power in network leadership and stakeholder's accountability to deliver on Glasgow and Copenhagen's sustainability strategies. The research utilises Held's (1995:170) definition of power:

'The capacity of agents, agencies or institutions to maintain or transform their environment (social or physical); and it concerns the resources which underpin this capacity and the forces that shape and influence its exercise.'

This definition applies within a governance network formation as it addresses the capacity of stakeholders to influence their environment (a key component of a network), the structure of such networks and how they change over time and, in addition, focuses on resource dependency and knowledge sharing between stakeholders and how this impacts the power dynamics and thus network outputs (e.g., contribution to carbon emission reduction). The definition aligns with Weber's (1978:53) definition of power which focuses on the ability of a stakeholder to exercise influence over others but does not utilise other approaches such as Arendt's (1958) highly normative definition that ignores the empirical perspective of effectiveness within networks. Power defines and creates social realities and as such, although power can shift between stakeholders, the need for stable power relations within governance networks in general is explored within this research (Flyvbjerg 2003).

Types of power within networks

Within a governance network, power can be defined as structural (e.g., the shape of the network and in turn, how the network is socially structured and the practices of resource sharing between stakeholders) and/or relational (e.g., the relations of interactions between stakeholders). This research focuses on both types of power which were evident in the case studies of Glasgow and Copenhagen and will be assessed further in chapter five. The relational power is specifically of interest within governance networks, as power does not exist in isolation, but rather, is produced and reproduced through the interaction of network members (Goverde et al. 2000). As such, this approach considers the vertical and horizontal power relations between stakeholders deemed as leading the network and those actively participating (*ibid* 2000).

Within the governance networks and power discourse, scholars have attempted to understand the relative power and influence of different stakeholders participating in networks, as each has different interests and priorities (Goss 2001). The emergence of such modes of governance has shifted the context of interrelations between public, third and private sector organisations (Goverde et al. 2000). How power plays out within a governance network has remained relatively under researched area. For example, Clegg et al. (2016) argues we know very little about how power relations play out in networks, specifically analysing how network management and structure impact such dynamics and thus influences network outputs. Bovaird and Loeffler (2005) agree by stating that the specific mechanism by which the relative roles of municipalities and external stakeholders emerge within governance networks and the balance of power between them has not been fully explored. The dispersion of power between diverse stakeholders can affect network outputs, internal and external communication and the ability of the network to develop innovative approaches to address sustainable development within cities (Torning 2019).

Power and governance networks features

Governance networks have shifted the political process and thus altered the dimensions of power within decision-making (Goss 2001). The creation of governance networks within cities has seen a shift in the initial top-down power balance experienced in traditional modes of government towards increased dispersion of power between municipalities and external stakeholders within society (Di Gregorio et al. 2019). Within this research, governance network is defined by its key features: inter-dependency, co-ordination and pluralism, and the concept of power is examined within each feature.

a. Inter-dependency

Within this research, the accent on power relations within networks is particularly orientated towards inter-dependency, specifically focused on resource dependency (Goverde and Tatenhove 2000). Stakeholders within governance networks can provide diverse resources (e.g., material, financial, knowledge, institutional) that can influence an stakeholders' claim to authority and influence (e.g., in other words, their power). For example, within the RUGGEDISED project, a private sector stakeholder withheld access to key infrastructure for the project, due to perceived costs and inconvenience. In addition, the dependencies between stakeholders can be asymmetric (resulting in power differences) and are related to stakeholders' (perceived) possessions of resources (Klijn and Koppenjan 2016a). Conversely, stakeholders can withhold resources (or use their veto power) to influence (e.g., delay or block) the development of sustainability policies or projects within networks and thus have the agency to directly impact the network outputs (Goverde and Tatenhove 2000; Klijn and Koppenjan 2016a). Therefore, stakeholders can bring resources but also participate within governance networks to acquire resources thus there are elements of inter-dependency among stakeholders (Gordon and Johnson 2017).

b. Coordination

Stakeholders participating within governance networks all have different interests and priorities, and as such possess varying levels of relative power and influence (Goss 2001). Within networks, the coordination and management of stakeholders (e.g., developing rules and standards, terms of reference, facilitating negotiation and discussion) directly influence the structural and productive forms of power developed through these processes (Barnett and Duval 2005; Broome and Quirk 2015). Both Sending (2015) and Kuzemko (2015) elaborate, stating that the coordination amongst stakeholders within a network (e.g., internal production of order) and the mechanisms to assess progress towards network objectives impact the power relations within a network. For example, the more stakeholders within a network rely on one specific stakeholder to coordinate interactions (e.g., make connections, facilitate negotiation, resolve conflicts), the more power that specific stakeholder has (Di Gregorio et al. 2019). For example, in Sustainable Glasgow the municipality were seen as a key 'node' for most stakeholder interaction. In addition, stakeholders sharing information or knowledge within a governance network can use their resources to leverage influence among other stakeholders or use it to assess other stakeholders' positions as knowledge is a source of power and stakeholders can provide it or withhold it from other organisations (Hartley and Benington 2006). As well as exercising power through resource sharing, stakeholders can also utilise soft power to persuade or influence other organisations to align with their own objectives or preferences (Bovaird 2005). Gordon and Johnson (2017) note the informal network approach and altruistic volunteering may result in soft power being utilised by powerful stakeholders.

c. Pluralism

Governance networks have shifted the formal process of sustainability policy development to now include a variety of non-state stakeholders and thus has become an important unit of political analysis (Bulkeley and Schroeder 2011; Hale and Roger 2014; Abbott et al. 2016). Governance increasingly occurs through interactions between formal and informal 'spheres of authority' (Rosenau 2009; Di Gregorio et al. 2019). Studies by Di Gregorio et al. (2019) have

examined external stakeholder interaction involved within decision-making and argued that it could improve sustainability decision-making outputs. Drawing on external stakeholders within a closed network setting can facilitate cooperation, information and resources sharing (Girvan and Newman 2004; McAllister et al. 2015). Both Allen et al. (2010) and Bulkeley (2012) state that analysing networks where diverse stakeholders work together can capture different frequencies of power that operate as they seek to produce coordinated urban climate governance activities. Therefore, it is necessary to identify the efforts of such stakeholders to deploy their power and the particular intermediaries through which they do so (Gordon and Johnson 2017).

Municipalities power dynamics within governance networks

Governance networks are increasingly associated with powerful and legitimate political stakeholders (e.g., municipalities) who proactively create or reshape the development and implementation of climate policies within the city (Klijn and Koppenjan 2016b). Municipalities are frequently perceived as leaders as they are able to steer climate governance networks in their own favour (Gillard et al. 2017). Leifeld and Schneider (2012) argue that this is largely due to public sector bodies retaining decision-making authority, however, Goss (2001) states that new partnerships and cross-boundary working may represent new distributions of power. For example, the involvement of private sector stakeholders (e.g., private energy companies) within city diplomacy and governance networks can generate concerns around the potential impact of private sector objectives and the potential fragmentation effects on local politics (Acuto and Rayner 2016). While stakeholder power within governance networks can be unequal, the leadership role of establishing accountability for outputs, managing relationships and performance can shift the power dynamics in favour of the municipality. As such, Abbott et al. (2015) notes, leaders of governance networks can use 'soft inducements' such as the provision of material or ideational resources as a means of steering stakeholders towards particular objectives. Coupled with this, the accountabilities of each stakeholder are different, which means that network relationships are uneven and shifting power relations can impact

network outputs (Goss 2001). This research explores the power dynamics between perceived leaders and stakeholders participating within a governance network to understand how such dynamics can influence network outputs.

2.1.4 Leadership within governance networks

The role of leadership affects management and coordination of the network, thus has the potential to impact the effectiveness of the network itself. The emphasis on municipalities to lead the sustainable development agenda has become increasingly evident within Europe since the 1980s (Kemp and Parto 2005). European Union policy instruments have increasingly placed the onus on cities to develop effective sustainability policies (Heinelt and Niederhafner 2008). In many cases, for municipalities, this international decision-making has become more important than national decision-making (Heinelt and Niederhafner 2008; Kern and Bulkeley 2009). Various international agreements such as 'Agenda 21' and more recently the Sustainable Development Goals, have emphasised the important role of city-level governance regarding sustainable development (UN 1992). Following the Paris Agreement in December 2015 and COP21, the multi-lateral framework has been expanded to give greater consideration to sub-national stakeholders, specifically the leadership role cities (and thus municipalities) can play. This was emphasised by Nicholas Stern who argued that '[m]uch of the power to reduce climate emissions lies now with cities, not national governments', as cities become a key part of the response to climate change (Stern 2016). As such, many networks are attributed to a number of city leaders (e.g., Mayors) who seek to lead the development of city networks as a means to collaborate and cooperate with city stakeholders as well as foster collective action on climate change (Acuto and Rayner 2016). However, much of the success of these networks depend on the authorities given to the Mayor (e.g., control over assets, budgets and long-term planning).

With increasing demand to deliver effective policies and outcomes, European cities have experienced significant resource and budget cuts leading to spending freezes and a reduction

in core staff (Kern and Bulkeley 2009). Thus, municipalities have relied on local networks to draw on resources from a range of stakeholders within the city in order to develop innovative solutions to sustainability challenges that align with European policy guidance. In addition, from the 1990s onwards European cities have increasingly been part of an emergent system of transnational climate governance to encourage and support local decision-makers (Selin and VanDeveer 2007; Bulkeley and Castan Broto 2013). Municipalities are playing a leading role within governance networks as they are widely perceived as a credible organisation to create partnerships (e.g., have a democratic mandate to deliver on city climate targets), manage network dynamics and facilitate negotiations to deliver specific target driven sustainability policy outcomes that align with city-wide objectives (Goss 2001). However, Klijn and Koppenjan (2016a) challenge this notion of leadership, as municipalities increasingly require external stakeholder interaction to implement sustainability strategies, therefore, their ability to govern stakeholders could weaken their leadership position. Despite this, municipalities' ability to potentially lead a network opens up the capacity for delivering new performance assessment (e.g., such as key performance indicators) and strategies to address the climate challenge. In contrast to hierarchical and competitive strategies, multi-stakeholder collaboration within governance networks can facilitate the exchange of knowledge, competencies and ideas between relevant stakeholders which may improve the range of creative ideas about how to solve the climate challenge (Roberts 2000; Torfing 2019). The concept of leadership within governance networks (hierarchy) challenges the notion of horizontal governance as the management of the network (vertical, top-down approach) is led by an individual or organisation who can influence network formation, interaction between stakeholders and the coordination.

2.1.5 Normative issues in Governance networks

Democratic legitimacy and stakeholder accountability

Within the governance discourse, less attention has been paid to the democratic legitimacy and accountability of governance networks (Backstrand 2008). Democratic legitimacy refers

to network effectiveness and the participatory processes and democratic values within the governance network. Such challenges around legitimacy cannot simply be 'solved' as they are not caused by inefficiency, or by systems failure (Goss 2001). They are practices of governance networks and the structural and systemic changes within municipalities that arise from such practices (*ibid* 2001). These require decision-makers to face contradictory pressures and understand such changes, in order to address them. For example, legitimacy refers to the perception by the stakeholders of the overall quality of the network structure which includes stakeholders, network rules and outputs (Risse 2004). Many scholars disagree with the characterisation of legitimacy within governance networks, for example, Aars and Fimreite (2005) argue networks are predominately legitimised on the basis of the results they achieve and not necessarily the process through which they are reached, conversely, Backstrand (2008) argued legitimacy is a feature of network structure rather than the results achieved or the characteristics of the stakeholders themselves. Within this research study democratic legitimacy is associated with the perception of stakeholders within the network: how they perceive network structure (e.g., stakeholder selection), stakeholder interaction (e.g., strong ties between organisations) and leadership (e.g., do leaders have a legitimate justification for their positions) (Risse 2004).

Within governance networks, accountability mechanisms tend to be weaker if there are a lack of formal roles and processes in place, thus networks can be considered problematic (Slaughter 2001; Bingham et al. 2005). The fragmented structure of governance networks may result in no stakeholder holding the network to account for its overall performance. In addition, where network objectives require negotiation, it can be challenging to hold specific stakeholders (including elected decision-makers), completely accountable for decisions (Acar et al. 2008; Klijn and Koppenjan 2016b). Therefore, networks are neither directly accountable to an electoral base nor do they exhibit clear principle-agent relationships (Backstrand 2008). Network accountability is important within this research as it impacts the effectiveness and legitimacy of networks (Klijn and Koppenjan 2016a). Accountability mechanisms tend to be focused on the goals of a specific organisation. A variety of stakeholders are involved in

governance networks, whose actions are held accountable within their own respective organisations with different accountability mechanisms (Klijn and Skelcher 2007). Therefore, accountability can become complex and mechanisms may not be integrated formally into the governance network (Koliba et al. 2010).

As a result, new forms of accountability emerge, in order of importance and prominence within the wider governance network discourse, such as peer accountability (e.g., where stakeholders pressure on each other), reputational accountability (e.g., stakeholders invited to participate in the network due to their skills and experience), market accountability (e.g., when private sector stakeholders are partners within the governance network) and public accountability (e.g., when local government and stakeholders within the networks are held accountable by the media) (Klijn and Koppenjan 2016a). Concepts of peer, reputational and market accountability are necessary within governance networks, as Backstrand (2008) states networks require plural forms of accountability (e.g., stakeholders' holding each other accountable; being perceived as a favour partner within a network). Noordegraaf (2013) states that addressing reputational accountability is an important challenge within networks as the reputations are frequently built upon developing partnerships and engage with different stakeholders. Market accountability is relevant to governance networks as municipalities engage private sector representatives who are accountable to shareholders and owners, not necessarily their contribution within the network (Koliba et al. 2010). The latter approach tends to be minimal within governance networks due to the lack of representation and lack of functional monitoring mechanisms (Backstrand 2008). These concepts are considered when exploring accountability within this research, in order to identify the different types of accountability that emerge within sustainability governance networks, as these have the potential to impact the network's effectiveness.

Currently, there is little information available to the public on the city's networks activities and contributions towards the sustainable development vision, thus little public accountability (*ibid* 2008). However, this research examines stakeholders' perceptions of peer, reputational and market accountability within governance networks in Glasgow and Copenhagen rather than

public accountability as sustainability orientated networks tend to be 'closed' to the general public and by invite only. The research asserts that transparency, monitoring mechanisms and sectoral stakeholder interaction are necessary preconditions of accountability within a governance network.

Evaluating Governance Networks: Effectiveness

The effectiveness of networks in Glasgow and Copenhagen are assessed by examining the network objectives, formation, stakeholder interaction, governance networks features and, network outputs all of which influence each city's ability to design and implement sustainability strategies that lead to carbon emission reduction (Klijn and Edelenbos 2010). This research has adopted Provan and Kenis (2008:230) definition of 'network effectiveness' as:

'The attainment of positive network-level outcomes that could not normally be achieved by individual organisational participants [stakeholders] acting independently.'

This definition of effectiveness refers to the collective collaboration between stakeholders on sustainability orientated governance networks and projects. In this research, if stakeholders can collaborate effectively, this will result in the delivery of more efficient sustainability initiatives and projects. This would enable the municipality to leverage more resources and potentially increase stakeholder buy-in to accelerate the transition towards a sustainable city (as defined in chapter one) and reduce carbon emissions. This research is concerned with the network's ability to *progress towards* (contribute to) carbon emissions reduction targets as outlined in each city's sustainability strategy (which can provide rational and comprehensive evidence from which decision-makers can evaluate progress towards sustainability targets) (Kitchin et al. 2015; Krellenberg et al. 2019). This measure of effectiveness was selected as it can be monitored over time and directly linked to specific projects; it encompasses the collective effort from a variety of stakeholders involved in sustainability initiatives, networks and projects within a city, and; given the subjective nature of stakeholder interactions within networks, it provides a clear measurement from which to explore such relations (Provan and Milward 2001). This research does not *calculate* carbon emission reductions as a means of

assessing 'effectiveness', but rather, it uses these targets as a backdrop to examine stakeholder collaboration to understand what helps and hinders effectiveness as cities progress towards sustainable development.

The collective collaboration within governance networks embedded within the methodological framework and thus is explored through network features (governance network theory); network management (e.g., leadership, power) and normative issues (e.g., accountability). Key features of governance networks are embedded within the research to understand how stakeholders collaborate in order to achieve city-wide sustainability targets. Networks in both Glasgow and Copenhagen are focused sharply on contributing positively towards the city's sustainability targets therefore, this research focuses on the progress towards these and equates them with effective governance (as per the definition). Selin et al. (2000) agrees with the governance network features approach arguing that network effectiveness tends to focus on identifying and describing relationships between stakeholders. Within goal-orientated networks such as Sustainable Glasgow and Copenhagen Climate Panel, stakeholder interactions require a form of network management to ensure they engage in mutually supportive climate action, minimise conflict and use network resources effectively (Goss 2001; Provan and Kenis 2008). As such, in addition to governance network features, this research also explores concepts of leadership (based on Ansell and Gash's 2008 definition) and power (based on Held's 1995 definition). Assessing governance networks and their processes go beyond the traditionally used criteria of effectiveness and efficiency approach, thus this research addresses a wider range of normative concepts such as democratic legitimacy and accountability (Klijn and Skelcher 2007).

2.1.6 Governing sustainability in networks: The policy process

Having considered the normative issues in governance networks, this next section explores the practical aspects of decision-making. The sustainability policy process is now seen as the negotiated outcome of governance networks, with diverse interacting stakeholders and not specifically reserved for 'policy planners' and 'decision-makers' (Bovaird 2005). A variety of

concepts have been developed to address these relationships and to describe the policy process (Rhodes 1990; Van Waarden 1992). Klijn and Koppenjan (2016b) have identified that each concept highlights the fact that decision-making is in some way relatively closed to a certain number of stakeholders: this can be empirically evidenced through sustainability orientated governance networks.

Policy design and implementation

In the literature, to understand the policy process it is necessary to profile the governance networks examined and identify key characteristics in both Glasgow and Copenhagen (Ostrom 2008). For example, the objective of such networks (e.g., reduce carbon emissions), process of decision-making (e.g., characteristics of horizontal collaboration) and network management (e.g., how to manage and organise networks) (Agranoff and McGuire 2001).

Through the analysis of the key features of governance networks in two case studies, this research loosely refers to the 'phase model' approach for decision-making (Parsons 1995; Fischer et al. 2007; Howlett 2009). This addresses the following within a governance network approach: formulating the policy problem, analysing problem situation (e.g., through stakeholder interaction), identifying alternatives for problems, setting goals (e.g., sustainability targets), comparing and selecting alternatives (e.g., negotiation and compromise), implementing solutions (e.g., through projects), monitoring implementation and evaluating (e.g., assessing progress towards targets). However, scholars acknowledge that in practice, processes do not often occur sequentially, but rather, in a less orderly fashion, given the nature of governance networks and the complex policy problems they are trying to address, such as climate change (Howlett 2009). The decision-making process takes place within a network in which mutually dependent stakeholders shape policy problem definitions and solutions therefore, it is between traditional decision-making as an intellectual design process and social interaction process as detailed by Heuvelhof et al. (2009) Klijn and Koppenjan (2016a). Thus, the policy process develops differently from the policy phase model (though this is loosely

referred to, in order to examine how governance networks influenced the process). For example, formulating the policy problem in the 'phase model' aligns with key areas of this research - the key features of governance networks overlap with 'analysing the problem situation' and the identification of 'alternatives' may require negotiation or compromise. In networks, decisions require political compromise and negotiation with external stakeholders to co-develop the choice of objectives, and where problems are sometimes found to fit existing solutions (Klijn and Koppenjan 2016a).

Projects are increasingly becoming mainstream as municipalities implement their sustainability policies, as evidenced in both Glasgow and Copenhagen (Goss 2001). Many solutions are implemented through managing projects with tight deadlines and budgets, clear partner roles and links to local sustainability strategies (e.g., aligning thematic focus). Delivering environmental projects can enhance trust in a governance network, as emphasised by Klijn, Steijn and Edelenbos (2010); this can enhance the effectiveness of both project and network discussions. In a project context, the cooperative nature of interactions (and inter-dependencies) are acknowledged by Klijn et al. (2015) who state that projects centre on a specific favourable result that is of benefit to most stakeholders participating, therefore it is in their interest to collaborate.

Participation in the policy process

In governance networks, the policy process discourse has emphasised the 'closed' nature of such networks, limiting access to participate in decision-making which excludes various perspectives (Marcussen and Torfing 2007). The categorisation of stakeholders selected to participate in each governance network can vary depending on the network objectives, resources and individual and/or organisational representation required (Edelenbos and Klijn 2005; Klijn and Koppenjan 2016a). Stakeholders selected can be invited to participate by the municipality, either in an individual capacity (e.g., their influence, sectoral expertise, reputation etc.) or in an organisational capacity (e.g., sectoral representation, organisation with significant

local influence, potential investment, etc.) (Goss 2001). Policy orientated networks are composed of a diverse set of stakeholders, the majority of which are selected by the municipality who play a 'gate-keeping role' by maintaining control over those who can access the network and excluding those who cannot (Klijn 1997; Ostrom 2001; Beach 2008). Scholars have critiqued the 'closed' nature of such networks as hand-picked individuals which result in policies and projects that exclude other groups from the decision-making process (Klijn and Koppenjan 2016b). As such, stakeholders invited to participate in networks gain access to decision-makers within the city and could directly influence the formation and implementation of policies, despite not being elected officials (Bingham et al. 2005). A variety of diverse stakeholders in a network could influence various phases in the policy phase model as they strategically participate in discussions and coordinate across sectoral boundaries.

Some scholars argue that the selection of some stakeholders is based on their agreement on a specific objective, aim or function of the governance network (Ramos-Vidal 2016). Hansen (2001) agrees, stating that a shared vision is necessary to ensure a workable coalition of stakeholders. Ideally, the combination of stakeholders selected should be determined by the problem at hand and stakeholders should be selected with either the relevant knowledge and resources or who are affected by the problem (Torfing 2019). Klijn and Koppenjan (2016a) suggest that stakeholders may also be invited to participate in the network as they have the resources necessary to address a problem or develop a policy. Ostrom (2001) stated that the need for exchange of resources, both horizontally and vertically in a network, requires a level of 'buy-in' to invest in such initiatives. Often municipalities select stakeholders they have previously engaged with. This can reduce risk of conflict and foster trust, having already learned how each stakeholder functions (Hansen 2001; Parker and Vaidya 2001). However, this can raise questions regarding the democratic transparency as participation is not open to all stakeholders, but rather, only a select few with established relationships with the municipality (Goss 2001; Klijn and Koppenjan 2016a). This research explores stakeholder access to the policy process in order to understand the effect this had on the design and implementation of sustainability strategies in Glasgow and Copenhagen.

Impact of elections on the policy process

In addition to participation challenges in governance networks, the policy process in such networks can be interrupted by both local and national elections in mature representative democracies such as Glasgow and Copenhagen. For example, the policy process within governance networks does not always align with the electoral cycle (featured in European countries with representative democracies). The four or five year election cycles can disrupt decision-making (e.g., resource sharing, knowledge exchange) within networks as the political landscape within the city can shift in the short-term, directly influencing the city's ability to plan for sustainable development in the long-term (10+ years) (Klijn and Koppenjan 2016a).

2.2 Stakeholder perspectives in defining Sustainable Development within a Governance Network

2.2.1 Definitions of Sustainable Development

This section explores various stakeholder definitions of sustainable development in relation to governance networks, examining how cities and stakeholders' shape the definition and in turn influence its implementation at city-level. Initially, alternative definitions of sustainable development at both an international and a city-scale are examined. The key debates surrounding the concept within governance networks are addressed, such as: lack of stakeholder consensus, timescales to achieve the concept, the anthropogenic focus and the limitations of using 'three pillars' of sustainable development. This section provides examples of how stakeholders and cities define the concept and what it means to progress towards, and ultimately achieve, sustainable development within cities (as outlined within their sustainability strategies). Stakeholder definitions also provide insight into how they perceive the policy problem, shaping their perspectives, motivations and potentially influencing how they may interact in a network setting. These debates inform the implementation of sustainable development by exploring issues of governance networks in an urban context.

2.2.2 International definitions of Sustainable Development

The most prominent definition of sustainable development adopted by the World Commission on Environment and Development (WCED) has been used to rejuvenate the concept through the Brundtland Commission's report 'Our Common Future' (1987):

'Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' (WCED 1987: 43)

The report was the first major attempt to define and align sustainable development, that represented mainstream thinking within international agencies. It is necessary to look specifically at this definition as it has set the standard and become the point of reference for

every debate about, and subsequent definition of, sustainable development (Imran et al. 2014). Practitioners and academics have applied this definition to different spatial scales (e.g., from national-level to city-level) and different cultures and political settings (Giddings et al. 2002).

Currently, the use of this particular WCED definition of sustainable development is widespread, as evidenced by its frequency of citation (Kates et al. 2005). This is clearly demonstrated within the research as stakeholders in Glasgow mentioned the WCED's definition as a reference point for defining sustainability in an urban context. The definition was perceived as favourable by Pearce and Atkinson (1998) who stated that it fitted nicely into the political sound-bites of the time (e.g., focusing on people's 'needs'), compared to the emphasis on the previous definition on 'eco-development' and its focus on sustainable economic growth. The WCED definition emphasised the concepts 'coming of age' and established the content and structure of the present debate (Mebratu 1998; Redclift 2007). Lele (1991) argued that the all-encompassing nature of the WCED concept gave it political strength, unlike alternative definitions proffered since 1987; it provided common ground for various stakeholders (private, public and third sector organisations) whilst simultaneously avoiding the need for anyone to compromise their position. This argument is particularly pertinent when applied to the development of urban governance networks, as it can be applied to any stakeholders organisational perspective on the concept. One significant critique of the WCED's definition was the fact that it did not mention the problem of rapid urbanisation, and the potential impact cities could have on carbon emission reduction (Rees 1997).

The concept represented a strong link between poverty alleviation, environmental improvement and social equitability whose roots were in the 1972 Stockholm Conference on the Human Environment where conflicts between environment and development were first acknowledged (Bond and Saunders 2009). As such, many scholars argued that the WCED's definition of 'needs' and 'limitations' focused on ecological and social equitability and sustainability, which was very similar to previous attempts to define sustainable development (Adams 2001). In addition, Constanza and Patten (1995) argued the WCED definition did not account for the changes in generational 'needs' over time and thus the concept was predicting

that the needs of future generations would align with environmental objectives (e.g., that meeting such 'needs' would ultimately lead to sustainability). The anthropogenic focus of the WCED definition fails to acknowledge the relationship of environmental crises to environmental ethics and values, a concern that stakeholders in Sustainable Glasgow noted (Abedi-Sarvesanti and Shahvali 2008). In addition, Imran et al. (2014) argue that the WCED definition has distinctly divided the world view of sustainable development into the controversial anthropocentric and eco-centric debate. As such, this dichotomy between the two approaches has been an important element within the sustainable development discourse (Gough and Scott 2003; Thrower and Martinez 2000; Hoffman and Sandelands 2005). The ambiguity of the WCED's definition allowed both private and public sectors organisations to align with sustainable development without fundamentally changing their practices (Hopwood et al. 2005). As such, the definition could be used to justify practices that contributed towards 'sustainable growth' but not necessarily align with environmental objectives (Christie and Warburton 2001).

2.2.3 Alternative definitions

Since the publication of the Brundtland Commission report 'Our Common Future' (1987), a range of sustainability definitions have been developed; each has sought to define or redefine the concept. Such definitions were selected as they neatly bring to the fore the common challenges identified in the creation of the sustainable development concept. From these definitions, it is possible to critically examine the relevant key themes and challenges within the concept. Three different definitions have attempted to refine the concept and are examined to identify common ground and overlap in components. Guiding this, leading scientist Solow (1992:7) equates sustainability with the preservation of a system (e.g., such as a city region):

'If 'sustainability' is anything more than a slogan or expression of emotion, it must amount to an injunction to preserve production capacity for the indefinite future. That is compatible with the use of non-renewable resources only if society as a whole replaces used-up resources with something else.'

In this definition, the preservation of 'productive capacity' is similar to the link between sustainability and preservation in the Brundtland Report by the WCED (1987). However, it differs as the WCED does not explicitly recognise the 'ecological limits' of natural capital. For example, the boundaries beyond which exploitation of a natural resource will have significant irreversible impacts (Imran et al. 2014). The report focuses on preserving the possibility of meeting the needs of the global population and can be seen in other definitions of sustainable development, namely Pezzey (1992) and Pearce (1987).

Another definition put forward by the Organisation for Economic and Cooperative Development (OECD) (2001:4) mentioned the broad spectrum of long-term concerns that affect all of humanity:

'[Sustainable development] seeks to balance the economic, environmental and social dimensions of development in a long-term and global perspective. It implies a broad view of human welfare, a long-term perspective about the consequences of today's activities, and the full involvement of civil society.'

This is similar to Clark's (1989) definition, which touched upon the long-term perspective of sustainable development and the consequences of our actions on future generations. In other words, inter-generational fairness - ensuring future generations are not worse off. Additionally, OECD's concept of 'civil society' evokes the idea of participation within both the definition and also operationalisation of the concept. Discourse surrounding sustainable development is characterised by democratic participation and stakeholder interaction, which is essential to ensure the decisions reflect the voices of the collective, empowering people in order to develop better social cohesion within communities.

The OECD's (2001) definition marked a further expansion of the WCED standard definition by drawing on the triangle definition of sustainable development, which utilised three core thematic pillars: environment, economy and society, that are frequently referred to within the discourse (Kates et al. 2005; Glavic and Lukman 2007; Vos 2007). This was evidenced by stakeholders on the Copenhagen Climate Panel who utilised this definition as a way to provide

a holistic approach to sustainability. The triangle concept is often mentioned alongside the 'long-term' requirement for the three elements to reconcile: 'to grow the economy, distribute the growth fairly, and in the process not degrade the ecosystem' (Campbell 1996). The concept highlights the point that a one-dimensional 'man vs. environment' fails to address the social pillar within environmental challenges and implies varying sectoral expertise to integrate all three elements, in order to achieve sustainable development (*ibid* 1996). Whilst the three pillars were adopted relatively quickly, there was no universal agreement as to their details (Kates et al. 2005). Other scholars such as Meadowcroft (2011) stated that sustainable development is political concept and that a political element should be integrated into mainstream thinking, as flawed governance practices can encourage unsustainable activities. Governments of all levels (from municipalities to national governments) are now expected to play an active role in implementing sustainability policies (ibis 2016).

Conversely, alternative definitions were developed by scholars such as McMichael et al. (2003:1919) that explicitly regarded the challenges of achieving a steady-state society:

'Sustainability means transforming our ways of living to maximise the chances that environmental and social conditions will indefinitely support human security, well-being and health.'

This is clearly an anthropogenic concept, focusing solely on the need to preserve the environment and those social conditions for human society and omitting the needs of other living organisms. The definition of Brown et al. (1987:717) focus remains on the 'indefinite survival of the human species' and raises ethical questions regarding the protection of all living organisms, without which the human species are likely not to survive (Redclift 2007). Furthermore, the concept of 'indefinitely' is in itself questionable, as Costanza and Patten (1995:195) argue that nothing lasts forever, 'sustainability thus cannot mean an infinite life span, or nothing would be sustainable'. The authors then propose that it should mean a life span that is 'consistent with the system's time and space scale'.

Since the WCED Brundtland Commission defined sustainable development in 1987, scholars have articulated and promoted their own alternative definition, yet an agreed comprehensive meaning has not emerged (Kates et al. 2005). Many scholars have attempted to identify specific elements of sustainable development (e.g., the social pillar; the specific values the concept represents or supports), rather than a holistic definition, per se (Rassafi et al. 2006; Glavic and Lukman 2007). However, the critiques have contributed to an important part of an ongoing dialogue and the concept's very ambiguity and malleability allows it to remain an 'open, dynamic and evolving idea' that can be applied to different spatial scales and timeframes (Kates et al. 2005: 11). This research is predominantly interested in how the concept of sustainable development has been adapted to address challenges within an urban context and explores how Glasgow and Copenhagen municipalities have defined the concept taking into account the global and local sustainability issues.

2.2.4 City definitions of the sustainable development concept

Overview of how cities define 'sustainable development'

Within European cities, many municipalities have sought to define sustainability to enable them to put in place sustainability strategies that improve their environment, reduce resource use and waste (Satterthwaite 1997; European Commission 2010). Since the publication of Agenda 21 (1992), an increasing number of municipalities have committed to sustainable development as the discourse. This has gained greater official recognition more recently through the UN's SDGs (2015) and the Paris Agreement (2016) that has placed the emphasis of sustainability firmly within the context of cities. Despite this, cities have been given very little guidance regarding how to define the concept, and to this day, there is no clear, agreed definition as to what a sustainable city means (Newman 1999; Imran et al. 2014). As such, each city has defined their own interpretation of sustainable development and has begun to design and implement sustainability strategies that seek to meet their own objectives and consider both the global and local contexts (reflecting their environmental, societal and the economic considerations) (Haughton and Hunter 1994; Kates et al. 2005).

Glasgow and Copenhagen's definition of 'sustainable development'

Definitions vary between cities, each influencing how the concept is integrated into policy design and how it is then implemented within sustainability strategies. Hassan and Lee (2015) state the 'sustainable city' concept is located in an intermediate stage between sustainability and sustainable development and the definition of the former is as diversified as that of the latter concept. Many approaches taken to define sustainable development within an urban context, consider how it is measured, as Kates et al. (2005) argued the serious efforts to define the context come in the form of indicators and carbon emissions reduction targets. This can be evidenced through the urbanism comparative case study approach between Glasgow and Copenhagen.

Glasgow City Council's 'Sustainable Glasgow' (2016:2) vision of a sustainable city (within this research the geographical boundaries of the city are the jurisdictional boundaries set by the municipal government):

'By improving the lifestyles and opportunities for Glasgow's people and businesses, Glasgow's image as a leader in sustainable urban living will be enhanced, ensuring that sustainability and the development of a vibrant and growing city economy go hand-in-hand.'

Whereas the City of Copenhagen's vision in the 'Eco-metropolis: Our vision for Copenhagen' (2015) document permeates all urban planning strategies that follow:

'Copenhagen will demonstrate to other capitals how a greener urban environment can enhance the quality of life in practical terms. This will be to the advantage of the citizens both in our city and the world. This will also be to the advantage of current and future generations.'

Though some similarities are clear (e.g., aiming for a greener environment), both definitions differ: the former emphasises the city's economic development (e.g., mentioning 'businesses' and 'growing city economy') whereas the latter focuses on the citizens quality of life and touches upon the Brundtland Commission's (1987) definition, highlighting the importance of future generations ability to meet their own needs. Both definitions refer to the intention of becoming global leaders demonstrating how their city can be more sustainable (e.g.,

Copenhagen will demonstrate to other capitals; Glasgow's image as a leader in sustainable urban living). Copenhagen's definition states the intention to have a positive impact regarding sustainable development not only within the city, but also globally, whereas Glasgow's definition appears to be limited to the city region. Both cities initially focus on the anthropogenic benefits of developing a sustainable city (e.g., improving lifestyles and opportunities for Glasgow's people; Copenhagen aims to enhance quality of life in practical terms). Definitions frequently tend to perceive sustainability through an anthropogenic lens with the goals of economic development appearing to take precedent over environmental protection (Geisinger 1999). This can be evidenced in Glasgow's Energy and Carbon Masterplan (2014) which dedicates a chapter to the carbon emissions and the impact this will have on the city's economic development prospects. No definitions explicitly mention a clear timescale for achieving a 'sustainable city' as the definition is a vision (or an ambition) rather than an end goal. However, clear carbon emission reduction targets are linked to this ambition and mentioned within each city's sustainability strategy as is the definition itself. For example, Copenhagen's 2025 Climate Plan aims to be carbon neutral by 2025 and Glasgow's Energy and Carbon Masterplan aims to reduce carbon emissions by 30% by 2020.

The differences in city definitions of 'sustainable development' clearly highlights the differences in the types of sustainability policies designed and how each concept is implemented within each city. Importantly, the definition paves the way for how progress towards the concept will be measured in the form of thematic areas, indicators and/or actions (Kates et al. 2005). A city's sustainability definition often reflects the thematic focus within the sustainability strategy and thus the legislation, regulatory action and voluntary or incentive programmes that follow (Brown, Southworth and Sarzynski 2008). Both definitions highlight the various challenges in defining the sustainable development concept and identify the comparative features that differ within each case study that enable us to understand the processes and variables that lead to different network outcomes (Robinson 2016). These discussions feed into the wider debates with the discourse which are addressed within the next section.

2.2.5 Challenges defining Sustainable Development

Within the sustainable development discourse, the main challenges to arise when developing a definition (at both global, city and individual-level) include: lack of stakeholder consensus on the concept; timescales to achieve the concept; the anthropogenic focus within definitions; and, challenges when adopting the three pillars of sustainable development approach.

Lack of stakeholder consensus on the sustainable development definition

As evidenced by both Glasgow and Copenhagen, there is no agreed upon definition of sustainable development and this has implications when implementing the concept. The manner in which the concept 'sustainable development' is used and interpreted varies amongst scholars and practitioners (O'Riordan 1985; Redclift 1987; Lele 1991; Giddings et al. 2002). Sustainability is seen as a characteristic of a process or state that can be maintained indefinitely, whereas development is often associated with economic development which exhausts finite environmental resources (Redclift 1987). This paradox can be evidenced within a governance network where stakeholders negotiate to reach consensus on the concept and how it is implemented within a city. Many definitions argue that sustainable development aims to bring the environment and development together in an attempt to reconcile this paradox and to address the relations between the two as evidenced through the Brundtland Commission's definition (Bond and Saunders 2009). However, this can prove challenging within a network as stakeholders aim to manage how these concepts influence their own city's definition (Jabareen 2008). With the continuing lack of consensus regarding the definition of sustainable development and its broad normative objective, many scholars argue the concept is 'slippery', in other words, open to interpretation, making it difficult to translate into policy (Rees 1997; White 2013). Both Lele (1991) and Bebbington (2009) elaborate, arguing the concept is 'politically plastic' - an umbrella term that can be moulded to legitimise any policy action (Brown 2011). The malleability of the concept enables various stakeholders, organisations, governments to each project their vision onto the banner of sustainable development and represents a core challenge within the governance networks in each case study (Kates et al.

2005). As such, the lack of consensus surrounding the concept and with diverse stakeholders actively negotiating their interpretation, presents challenges when developing a city's sustainability strategy. The lack of consensus around the term potentially grants municipalities the freedom to focus on any economic development policy while pretending to ensure sustainable development (Gibson 2013). As such, there is a risk of 'green washing' policies to legitimise unsustainable practices as well as municipalities carefully selecting societal stakeholders within a network who align with these practices, in order to reach consensus and justify policies. This can be evidenced in both Glasgow and Copenhagen where the municipality select stakeholders they have worked with before on sustainability related work, suggesting a degree of alignment with the concept. Therefore, how stakeholders are selected within a governance network will be examined as these effects network dynamics and can account for variations in how cities define and implement sustainability policies (Bevir 2011). However, as outlined in Local Agenda 21, municipalities engaging with various stakeholders can be advantageous as it can increase legitimacy of sustainability policies implemented. Various scholars contend that sustainable development in the WCED report is intentionally left ambiguous in order to gain widespread acceptance, regardless of interpretation by municipalities (Button and Pearce 1989; Giddings et al. 2002). The concept requires action from all organisations and enables municipalities to develop localised sustainability strategies and responses to an increasingly global issue.

Timescales for achieving sustainable development

Within the sustainable development discourse, emphasis has been placed on the timescales to achieve sustainability within cities (Costanza and Patten 1995; Kates et al. 2005; Hassan and Lee 2015). For example, many definitions such as the Brundtland Commission's (1987) and the OECD's (2001) all of them link what is to be sustained with what is to be developed and the timescales in which to achieve sustainability is ambiguously defined as 'now and in the future' or 'long-term perspective' with no end date. It has been defined from as little as a generation to 'forever' or 'indefinitely' as noted in Solow's (1992) definition. Although Glasgow City Council and City of Copenhagen's definitions are not time-dated, they sit within a

sustainability strategy that does provide end dates for specific policy targets. Thus, all definitions of sustainable development (global, national or city-level orientated), tend to be intention setting statements or ambitions, rather than concrete targets with clear measurable progress (Costanza and Patten 1995). However, scholars such as Yanarella and Levine (1992) suggest that all sustainability definitions should be centered around strategies for designing and implementing policies for sustainable cities on a practical basis. In addition, defining a timespan in which to achieve sustainability requires measuring progress towards such targets. This also applies to city's definitions which state they wish to 'maintain sustainable development indefinitely' as this still requires a level of sustaining specific activities that directly lead to carbon emission reduction (Constanza and Patten 1995). In turn, this implies that the political commitment to sustainable development should also be sustained in order to achieve sustainability targets. As a result, Klauer (1999) argues definitions of sustainable development should be aimed at a specific target and from this, concrete political commitment and actions developed to measure progress within a certain time frame.

Anthropogenic focus of current sustainable development definitions

In recent years, definitions of sustainable development, specifically at city-level, have focused on human development as the primary driver to reduce carbon emissions. For example, the Brundtland Commission (1987) focused on the 'needs of current and future generations' and McMichael et al. (2003) aimed to 'indefinitely support human security, well-being and health.' Redclift (2007) notes that both definitions focus predominantly on human needs and highlights the ambiguity around such concepts as such needs differ both between and within generations and across cultures. In addition, Imran et al. (2014) add that the anthropogenic focus can prioritise one set of people's needs and exclude others' needs which does not necessarily contribute towards sustainable development objectives. This challenge can be evidenced within governance networks where stakeholders can prioritise their own organisational priorities and perceptions of sustainable development over others within the network.

Both Glasgow City Council (2014) and McMichael et al. (2003) definitions markedly characterise satisfaction of basic human needs (Imran et al. 2014). As such, the concepts can marginalise nature and the environment over economic growth and human development. The anthropogenic focus can also separate 'humans' and 'nature' (all other living species) as distinct entities and not interlinked - these neglect non-human rights (Redclift 2007). This lack of clarification within definitions can create confusion within both academic and political debates (Robinson 2004; Imran et al. 2014). Both De Paula and Cavalcanti (2000) and Ehrlich (2002) note the ethical concerns around the anthropogenic focus as it marginalises the needs and rights of nature. This can illustrate through Glasgow City Council's (2014) definition of sustainable development as 'improving the lifestyles and opportunities for Glasgow's people' as the primary focus is human development, includes an emphasis on targets such as increase life expectancy and equity (Kates et al. 2005). This definition reflects the municipalities own internal objectives and may not necessarily align with other stakeholders, which may cause challenges when implementing the concept. Thus, the definition of sustainable development at city-level can significantly influence the types of policies and projects implemented to reduce carbon emissions and therefore stakeholder perceptions of the definition requires analysis within this research.

Three pillars of the sustainable development concept

As illustrated previously in this chapter, various definitions of sustainable development have focused on specific thematic areas of the concept (e.g., human development focused and/or orientated towards the economy, etc.) and not just environmental challenges. In recent years, the triangle definition of sustainable development, which used three core pillars: environment, economy and society, has been frequently referred to within the discourse and has been identified within this research by participants in Copenhagen (Giddings et al. 2002; Hassan and Lee 2015). In particular, the interaction between the three pillars is seen as imperative to achieve urban sustainability (Hassan and Lee 2015). Scholars argue that specific pillars or thematic areas of the concept should be emphasised in a definition, for example Dempsey et al. (2011) states that social aspects (e.g., social equity and community) are often overlooked

within modern society, whereas Ehrlich (2002) states environmental conservation is an important issue (e.g., referring to the interconnectedness of all living things, including humans). Lele (1991) attests that many definitions of sustainable development can be interpreted as 'sustained growth' as development can be synonymous with growth in material consumption. This can be evidenced in Glasgow City Council's definition: '...ensuring that sustainability and the development of a vibrant and growing city economy go hand-in-hand' and Solow's (1992) definition that sustainability 'must amount to an injunction to preserve production capacity for the indefinite future' implies priority is given to the natural stock of resources and the flows of income that depend on it (Pearce 1993). Over time, the three pillars approach to sustainable development have been rapidly adopted (e.g., shifting from single issue, siloed thinking), however, there is still no universal agreement as to their details and how they interact with one another (Kates et al. 2005).

2.2.6 How stakeholders define Sustainable Development

This section outlines the competing interests of various stakeholders within a governance network and draws upon the different motivations for defining the sustainability agenda. In addition, this section explores the external perceptions of network stakeholders on how they may act to progress towards sustainable development. Specific sectoral groups interested in defining the sustainable development concept leading to a number of alternative meanings since the conceptualisation of the definition in 1987 (Tisdell 1988). Redefining the concept within networks has often resulted in stakeholders addressing their own personal, organisational and political agendas, as evidenced in this research, rather than using the concept to implement the policies required to progress towards a sustainable city (Lele 1991). Within a network, the challenges of both progressing towards sustainable development, and then achieving it, require consensus and are therefore frequently contested. This can be evidenced through the different ways in which various stakeholders portray the nature of sustainable development (Giddings et al. 2002; Redclift 2006). Redclift (2006) noted that the concept has various uses from cities to nation states and often it is unclear whether these definitions complement each other or are mutually exclusive. This research discusses the

stakeholders within a network and their tendencies and perspectives when developing a definition applicable to the urban context (Rossi et al. 2000; Bulkeley and Betsill 2005; Brown 2011).

Municipalities perspective

Since the publication of Local Agenda 21 (1992), municipalities have been placed at the heart of sustainability decision-making within Europe. Municipalities have been defining and implementing sustainable development policies, thus their leadership, regulatory and coordination roles are becoming increasingly evident within the literature (though this research examines this in practice). Despite the onus on municipalities to lead the transition towards sustainable development, international agreements and aspirations such as the United Nations Sustainable Development Goals and the Paris Agreement objectives do not always specify the financing and resources available to them and little guidance is provided (Satterthwaite 2015). In addition, national government can withhold, or increase, the legislative power of municipalities, thereby directly impacting the city's ability to implement sustainability strategies and mitigate carbon emissions reductions (e.g., there may be limitations over a specific sector) (Bassett and Shangdas 2010). Similarly, the legislative power given to the Mayor within a city (e.g., TE Mayor in Copenhagen), can also directly impact the city's ability to develop a sustainability strategy and their perspectives on the concept can also influence the city's approach (*ibid* 2010). Economic challenges have resulted in significant budget cuts in European municipalities (e.g., as experienced in both case study cities) as well as added pressure to deliver more services with less resource. As such, governance networks in Glasgow and Copenhagen have become necessary to forge consensus among societal stakeholders around sustainable development definitions to enhance the development and implementation of sustainability policies within cities (Khan 2013).

Municipalities tend to be perceived by external stakeholders as largely accountable for acting on sustainable development within cities (Rossi et al. 2000). This is evidenced by Balkyte and Tvaronaviciene (2010) who state that municipalities focusing on sustainable development and

growth (e.g., resource-efficient economies) do so as it can attract more people, investment and firms and improve their position in a global ranking of cities. No other external stakeholder within a governance network has the democratic mandate, legal powers or reach within the city boundaries to drive economic and social development on a global scale (*ibid* 2010).

Public sector agencies perspective

Public sector agencies (e.g., public sector housing organisations) tend to support the sustainability objectives set by the municipalities (as the main 'agents of change') who have the power to develop an ambitious climate agenda (Rossi et al. 2000). While public sector agencies need to have input into the agenda setting process (e.g., defining sustainable development), they tend to support the implementation of such agendas - this is especially true within governance networks (*ibid* 2000). As such, agencies are seen as service providers and can either follow their own needs and interests or attempt to align their services with the needs of the municipality, most often it is the latter (Klijn and Koppenjan 2016a). Although there are jurisdictional requirements for public sector agencies to support the municipality, such alignment tends to occur at an individual level rather than an organisational level (*ibid* 2016a). These types of relationships are best expressed within a governance network.

Public sector agencies are perceived as similar to municipalities in their ability to act on sustainability issues. Marsden (2000) supports this claim by stating that such organisations are protected by government activity, in that they have to uphold, and mirror sustainability activities given their close affiliation with the municipality.

Private sector perspective

The private sector is widely perceived to be a key player within the sustainability agenda (Holliday et al. 2002). Springlett (2013) claims that the sustainability concept itself is perceived to be a consequence of the 'free market' and corporations tend to shift the environmental

agenda to one focused on economic growth, which is often at the expense of natural capital. The corporate vision defined by Prahalad and Hart (1999) and Holliday et al. (2002) emphasised the triple bottom line goals of increasing shareholder value, where improving the environmental performance tends to be a side goal (*ibid* 2002). Within business, innovation and efficiency, are seen to address the necessary environmental improvements required (Rossi et al. 2000). Private sector organisations are able to implement such changes quickly and work to different timescales than the municipality (*ibid* 2000). The corporate vision has influenced the public sector where there is increasingly a need to understand the importance of innovation to progress towards sustainable development (Rossi et al. 2000). This is specifically true within cities, where corporations can quickly scale up technological solutions (Jacquier 2005). However, the risk-averse municipality can limit such implementation as they are wary of collaborating with private sector entities who have their own commercial vested interests (Rossi et al. 2000).

The private sector is perceived by many stakeholders as driving their own organisation's agendas which can implement their vision of change through new technological development, production and product marketing (Rossi et al. 2000). Holliday (1999) and Prahalad and Hart (1999) argued that corporations emphasised the need to increase shareholder value and triple bottom line objectives as a priority and carbon emissions reduction as a secondary objective. However, private sector organisations are increasingly understood as being a key part in the solution to solving the world's sustainability problem as they are becoming increasingly powerful on the global political arena (Marsden 2000). A key issue with private sector involvement in a governance network is their ability to balance internal objectives with the collective benefit of all other stakeholders in the network.

Third sector perspective

Approaches used by NGOs, charities and higher education institutions (HIEs) to accelerate sustainable development has evolved over time from predominantly lobbying, to collaborating with the private and public sector in order to develop solutions to the climate challenge. Though

there have been successes with this approach, there have been challenges applicable within a governance network where both types of stakeholders are present: few corporate leaders are willing to work with NGOs. The rational in this type of collaboration is complex, as NGOs lack the coercive power of the state, which would explain why businesses collaborate with government directly (e.g., lobbying for policies that align with their own interests). This can also be evidenced through how charities and universities define the sustainability agenda. Charities tend to provide expertise and knowledge within a governance network, especially within sustainability projects. However, how projects are defined and implemented differ in European countries as a result of dissemination and communication between various stakeholders and sectors within each country (Rossi et al. 2000). This research highlights the diverse visions of sustainability and a range of views on which stakeholders should play leading roles in setting the sustainability agenda.

Third sector organisations are perceived differently regarding their ability to act on sustainability issues (Cortese 2003). These organisational types are transitioning towards managerial models as a result of quasi-market strategies. This can be evidenced in NGOs approach to sustainability, which originally focused on lobbying and litigating on specifically issues and has now shifted to either collaborate with or confront private sector organisations to achieve sustainable development (Rossi et al. 2000). Universities pivotal and influential role within society makes them important stakeholders in transitioning towards a sustainable future (Cortese 2003). Universities specifically can be models for local communities in how they both commit to sustainability and integrate them into their development plans (Ferrer-Balas et al. 2008). Many universities are also developing sustainability strategies, working with private sector organisations to implement sustainability initiatives, technologies and projects within the university, for example (*ibid* 2008).

Civil society perspectives

The representation of civil society within governance networks tends to be minimal, if it exists at all, therefore their perspectives within governance networks are not defined. This is largely

a result of the municipality being seen as having the democratic mandate on behalf of civil society to implement sustainability-orientated policies outlined within their manifesto (Evans et al. 2005). Selecting individuals from civil society to represent a large group of people could be perceived as biased and no approach has been identified to date that reduces or eliminated this bias (Klijn and Koppenjan 2016b). However, Evans et al. (2005) argues that reducing civic engagement within sustainability governance debate tends to have adverse impacts on sustainable urban development. This is largely due to those being affected by the policies not having a say in their creation and is a key criticism of governance networks and their democratic legitimacy.

2.2.7 Achievement of sustainable development within cities

The majority of municipal definitions of sustainable development within their sustainability strategies are rather ambitions regarding what a sustainable future should look like. However, these ambitions do not always identify when sustainability will in fact be achieved (e.g., when a city will achieve its carbon emissions reductions targets). This section explores the concept of achieving sustainable development within a city and what definitions and sustainability strategies should address or consider, in order to provide clarity for stakeholders within governance networks.

Municipalities sustainability strategies tend to provide a carbon emissions reduction target within a specific timeframe. For example, Glasgow's Energy and Carbon Masterplan (2014) outlines an end date of 2020 to reduce its carbon emissions by 30% (baseline year 2006) whereas Copenhagen's 2025 Climate Plan mentions an ambitious end date of 2025 for carbon neutrality. Costanza and Patten (1995) state that such approaches are required in order to achieve sustainability, as cities definitions alone do not always specify such time dated targets (as evidenced previously in Glasgow and Copenhagen). Scholars such as Klauer (1999) agree, arguing that achieving sustainable development must be derived from scientific, technical and economic evidence that can be implemented by setting sustainability targets and limits of carbon emissions. Glavic et al. (2007) define sustainable development as a 'timeline'

where strategies and policies enable cities to work towards a sustainable society. However, such targets can only be assessed after the time has passed, therefore sustainability policy development must assess uncertainty to ensure targets are achieved (Costanza and Patten 1995). There are conflicting perspectives with achieving the definition. Kates et al. (2005) argue that the sustainable development concept is defined in practice, this includes defining the concept, creating targets and indicators. Hence, this has led municipalities to focus on developing sustainability strategies as a way in itself to define what is meant by the concept. Whereas Costanza and Patten (1995) argue that most definitions do not account for assessing when the system (e.g., such as a city) has been sustained.

As with the definition of sustainable development, the challenges defining the concept also ring true when identifying sustainability has actually been achieved. For example, the integration of the three pillars of sustainability was perceived by Hassan and Lee (2015) as not only necessary for the definition but also for assessing when sustainability has been achieved, as how they interlink is essential for sustainability to be maintained. Similarly, Rees' (1997) exploration of what a 'sustainable city' looks like, identified that in order for cities achieve sustainability, the immediate hinterlands that the city relies on for resources (e.g., energy) would also have to be sustainable. Therefore, a sustainable city can only be achieved when both work in symbiosis. Scholars such as Dernbach (2003) and Evans et al. (2005) argue that sustainable development within cities can only be achieved with good governance and integrated decision-making with various stakeholders from society, as evidenced through governance networks. Thus, this research explores stakeholder definitions of sustainable development in order to understand how this influences the implementation of the concept at city-level. The next section examines city's sustainability strategy to identify how such definitions can influence the city's sustainability policies and targets specifically.

2.3 Sustainability Strategies: Governing through stakeholder interaction and measurement indicators

The literature review thus far has provided a theoretical and practical understanding of governance network theory by identifying key characteristics and contextualizing how they are formed, managed and evaluated within cities. It has identified the opportunities and challenges with governance networks, shaping our understanding of how they work in practice. The second section provided various approaches and challenges when defining the sustainable development concept and identified the various conceptual perspectives from network stakeholders. Understanding stakeholder perspectives enables us to understand how this shapes their interaction with the network. Building on this, the following section marries the governance network and sustainability concepts, focusing on the development of sustainability strategies within cities. Such strategies and their respective sustainability targets were a primary motivating factor for the development of sustainability orientated governance networks. Understanding sustainability strategies with specific reference to Glasgow (Energy and Carbon Masterplan) and Copenhagen's (Copenhagen 2025 Climate Plan) throughout, will help us to answer the research question by providing insight as to the role of governance networks on their design and implementation.

2.3.1 Concept of measurement within policy

Within the sustainability and governance discourse, stakeholder interaction and indicators play an increasingly important role within a city's sustainability strategy and as such, each city's approach is tailored to its localised context (Bebbington 2009). This research examines the concept of measurement through indicators and its implications for governing sustainability in an urban context. As such, this section provides an overview of concepts of indicator measurement; sustainable development indicators role within the policy process; and, indicators utilised within cities sustainability strategies.

2.3.2 Indicators to evaluate sustainability policy progress

New forms of governance introduced in the 1980s-90s such as markets, hierarchies and new managerialism introduced market proxies into the public sector, by contracting-out work, collaborating with non-governmental stakeholders and developing incentive structures that were efficiency and outcome orientated (Rhodes 1996; Enroth 2011). Such forms of governance reformed the public sector to improve the effectiveness, transparency of decision-making and increase value for money by implementing evidence-based decision-making (Kitchin et al. 2015).

As such, the concept of measurement and benchmarking sustainability policy progress was first introduced to assess the performance of urban environments in the 1990s, through the United Nations Conference on Sustainable Development (UNCSD 1992). An outcome of the conference was the publication of Agenda 21, a non-binding action plan which provided a framework for the implementation of sustainability at city-level (Yvon 2013). The mid-1990's onwards saw such indicator frameworks being designed and implemented by municipalities to examine specific aspects of the urban system (Miller 2005; Kitchin et al. 2015). Many municipalities utilised sustainable development indicators (SDIs) and benchmarking initiatives to meet specific sustainability targets, provide evidence on the success or failure of new policies, and guide the development of new, more effective sustainability strategies (Craglia et al. 2004; Li et al. 2009). A plethora of SDIs have now been developed and revised within sustainability strategies, reflecting the most recent data within the political and scientific discourse (Boyko et al. 2012; Kitchin et al. 2015; Krellenberg et al. 2019).

Over the past twenty years, research measuring and monitoring sustainable development has grown exponentially (Holman 2009). Valentin and Spangenberg (2000) argue that indicator development is now a two-way process: they are derived from policy aims and simultaneously help shape and actualise policies. As such, the governance process of developing indicators should be an open and communicative process with societal stakeholders collaborating and

not just derived from purely technical and scientific data (*ibid* 2000). It is within these municipal sustainability decision-making processes that governance networks come into play.

Target setting in cities: Stakeholder vision and commitment

Setting urban sustainable development plans and policy targets are becoming increasingly common; currently over two thirds of European cities have already developed sustainability strategies (Li et al. 2009; Hiremath et al. 2013). However, only a minority of countries have made city sustainability reporting mandatory, such as Denmark and the UK, which then places onus on their cities to comply with such requirements (Reckien et al. 2018). In cities that do comply, such targets are frequently linked to their definitions of sustainable development or carbon emission reduction targets, as seen in Helsinki's 'Action Plan for Sustainability' (2002) (Holman 2009; Greaker et al. 2013). Many of these sustainability targets are designed and implemented by municipalities and other stakeholders within the city region and signal a level of unified commitment to climate action (Camagni 2002; Tanguay et al. 2010). For example, Glasgow City Council has set a sustainability target of a 30% reduction in carbon emissions by 2020 (baseline 2006) and the City of Copenhagen has set the target of carbon neutral by 2025. Such sustainability target setting by municipalities can help guide policy outcomes and influence stakeholders within governance networks and in the wider city (*ibid* 2002; 2010). As more cities globally adopted sustainability as a target to shift the current development of urban areas, it becomes necessary to determine what actions are required to achieve such targets (Hiremath et al. 2013). Many scholars such as Voula (2005) argue that achieving sustainable development means achieving a balance between the development within a city and protecting the environment. As such, it is necessary to understand the specific areas a city is, and is not, meeting its specific targets (*ibid* 2005).

SDIs can play a vital role in enabling a municipality to assess its progress towards its own sustainability targets and also enable comparison with other cities globally (Hiremath et al. 2013). To achieve this, indicators must be linked to 'reference points' (e.g., interim short and long-term targets) that can determine whether progress has been made towards sustainability

targets (Maclaren 1996). Copenhagen's strategy details four-year road maps as interim reference points to meet specific indicators. For example, the roadmap 2017-2020 specifies the development of 'intelligent control of energy sub-systems' within the Energy Lab project, as an indicator of progress as key learnings on energy production and use, will be upscaled following completion (City of Copenhagen 2016). Both SDIs and sustainability strategies have been developed by municipalities to provide objective evidence for assessing progress towards sustainability targets and focusing stakeholder discussion on key thematic areas of relevance to each city (Li et al. 2009). Within the sustainability and governance discourse, Holman (2009) identified the diverse roles indicators can play within the decision-making process. For example, indicators can play aspirational roles as municipalities seek to promote a vision of a sustainable future as this can motivate stakeholders to act.

The proliferation of governance networks has resulted in municipalities using targets and target attainment to evaluate sustainability policy outcomes (Provan and Milward 2001). Developing targets with various stakeholders can create a sharable vision of reality and encourage stakeholder buy-in, however, it can be problematic as selecting targets may favour one specific stakeholder in the network over another and not accurately assess the success or failure of a policy (Voets et al. 2008; Klijn and Koppenjan 2016a). This research assesses the effectiveness of stakeholder interaction and progressing towards sustainability targets within cities, in order to understand similar and different features within comparative case studies that influence network outcomes (sustainability strategies).

Measurement: Evaluating progress towards sustainability targets

The concept of measurement is appropriate within the research as it creates units of analysis and different measurements that reflect different definitions of the 'sustainable development' concept (Babbie 2013). An indicator is a type of measurement that is selected in order to consider a reflection of a variable; in this research the selection of an indicator requires negotiation and consensus within a governance network. SDIs are parameters that provide information about a phenomenon and are used specifically by governance networks to both

measure and evaluate progress towards sustainability targets (Hiremath et al. 2009). Yvon (2013) perceives indicators as 'tools of action' that directly correspond to a specific political and scientific function (e.g., aligning with thematic politics and/or carbon emission reduction targets). For example, in Glasgow's strategy, the SDI 'Conversion of remaining coal-fired boilers and oil boilers into gas boilers in GCC buildings,' neatly describes key actions that need to be taken and how to know if progress has been made (e.g., reduction in number of coal-fired and oil boilers) (Glasgow City Council 2014). Thus, the role of indicators is twofold: SDIs are tools for policy making (prospective) and for assessing policy implementation (retrospective) (WRI 1994). Both Molden and Dahl (2007) and Holman (2009) agree, arguing that indicators are information tools that enable policy makers to condense and digest complex information quickly. Holman (2009) elaborates, stating that SDIs are, by virtue of scientific validity, tools for feeding information into the policy process.

Scholars generally agree that SDIs should be policy relevant (for a specific city), measurable and offer insight into how cities perceive (and define) sustainable development (Levett 1998). Although SDIs can improve the transparency within decision-making and help municipalities monitor how a city is performing (Godin 2003; Kitchin et al. 2015), they need to be timely and understandable to be useful, conveying information quickly and effectively (Brandon and Lombardi 2011). Within a governance network, developing SDIs for cities can be challenging as a diverse range of perspectives on sustainable development can influence the indicators selected (Klijn and Koppenjan 2016b). In addition, new forms of governance have resulted in municipalities implementing measurement techniques to assess the performance of sustainability policies and achieve sustainable development targets (Kitchin et al. 2015).

Definition of sustainable development indicators (SDIs)

In an urban context, there are various stakeholders involved in designing sustainability strategies; thus, translating the concept into a set of specific activities for implementation is somewhat challenging (Torfing 2007). However, through indicators, topic areas that relate to sustainability can be quantified and assessed. Therefore, it is necessary to explore SDIs as a

type of measurement for sustainable urban development. Aligning with the researcher's definition of sustainable development, SDIs employed in sustainability strategies have been defined here by (OECD 1997:67) as:

'...a statistical measure that gives an indication on the sustainability of social, environmental and economic development.'

This definition of indicators addresses the continual assessment towards sustainable development. Indicators have a role in developing and constructing what it means to 'do' sustainability and help to frame the discussion (Miller 2005; Holman 2009). The mention of measuring sustainability aligns with the research aim to assess progress towards sustainability targets (e.g., which are often carbon emission reduction and require quantitative data). Specifically, within this research, the concept of indicators also refers to the policies, actions and city-level projects or initiatives that directly contribute towards carbon emission reduction as they can provide an indication of sustainability progress. For example, SDIs in Glasgow's Energy and Carbon Masterplan includes the indicator, 'procurement and deployment of a further 20 electric vehicles for the council fleet and further electric vehicles for Community Planning Partnership (CPP) partners', which specifies a specific quantity of electric vehicles required to progress towards thematic objectives outlined in their sustainability strategy document (GCC 2014). Whereas in the Copenhagen 2025 Climate Plan, SDIs include time-dated city initiatives such as, 'develop strategy for energy consumption in construction sector' (City of Copenhagen 2017). As such, they can help to identify the effectiveness of each cities activities and how they contribute towards sustainability strategies targets. The indicator definition itself is specific to sustainable development but can be moulded to suit to various city contexts and thus different definitions of sustainable development (Babbie 2013). Tanguay et al. (2010) note the indicator(s) selected should be able to complement each city's definition of sustainable development, therefore this research argues that definition of the concept has significant ramifications for how the concept is conceptualised within the city's sustainability strategy. This research utilises the OECD's definition as it provides flexibility for each city's definition and is primarily concerned with progressing towards sustainability targets. Alternative

definitions of indicators, such as EEA (2007)'s which defines SDIs as communication tools that simply complex issues and inform and empower decision-makers was not adopted as their use as communications tools for decision-making is widely contested.

SDIs tend to form a framework to address multiple sustainability policy issues in order to provide a holistic context on the state of cities (Kitchin et al. 2015). Such sustainability frameworks aim to 'assist decision-making by identifying, measuring and comparing the social, economic and environmental implications of a policy option' (DSE 2007:1). Quantitative indicators within such strategies must be transparent and undergo rigorous selection criteria to ensure scientific credibility and inform decision-making processes (Slocombe 1998; Niemeijer and De Groot 2008). The UN states that all indicators must be SMART: specific, measurable, achievable, relevant and time-related (UNDESA 2007). Dale and Beyler (2001) confirm that this approach can be utilised to validate the selection of SDIs. In this research, indicators vary in each municipality depending on each definition of sustainable development.

SDIs offer a means to measure progress made in the sustainable growth and development of cities. Their uses include assessing conditions, comparing urban areas and anticipating future trends -both Glasgow and Copenhagen's strategies detail SDIs and their direct links to carbon emission reduction trends up to 2020 and 2025 (Boyko et al. 2012). Indicators can often signpost whether a policy is working effectively or not, which can enhance decision-making, specifically for network leaders who often have to make decisions efficiently. This is especially true if the data reflects little progress in a specific policy area. Hence governing networks need '...information tools that can condense and digest information for rapid assimilation, while making it possible to explore issues further as needed.' (Moldan and Dahl 2007:1). Holden (2006) states SDIs are a 'flag' for further investigation and policy action and that both quantitative and qualitative indicators can each provide useful information in a variety of political contexts.

2.3.3 SDIs in the policy process

This section details the characteristics of indicators utilised to measure sustainable development within cities in order to contextualise network discussions around them. Specifically, this section addresses indicator: types; selection and stakeholder interaction; opportunities; challenges; and, their applicability in helping cities assess their progress towards sustainable development.

Types of SDIs

A review of sustainability measurement literature identified four types of indicators that have been adopted by cities seeking to assess their progress towards sustainable development targets, specifically: single, composite, descriptive and diagnostic indicators.

Various scholars referred to single indicators as being utilised by municipalities to assess sustainability (Franceschini et al. 2007; Bhada and Dan Hoornweg 2009; Brandon and Lombardi 2011). Single indicators are direct measures that are well-defined, unambiguous quantitative data. For example, the 'number of passengers using public transport compared to 2009' as outlined in Copenhagen's Climate Action Plan 2025 (Bhada and Dan Hoornweg 2009; City of Copenhagen 2017). There are benefits to municipalities utilising such indicators as they are relatively objective, neutral, value-free, traceable over time and cost effective to collect, process and update (Franceschini et al. 2007; Brandon and Lombardi 2011). Single indicators are relatively straightforward to understand for all stakeholders and thus are often utilised within governance network discussions. In addition, trade-offs with such indicators can be assessed and it enables city comparison and benchmarking (Brandon and Lombardi 2011). However, given the nature of measurement is directly related to one single phenomenon, numerous single indicators are frequently adopted within a framework to assess the sustainability of the whole urban system (Kitchin et al. 2015).

Alternatively, scholars identified composite indicators which Maclaren (1996) described as the combination of various single measures in order to create a new measure (often used to

describe cross-sectoral indicators). For example, Glasgow's strategy states 'improve traffic management in congested areas of Glasgow and using measures such as Air Quality Management Areas' as an SDI, which brings together separate single indicators: improved traffic management, air quality and health/well-being of citizens (Glasgow City Council 2014). Such indicators can acknowledge the interrelated and multi-dimensional elements of sustainability, as no one single indicator can reveal the complexities underpinning such issues, some of which are specific to local cities (Kitchin et al. 2015). However, Jacobs and Goddard (2007) argued that composite indicators can oversimplify interrelations between single indicators which was also acknowledged by Brandon and Lombardi (2011) who stated the simplicity of such indicators could give misleading signals and not necessary measure progress towards sustainability targets. In addition, such indicators can create challenges when standardising measurement limits and weighing the impact of each element (Maclaren 1996).

Both single and composite indicators can be either descriptive or diagnostic. Hoernig and Seasons (2005) argue that the former can be achieved through direct observation of sustainability issues and understanding cause-effect relationships. For example, Copenhagen's strategy details '20% more passengers use public transport compared to 2009', in order to progress towards carbon neutrality by 2025 (City of Copenhagen 2017). Whereas SDIs such as Glasgow's 'Conduct internal energy audits of municipal properties and identify those that will benefit most from energy efficiency measures actions and projects' requires stakeholder insight regarding energy audit results and the corresponding actions or projects necessary (Glasgow City Council 2014). The latter is more complex and requires a deeper understanding of the sustainability challenge, requiring negotiation with experts to identify how a reported trend could be solved (Cobb and Rixford 2005; Holden 2006). With this, there are political motivations for choosing specific interpretations of expert-derived fact (Holden 2006). This research explores the indicator types that arise from the sustainability strategy policy analysis and how these translate into governance network discussions.

Selection of Sustainable Development Indicators (SDIs)

Various scholars recognise the significance of defining transparent and rigorous selection criteria for indicators, to ensure they are scientifically credible and can inform decision-making processes (Tanguay et al. 2010). Selecting a series of indicators within a sustainability strategy should retain an element of flexibility to respond to the different trends of sustainable development within cities (Li et al. 2009). Boyko et al. (2012) developed an indicator sustainability framework composed of a series of generic and topic specific SDIs and a list of characteristics to describe future scenarios to provide a holistic overview of sustainability within a city. However, Westfall and Clarke (2001) argue that SDIs selected must have data readily available and link directly to specific city targets and sustainability policies. In addition, SDIs that are vague are open to interpretation from all stakeholders within a governance network which may influence how they are implemented and measured within the city. As such, when selecting SDIs, municipalities should consider input and engaging with multiple stakeholders within the city to ensure they are relevant for the city and local policy context (Maclaren 1996).

Stakeholder interaction process

In recent years, there has been a proliferation of literature on the stakeholder interaction process when selecting SDIs. Foxon et al. (1999:146) stated the development of SDIs is a 'dialectic process' that must be done alongside the development of policies. As such, municipalities are increasingly engaging with stakeholders to initiate the search for consensus-based indicators (Gibson 2001). Multi-stakeholder insight can enhance the reliability and validity of the SDIs selected as the sustainable development concept itself is contested and requires input from various participants within the policy process (Maclaren 1996). Both Glasgow and Copenhagen's strategies mention the need to involve diverse stakeholders in the design and implementation of SDIs. This is an important process as Brandon and Lombardi (2011) argue they possess local knowledge, ensure political commitment and ownership of the results. In addition, Holden (2006) argued that the productive dialogue on sustainability issues

is necessary to broaden understanding of the concept and provide useful insight on different intents, backgrounds, interests and ways of thinking.

Stakeholder interaction within the process requires a level of negotiation, with respect to the impact and implications of developing SDIs (Holden 2006; Hunsberger et al 2005). Within governance networks, participants are sought to provide meaningful participation, consensus building and improving the quality of information used by decision-makers (Sapountzaki and Wassenhoven 2005). Furthermore, selecting SDIs influenced by both practitioners and decision-makers can support the practical implementation within the city (Li et al. 2009). Despite the advantages of stakeholder interaction within the policy process, Holden (2006) argues that it is impossible to understand the different motivations and variations in power within the network. In addition, the process can reveal conflicting interests, values and preferences when developing SDIs that must be taken into account (Holden 2006; Brandon and Lombardi 2011). Thus, both the design and implementation of SDIs is fraught with ambiguity and subjectivity, but stakeholder interaction can provide insight out with the municipality's capability (Phillis et al. 2017).

Advantages of utilising SDIs within decision-making

Various scholars agree that SDIs can be appropriate tools for feeding information into the policy process and are needed to help leaders within governance networks, 'make the best decisions and design the best policies' (Wilson et al. 2007:312, Hiremath et al. 2013). The European Commission's 'European Sustainable Cities' report stressed the need for indicators to be used as metrics for assessing sustainability performance, where municipalities need to be able to determine if progress towards sustainability targets is being made – a key component of this research study (European Commission 2010). Many cities in Europe routinely develop SDIs and sustainability indicator frameworks to enable them to track and assess performance, guide policy development and inform how cities are governed (Miller 2005). SDIs can provide a tool for guidance in sustainability policies and enable monitoring of

trends to inform and communicate to decision-makers (Spangenberg et al. 2002; Tanguay et al. 2010).

SDIs can assist identifying trends by guiding and moulding policy actions, adding to the process of governance (Rydin et al. 2003). The use of indicators can support decision-makers in tracking a selected number of indicators to assess a specific thematic area and to obtain information on the largest improvement to carbon emissions reduction, which in turn can inform future iterations sustainability strategies, as evidenced in Copenhagen's strategy roadmap which details time dated indicators to assess performance (Phillis et al. 2017). Similarly, SDIs should also lead to a better coordination of projects within cities and identify local sustainability challenges (Tanguay et al. 2010). For example, Sustainable Seattle a third sector organisation in Seattle, developed a series of SDIs for the city, developing localised indicators (e.g., fish stock numbers to assess water pollution) (Eurofound 1998). Voula (2005) stresses the importance of identifying the areas a city is doing well in according to its specific targets to recognise policy progress towards sustainable development. There are explicit linkages within the sustainability and governance discourse that bind the creation of SDIs and the dynamics of governance tied to their use (Holman 2009). In this respect, SDIs require communication between various departments and stakeholders which help to 'shape networks' (Valentin and Spangenberg 2000; Asleithner et al. 2004). Yvon (2013) elaborates, stating that SDIs can also give clues as to how municipalities and stakeholders interpret the sustainable development concept, as detailed previously. Several scholars argue that indicators can be an effective way to understand stakeholders' perspectives, needs and concerns and thus how they may interact in a governance network (Holden 2011; Moreno-Pires and Fidelis 2012). This can provide insight as to how they to contribute towards sustainable development and collective action, through networks and projects implemented in the case study cities (Gahin et al. 2003; Moreno-Pires and Fidelis 2012).

Challenges with using SDIs within decision-making

The usefulness of SDIs in measuring progress towards sustainable development targets has been widely critiqued. Scholars have argued that indicators are meaningless without a shared vision, specified objectives and a common language between various stakeholders in a governance network (Eurofound 1998; Yvon 2013). Given the diverse background of stakeholders participating in a governance network, a shared vision can prove challenging as each individual possess different interests and perspectives, as demonstrated in the variety of sustainable development definitions within the literature (Kates et al. 2005). Kitchin et al. (2015) argues that new forms of governance are multi-level and complex and require consensus building, this can create challenges when reducing the sustainable development concept to performance metrics and targets. However, scholars such as Valentin and Spagenberg (2000) state developing a shared vision and SDIs framework requires open communication between stakeholders as SDI formation cannot be a purely scientific process.

The same issue applies to determining the optimal choice and number of SDIs within a sustainability strategy. For example, Copenhagen's 2025 Climate Plan (2016) has 60 indicators grouped into thematic areas such as 'transport' whereas Glasgow's Energy and Carbon Masterplan (2015) has 33 indicators, also in thematic areas such as 'energy use in buildings' (City of Copenhagen 2016). SDIs will be selected on the basis of consensus, process, scientific research and negotiation; this can result in plurality of purpose in measuring sustainability and can create challenges within governance networks (Parris and Kates 2003). When assessing the sustainability of cities, Valentin and Spagenberg (2000) state SDIs should be simple (limited number of indicators), directionally clear (terms of sustainability) and sensible (signal process or absence of it). However, others argue SDI implementation is challenging and it is impossible to select indicators that cover all facets of sustainable development within a city, which is why both case study cities only focus on a handful of thematic areas in their strategies (Merkle and Kaupenjohann 2000; Repetti and Desthieux 2006). Klopp and Petretta (2017) state that indicators should be used as guidelines for evaluation and not as definitive measures of progress on complex sustainability issues within

an urban area. When applied within a network formation, Olewiler (2006) suggests that some SDIs are taken as definitive measures and are selected to support a specific sustainability goal which would benefit decision-makers and not necessarily the external stakeholders within the city, which may lead to disagreement and lack of stakeholder buy-in. For example, in both case study cities, a select number of indicators are solely focused on energy efficiency within municipal owned buildings. Although these emissions only represent a very small proportion of the total carbon emissions, the municipalities aim to lead by example. However, such an SDI may not be relevant for other stakeholders, who would not necessarily directly benefit from these changes. Therefore, stakeholder buy-in is critical for SDIs in a governance network.

Cities tend to select SDIs they have data for however, data availability can be a challenge for cities. Thomson (2009) questions whether an indicator for sustainability should be omitted due to lack of data, or if that highlights issue with data collection. Klopp and Petretta (2017) argue that this challenge may be reduced with the new 'data revolution' in cities, specifically the development of 'smart city' approaches to development which may strengthen data collection systems at city scale. This can be evidenced within Glasgow and Copenhagen, as 'big data' and 'smart cities' are key thematic areas for both city's sustainability strategies and projects. However, if data availability is not an issue, the usefulness of SDIs is still questioned by Holman (2009) as indicators are uni-directional; they lack a full understanding of the situation. Furthermore, despite SDIs signaling action, they do not always specify the type of action necessary to address problems (*ibid* 2009). Data availability and clear definitions of sustainable development has resulted in a lack of internationally comparable data and even the regional data utilised by some cities, can ignore the realities on the ground (Leff and Petersen 2015). The lack of data can create challenges for cities, however, if the data is available, SDIs can be more useful analytical tools than the data alone (Segnestam 2002).

2.3.4 Sustainability Strategies within cities: Opportunities and challenges

This section explores the assessment of urban sustainability through the development of SDIs and sustainability strategies within cities. Sustainability strategies are policy documents that

outline a city's strategic plan to measure progress towards sustainability and comprises of a series of indicators to monitor progress towards or away from sustainability targets (Krellenberg et al. 2019). This section identifies the advantages and disadvantages of such strategies, how this impacts a city's international standing and the municipalities ability to influence different stakeholders within the city region. Within this research, the comparative case study approach focuses on the differences of each city's sustainability strategy and respective carbon emission reduction targets as a basis to identify specific features that help or hinder progress.

Sustainability Strategies: Opportunities

Sustainability strategies and indicators can enable assessment of progress towards sustainability targets as well as comparisons with other cities, which can be beneficial for a variety of reasons that have been identified in the literature. The large number of indicators currently utilised by cities highlights the important role they play in assessing urban sustainability (Brandon and Lombardi 2011). Indices can help to inform and gauge each city's future prospects and can be incorporated into long-term strategic planning by providing a high-level view of a city's progress (Moreno and Martinez 2010). This high-level perspective can offer decision makers important insight and guide the development of policies going forward, however, only through more extensive research can cities get a more accurate view of how such policies impact cities progress (Leff and Petersen 2015). That said, Kitchin et al. (2015) argue that indicators form a key basis from which to assess if a strategy is working or not as Franceschini et al. (2007:9) state that a 'strategy without indicators is useless; indicators without a strategy are meaningless'. Sustainability strategies have the ability to increase local government effectiveness and the delivery of key services (Kitchin et al. 2015). Various scholars argue that the design of sustainability strategies should align with the following principles, in order to be effective in assessing urban sustainability, the strategy should be: objective, independent, measurable, accessible and provide relative stability (e.g., by capturing long-term processes rather than short term processes) (Repetti and Desthieux 2006; Li et al.

2009). Overall, SDIs within sustainability strategies can improve the coordination of projects and initiatives within cities (Tanguay et al. 2010).

Sustainability strategies can enable cities to learn from each other's governing process regarding the types of indicators selected and the resulting policies implemented. Similarly, within municipalities, linkages can be created across different sectors and trends between cities can be identified and replicated (Boyko et al. 2012; Hiremath et al. 2013). City benchmarking tends to utilise indicator frameworks as a way to evaluate different aspects of urban sustainability performance (Phillis et al. 2017). Decision-makers tend to use city rankings to understand the performance of cities based on available data; this also enables them to learn more about strategies in other relevant cities (Leff and Petersen 2015). Kitchin et al. (2015) elaborate, stating that comparing sustainability strategies and SDIs within and across cities to establish sustainability performance in comparison to other cities is best practice. As such, this research utilises a comparative analysis approach to explore if Glasgow and Copenhagen engage with, and assess their progress against, other global cities.

In recent years, numerous organisations have sought to measure the sustainability of cities, for example the Arcadis' Sustainable Cities Index (Leff and Petersen 2015). Such benchmarking sets aspirational and competitive agendas for cities and is widely seen as a mechanism to keep municipalities accountable for their decisions and actions (Boyko et al. 2012; Leff and Petersen 2015). Such accountability can give mayors, for example, more leverage to action specific policies if it is perceived as improving international rankings and progressing towards sustainable development (Klijn and Koppenjan 2016a). This is particularly pertinent as the rise of transnational networks such as C40 Cities, ICLEI and Euro Cities seek to benchmark, and support decision-makers develop sustainability strategies (Acuto and Rayner 2016).

Introducing the idea of competitive cities, city comparisons may foster competition between municipalities to improve governing processes in order to meet sustainability targets and promote images of their city as a 'clean and attractive place' for businesses and civil society

(While et al. 2004:2). This reimagining of cities has encouraged the opening-up of urban spaces for new waves of investment, encouraging migration into the city through job creation and offering better quality of life for residents (Keil and Desfor 1996; Balkyte and Tvaronaviciene 2010). The current focus on cities within Europe has given municipalities an unprecedented economic role, thus putting more impetus on issues such as sustainable development, that could further fuel and sustain this growth (Sassen 1998; Sudjic 1999).

Sustainability Strategies: Challenges

At city-level, various challenges have been identified when municipalities seek to develop sustainability strategies. Given that there is no agreed definition on the 'sustainable development' or 'sustainable cities' concept, the discourse around sustainable urban development is challenging when developing SDIs (Springett 2013; Phillis et al. 2017). As a result, quantifying a city's sustainability performance by adopting indicators, can lead to different definitions and outcomes (Leff and Petersen 2015). Many cities in Europe such as Paris, London and Stockholm, have designed and implemented sustainability strategies to guide their development. However, the conflicting perceptions of the sustainable development concept can hinder indicators selection (Holden 2006). Many strategies do not reflect broad consensus on sustainable development and lack consensus on targets and evaluation tools that justify the analysis of a potential SDI (Tanguay et al. 2010). In addition, Krellenberg et al. (2019) argue that many strategies do not include clear (or complete) definitions of sustainable development, lack a clear vision and timeframes. However, within both case studies strategies, cities do refer to the legislative conditions (Glasgow) and national framework conditions (Copenhagen) to ensure alignment with national and international sustainability targets (Klopp and Petretta 2017).

This can be evidenced through governance networks, where stakeholders often have different perspectives of what sustainable development means, making it incredibly difficult to develop a strategy that could be implemented effectively with a city (Brown 2011). Though working with different stakeholders at city-scale can be useful to share experiences, lessons and insights,

reaching agreement with stakeholders can be challenging (Holden 2006). Agreements reached by consensus can put pressure on decision-makers to deliver on sustainability strategies and may lead mistrust and disappointment when stakeholders fail to reach policy targets (Holden 2006; Klijn and Koppenjan 2016b). In addition, whilst cities co-develop sustainability strategies with stakeholders within the city, many data issues with SDIs come to the fore, as most data is collected at a regional level and not necessarily the city jurisdictional boundary (Campbell 1996). Participation within networks to develop sustainability strategies can be beneficial for decision-making, however, Marcussen and Torfing (2007) argue that a lack of certain groups from the discussions can diminish trust and democratic legitimacy in the sustainability outcomes (Klijn and Koppenjan 2016a). Therefore, the sustainability strategies only represent a small number of the population within a city who can influence the policy process to steer towards specific objectives that do not necessarily benefit other citizens (Holden 2006).

In addition, there are no clear guidelines on how to achieve a city that is deemed 'sustainable' and no standardised format for developing a sustainability strategy (Klopp and Petretta 2017). Many international organisations such as C40 Cities, ICLEI and UN-Habitat have provided guidance for best practice sustainability strategies but stop short of calling them a 'template' as they acknowledge the inherent challenges within this. Developing templates is challenging as European cities vary significantly in terms of size, density and urban design (Gustavsson 2009). This is largely due to the rigid nature of SDIs and their inability to fully reflect urban complexity and the many scales on which sustainability impacts are felt within each city (Holden 2013). Developing a blueprint for sustainability strategies that assesses diverse cities by the same criteria would ignore local characteristics that may otherwise offer insight into successful policies and would not necessarily be owned by the city (Eurofound 1998). Becker (2005) proposes an international sustainability strategy framework that can guide and progress stakeholder discussions, ensuring stakeholders are involved in the development of visions, definitions, targets and indicators. Krellenberg et al. (2019) state that comprehensive indicator frameworks are needed for cities, though SDIs need to be somewhat tailored to specific cities

and local contexts, which can hinder comparisons. SDIs utilised within cities lack consistent structure and fail to mention organisations that are accountable to deliver on such policy targets (*ibid* 2019). As a result, clear and accountable leadership is necessary to ensure responsible stakeholders and strategies are implemented effectively (Ricard et al. 2017). Block and Van Assche (2010) elaborate, stating that sustainability strategies should be steered and controlled by strong leadership to ensure accountability, frequent communication with stakeholders and integrated evaluation mechanisms, all of which are explored further within this research.

CHAPTER 3: RESEARCH METHODOLOGY

3. 1 Overview

This chapter details the qualitative research design that has been designed to provide valuable insight into the effectiveness of governance networks on the design and implementation of sustainability strategies in Glasgow and Copenhagen. Initially, governance network theory is justified and then applied in practice. Data collection is then informed by a sequential qualitative approach, blending secondary sources (literature review) and primary sources (interviews) and linking these to a detailed investigation and comparison of each case study city region. Qualitative data is collected through semi-structured interviews of network stakeholders and pilot studies are initially conducted to increase validity of responses. Social Network Analysis (SNA) then employed to categorise and standardise data into a schematic network diagram by mapping and quantifying patterns of connection between stakeholders in each network and project. Ethical and reflexivity issues are then considered for the whole research design process.

As identified by the literature review, this methodology can provide insight for examining the relationship between two variables: the role of governance networks on the design and implementation of effective municipal sustainability policy outcomes. A governance network 'process' is taking place within cities and municipalities have experienced new patterns of activity that transcend traditional political boundaries (e.g., which were comprised of top-down, vertical governance approaches) (Salet et al. 2003). As a consequence, the municipalities, as perceived leaders, have had to come to terms with 'new' forms of governance, managing the change both internally and externally by working with a variety of stakeholders to deliver on their sustainable development commitments. Different cities have used different approaches to coordinate such changes.

3.2 Theoretical approach

This research places governance networks within the governance school of thought as the concept is viewed as a mechanism of governance (as defined by Torfing et al. 2012) as it is a consequence of wider governance shifts such as globalization, introduction of market proxies, pluralism and decentralisation (Kettl 2002; Bevir 2011). This is reaffirmed by a plethora of literature that considers networks as a type of governance (e.g., collaborative, shared, interaction and network) and explores the ways in which governance arrangements are managed at a macro-level (in contrast, policy network analysis emphasises meso-level relations and the solely structural characteristics of networks). In practice, the concept encapsulates significant shifts as governance power is transferred from the state to the local (city) level, where municipalities are collaborating with a variety of stakeholders (private, public and third sector organisations) to make collective decisions on key policy issues. The literature review provides further detail on the governance concept in relation to networks.

The theoretical perspective of governance networks is utilised as an organising framework and key features - interdependence, coordination and pluralism - are applied as a theory that is analysed through sustainability decision-making processes in Glasgow and Copenhagen. Each city serves as a case study to explore the features above and investigate the role municipalities play in demonstrating leadership in the coordination of the network. The objective is to provide an explanation of the potential and constraints of governance networks that are established through a theoretically informed empirical analysis of network-based policy outcomes. Theory employed in this research does not provide an estimate of whether a process is governance or not. Only after demonstrating that network structures may have different effects on the policy process, can a rationale for further developing the governance network theory be justified (Babbie 2010).

Given the lack of an over-arching theory for governance networks, inductive reasoning was not employed as there has been doubt cast with regards to the validity and justifiability of the

principle of induction. Echoing Chalmers (1987:22) argument of the 'naive inductivist' this research asserts that generalisations arrived at by legitimate inductions can only ever be *probably* true therefore developing predictions rather than producing knowledge could be deemed counterintuitive. The exploratory method applied within this research focuses on understanding the role of governance networks within sustainability policy outcomes (Babbie 2010). This approach enabled a exploration of whether governance network theory aligns with network activities and policy outcomes, offering exploratory justification either way and contributing to the governance theory discourse.

Governance network theory is embedded within the research design as other theoretical perspectives and concepts outlined below were not theoretically or practically appropriate to sufficiently answer the research question. Therefore, the justification for governance network theory necessitates the brief exploration of other theoretical perspectives to ascertain why they were not applied within this research.

Theoretical perspectives such as policy network theory were not embedded within this research as many policy network theorists adopted an anti-foundational, nominalist perspective within networks, which shifted focus to 'meanings' and deconstructed even the concept of the 'group' and issues of power (Enroth 2011). This research does not focus solely on issues of power, but also leadership (power is referred to in the context of resource dependency within the network). The latter is only briefly referred to in terms of power and position in this study as these terms are far from clear in a governing network, whereas the concept of leadership can be assessed more easily (Enroth 2011). Thus, leadership is conceived in terms of Ansell and Gash's (2012) definition of 'steering', 'facilitating' and accountability within a network - a core concept within the governance discourse (Rhodes 1996). It is imperative to investigate these concepts by exploring the role of these governance concepts within the policy process and the effectiveness of progressing towards sustainability policy outcomes (Koimann 2003). Scholars argue that governance concepts (e.g., the role of leadership) can enable cities to increase the implementation capacity of an ambitious

sustainability agenda (Khan 2013). However, the research does not aim to discover governance concepts and patterns that can be applied to all public governance networks and systems, but rather investigate localised governance networks as response to global (un)sustainable development - not a 'one size fits' approach (but which nevertheless can contribute to the overall theory development). In addition, this research conceptualises networks as complex settings of mutually dependent stakeholders rather than a series of rules that inform interaction (Klijn and Koppenjan 2016a).

Theoretical perspectives not used within the research include: interpretive theories, as they tend to reject the lingering positivism of other approaches to governance and rational choice theory which focuses on modelling how actors would act if they did so in accord with preferences having a *formal structure*, whereas governance networks are distinctly known to have an informal, horizontal 'fuzzy' structure (Lele 1991; Tanguay et al. 2010). Though this research aims to clarify the network structure by mapping stakeholders and relationships, the research does not attempt to legitimise its formality. Importantly, the research did not adopt theoretical approaches such as interdependence theory, integration theory and governability theory, as they all focus on specific features of governance networks and do not capture the network as a whole. This would limit the research that aims to map all stakeholders involved in the decision-making process and does not focus on one specific entity to examine the decision-making processes within the networks.

Other approaches such as actor network theory, which Latour (2005) argues, is a 'how-to' methodology rather than a theory, is not embedded in this research as it maps relations that are material and semiotic. The theory does not aim to explain why a governance network takes form (rather, it is concerned with *how* it takes form) and actor network perspectives tend to focus on descriptions, often failing to provide explanations for social and political processes. In other words, actor network theory can provide a framework for empirical analysis of organising and stabilizing relationships within networks to ensure they can be sustained over time, but it cannot provide a critical account of this organisation (Callon 1991; Whittle and

Spicer 2008). This research necessitates explanations for policy processes and outcomes to fully understand what features support or hinder the effectiveness of sustainability decision-making within cities.

3.3 Data Collection

3.3.1 Qualitative research design

The qualitative research design provided a framework to gather qualitative data to identify key ties within a governance network, by exploring how these ties could affect policy outcomes in two European cities. Qualitative interview data was transcribed (phase 1), coded (phase 2) to firstly illicit key themes in the narrative and secondly (phase 3) to quantify interview data in order to produce network maps (e.g., social network analysis). The qualitative approach was effective in exploring governance network theory in two European cities. Qualitative data revealed that governance networks are vehicles for stakeholders in the city to share resources (e.g., the inter-dependent nature of stakeholders in networks) and foster a collaborative approach (e.g., cross-sectoral stakeholder engagement) to sustainability decision-making as evidenced in Glasgow and Copenhagen. The research design enabled exploration on how governance networks can enhance the design and implementation of sustainability strategies and identified areas for future study.

3.3.2 Sequential qualitative approach

A sequential qualitative research design was required to identify the implementation sequence of data collection and analysis (Creswell 2003). This research adopted an exploratory approach which consults secondary sources (e.g., grey literature) and collects primary data sources (e.g., semi-structured interviews) for two comparative case study cities (Creswell 2003). The sequential steps are not mutually exclusive, nor are they separate and distinct - each step fed into and informed the following step (Kothari 2004). This approach was specifically useful for developing and testing theoretical perspectives such as governance

network theory, as the key features were embedded within the flow of the research design process as in Diagram 3.

Diagram 3. Sequential qualitative approach (the design, analysis and outputs)

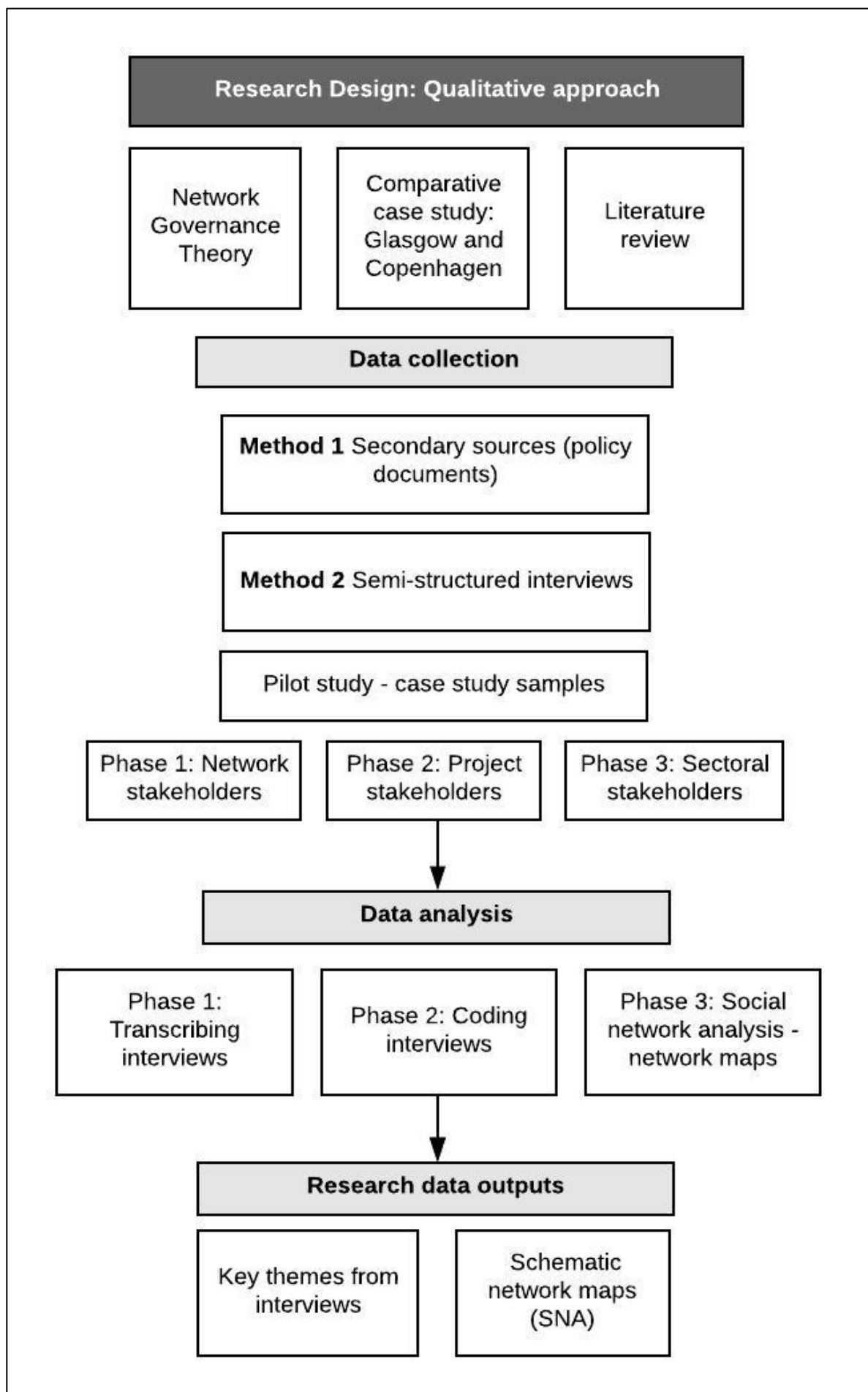


Diagram 3 illustrates the research design process by outlining methodologies employed and the data outputs utilised to answer the research question (Creswell and Clark 2011). The research design enables exploratory approach to the research question. Governance network theory provided an organisational framework for the organisation and flow of the research processes (Cameron 2009). The framework incorporated interlocking research approaches, and informed the literature review, comparative case study selection, semi-structured interviews and data analysis.

3.3.3 Approach to the Literature Review

This section provides an overview of the literature review approach adopted as part of the research design, namely, the selection criteria for inclusion into the study, the types of sources reviewed and detailed how the sources were analysed. The section then details secondary sources (e.g., specific policy and project documents) that have been analysed and compared within each city as part of data collection method.

Within this research study, the literature review provides a context for the research design methodology (Hox and Boeijs 2005). This process contextualises various perspectives on governance networks; it identifies organisations involved in governance networks and the types of sustainability policies developed in European cities (Torraco 2005). Examining literature that addresses related research problems in different European cities requires a sound understanding of the key themes within the governance and sustainability discourse (Russell 2005). The identification of these themes paved the way for the literature review chapter, secondary source analysis (e.g., policy documents) and the primary data collection approach (e.g., semi-structured interviews).

The literature selected was based on a variety of criteria and their relevance in relation the research question and its objectives (e.g., focus on governance network theory, sustainable development and strategizing for sustainability); the thematic priorities within the research provided a clear focus for identifying relevant sources. In addition to relevance, sources had to be from credible journals, publishers and up to date – this varied depending on each type of

data source. Whereas academic publications from the last thirty years provides a rich source of literature which details the transition to governance; it offers a plethora of detailed concepts on how this influences policy outcomes. From this, relevant articles that directly relate to the research question and themes were utilised and analysed.

The research employs a variety of literature to answer the research question as they present a synthesis of relevant information, specifically: journal articles and academic books (e.g., relating to thematic priorities within the research study), organisational reports (e.g., utilised to provide contextual information on stakeholders involved within the governance networks), European municipal publications and policy documents on sustainability strategies (indicators) (e.g., these secondary sources are detailed below). In addition, project websites (e.g., Energy Lab Nordhavn website) and selective unpublished material directly from municipalities (e.g., city-specific documents such as the network's 'terms of reference') were accessed and used (Matthew and Ross 2010). Where journal articles and academic books provided more general, contextual information on the research themes, they provided the point of departure for subsequent primary research (Stewart et al. 1993). Whereas the latter sources (e.g., reports, strategies) provided city-specific data necessary for the comparative analysis necessary to answer the research question. This blended approach ensured a thorough knowledge of secondary information which enhanced the efficiency of primary research efforts and provided a foundation for research design (*ibid* 1993).

Academic literature was sourced through two methods: firstly, the key themes within the research aims and objectives were used as a starting point to identify readings within The University of Oxford's online article database 'Search Oxford Libraries Online' (SOLO). Secondly, specific documents, such as the municipalities' sustainability strategy, Glasgow and Copenhagen policy data and network stakeholders' organisational reports were identified online through relevant organisation and municipality websites. Unpublished materials were provided by the municipality when the researcher approached asking for more information on governance networks. All literature was scrutinised to ensure authenticity as research relies on the correct identification of stakeholders and policies (Kane 1985). Additionally, documents

were critically reviewed, and cross checked to assess relevance of information and data for the intended use as information was originally collected for a different purpose (Stewart et al. 1993).

This section details how the literature was analysed. The literature review analysis initially shaped themes relevant to the research aims and objectives, informing chapter two, the secondary sources (e.g., policy and project documents) and primary sources (e.g., semi-structured interviews). Following this, social network analysis was applied to quantify interview data and map each governance network (Matthew and Ross 2010). The process is detailed the table below:

Table 1: Literature review analysis

STEP	AIM	ACTIVITY
1	Preparing materials for analysis	Collated relevant literature, printing off all materials to enable detailed notetaking. Set up excel database to record literature analysis.
2	Clarity on research question and themes	Clarified the research question and objectives to ensure the review focused on specific priorities and provide a rationale as to why specific data had been collated and how this could contribute towards the research study.
3	Review literature	The review comprised of four stages that were recorded on an excel database. The literature was analysed to: identify the thematic focus/ discourse (by recurring frequency); understand author perspectives and arguments (if any); structure of the text (e.g., identify if focus is one discourse, or if discourses overlap, understand how arguments are structured); and, identify the intended audience (as this provides insight on messaging).
4	Refine thematic areas within the literature	Repeated step 3 as the analysis identified recurring themes that require further investigation (e.g., governance network theory identified key features such as coordination, which was then explored further).

Secondary sources

Secondary sources (e.g., policy and project documents) are examined in detail within this research and are a source of data referred to throughout the results and discussion chapters. The city's sustainability strategy documents and policy sources were analysed to identify recurring themes and policy priorities to understand how the shape of the sustainability and

governance discourse has developed through time and within different cultural settings (Robson 2007). Secondary sources selected for this analysis are detailed in the table below.

Table 2. Secondary sources selection

SECONDARY SOURCE	PUBLICATION DATE	EXPLANATION SELECTION
Copenhagen 2025 Climate Plan	2012	Copenhagen's key sustainability strategy from 2015 – 2025; details all climate targets, indicators and policies developed; focus of the Copenhagen Climate Panel discussions;
Copenhagen 2025 Climate Plan Roadmap 2017-2020	2016	Aligns with the Copenhagen 2025 Climate Plan and provides a comprehensive roadmap for implementing sustainability policies as well as detailing progress towards these using indicators; enables a more thorough analysis of indicators and policy progress.
Copenhagen Climate Projects	2016	Details the practical implementation of projects outlined in the Copenhagen Climate Plan; contextualised EnergyLab; Nordhavn Project; outlined initial progress towards sustainability targets.
EnergyLab Nordhavn Project Brochure	2015	Provides an overview of the EnergyLab project (e.g., aims/objectives); contextualises project within

		Copenhagen; identifies key thematic priorities; identifies project partners.
Glasgow Energy and Carbon Masterplan (ECM)	2014	Glasgow's key sustainability strategy from 2015 – 2025; details all climate targets, indicators and policies developed; focus of the Sustainable Glasgow network.
RUGGEDISED Project Brochure	2016	Provides an overview of the RUGGEDISED project (e.g., aims/objectives); contextualises project within Glasgow; identifies key thematic priorities; identifies project partners.

Publication dates of sustainability strategies and project documents were limited to the last ten years (2009-2019) because governance networks are seen as fluid partnerships with stakeholders changing frequently. Similarly, sustainability strategies tend to be revised, updated and assessed within a five-year period (see City of Copenhagen five-year climate roadmaps). Selecting a time period in this way to assess the governance network enabled the identification of relevant sustainability policies and the current stakeholders within each network and their potential influence on the design and implementation of the city's sustainability strategy.

The comparative case study approach warranted an in-depth analysis of each city's sustainability strategy. This analysis covered step 1-4 in Table 1 (above) in a separate excel database from the main literature review analysis. The sustainability strategies and project documents were then analysed further to identify: the municipality's thematic priorities (e.g., frame the city's focus), policies introduced within the plan(s), indicators selected (as direct evidence of policy implementation); stakeholder engagement processes in the design and implementation of the strategy; and, each city's sustainability targets (carbon reduction targets). These elements were then linked to each city's governance networks and projects.

Secondary sources were then cross-checked and compared to identify similarities and differences in sustainability strategies and projects in Glasgow and Copenhagen.

3.3.4 Primary data sources

Based on the literature review and secondary sources analysis, primary data was collected by conducting forty-two semi-structured interviews with relevant and knowledgeable participants (at a network, project and sectoral level). Research participants were purposefully selected because of their involvement and role with each governance network, relevance to subject and experience in post. Participants were researched in advance and selected because they were confirmed as formal nodes of information and were perceived to be in a position to provide informative responses for this specific research (Hox and Boeijs 2005). The research participants were selected from a preliminary list of stakeholders representing organisations within governance networks in Glasgow and Copenhagen, which was informed by the literature review. Though appropriate for this research, the purposeful sampling approach can be prone to researcher bias, as the researcher applies their own interpretation of which participants' they think hold valuable information. To reduce this bias, within all interviews, the researcher asked participants to suggest other stakeholders that may be able to contribute to the research study. Preliminary research identified that both governance networks consisted of high-level (e.g., elite) individuals, such as senior officials and director-level stakeholders, therefore the researcher undertook elite interviewing training course at The University of Oxford (completed June 2017) to ensure appropriate dialogue and engagement.

The content of interview questions was informed by the literature review and secondary sources (detailed above), including communication-related open questions regarding specific organisational information and ties. These questions combined free recall, suitable for identifying relationships as well as recognising organisations from a preliminary list (or prompted by the researcher) to find weaker ties (Ferligoj and Hlebec 1999). The characteristics and frequency of communication between stakeholders were recorded on a weekly, monthly, quarterly and 'less frequent' basis. Bernard et al. (1982) support this methodology, claiming

that despite the reliability of communication frequency measures to be relatively low, numerical scales of frequency can improve the reliability when asking participants to identify their ties with other stakeholders. The frequency enabled participants to recall their ties that were then converted into a binary data set for both governance networks in Glasgow and Copenhagen. This was followed by a mixture of open and closed questions on key features and their role in formulating sustainability strategies at municipal level. Open-ended questions are constructed in order to elicit additional themes, allowing further enquiry on the initial questions. Closed questions ensure thematic responses are consistent between case studies, allowing comparison of the networks and stakeholders. The questions on interests and motivations focused on what each stakeholder was hoping to achieve participating in the network process and why. The themes were recorded as directly related to each municipality's own sustainability strategy. Both the network data and the policy information (e.g., progress towards climate targets) were derived from the interviews. Where possible, documentation enabled confirmation of some specific network ties which were reported by one stakeholder but where the other did not.

Semi-structured interviews represent a suitable method for data collection as the 'non-standardised' approach is beneficial for exploratory research such as explanations as to how network dynamics effect policy outcomes (Patton 2003). Despite various standardised questions asked, interview themes were utilised as they enabled the researcher to adjust their approach depending on the interview process and dynamic with each participant. The qualitative data collated from the interviews were cleaned (e.g., incomplete data removed), analysed and coded. However, responses were not coded in pre-determined categories due to the exploratory nature of the research question, but rather, categories were determined following the data analysis process. The coding process was based on the assumptions and interpretation of the researcher, thus, to ensure reliability, for each participant's responses, once the core themes for each question had been identified, the researcher ensured empirical evidence was available that could back up and justify the claim. This was a time-consuming

process tracing code to the preliminary response data but increased the validity and robustness of the results.

Data confidentiality was maintained and required that some data made available within the research study was to be purposely altered (such alterations have been highlighted where appropriate) as it may have been possible to identify participants (with reasonable probability) given the small sample for each case study (Hox and Boeije 2005). Thus, different names and random numbers have been selected instead of acronyms, to reduce this possibility and conform with Oxford University's data protection and ethics standards.

3.4 Case studies

Comparative case studies were employed as they provide a detailed and holistic study contained within clear geographical boundaries of a city (Hakin 1987). The data and clear research boundaries are of particular value when exploring how and why governance networks effect policy outcomes (Yin 2014). A case study approach was utilised as it offered what Robson (1993:53) described as:

'A strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence.'

Various sources of evidence enable a more richly detailed and precise account of processes at work within a network, allowing the research to be conducted within reasonable logical parameters (Hakin 1987; Creswell 2011). Examining Glasgow and Copenhagen as comparative case studies permits the researcher to compare and contrast processes with greater resolution. It allows exploration of why processes are in place and to offer an opportunity to share best practice (Seawright and Gerring 2008). Case studies are useful for analysing the policy process, illustrating casual links and exploring the flows of resources towards developing policy outcomes.

3.4.1 Comparative case study approach

Chapter one outlined the comparative case study approach and justified its application within this research study. This chapter embeds the comparative approach within the research methodology. A comparative analysis is an effective qualitative tool and offered a rich understanding of the situation analysed within each network: illustrating how and why communications operate in known instances of sustainability decision-making (Zartman 2005; Bartlett and Vavrus 2017). Within this research, the term 'comparative case studies' is defined as the exploration of key similarities and differences within each city's governance network approach (each 'case'), in order to provide analytical insight on the practical application of the theory (UNICEF 2014; Bartlett and Vavrus 2017).

Comparative case studies are an appropriate research methodology for this study as it engages two logics of comparison: it enables contrasting and comparing between two municipalities as well as processual logic that identifies features of each network over a five year period within a specific geography (e.g., city scale) (Bartlett and Vavrus 2017). The approach is informed by a critical look at governance network theory and incorporates issues of power within each case study - theoretical underpinnings are central to comparative case studies (*ibid* 2017). Therefore, within this research, comparative case studies involve a comparison of governance network theory application through the perspective of stakeholders involved in such networks. In addition, comparative case studies are process orientated which aligns with the research question of the role of governance networks in shaping sustainability policy outcomes, and what processes connect governance networks and sustainability decision-making (Maxwell 2013:31). The benefits of the comparative case studies approach enable the researcher to identify the policy process within a network as well as decision-making across different sites and scales (e.g., at a local, national and international level) and the power dynamics inherent within such geographies. Mapping social relations can be complex - comparative case studies permit the researcher to extend beyond the confines of the pre-defined networks to explore alternative decision-making arenas and their role in shaping

sustainability policy outcomes, providing a deeper understanding on how such practices can be made more effective, which is central to the research question.

Comparative case studies: Type

Within the research, critical case studies were deliberately selected research for detailed empirical analysis as both urban systems have similar features - governance networks for sustainability decision-making. 'Critical' case studies were utilised as the research purposefully selected both cities as they both met key criteria for inclusion into the research study (they were pre-determined cases). For example, both cities had networks that were comprised of stakeholders from a variety of sectors, with the sole purpose of progressing towards the city's climate targets as outlined in their respective sustainability strategies (Flyvberg 2006). Thus, it was very likely that such networks were indeed governance networks as other networks explored were not cross-sectoral (e.g., only one sector represented) or focused on specific area of the city's sustainability strategies (e.g., energy generation) rather than a holistic approach.

The comparative case study provided a setting in which on one hand there were key similarities in each governance network which enabled governance network features to be examined and brought together different contexts into the same analytical frame. Whereas on the other hand, there were variables exposed that resulted in a range of different urban outcomes (e.g., different climate targets, governance processes, stakeholders represented within the network, etc.). The results from this evaluation may provide regional generalisations that can further our understanding of governance network theory.

Comparative case studies: Role

The relative newness of the governance network theory necessitates a comparative case study approach to further refine and develop the theory as it can help to develop new understandings of the different urban systems. Building and revising theory from different starting points

(cases) with a range of different urban outcomes (a 'third term' of comparison) can offer the insight and understanding that wouldn't be possible with one case study (Jacob 2012). As such, one case study cannot be used to confirm or falsify a theory, however two critical case studies can provide regional insights that can further contribute to the governance network theory. Originally, urban studies focused on a small number of 'global cities' or set of 'global city functions' that frequently dominated the literature, whereas this research shifts away from that and contributes to a newer concept of governance networks within mid-sized cities that are traditionally not examined as closely within the literature, in order to identify new insights (Sassen 1994). Mid-sized cities make up the majority of cities within Europe, with 44% of all urban inhabitants in Europe living within them, yet they face challenges addressing sustainable development due to lack of resources, assets institutional and organising capacity (Giffinger et al. 2007). Thus, the comparative case studies can provide located insights that may be applicable in other similar sized cities.

Comparative case studies: Process

The urban comparative case studies selected have similar and different features that are examined within the research. Both Glasgow and Copenhagen have similar characteristics such as their governance network approach, flagship projects selected and wider city context (e.g., history, demographic, industries, etc.). However, there are differences within each urban system, such as the level of sustainability ambition and the sustainability strategies adopted. More generally, in Scotland and Denmark, each case study has slightly different governance (political parties) and economic structures at both the national and local levels (e.g., Scottish local government have limited powers; Danish local government cover 90% of expenditure and have more power). The similar features enable us to understand where and how these differences appear and account for different network outcomes. The different features provide the grounds for conceptual innovation as we seek to understand the processes and variables that lead to different network outcomes (Robinson 2016). Both the similar and different features are examined within the same in each governance network. The limited scope of this analysis

primarily focuses on comparing governance network theory in practice and is utilised to examine the informality of governance arrangements in a network characterizing both government institutions and their external partnerships in two different case studies (Robinson 2016). Exploring these different and shared processes across various urban systems (cases) furthers our conceptualization of the governance network concept (Savitch and Kantoor 2004).

Comparative case studies: Boundaries

Within any case study approach, it is necessary to identify clear research boundaries (Heath and Street 2008). Yin (2014:33-34) agreed with this approach, stating that, 'bounding the case' was necessary to inform the appropriate research methodology (e.g., type of data and analysis). Comparative case studies were specifically constituted of theoretical constructs (governance network theory) and empirical units (three key features of governance networks, as well as concepts of power, leadership and accountability) which enabled the theory to be deeply embedded within the research, providing clear variables of comparison between municipalities in Glasgow and Copenhagen (as outlined in the chapter one). Developing case study boundaries adheres to a positivist logic approach which aligns with governance network theory. Similarly, Miles and Huberman (1994) and Creswell (2013) also contend that research boundaries (e.g., bound by time, activity or context) is necessary to clarify as the empirical units can strengthen and enhance case study research. Although this research pre-defined such units (e.g., specific networks in each city over a five year period, exploring sustainability decision-making), it did not seek to create a 'closed system' that could potentially risk foreclosing analysis of how other stakeholders and entities affect sustainability decision-making (Bartlett and Vavrus 2017). But rather, adopted a flexible approach by creating clear time, activity and context variables. Limiting case study boundaries ensured that different levels of decision-making could be considered, as well as relations of power between specific stakeholders or entities that were indirectly linked to networks and projects within each city (*ibid* 2017).

3.4.2 Glasgow and Copenhagen

Case study selection: Justification

Both Glasgow and Copenhagen represent a population of similar sized cities evident throughout Europe, those municipalities are adopting similar network approaches towards governing sustainable development within their respective urban regions (Seawright and Gerring 2008). Each case study has a similar variable, such as: population, economic conditions, mature representative democracies, facing similar climate problems as coastal cities but differ in that they have different thematic climate targets (sustainability strategies) and roadmaps on how to achieve sustainability (e.g., project development and implementation). The following section provides a context for the governance networks and projects in Glasgow and Copenhagen.

Case study selection was based on the specific properties of each case and their respective similarities and differences. Glasgow and Copenhagen were compared by utilising a specific theoretical study. For example, both cities had employed governance networks to enhance sustainability decision-making (e.g., Sustainable Glasgow and Copenhagen Climate Panel), however, network outcomes (e.g., sustainability targets) differed in each city. This research seeks to compare and contrast the key factors within each governance network process that potentially contributes towards these different outcomes. Focusing primarily on the city network perspective and internal network formation, stakeholder interaction, features of governance networks (characteristics) and management, the research also explores relevant external factors too, and explores the city in relation to other levels of governance (e.g., national, international), stretching beyond the physical extent of the city (Robinson 2005). Within this research, the comparative case study approach offered many benefits such as reduced researcher bias as the two case studies had different localised contexts were examined under the same conditions, using the same methodology which provided scientific evidence and enabled a narrative to back up key findings. The narrative in particular, can provide insight into the complexities and contradictions of sustainability decision-making in practice.

Case study context

Themes identified from the literature review analysis inform the comparative analysis between Glasgow and Copenhagen. Sustainable Glasgow is an initiative within Glasgow City Council that created the non-incorporated network in 2010. The network consists of over ten stakeholders. The initiative is embedded within the resilience council team and reports to the Leadership Council Administration. It defines itself as a 'partnership of the willing', as selected stakeholders have the option to join and actively participate towards supporting Glasgow meet its sustainability targets. The City of Copenhagen has a different structure - sustainability strategies are the remit of the 'Technical and Environmental Administration' within the municipality, led by the Mayor of that administration (hereafter TE Mayor). The Mayor of Copenhagen, who leads all seven administrations, has also emphasised the importance of sustainability for city-wide economic development. In 2015, the administration created a network, the 'Copenhagen Climate Panel' to engage with less than ten stakeholders and feedback into the 'Copenhagen 2025 Climate Plan'. The stakeholders must meet specific criteria (e.g., expertise) to be included within the network.

Glasgow City Council developed the Sustainable Glasgow network in 2010 with the aim of making Glasgow 'a world leading centre for sustainable policy, innovation and action' (Bellingham 2010). The council-led initiative invited a limited number (under 10 participants) high-level partners from business and enterprise, universities, public sector agencies and communities. The network supports a diverse range of sustainable development focused projects, that improve the quality of life for citizens, boost the city's economy and protect the environment (*ibid* 2010). One of the projects supported by the network, RUGGEDISED, is a smart city project funded by Horizon 2020 programme. The project works in partnership with businesses and universities to combine energy solutions to design smart and resilient cities, by focusing on a specific area (street) within Glasgow (RUGGEDISED 2017). The project was selected for this research as many partners involved in the Sustainable Glasgow network are

directly involved with RUGGEDISED project, it is the most current project being implemented and deemed significant in the delivery of the city's sustainability targets.

The Copenhagen Municipal Council initiated the Copenhagen Climate Panel in 2014, with the aim of transforming Copenhagen into a greener city with a higher livability and sustainable urban mobility (City of Copenhagen 2018). The panel was largely driven by the then Mayor of Technical and Environmental Affairs (TE Mayor) vision to draw on networking within and between cities, in order to inspire and learn how to implement sustainability strategies (or plans) towards ambitious climate targets. The panel was comprised of a small network (less than 10 people) of invited key stakeholders within the sustainability sector in Copenhagen, partners ranged from CEOs of large corporates, universities, third sector organisations and environmentally focused think tanks. The stakeholders worked closely with the municipality to advise and build on Copenhagen's 2025 Climate Plan leading the city to become the first carbon neutral capital in the world by 2025. Many stakeholders involved within the panel also supported the Nordhavn Energy Lab Project. The large-scale project aims to contribute to developing a future smart energy system that integrates multiple energy infrastructures in an area (street) in Copenhagen. The project is funded by a Danish public grant scheme and the most current project being implemented and seen as a lighthouse project in the delivery of the city's sustainability targets.

To summarise, Glasgow and Copenhagen represent a sample of similar sized cities within Europe facing similar sustainability issues and facilitate exploratory insight regarding how municipalities can effectively govern sustainable development at city-level.

3.5 Pilot Study

Small-scale pilot studies were conducted within Glasgow and Copenhagen in August 2017 as they are a crucial element in research study design and can increase the likelihood of success in the main research study (Teijlingen and Hundley 2002). This section addresses the functions of the pilot study, the advantages and disadvantages of utilising the methodology and how

such disadvantages can be reduced, as well as key learnings that were applied to the main study.

The main function of the pilot study was to examine the recruitment processes for stakeholders; assess the researchers' skill and approach when elite interviewing; and, examine the data collection and data analysis methodologies in advance of the main data collection stage (Holt and Walker 2009). The exploratory nature of the research required pilot testing to assess and amend the wording and length of qualitative interview questions, to ensure stakeholders understood what was being asked. From each case study network and project, a small sample of stakeholders were selected (four in total) as the available research participants in both the networks and project interviews were relatively small (5 - 10 participants' in each). Stakeholders were selected based on the sectoral representation within each network and project (e.g., where there was more than one stakeholder in each sector, that could be interviewed). This was to ensure that if the pilot study interviews did not gather relevant information required for the research study, there was still other sector specific stakeholders that could be interviewed.

Pilot studies were conducted both face-to-face and via Skype, both approaches were adopted throughout the research study.

Conducting a pilot study was necessary as it grounded the researcher's theoretically derived understanding of the subject and offered a practical sense of the domain within which the phenomenon is situated in order to develop a deeper understanding (Kezar 2000). The pilot study enabled the researcher to refine their approach to data collection by training them in a relatively new element of the research process whilst simultaneously collect preliminary research data. Importantly, pilot studies tested the adequacy of the research instrument and feasibility of research questions within different cultural settings to assess differences in the perceptions of questions in the UK and Denmark (Holloway 1997). Specifically of interest to this research study is that the approach identified local politics and problems that could have

affected the research findings (e.g., how sensitive questions are asked, such as relationships with, and opinions of, other stakeholders).

Pilot studies highlighted limitations that must also be considered. In general, using a small sample size increases the risk of assumptions that are made on the basis of pilot data (Matthew and Ross 2010). This may result in changes to the interview questions for example, but which do not benefit all participants per se. To overcome this, the pilot study sample size in comparison to the total number of participants interviewed was relatively high, as one interview for each case study (Glasgow and Copenhagen) and interview type (network or project) had to be conducted. This enabled the researcher to fully grasp the interviewing technique and make amendments to interview structure and questions. However, the researcher had to carefully consider the extent to which this process of piloting influenced the size of the intervention effect, to ensure data was not contaminated (Holt and Walker 2009). It would not be possible to exclude the pilot study participants, and this would result in too small a sample of research participants. Therefore, data from the pilot study was included in the main result - this was largely due to the changes made following the interviews which were minimal, structural amendments and not necessarily altering the core focus or themes within the interview itself (Robson 2007). Scholars such as Holloway (1997) argue that the contamination of data tends to be less of a problem in qualitative research as researchers frequently adopted a similar approach by using some or all of their pilot study data as part of the main study, as it still offers valuable insight for the research question.

The key learnings from the pilot study are detailed in table 3 below.

Table 3: Key learnings from pilot study

FUNCTION OF PILOT STUDY	AMENDMENTS & KEY LEARNINGS WITHIN RESEARCH STUDY
Test researcher's interviewing skills	• The initial discussion with the research participant was amended as the introduction to the study largely focused on theoretical underpinnings of the research and not necessarily how the knowledge could be beneficial to the participants. The word length of the introduction was reduced and provided verbally to the participants at the start of the interview (as well as participant information sheets provided prior to the interview). This enabled the participant to quickly understand the aims of the research study and how the findings could be useful for them. • The researcher identified that participants assumed a specific level of knowledge regarding the specific networks and projects they were affiliated with, therefore the researcher encouraged the participant to explain phenomenon and provide examples of processes and relationships. • The researcher also identified that participants tended to talk in a personal capacity and not an organisational capacity, therefore interview questions had to be tweaked to ask the participant in the appropriate capacity.
Participant's recruitment	• Where possible, the researcher sought introductions from research participants - this was sometimes necessary as high-level individuals were relatively difficult to access and had limited time available.

FUNCTION OF PILOT STUDY	AMENDMENTS & KEY LEARNINGS WITHIN RESEARCH STUDY
	• It was necessary to contact research participants numerous times before confirming an interview with them.
Interview questions	• Questions on the level of engagement with each stakeholder was amended as initially the researcher had asked to 'number' the relationships depending on the frequency of engagement. However, participants were uncomfortable with this. Instead the researcher asked participants to describe the relationship and in the analysis stage, placed a numerical value on the relationship type. This approach elicited fewer abstract responses. • The questions on coordination were tweaked to not mention 'conflict' within the decision-making process, as participants did not want to be seen to be engaging negatively with other participants instead asking to provide examples of when a decision hasn't been made, etc. • The last question was left open ended as it offered the participant a chance to focus on specific <u>areas</u> they deemed important.
Data analysis	• The initial database utilised was insufficient for the relationship mapping and it was not possible to label and profile each stakeholder in the maps, thus another software was utilised. • Many of the responses to questions were thematic and not necessarily relationship orientated as initially thought. This

FUNCTION OF PILOT STUDY	AMENDMENTS & KEY LEARNINGS WITHIN RESEARCH STUDY
	altered the data analysis approach as maps were changed to be thematic orientated.

To summarise, the pilot study enabled the researcher to obtain ‘real world’ experience and reframe the interview questions and analysis process, whilst also collecting valuable primary data. The process highlighted numerous amendments outlined in the table above which further refine the research study design.

3.6 Social Network Analysis (SNA)

Social Network Analysis (SNA) methodology enables the researcher to create network diagrams by mapping, quantifying and analysing the patterns of connection between various stakeholders (Scott 2015). This methodology maps the set of ties and nodes between stakeholders, developing a network structure and analysing the positions and dynamics between stakeholders within the network (Snijders et al 2010). This research explores socio-centric networks by creating a clear set of criteria from which to assess an organisation’s inclusion or exclusion into a network. Hence, networks are viewed as ‘closed systems’ with ‘measurable regularities’ within this research (Sayer 1984:129). This approach facilitates the identification and coordination stakeholders, flows of information and the analysis of resource allocation (Bodin and Crona 2009). The methodology is utilised within this research to firstly map stakeholder interactions, and secondly, to identify stakeholders’ thematic priorities within the governance network, by converting the qualitative data from semi-structured interviews into quantitative data (Shah and Mehta 2017). SNA offers diagnostic insight into how new connections are developed and is an important variable in the ‘success of environmental governance’ (Scott 2015:1). The approach focuses on collecting data for a smaller sample of the population that are wholly inter-dependent. This is counter-intuitive to other methods that

utilise larger population samples by surveys and assume a level of independence of stakeholders (Scott 2011).

3.6.1 SNA and Cytoscape

In order to analyse networks, network theory was applied to assess the stakeholders' cohesiveness, patterns and the location of central stakeholders that influence, regulate or lead flows of information and connections (Wasserman and Faust 1994). This methodology can transform complex webs of stakeholders involved in decision-making into maps (e.g., nodes represent organisations or themes, with links showing relations and flows between the nodes). SNA permits the use of nodes (points) and edges (lines) to convey a meaning or relation between two phenomena. Network theory enables the researcher to focus on the whole network within each city, explain leadership, analyse status structures, flows of information and stakeholder thematic priorities. SNA methodology and network theory are particularly useful for examining goal-directed organisational networks (Scott 2015). In Glasgow and Copenhagen, progressing towards sustainable development is taken to be a mutual goal for everyone, and within a distinct network identity, a form of governance is necessary to ensure that participants engage in mutually supportive action, ensuring resources are acquired and used effectively (Snijders et al 2010).

The classification and categorisation of data into a standardised form is required to computerise data into Cytoscape, which is compatible with algorithms from SNA. Cytoscape is an open source software platform and was selected for visualising networks as it can be integrated with any type of data (e.g., Excel) (Shah and Mehta 2017). The software provides a large set of layout options to enable various network visualisations enabling analysis of data sets (*ibid* 2017). It provides a common and extensible language for the analysis of relations between entities and themes, as well as metadata attached to each entity and relation (e.g., the ability to profile each stakeholder). Cytoscape's basic set of features for data analysis can be applied to all network and project maps in this research study, which can be found in the Results chapter.

3.6.2 Coding process: Core themes and network maps

Interview questions were used to derive simple numerical values in a researcher driven coding process that fed into the research design. The coding process consisted of interview participants responses mapped on Excel which was coded in four phases. The core themes were deduced from the data, in line with governance network theory. The four phases included:

- Phase 1: Data cleaned (reduced and organised); discard irrelevant information; identify preliminary long list of quotes
- Phase 2: Data filtered; terminology check; overarching themes identified; stakeholders identified
- Phase 3: Data filtered; themes refined further; examples to support themes identified
- Phase 4: Final core themes identified and compiled into 'results' table; short list of quotes to evidence themes.

A result excel sheet compiled all of Phase 4 data from the interview participant's responses for each research question. Adopting Babbie's (2001) approach to ordering data and results, all responses were analysed for patterns and numbers assigned to core recurring themes mentioned frequently by participants (e.g., first order themes, second order themes). The numerical value corresponded to the frequency of the recurring theme and not necessarily to the value of the response itself. This process involved understanding the core themes that emerged from the empirical data and to examine their alignment with governance network theory. The coding process (Phase 2) also identified stakeholders that each participant mentioned and in what context, the relationship was then assigned a specific numerical value that was used to describe the relationship. This enabled the network structure to highlight stakeholders around specific themes and provided insight into relational ties when the dataset was entered into excel form then the Cytoscape platform.

The main disadvantage when using coding as a data analysis methodology is mis-classifying empirical data to support one's argument and align with researcher bias (Babbie 2010). In Phase 4 of the coding, every interview answer was assigned a numerical value to ensure all responses are represented allowing patterns to be identified and justified. This research takes heed of Berg's (1989) advice that these risks can be avoided by providing examples for any assertion made about data (as addressed in Phase 3) as well as reporting inconsistencies and counterarguments.

Twenty-six SNA diagrams in total were produced from which eighteen were selected as they provided insight that could help answer the research question. In both networks and projects the diagrams for the key features 'coordination' were not utilised as the research findings concluded it did not occur as frequently as anticipated, similarly, 'leadership' diagrams did not offer additional insight that was not gained through interview data.

Network maps type: Interaction

Within networks, important concepts for acquiring insights on relationships are the frequency (e.g., contact between stakeholders) and variety of interactions (e.g., projects, memberships). Analysing the network maps with these concepts provides a deeper understanding of the network and enables the researcher to distinguish between stakeholders' positions within the network (Klijn and Koppenjan 2016a). This research has adopted a qualitative impression of interactions based on a limited inventory of stakeholders involved in the networks and projects. The inventory of the frequency and variety of interactions was developed following an initial analysis of the qualitative data within the interview transcripts (e.g., the researcher examined the qualitative impression of interactions between stakeholders).

Based on the interview transcripts the information was then quantified, as detailed in the table below:

Table 4: Network map type - Frequency and variety of interactions between stakeholders

FREQUENCY OF INTERACTION (1 = FREQUENT, WEEKLY AND 3 = INFREQUENT, QUARTERLY)	VARIETY OF INTERACTION	JUSTIFICATION
1	Funder / Member / Official partner	Funder - Close affiliation with funders as high-level of dependency on and accountability to funding stakeholders (e.g., reporting, bid writing, legal commitments, etc.) Member - Official member (either paying or contractual), suggested level of mutual benefit and time commitment to make interaction worthwhile and valuable (e.g., frequent contact with host organisations and other members). Official partner - Public agreement to collaborate, differs from project work as partners necessitate collaboration due to the nature of their daily work activities
2	Projects and initiatives (current)	Projects currently ongoing suggested a level of time and interaction commitment with other project partners, however this varied per stakeholders as they all have different roles and outputs, thus was deemed '2' as there was a distinct level of commitment and interaction required from all regardless of roles

3	Projects and initiatives (past)	Projects in the past suggested a level of familiarity with stakeholders that previously interacted together, some of which still interact on other projects or initiatives, but more often than not, interaction was relatively infrequent
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For stakeholder interaction research questions, all participants were examined using the same frequency and variety of interaction inventory, this resulted in a cross-tabulation (in excel) with stakeholders on both axis x and y, quantifying the intensity of interaction between two actors placed in a cell. The cross-tabulation was then transferred into simple tables in another excel spreadsheet that was compatible with Cytoscape software.

Network maps type: Thematic

Research questions focused on the ‘inter-dependent’ nature of governance networks, specifically, the resources provided and received by stakeholders within the networks and affiliated projects. Therefore, this network map focuses on thematic responses by participants and not necessarily interactions between them. The SNA approach was utilised for thematic priorities as they enable the researcher to identify recurring themes within the data, illustrating how each stakeholder rates their relative importance and profile stakeholders to understand their priorities and how this could influence interaction within the networks.

Table 5: Network map type - Thematic areas rated by stakeholders

The table below identifies the specific network maps for each case study, focusing on interview question sections.

GLA + CPH NETWORK	THEMATIC AREAS	GLA + CPH PROJECT	THEMATIC AREAS
Theme 1: Inter- dependency (resources provided)	People's time; knowledge; contacts; rule setting; partnerships	Theme 1: Inter- dependency (resources provided)	Funding; time; information / knowledge and materials; partnerships; new technologies
Theme 1: Inter- dependency (resources received)	Collective commitment; sharing knowledge; insider council knowledge; international links; influence decision- making; nothing	Theme 1: Inter- dependency (resources received)	Knowledge; partnerships; funding; technology
Theme 3: Pluralism	Public sector; private sector; third sector	Theme 3: Pluralism	Public sector; private sector; third sector

The table below identifies the specific network maps for each case study, focusing on interview question sections.

Table 6: Network map type for each case study network and project

GLA + CPH NETWORK	TYPE OF NETWORK MAP	GLA + CPH PROJECT	TYPE OF NETWORK MAP
All network stakeholders map	Interaction	All project stakeholders map	Interaction
Theme 1: Inter-dependency (resources provided)	Thematic	Theme 1: Inter-dependency (resources provided)	Thematic
Theme 1: Inter-dependency (resources received)	Thematic	Theme 1: Inter-dependency (resources received)	Thematic
Theme 3: Pluralism	Thematic	Theme 3: Pluralism	Thematic

Diagrams of networks and themes enable the researcher to relate specific interactions within the networks and provide explanations for such interactions as well as provide recommendations for how relations could be improved to potentially enhance the sustainability decision-making process. For all network maps, relationships were evidenced through different ties, with a line equating to a strong relationship / frequent engagement more than once a month (rated 1), a broken line equating to a good relationships (semi-frequent engagement, less than once per month) and a double line for weaker relationship (infrequent engagement).

SNA limitations and implications

A variety of limitations of SNA were identified, evaluated and where possible addressed. Hoppe and Reinholt (2010) highlighted potential SNA limitations, such as the ability to draw conclusions from incomplete data, oversimplification of analysis and the incorrect interpretation of network measures. In addition, de Brun and McAuliffe (2018) argued that networks cannot account for influence beyond the network itself, therefore it is unlikely that network maps

capture the full extent and influence of all relevant stakeholders. To address such limitations the research interviewed the majority of network participants, evaluated the descriptive maps alongside exploratory data detailing why interactions and relationships existed. In addition, the research detailed empirical data as evidence for interpretations and assumptions as well as interviewing sectoral stakeholders to understand participants influence beyond the network.

This research utilised network maps as a descriptive tool in order to identify stakeholder interactions and priorities. The implications of this methodology provided illustrative diagrams as way to describe such relations, which was integrated with exploratory qualitative research data on why specific relations existed (e.g., stakeholders were able to explain their relations with others and were asked about network functionality and effectiveness) (de Brun and McAuliffe 2018).

3.6.3 Summary

The methodology utilised enables the researcher to identify stakeholders' thematic priorities as well as map the set of ties and nodes between stakeholders, developing a network structure. The SNA process identifies the coordination of stakeholders, flows of information and the analysis of resource allocation that can enhance our understanding of the role of governance networks in designing and implementing sustainability strategies (Bodin and Crona 2009).

3.7 Ethics and reflexivity

Within any research study it is necessary to consider ethical implications, barriers to research and reflexivity during the research process. The researcher's ethical standpoint, behavioural impact and theoretical perspective has be continuously considered, monitored and refined throughout the study (Horsburgh 2003).

3.7.1 Ethical considerations

All secondary sources have been checked to ensure direct relevance for the research and from peer-reviewed sources within a reasonable publication date for the respective topic (Kane 1985). The research process has considered the relevance and sourcing of secondary sources throughout and has revised all articles for updates during the write-up stage.

With primary sources, all participants were briefed on the research objectives and were asked if they consent to information given. As a default, all participants remained anonymous - as they were commenting on political processes and policies as well as professional relationships and opinions of other stakeholders (e.g., both individuals and organisations). Furthermore, participants were briefed on the possibility of their information being used in a second study, as once study is submitted to the University of Oxford, data can be made available to other researchers (Hesse-Biber 2010). Ethical issues can arise when conducting network analysis regarding consent, as the interviewed participants can provide individual consent but cannot speak on behalf of the organisation as whole, nor consent to other stakeholders in the network (Borgatti and Molina 2005). This was overcome by clarifying the position of the participant (e.g., whether they responded in a personal capacity or in an organisational capacity) and where appropriate, clarified the participant's stance in the results as this provided insight regarding the capacity of involvement within each governance network. Regarding relations between other organisations, dynamics and motivations for involvement in the policy processes, both confidentiality and anonymity are imperative - participants have been assured anonymity. However, some organisations type may be identifiable through interview responses (though not through explicit identification by the researcher). No personal information about the participant or the organisation has been included in the research findings.

Due to the nature of the research study, for the networks and projects in each case study, participants selected were largely high-level individuals. This research defines high-level individuals as having a 'privileged position in society [who are] likely to have had more influence on political outcomes than general members of the public' (Richards 1996:199). Interviewing

high-level individuals (elite interviewing) requires preliminary research as there are various advantages and challenges when approaching such participants, for example: accessibility and sample size, reliability of responses and power relations. By definition, high-level individuals tend to be less accessible than other stakeholders due to their schedules and work commitments. This presented a challenge for the research study as long lead in times were required between initial contact with the participant and conducting the interview. This was overcome by planning ahead and contacting such individual's months in advance (as well as sending numerous reminders). The duration of interviews was limited to between thirty minutes to one hour, depending on the participants' availability. There was a strong willingness to partake in the research study, this was evidenced by many participants offering time before and after work or during lunch hours to be interviewed, therefore the researcher had to remain flexible with timescales. Due to such timescales, the researcher developed a one-page summary of the research and its aims in a non-academic context (e.g., how the findings could be applied to the participants work) to obtain buy-in from the participants and build rapport within a short timescale.

Within the research study, sample sizes tended to be smaller due to the nature of the research which focused on one governance network in each case study city. Thus, the researcher could not obtain a complete representative sample. To overcome this, where possible, the researcher sought different viewpoints on each governance network from sectoral stakeholders and asked all participants to confirm or deny relationships between one another. Additionally, high-level research participants tend to provide a very subjective account of their involvement within a network or project, thus the researcher aimed to provide insight into the 'mindset' of stakeholders that play an active role in shaping society. This method benefited the research question as it helped to interpret personalities involved in the relevant decisions and explained the outcomes of specific discussions.

Power dynamics within such interviews were considered during the research design stage. Reflecting on the researchers' position, given the type of high-level stakeholder selected, it became apparent throughout the interview that they had the ability to control the flow of

information thus exerted a level of power over the exchange of information. Within this research study, the participants tended to be more conscious of their own importance and therefore the interpretations of events placed themselves (and their organisation) in a favourable light. Additionally, participants were conscious that their involvement with the networks were in a personal capacity and not necessarily in an organisational capacity as well as shying away from disclosing their political opinions or speaking unfavourably of any other stakeholder(s). Given the researchers position as a part-time doctoral student and in part-time employment in the sustainability sector at the University of Edinburgh, this did, to a degree, redress the power imbalance, as the researcher had both theoretical and practical knowledge of the topic, did alter dynamics that may usually exist between a practitioner and researcher with little or no experience in the sector. Coupled with this, the researcher adopted a flexible approach to interview questions, focusing on thematic areas rather than specific questions depending on the responsiveness of the participant. Where possible the researcher asked participants to provide examples of responses to answers in more detail to understand relationship dynamics with other stakeholders and only asked potentially sensitive questions (e.g., questions around conflict or disagreement with other stakeholders) towards the end of the interview when participants felt more at ease and when a rapport between the researcher and participant had been developed.

3.7.2 Analysis and coding process

Within the coding process, researcher bias has been considered and addressed, for example: the researcher driven coding process from qualitative data collected into quantitative data; core theme selection and coding key; and, the analysis process. The coding process extracted data from a qualitative source (interviews with stakeholders), which was then transferred by the researcher analysing the frequency and variety of interactions and assigning a corresponding number to quantify the interaction (see 'SNA' section). The researcher also analysed the thematic areas rated by stakeholders and quantified them regarding their respective importance. Although somewhat subjective, the researcher conducted a detailed analysis of the context in which interactions were discussed in order to justify quantifying interactions or

thematic areas. Specifically, for network maps, where stakeholders reported different frequency and variety interactions, the researcher conducted a detailed analysis of the context (e.g., the wording used to describe the relationship between stakeholders) to ensure quantified data accurately represented the interactions and examples from the data which could confirm the interaction and/or relationship. Additionally, the researcher obtained empirical data to evidence all claims. The initial overarching themes developed in Phase 2 of the coding process, followed by the core themes selection in Phase 4 also followed this process, enabling the researcher to identify recurring themes as well as any nuances that otherwise may have been missed. Researcher bias was further reduced by adopting a colour coding key during the coding process, highlighting the information that was added by the researcher, or if the meaning was unclear or contested by other stakeholders.

3.7.3 Barriers

Language barriers did not pose as much of a challenge to the research as initially thought as all Denmark has an exceptionally high English literacy rate and all documentation and literature on the city's sustainability plans were published in both Danish and English. To minimise any language barriers potential impact research interviews, all questions were sent to participants in advance in both Danish and English and during the interview any specific concepts that could not be expressed eloquently in English, were recorded in Danish and translated following the interview. Danish interviews were translated by a lecturer in the languages department at the University of Edinburgh. In addition, if the participant could not express a response eloquently, the researcher encouraged the participant to provide examples of intended meanings or synonyms that could encourage the participant (though this was only provided if the participant was having any difficulties). At times, the participants would ask for help identifying the correct word to describe a situation or convey a feeling and the researcher would offer words and phrases to support the participant. Overall, the language differences did not appear to be a barrier to the researcher, as the participant type (high-level stakeholders) had a good grasp of the English language as their job type necessitated a strong understanding (in this respect, the high-level nature of the participant benefitted the research).

3.7.4 Reflexivity and positionality

Upon reflection, the researchers' positionality reading for a doctorate degree at a prestigious university coupled with the researchers' work position at another university added credibility to the interview request (as well as accessing participants) (Bourke 2014). This positionality proffered a relatively high level of understanding of the subject area, and the researchers' experience in the sector provided an insight that enabled the researcher to communicate the potential value of the results of use to the participants (in the same sector). The positionality of the researcher potentially shifted power dynamics as the 'student' in this respect was also experienced in the sector. This was evident in the terminology used and assumptions of knowledge by participants, where at times, the researcher had to ask participants to clarify concepts or provide examples to ensure both the researcher and participant shared the same meanings and understanding. In addition, the researcher possessed various contacts and named individuals within the sustainability sector in both Glasgow and Copenhagen. This overcame various issues affiliated with elite interviewing as high-level research participants have a tendency to work more cooperatively with individuals in the sector that are perceived to be knowledgeable and / or well connected. From a cultural perspective, this was especially true in Denmark, where connections with participant's contacts appeared to make a favourable impression when approaching for interview and during the interview process.

CHAPTER 4: CASE STUDY RESULTS

4.1 Overview

This chapter details the results from the research data collection. The results are structured through each case study city: Glasgow (4.2, 4.3 and 4.4) and Copenhagen (4.5, 4.6 and 4.7). Section 4.2 presents findings from Glasgow's governance network 'Sustainable Glasgow' and 4.3 from Glasgow's project 'RUGGEDISED', followed by an overview of the sustainability sector in Glasgow in section 4.4. Then Copenhagen results with 4.5 detailing the results from Copenhagen's governance network 'Copenhagen Climate Panel' and 4.6 on Copenhagen's project Nordhavn 'Energy Lab' then section 4.7 provides an overview of the results for the sustainability sector in Copenhagen.

For both networks and projects, the results are structured in the following manner: network/project formation, stakeholder interaction, governance network features (characteristics), management, internationalisation and evaluation (effectiveness). Within each section, where appropriate, SNA diagrams are illustrated with a brief description of their findings. All network maps are evidenced through different ties². The direction of arrows constitutes the stakeholder's evaluation of another stakeholder or theme. The colour of the nodes represents a sector³. This is followed by interview data results that are structured into sub-themes, directly corresponding to how frequently they were mentioned by research participants. All sub-themes covered within this chapter have been mentioned by a minimum of two research participants as interview groups (e.g., Sustainable Glasgow) were relatively small samples, thus the study does not give weight to concepts and ideas that were not shared (where exceptions include significant findings that answer the research question, this will be noted). All quotes are from individuals representing organisations and do not necessarily

² Network map key: Line equates to a 'strong' relationship, frequent engagement more than once a month or high thematic priority (rated 1). Broken line equating to a good relationship, semi-frequent engagement less than once per month / medium thematic priority (rated 2). Double line for a 'weak' relationship, infrequent engagement / low thematic priority (rated 3).

³ Node colour: Light blue – municipality, dark blue – public sector agency, green – third sector and red – private sector.

represent the views of the whole organisation. For both sustainability sectors, interview data results are structured as follows: description and evaluation of sectoral stakeholder interactions, municipality decision-making, network, project and sustainability strategy awareness and insight. Organisation acronyms for stakeholders have been provided in each results section. The structure presents research data on Glasgow and Copenhagen as single and independent entities and case studies, prior to the comparative analysis within the next chapter, 'Discussion'.

Glasgow

4.2 Network: Sustainable Glasgow

The table below details the abbreviations for each stakeholder in the Sustainable Glasgow network and is necessary to understand the social network analysis diagrams.

Table 7. Abbreviations of stakeholders in Sustainable Glasgow

ABBREVIATION	STAKEHOLDER	SECTOR
GCC	Glasgow City Council	Public
SDS	Skills Development Scotland	Public - agency
SE	Scottish Enterprise	Private
COC	Chamber of Commerce (Glasgow)	Third
GHA	Glasgow Housing Association	Public - agency
SPT	Strathclyde Partnership for Transport	Public - agency
SG	Scottish Government	Public

4.2.1 Network formation

Stakeholder perceptions of the formation and structure of Sustainable Glasgow highlight features that can both help and hinder the networks ability to effectively design and implement sustainable policy within Glasgow.

Network formation

The main theme emerging from the data was the selection of stakeholders involved with the Sustainable Glasgow network. The majority of participants interviewed (5 out of 7) mentioned the 'selection' process, which was led by the municipality, where high-level senior stakeholders within the city were invited (or 'selected') to participate within the network from its conception. Seniority was mentioned by the majority of participants as a significant aspect in the selection and participation on the Sustainable Glasgow network. Network involvement was not open to members of the public but was exclusive and by invite from the municipality only. Many stakeholders invited were known to the municipality already, either through project work or general networking and the reputation of the individual(s) within the sustainability sector in Glasgow. Stakeholder selection was driven by the municipality who sought a diverse mix of organisational representation on the network, selecting individuals that could provide sectoral knowledge, insight and who could support the decision-making process.

The network was largely perceived by stakeholders involved, to be led and driven by the municipality: there was clear ownership by the municipality from selecting stakeholders involved, to developing and maintaining the Sustainable Glasgow network and 'leading [climate] action'. Research participants defined the network as a 'vehicle' for the municipality to formalise climate action and was necessary as there is increased 'pressure on public authorities for sustainable development' [SPT]. The platform enabled the municipality to share ideas and foster stakeholder buy-in for municipal-led climate initiatives. This formalisation added a degree of 'validation' and 'credibility' to the municipality's sustainability strategy.

However, participants noted that the network was predominately for the benefit of the municipality and there was little mention of benefits to other stakeholders involved. There was an awareness amongst stakeholders that the municipality was relying on other stakeholders for ideas and solutions.

Research participants briefly stated their different obligations for accepting the invitation from the municipality to participate and stressed that each stakeholder had their own motivations for getting involved (though often did not specify what these motivations were). Many participant's mention the example of the private sector representation within the network. Previous iterations of the network had selected corporates. However, there were issues regarding selection as the municipality must not be seen to be engaging with one private organisation over the other and had to remain commercially sensitive. Additionally, stakeholders noted that the private sector was believed to be identifying opportunities within the network, largely for economic gain. As a result, private sector stakeholders were removed from the network and replaced with business support organisations (in the form of public sector agencies and third sector organisations) who could 'represent' the business community.

As well as the lack of direct private sector representation in the Sustainable Glasgow network, participants also noted the lack of environmental NGOs and local citizens (residents) represented. Challenges around inviting one stakeholder from one organisation in order to represent an entire sector was noted, as there could be perceived and actual biases around selection.

Frequency of network meetings

Most participants (6 out of 7) claimed that the Sustainable Glasgow network met fairly regularly, on average on a quarterly basis. However, the UK general election in 2017 brought a new administration into the municipality and this has had a direct impact on the network as it is unclear if the new administration intended to support Sustainable Glasgow. Most participants

expanded on this claim, stating that the election period cycles can affect the ability of the network to act as Sustainable Glasgow is largely driven by the municipality (e.g., they organised meetings, agendas).

Stakeholder attendance at the meetings remained relatively consistent, but there were always a few individuals missing, for example, the Scottish Government did not often attend them, despite the network meeting being led by the Leader of the Council at Glasgow City Council.

Stakeholder motivations in joining network

Over half of participant's stated their motivations were largely internally focused to meet their own organisational objectives and keep their own stakeholder board satisfied. For example, SDS stated their motivation was to identify opportunities for jobs and skills development in the low carbon economy, whereas SE's remit was to engage with relevant stakeholders and identify areas of collaboration, such as projects, etc. Whereas two stakeholders mentioned other participant's involvement in Sustainable Glasgow was to support their partner, GCC, with their sustainable development ambition and 'deliver GCC objectives' [GHA]. Two participants referred to the political leadership of GCC as key motivators for their involvement, as well as the ability for Glasgow to play a global leading role in the transition to a sustainable economy. The municipality assumed the role of political leadership but required input and buy-in from stakeholders to make their plans and policies successful, thus there was an element of 'board level political leadership' [COC]. GCC reinforced the need for political leadership and how the support from Sustainable Glasgow stakeholders enabled the city to become a global leader, stating that:

'It was recognised by the leader of GCC at the time that Glasgow needed to be part of the mainstream leading on the sustainability agenda. The current situation of cities around the world, no cities want to be seen as un-resilient and un-sustainable, so these have now become the common discourse in political leadership and good city governance.' GCC, 02/08/17

Four participants voiced the partnership approach to sustainable development within Glasgow

as a significant motivator for their involvement in the network. In particular, the network facilitated engagement between organisations and the municipality. Stakeholders were motivated by the ability to both represent their organisation and sector as well as connect with other different sectors and organisations (as this is often an internal organisation objective). The partnership approach within Sustainable Glasgow enabled stakeholders to leverage knowledge and contacts.

Main objective of the network

The main theme emerging from the interview data was the city-wide partnership and collaboration opportunities that arose from the Sustainable Glasgow network. Four participants expressed partnerships and the overseeing of sustainability commitments from stakeholders was a core objective of the network. Participants frequently referred to the network as a 'leadership forum' or 'board' suggesting that access to, and discussions with, high-level stakeholders and leaders within the sustainability sector was perceived as a mutual benefit. Collaboration across sectors within the Glasgow region was largely seen as positive, with previous silo-ed working perceived as hindering the effectiveness of sustainability policy development and implementation, due to the nature of the sustainability challenge. Stakeholders representing the business community, stated that the main objective of the board for them, was to identify other motivations before their own in order to understand different points of views and assess other stakeholder's positions.

Another objective of the Sustainable Glasgow network was that the network provided the appearance of stakeholders acting on sustainable development within Glasgow due to the increased public pressure and awareness of climate issues (mentioned by all public sector agencies). Stakeholders seen to be engaging with these issues were generally perceived as a benefit of the network. This was particularly true for the municipality, as almost a third of participants mentioned the 'connotations' of the Sustainable Glasgow network that gave GCC the external appearance of collaboration with external organisations, as evidenced by SE

stating '[it gave] GCC the appearance engaging with stakeholders' as well as the internal appearance of credibility for the municipality's sustainability strategy.

The promotion of a vision and ethos for sustainable development and the commitment from stakeholders to progress towards that common goal, was also stated by participants as an objective of the network, as stated by SDS:

'Good practice across the city for getting oversight of the sort of...commitment to the vision of Sustainable Glasgow [in the] long-term.' SDS, 14/07/17

Sustainable Glasgow was perceived as a way to ensure stakeholders aligned with the municipality's carbon reduction targets (though it was noted by GCC that sustainable development was not just about reducing carbon emissions) and progressing towards these by supporting the implementation of city's projects and initiatives. GCC specifically stated that the promotion of the sustainability vision within the Sustainable Glasgow network was important at both city-level and also at a European-level, to share knowledge and enhance Glasgow's global ranking. However, the international remit was not mentioned by other stakeholders.

Stakeholder expertise in the network

All participants were able to clearly identify their organisation's unique sectoral expertise and contribution to the network, from economic development, transportation to housing stocks. No participants mentioned their own personal expertise as part of the network, but rather focused on the organisation's remit. All participants situated their organisation's remit within the wider context of the Sustainable Glasgow network and the city's wider sustainability objectives (e.g., key themes outlined in the city's Energy and Carbon Masterplan 2025). Stakeholders frequently justified their selection for the network by drawing on their organisation's expertise and the need for it to be represented. Additionally, just under half of participants emphasised their organisation's ability to provide 'the big picture' [SE] and 'roundness of thought' [COC] to

the network, their ability to draw on expertise out with Glasgow and understand how their expertise fits in to the wider sustainability agenda within the city. All participants have both a regional (Glasgow) and national (within Scotland) influence, apart from the municipality (GCC) and GHA (which is publicly owned).

Three participant's highlighted the expertise that they brought to the network was not solely reserved for the Sustainable Glasgow discussions, but rather, all stakeholders were using their expertise in their day jobs and brought with them to the network all knowledge of the work activities completed in an organisation's capacity.

Glasgow City Council justified their position on their decision-making representation and expertise which lent legitimacy to the decisions taken. Thus, they defined their expertise as 'legitimacy' as their representative stated that the mandate given to them by the people superseded all other stakeholders, for example:

'We have the legitimacy as in we are the only organisation sitting around the table with a democratic mandate from the people, so whoever leads the council sitting there was elected on a manifesto and over the last few elections with a few strong claims about sustainability.'
GCC, 02/08/17

Therefore, although stakeholders provide thematically relevant expertise to in the network, the municipality's expertise lies in its political legitimacy and commitment to design and implement ambitious climate policies, something which other stakeholders are unable to provide.

Stakeholders' definition of 'sustainable development'

The main result emerging from the interview data concerning working definitions was that the Brundtland Commission's (1987) definition of sustainable development was most influential. However, stakeholders elaborated on what they thought was omitted from the popular definition and questioned challenges around individual and collective needs, as expressed by GCC, 'they [stakeholders] are contested between liberty of the individual and the needs and

rights of the collective'. These concerns have been raised previously by Constanza and Patten (1995) who argued the WCED definition did not account for the changes in generational 'needs' over time. Some participants did state that though the definition needed refined, it still offered the best vision of achieving sustainable development. For example, SDS (public sector agency) stated:

'I go back to Brundtland so it's ability to meet the needs of future generation without compromising the ability of current generation to meet their own needs...you get the spirit of it.' SDS, 14/07/17

Four participants (specifically those involved in economic development) then directly linked their definition of sustainable development to their area of expertise and their organisation's remit (e.g., SDS defining the term in relation to economic opportunities), rather than applying the definition within a city context, per se. As such, there was a lack of consensus on the core principles of the definition of sustainable development and there was no mention of how other stakeholders in the network may held alternative definitions - nor how it tied into the city's own definition of sustainability. The malleability of the concept enables various stakeholders within a network to mould the concept to suit their own objectives, a challenge raised by Lele (1991) and Kates et al. (2005) amongst other scholars. However, when prompted on Glasgow's definition (or vision) of sustainable development, most participants were aware of the main components (objectives) and could elaborate on key themes (e.g., SDI categories) and projects that were related.

Two participants also referred to the sustainable development triangle that has been explored within the discourse; this is comprised of the: economy, environment and society as the main 'pillars' through to address sustainability as evidence by SPT (public sector agency):

'For me the definition of sustainable development still remains based on the triangle of the economy, environment and social inclusion and even saying those words feels a bit out of date to me now...but it still rings true for the basis of it.' SPT, 11/10/17

The latter theme 'society' was highlighted by stakeholders as a significant area on which to

focus efforts on. For example, public sector agencies GHA stated 'access to opportunities' and SPT stated 'inclusive growth' were core to sustainability. However, SE emphasised the necessity for an 'economically sustainable' model to increase productivity. It was acknowledged by some stakeholders (and scholars, see Hassan and Lee 2015) that while the sustainable development concept was still based within the triangle model, the focus should be on the interaction between these pillars.

4.2.2 Stakeholder interaction

Stakeholder perceptions highlight the role of the municipality within the Sustainable Glasgow discussions.

Stakeholders represented in the network

All participants mentioned GCC (the municipality), and other relevant council departments, as the main stakeholder in the Sustainable Glasgow network, as evidenced by SPT: 'GCC is number one'. Simultaneously, research participants referred to key individuals within the municipality that organised and facilitated the meetings and their respective roles within the operationalisation of the network. Six participants also mentioned UOS and UOG as key stakeholders in the network and noted GHA as an active participant (e.g., attended most meetings, proactively offered information). COC, SE and the NHS were mentioned consistently by nearly all stakeholders.

Significant sectoral representation in the network was noted by the majority of participants, who emphasised the proportion of public sector stakeholders represented on the network such as GHA and NHS, outweighed any other sector. Both private sector representatives (COC and SE) mentioned a change in private sector organisations invited to participate in the network. Historically, the municipality had selected two or three corporates to be involved in the network. After a short period (approximately one year) the relationship between the private sector and

other stakeholders in the network was not deemed 'favourable' [GCC]. Both COC and SE stated the corporates were seen as too financially driven and their motive did not align with Sustainable Glasgow's. Additionally, there were issues around procurement as corporates were bidding for project work from the municipality and GCC could not be seen to be collaborating independently with potential contractors as this could provide an unfair competitive advantage. Therefore, by proxy, GCC sought private sector representation from public and third sector organisations to ensure the financial motivations were not an issue.

Stakeholders that were not mentioned as frequently were the Scottish Government and the Scottish Colleges and both were seen to have an 'inactive' role within the network (e.g., did not attend the majority of meetings or provide resources). This was confirmed as the researcher approached the Scottish Government for an interview and the representative that was invited to the network was unable to answer interview questions regarding the dynamic of Sustainable Glasgow, but noted that the government collaborated with GCC through other means (e.g., face to face meetings) but should consider participating more actively on the network itself. GCC was the only stakeholder to note the lack of citizen engagement in the network, all other stakeholders did not mention the need to engage with local citizens.

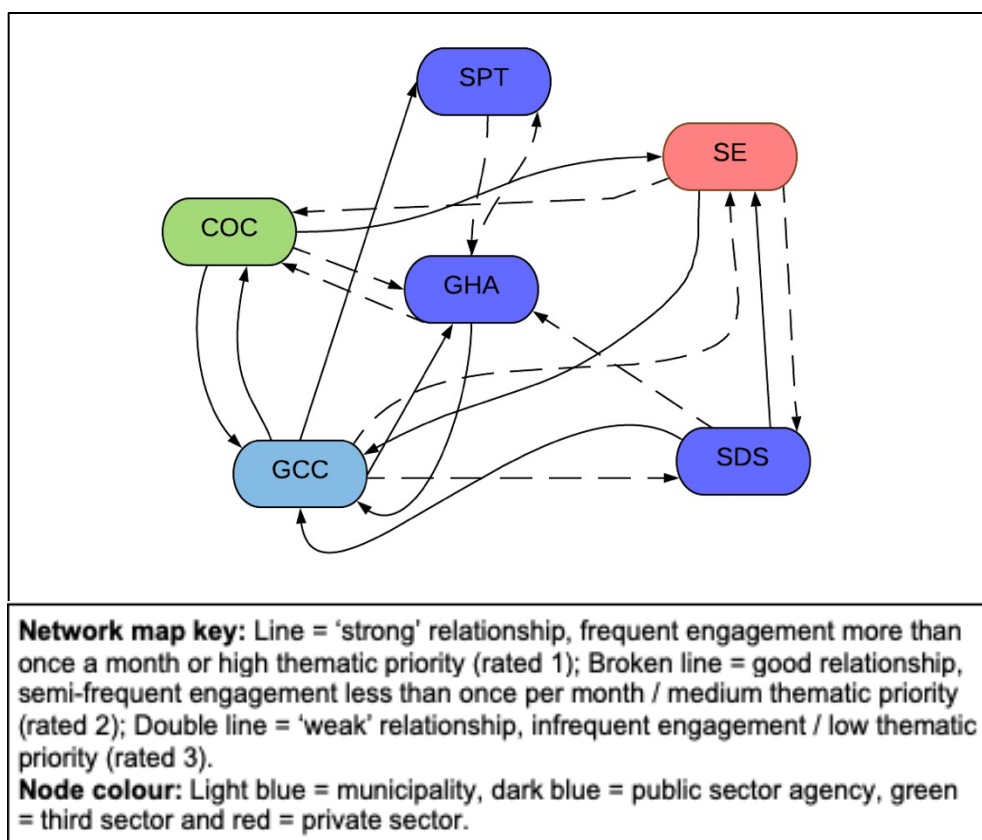
Stakeholder interaction within the network

Participants interviewed described stakeholder interactions within Sustainable Glasgow discussions (as evidenced in the SNA diagram below). These interactions are elaborated further through recurring themes identified from the interviews.

Network diagram highlights strong relationships (rated 1) between GCC and all other stakeholders involved within the Sustainable Glasgow network. UOS (third sector organisation) appears to have relatively strong relationships with most organisations within the network, with the exception of SE which is business focused. GCC has a close relationship with GHA and COC (rated 1) and weaker ties to SE and SDS (rated 2). COC and SE (business focused

organisations) exhibit a strong relationship (rated 1), this is largely due to a similar remit. The relationships between public sector agencies are relatively strong (rated 2) and very strong (rated 1) with the municipality (GCC).

Diagram 4. Sustainable Glasgow stakeholder interaction network map



The main theme identified from the interview data was the need for stakeholders to engage with the municipality (GCC) within the decision-making process. All research participants emphasised that GCC was the most important organisation in the Sustainable Glasgow network (including the departments that were also loosely affiliated with the network). From an organisational perspective, it was also necessary to engage with GCC as their remit increasingly required collaboration with external stakeholders, in particular the municipality, as they led the design and implementation of the city's sustainability strategy. Thus, engagement with the municipality directly affected the activities of all other stakeholders involved in the network.

Third sector organisations such as UOG and UOS were widely perceived to be active stakeholders in the network (mentioned by four participants), as they attended meetings regularly and had close relationships with nearly all partners, both in the network as well as out with the network in separate projects and initiatives (e.g., the Climate Ready Clyde initiative and the RUGGEDISED project). UOS had a key role in the development of the Sustainable Glasgow network, having conducted research on what the network would look like and its remit in its infancy (2010). Since then, UOS had established many personal relationships with stakeholders (e.g., with SE). UOG had also developed relationships with stakeholders on the network via project work that was external to the activities on the network (e.g., SPT and GHA).

Research participants emphasise that the engagement with stakeholders mentioned, was not exclusive to the Sustainable Glasgow network and that stakeholders engaged on various projects and initiatives beyond the network. This can be evidenced by the relationship between GCC and SG, as they engage on a weekly basis out with the network meetings. However, SG do not actively participate in the meetings, per se. Most research participants did emphasise that the network was one way that they engaged with stakeholders within the city and it was a useful platform to do so, but this was addition to the Sustainable Glasgow network.

Lastly, both GCC and SE claimed that stakeholders could nominate and lobby (within reason) for specific organisations or individuals to be invited to the Sustainable Glasgow network. For example, SE suggested to GCC that SDS would be an appropriate stakeholder to have on the network, but ultimately the decision to invite new organisations was taken by the municipality (GCC). All stakeholders on the network would also have to agree to such changes.

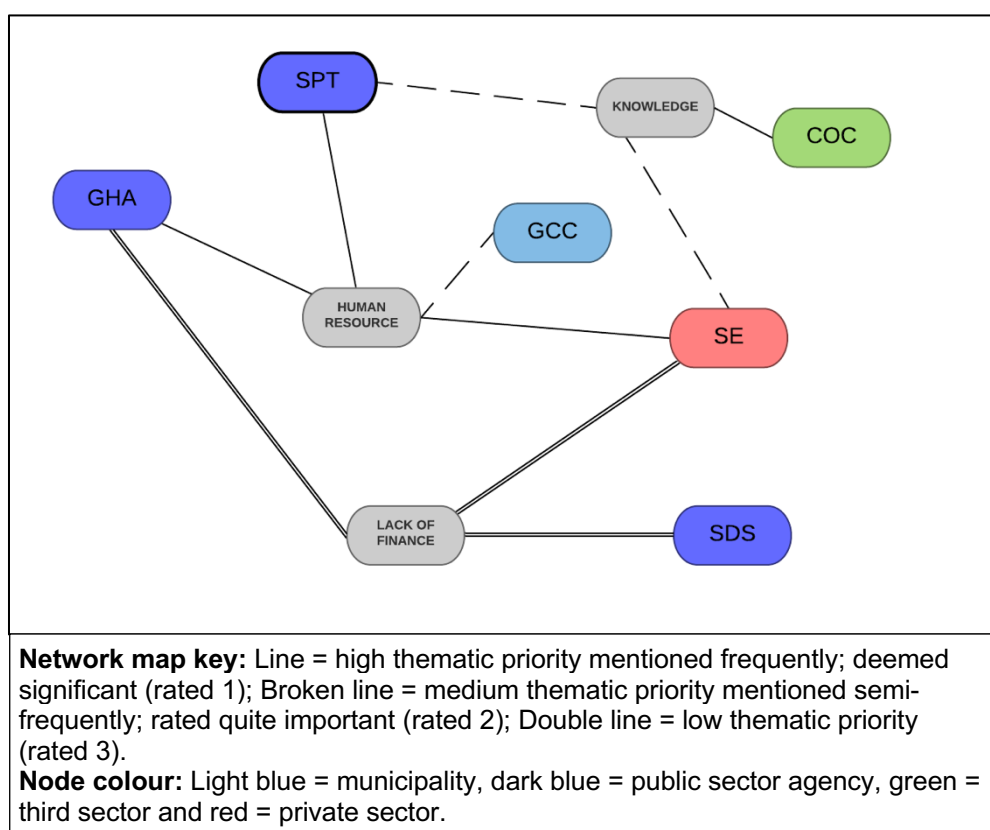
4.2.3 Network characteristics: Governance features

Stakeholder responses indicate that specific key features (characteristics) of governance networks were more evident than others within the Sustainable Glasgow network.

Inter-dependency: Resources stakeholders provide to the network

The SNA diagram below maps out the responses for the top three themes: human resource (people's time commitment), knowledge (expertise, insight, intelligence, sectoral representation) and the distinct lack of financial resource provided to the network.

Diagram 5. Sustainable Glasgow interdependency (resources provided) network map

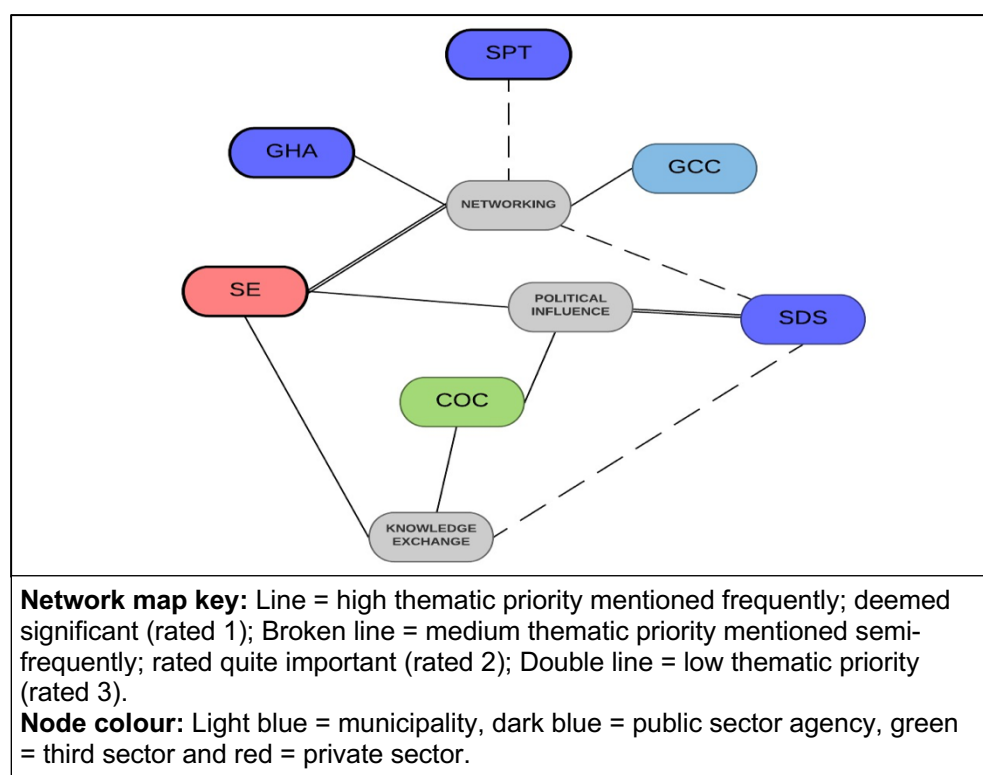


Most stakeholders stated time commitment as a key resource provided to the network. It should be noted that the municipality, GCC, did not appear to provide any other resource other than staff time. Knowledge, specifically sectoral intelligence, was mentioned across all sectors represented in the Sustainable Glasgow network. SPT in particular elaborated on this, listing the 'intelligence, analysis and statistics' on different projects was shared with other stakeholders. However, some participants referred to the lack of finance provided (e.g., or other 'valuable' resources) in return for this time and knowledge.

Inter-dependency: Resources stakeholders receive from the network

The SNA diagram below maps out the responses for the top three themes: networking (linking and building strategic contacts, collective commitment) which was mentioned mainly by public sector agencies, knowledge exchange (sharing information and expertise), and, political intelligence (insider knowledge, first-hand information from GCC). The municipality received useful contacts and developed partnerships from the network.

Diagram 6. Sustainable Glasgow interdependency (resources received) network map



Public sector agencies noted the networking and partnership development opportunities that they received from the Sustainable Glasgow network, though this was prioritised more by GCC and GHA than by SDS and SPT. All sectors mentioned the political intelligence from the municipality (GCC) was an important resource as they received first-hand information on key policy issues that was not necessarily available outside of the network. Organisation whose remit is economic development within the city (e.g., SE and COC) referred to the same resources (knowledge and political intelligence)

Coordination: Stakeholder negotiation within the network

The main theme to arise from the interview data was that there was very little negotiation within Sustainable Glasgow meetings. Four research participants, mainly public sector agencies and third sector organisations, stated that the network's discussion focused on sharing climate knowledge and potential initiatives of interest to the municipality and not on the wider contribution to decision making. There was very little mention of negotiation within the network as two participants stated that the network was not a formal decision-making body per se, but rather a forum for stakeholders to bring up interests and collaborate on projects, as evidenced by SDS response:

'I don't see the board as a decision making body on a vote of hands consensus, that's where priorities are decided or funding decisions are made so yes, before it reaches the board there will be conversations around what respective contributors might be made and who's best placed to carry this forward but it shouldn't get the situation where the Sustainable Glasgow board is the place itself where there is a fight between either sides of the table about who should be contributing to make something happen.' SDS, 14/07/17

Research participants stated that it is important to be seen to be participating in such discussions and contributing knowledge and expertise for both internal organisational reasons as well as externally, to convey an open and collaborative reputation of their organisation, with some stakeholders highlighting that the network had 'opened up their minds' regarding opportunities for collaboration.

Additionally, a third of stakeholders noted the lack of significant project delivery on the network, instead emphasising the discussions regarding delivery aspects of the projects in which they are involved in. The municipality was seen to be accountable for delivering any significant projects and used the network as a way to engage stakeholders and discuss ideas and thematic priorities that aligned with the Energy and Carbon Masterplan, to ensure their progress was being made against the SDIs developed. Research participants claimed that the discussion was led by the municipality who set the agenda and thus centered on projects that they were specifically interested in and was a way to gauge buy-in from external stakeholders

and make funding decisions, thus negotiation was not necessary. The network would then transition into a forum for each stakeholder to bring up a topic which was of potential interest to the network that could feature in a future agenda.

Some stakeholders referred to the removal of the private sector corporates on the Sustainable Glasgow network as an example of negotiation. Research participants expressed the challenge created by inviting corporates to participate in the network, stating that private sector representation was necessary but the alternative motives behind the organisations joining (e.g., profit driven) did not necessarily align with Sustainable Glasgow vision, as evidenced by GCC and COC:

‘I want to go with the business community because it is the one that’s more difficult and challenging one because it’s not formed to carry out public policy the way that we are its formed to make profits and without its profits it fails similar to the taxes that pay for what I do.’ GCC, Glasgow, 02/08/17

‘I think there was a general grudge that we are not giving up our time to be at this unless because it can make good commercial sales, we are going to win contracts but unfortunately that is the business community.’ COC, 20/07/17

The dis-satisfaction with the private sector on the board was expressed initially by the municipality and supported by two other stakeholders on the network. However, the network does still engage with businesses on a project-level (e.g., through RUGGEDISED).

Coordination: stakeholder compromise within the network

Three research participants specified that there was generally little compromise during the Sustainable Glasgow discussions as the network itself did not have direct ownership over key projects. However, stakeholders who participated in the network discussions also participated in external projects, often with the municipality, where deliverables were all pre-agreed and aligned with the city’s sustainability strategy. Two participants noted general disagreements on approaches to projects and initiatives when discussed in meetings and stated that it was

expected that not everyone would agree on the agenda. Participants evidenced this by drawing on new climate policies and projects, such as the Low Emissions Zone (LEZ) within Glasgow's city centre. This would help them progress towards indicator 'Action 28' in their Energy and Carbon Masterplan, focusing on improving air quality through low carbon transport initiatives within the city.

Additionally, research participants claimed that the municipality was perceived as responsible for delivering all actions mentioned by stakeholders and thus the network was being run by GCC to meet its own needs. The municipality had the ability to outline policies within their manifesto, however, there is disagreement amongst stakeholders as to how that climate target would be reached as each stakeholder has their own agenda.

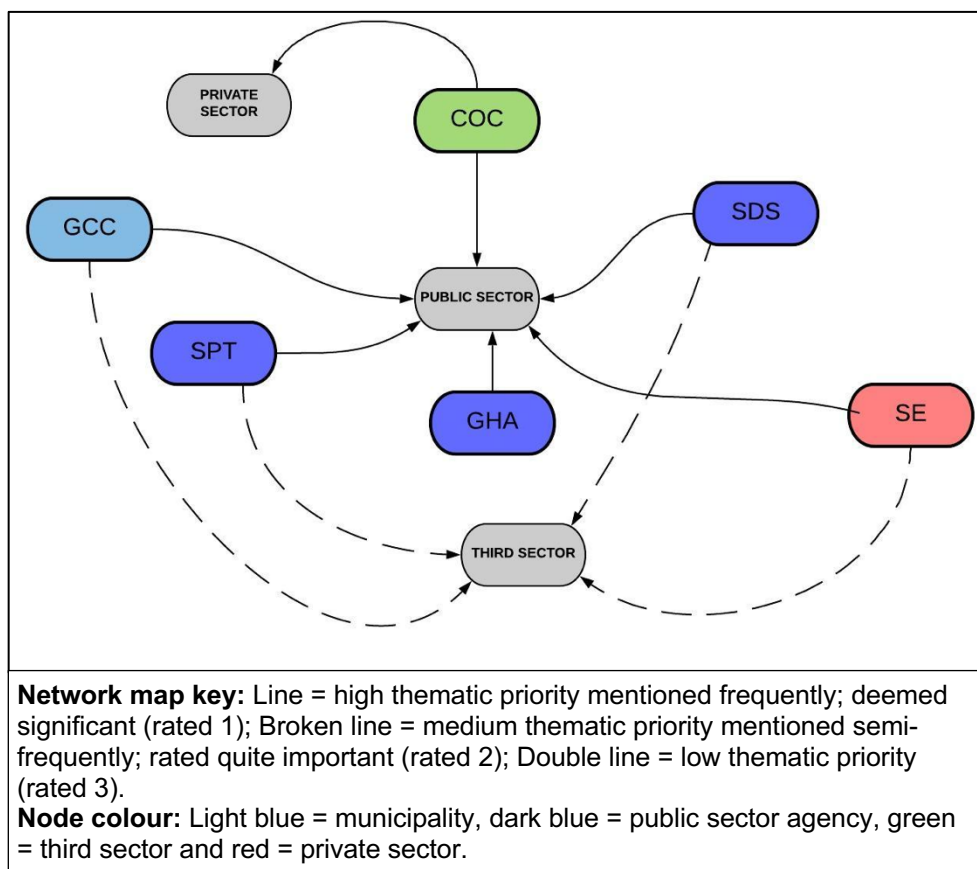
Pluralism: Stakeholder interaction with specific types of organisation

This section illustrates (through SNA diagrams) stakeholders' sectoral engagement in Sustainable Glasgow, followed by key themes that elaborate further on the sectoral interaction within the network.

'Sustainable Glasgow' pluralism network diagram

All stakeholders within the 'Sustainable Glasgow' network engage with public sector organisations frequently within the network (e.g., GCC) as described by rated 1 frequency of engagement. Most stakeholders within the network do not directly engage with the private sector, only one organisation (COC) have strong ties (rated 1) with the business community as their remit offers business support services for businesses and therefore represents the private sector on the network. SE is a business support stakeholder and uses the network to engage mainly with the municipality (GCC) and universities (such as UOS who are also involved in the network).

Diagram 7. Sustainable Glasgow pluralism network map



'Sustainable Glasgow' pluralism: stakeholder interaction

Stakeholder interaction appeared to vary by issue and task. Five research participants, with the exception of two business orientated stakeholders, stated that not all engagement with stakeholders in the network were always 'sustainability' focused, nor were they all linked to the Sustainable Glasgow network itself, but rather engagement was linked to their job position. Therefore, the researcher asked stakeholders to clarify engagement within the context of the network. Most stakeholders (e.g., GHA, SDS, SPT, SE) noted their engagement with the municipality as they had a clear sustainability agenda and stated that carbon reduction was a collective effort from all stakeholders. There was moderate engagement with third sector organisations from the majority of stakeholders, who made reference to the network collaboration as well as project engagement.

In addition to engaging with the municipality, participants noted that some stakeholders were 'natural partners' whereas others were not. For example, engagement with the municipality was frequent for all stakeholders, as they had worked on projects together 'side by side' [GHA] and had partnerships as well as financial arrangements in place. However, engagement with the private sector was more challenging as illustrated by SPT:

'...There are others we are not natural partners or bed fellows...[the] private sector guys perhaps a bit of a challenge to get them and us to see where the benefits could be between us... but like them we have always been open minded, there's always something we can work on.' SPT, 11/10/17

Some stakeholder interaction was not perceived as a 'natural fit' specifically with private sector representatives (e.g., COC) who had not engaged one-to-one with stakeholder participating in the network. However, there was an exception for SE who had noted moderate engagement with third sector organisations (e.g., UOS and UOG). Overall, there was a general consensus that Sustainable Glasgow was a useful platform to engage with stakeholders (both those who engaged frequently and those who were not a 'natural fit') as the platform would send light on city priorities that stakeholders were not always aware of. This afforded the opportunity to collaborate that otherwise may not have been available.

Pluralism: Stakeholder roles assigned within the network

Five participants stated there were no formal roles assigned by anyone involved in the Sustainable Glasgow network. Others suggested the need for thematic ownership within the group (e.g., creating task groups for ownership of themes). This was evidenced by SE stating that the network reviewed processes and initiatives rather than allocating work and the purpose of the network was 'advisory...rather than action' [SE]. Additionally, stakeholders noted there were few direct actions arising from the meetings.

This was followed up with comments on the municipality's role, with participant's stating that GCC were perceived as accountable for all actions taken and for the failures or successes of

the Sustainable Glasgow network outcomes. The municipality generated the network agenda and all actions that did arise from the meetings were taken on by GCC, '100% of actions were related to GCC' [SE]. As a result, participants felt that the municipality utilised the network as a way to give them the 'rubber stamp' [COC] for engaging with stakeholders regarding climate policy design and implementation.

Around a third of participants noted that ad hoc action was taken by stakeholders on a 'needs basis' [SDS] and there were elements of people taking things forward (e.g., if a project aligned with a stakeholders area of expertise), but no actions were assigned to specific individuals participating in the network.

4.2.4 Network management: Leadership and accountability

Stakeholders perceived the municipality as leading the Sustainable Glasgow network.

Stakeholder leadership within the network

All stakeholders agreed that the municipality led the Sustainable Glasgow network, specifically the leader of the council who chaired all of the meetings, which contrasts with the findings from the secondary data analysis which suggests that leadership can be unclear within a governance network. However, this was also confirmed on the Sustainable Glasgow website, which stated that the network was largely 'council-led'. The network was perceived by stakeholders to 'give a stamp of approval' [SE] for sustainable development related activities. The network provided political support for policies as GCC were seen as accountable for decisions on a practical basis. As GCC stated:

'I think there's been a collective sense of responsibility, but it has laid across the shoulders of the council.' GCC, 02/08/17

Therefore, GCC was aware of the accountability for actions within the network and therefore saw it as a responsibility that they lead the network. Specifically, the municipality referred to the network as a 'collective' that could commit to supporting their activities, this statement was supported by stakeholders, who expressed a desire to work together to contribute towards the carbon reduction targets in Glasgow.

The network was also seen as a vehicle for the municipality to develop climate policy; it enabled them to show a level of accountability on a very practical basis. In other words, the network provided credibility that the municipality led the engagement with stakeholders. Thus, the network facilitated political momentum as GCC could leverage new ideas and expertise when required as well as inform stakeholders of progress made. Some participants also noted the importance of the municipality 'being seen' to be showing leadership, stating that it was necessary for the municipality to play an active role in engaging with stakeholders that could provide support for council activities.

Stakeholder accountability for network activities and outcomes

The main theme to emerge from the interview data (mentioned by four participants) was the accountability placed on the municipality to deliver on the network activities and outcomes. This was largely due to the leadership role that GCC played and the power they had over the network logistics (e.g., they selected the stakeholders, wrote the 'terms of reference' and the creation of agendas for all network meetings, etc.).

The Sustainable Glasgow network enabled city stakeholders to input into GCC's sustainability strategies and gain consensus around key projects which the municipality was involved in or supported. The municipality was perceived as open to ideas and criticism and encouraged debate around key issues (focused on the 'collective' nature of the network: bringing city stakeholders together to discuss sustainability policies and projects). Stakeholders highlighted the presence of the Leader of the Council at meetings added credibility to the network

discussions the high-level facilitation focused people's minds [SPT]. However, the seniority brought a sense of accountability as it was important that stakeholders were then seen to be adding value to discussions. This is evidenced by SPT's comments:

'...There's nothing that focuses the mind than having to sit in front of the leader of GCC and account for your organisations actions. It does tend to focus your mind, you are very aware of who you are speaking to...' SPT, 11/10/17

However, two participants stated they weren't sure what the explicit outcomes of the network were, besides the city's sustainability commitment (outlined in the Energy and Carbon Masterplan).

4.2.5 International engagement

Research data implies there were no formal links directly between Sustainable Glasgow and other similar international networks.

Five participants stated that there were no clear links between Sustainable Glasgow and other city-level sustainability networks, but rather, international networks were linked to project work or a stakeholder's personal networks. Three stakeholders referred to GCC's links with 100 Resilience Cities which were established in 2014, which was seen as a very positive affiliation which gave Glasgow international credibility and showcased pioneering work. The RUGGEDISED project was noted as it had an international element with European partners that the stakeholders could collaborate with.

The limited relationships with other similar international networks was emphasised when stakeholders were asked in what capacity they were involved with such networks. For both examples mentioned previously, the municipality (GCC) was involved in 100 Resilience Cities as a member city. In RUGGEDISED, GCC was involved in facilitating discussions with European partners. The latter project also involved other stakeholders on the network (e.g.,

GHA) as they owned assets in the project area. The majority of stakeholders had limited involvement and understanding of such links.

Five stakeholders mentioned the international links as raising the profile for Glasgow (often referred to as 'Team Glasgow' [COC]). These in turn could provide global exposure, networking opportunities and collaboration with other similar sized cities. One stakeholder claimed that it would enable Glasgow to 'upscale and replicate technologies in EU cities' [GHA] as well as provide financing and 'large-scale funded projects' [SE] that focused on sustainable development activities and aligned with both Glasgow's sustainability strategy as well as the individual organisational objectives.

International networks raise the profile of Glasgow and providing stakeholders with an international and outward facing profile. This increases the likelihood of projects and financing opportunities for GCC with other cities and organisations as well as the opportunities to share knowledge and expertise. For stakeholders, the potential projects and partnerships were perceived as a real benefit for Sustainable Glasgow's involvement in international networks.

4.2.6 Network evaluation: Effectiveness of governance networks

The main theme to emerge from the interview data was the need for more formality within the Sustainable Glasgow network. Specifically, participants noted the need for more staff resources, responsibility and a budget for operationalisation. With this, it would be possible to reinforce the aim of the network and have targeted reasons for spending the budget. Coupled with this, participants suggested introducing more formal reporting from each stakeholder and increasing sectoral representation, specifically citizens representation. Conversely, the private sector argued that the advantage of informal discussions in the network avoided an extra layer of bureaucracy which helped, as stakeholders were not held accountable for activities and could freely make suggestions to the municipality - any more formal processes may hinder engagement with stakeholders (specifically the private sector).

The leadership by the municipality was largely seen as a positive feature within the network, and the seniority of stakeholders added credibility and enabled buy-in for projects and policies at a more senior level. However, stakeholders claimed that more integration was required between national, regional and city-level governance regarding sustainable cities as it was unclear how a sustainable city would translate into different levels of governance.

The change in administration and short-term election cycles were perceived as a challenge by some participants as they hindered the ability of the network to function in the long-term. This is effective in helping the municipality design and implement sustainability strategies. For example, since the UK's general election in May 2017, Glasgow's city administration changed, and it was unclear whether they knew administration would resource the facilitation of the network. This led some participants (SDS, SE) to question its fitness for purpose of Sustainable Glasgow as the political landscape changed.

Other suggestions from stakeholders regarding increasing the effectiveness of the network include the need for GCC to increase the confidence of stakeholders in their ability to deliver innovative and relevant climate policies. For example, many stakeholders felt that the municipality dominated the network and was a vehicle for GCC to discuss their business, though it was seen that it would be more effective if stakeholders could input in the agenda and discussion to draw on their own activities and experience. This was supported by the network lead in the municipality, who acknowledged the need for more a more action orientated network:

'I think we need to get into that be a bit more action orientated you don't want to get so caught up in action that you fail to be to apprehend the broader set of impressionistic contours of what is going on around you and the broader ambition. I think we need to now mobilise our partners to work together on some specific things.' GCC, 02/08/17

If the municipality focused more on the stakeholder's activities and thoughts than they on the ability to deliver much more significant projects as the network, they would be more 'active' rather than a sounding board for the municipality's work.

Additionally, research participants expressed that a lack of clarity impacted on the network, specifically referring to the networks' activities – this may be due to the municipalities inexperience with new governance approaches. For example, participants noted that work completed by stakeholders participating in the network was work that was already being done in their daily activities as emphasised by SE:

'It's how to reinforce clarity, I think with these types of broad ranging initiatives its quite easy to forget. I'm not saying there is not clarity I'm saying there's been a bit of a gap so for the next meeting it would be helpful to reinforce what the purpose of the board is and what the areas of focus are.' SE, 8/2/17

Distinguishing clear activities for the network beyond the participants' day jobs would enable the participants to identify who is responsible for key deliverables and assign outputs directly to the network itself. The network was accepted as an essential vehicle for collaboration, thus despite the lack of clarity, the activities were still necessary and still contributed to the city's sustainability targets generally.

4.3 Project: RUGGEDISED

The table below details the abbreviations for each stakeholder in the RUGGEDISED project and is necessary to understand the social network analysis diagrams.

Table 8. Abbreviations of stakeholders in the RUGGEDISED project

ABBREVIATION	STAKEHOLDER	SECTOR
GCC	Glasgow City Council	Public
TS	Transport Scotland	Public - agency
TNT	Tenants	Private
GHA	Glasgow Housing Association	Public - agency
UOS	University of Strathclyde	Third

4.3.1 Project formation

Stakeholders perceived the development of the RUGGEDISED project specifications (e.g., setting objectives, deliverables and targets) and the stakeholder selection process as formally driven by the municipality.

Project formation

Over two thirds of participants stated that the RUGGEDISED project was initiated by the municipality, who led the ideation and development of the project (this result was confirmed by documentation available on the project website). It was designed as a follow-on project from previous Horizon 2020 Smart City funding. The project aimed to develop a 'smart street' in Glasgow City centre composed of smart technologies and energy efficient heating. The project

aligned closely with the Energy and Carbon Masterplan, with one indicator specifically measuring city energy orientated projects that are led by the municipality (see Action 27 and 28). The municipality (GCC) approached organisations that they had worked with on previous projects or initiatives or had specific expertise (e.g., district heating expertise) that was required for the project to succeed. As evidenced by GHA:

‘[GCC] who I have worked with before and have a good working relationship with phoned and said: ‘Do you mind popping over, we have got an idea we can have a chat about,’ [and] it’s kind of went from there. I was telling them about the properties and how they operate and what I think [with] regards to demand side management, what would be possible. From that point we agreed that GHA would be - a partner - and that’s how it happened.’ GHA, 08/11/17

Three participants noted that the municipality had a good relationship with many of the stakeholders approached.

All stakeholders involved were asset owners and technical providers within the ‘smart street’; a key requirement of the project was to ensure all partners had infrastructure invested within the project (e.g., GHA properties were in the boundary of the ‘smart street’). The RUGGEDISED project was composed of various ‘mini-projects’ led by stakeholders in the city, which were already underway (in some shape or form). These projects were written into the project to add value for the funders, as they were not starting from scratch. They were developed by stakeholders involved to improve sustainability and reduce dependency on utility companies (e.g., SP). This required stakeholder and GCC engagement from an early stage in order to co-develop mini projects into manageable work streams within the project. However, there were a few infrastructure challenges as some ‘mini-projects’ are reliant on external organisations to complete the work.

Frequency of project meetings

Stakeholders involved the RUGGEDISED project met on a monthly basis, but there was a willingness to meet more frequently if it was required by the project or by the municipality.

Stakeholders noted it was difficult to engage everyone involved as they all had their own priorities within and outside of the project.

Stakeholders' motivations in joining project

The main motivation for three stakeholders involved in the RUGGEDISED project was the access to knowledge and best practice from partners, sharing their expertise and technological solutions to develop their own products and services (within the 'mini projects'). As evidenced by GCC:

'It was the access to the best practice - we have that in Sustainable Glasgow but it hasn't been operating at an optimal so combined expertise and more effort is required; in one of the work packages we need to be seen as being active in the innovation landscape and co-creating solutions; we need to morph this in to a sustainable platform and suggest ways GCC can integrate this data, knowledge and expertise into impact (proposal); it's all about the innovation process.' GCC, 22/01/18

The municipality sought combined expertise and how this could be integrated into meaningful and innovative projects on the ground. Private sector participants were specifically interested in accessing knowledge to improve products or services that could be sold in the future.

Accessing funding was deemed important by two stakeholders, not only to develop their products and services but also pay staff time. Funding varied depending on organisational type (e.g., third sector organisations such as universities could receive full funding, whereas private sector organisations could receive a maximum of 40% funding, as per European funding criteria). However, one stakeholder expressed a concern regarding other project partners unfairly vying for more funding from RUGGEDISED.

A key motivation for half of the stakeholders interviewed was the desire to identify scalable solutions and findings for Glasgow and provide a wider benefit to the city. Participants noted the solutions must demonstrate benefits out with the project itself and the organisations and evidence the potential to be rolled out on a national and international basis. Two stakeholders

claimed that the mini projects that were pulled into RUGGEDISED had been 'reversed engineered' and provided a good link to previous work delivered by the municipality (e.g., Horizon 2020 funded projects). Coupled with this, stakeholders were motivated by the co-creation of projects and technologies and the development of new partnerships in order to deliver projects for the city. Stakeholders were interested in being seen to be active within the innovation landscape and the RUGGEDISED project provided a good opportunity to do so.

Main objective of the project

Three stakeholders interviewed defined the main aim of the RUGGEDISED project was to create to smart street pilot and GCC to propose a suite of technological energy efficient solutions (e.g., heat, energy efficiency and big data) and establish a commercial model for it. This required a suite of documents, contractual models and business models for new technology integration into the grid (these were perceived as a benefit of the project and not necessary the main focus of it). Stakeholders elaborated, stating the project aimed to expand the scope of previous mini projects by integrating different technologies together (demand side management, EV, renewable energy), with the intention to showcase how such technologies could be replicated and shared elsewhere. The municipality stated there were three challenges that the project aimed to address: fuel poverty, energy poor infrastructure and air quality (all of which aligned with the SDI categories outlined in the city's sustainability strategy). The intention to share learnings and findings from the 'ambitious project' led participants to state the need to leave a legacy infrastructure for citizens of Glasgow in the future as well as upscale the project in other areas of Scotland, using Glasgow as a blueprint.

Project participants that did not specify the 'smart street' concept focused instead on the ability to replicate the project elsewhere and to share knowledge gained through the project. Some stakeholders also noted that other countries involved (international partners) were more integrated and further ahead than Glasgow regarding integrated energy efficient technologies

within cities, however there was an opportunity to share knowledge and learn from the partners.

Stakeholder expertise in the project

The main area of expertise required in the project was: district heating infrastructure, big data and modelling (system integration) and social housing and infrastructure (led by GHA). Other areas of expertise within the project include (but were not limited to): transport (specifically electric vehicles, led by Transport Scotland), the development of procurement packages (led by the municipality) and other additional general technologies to address climate change at city-level.

Project contribution to Glasgow's 'Energy and Carbon Masterplan'

Stakeholders were asked how the RUGGEDISED project aligned with Glasgow's Energy and Carbon Masterplan. Four participants viewed the project as GGC leading the development of new integrated renewable technologies within buildings, from which the data would inform decision-making online to build a 'rich picture' of energy use and energy needs. The project aims aligned with the thematic areas outlined within the Energy and Carbon Masterplan and the overall objective of the project to reduce the carbon footprint fed into the city's ambition to reduce carbon emissions by 30% by 2020. For example, district heating could alleviate fuel poverty whereas the electric vehicle charging infrastructure development could increase energy efficiency and improve air quality in Glasgow City centre.

The project was perceived three stakeholders as an opportunity to play a small part in supporting Glasgow's Energy and Carbon Masterplan and rolling out new technologies and 'joining the dots' [TNT] between stakeholders and expertise to deliver the low carbon vision of the city, however with this collaboration, stakeholders identified challenges.

'...there seem to be people doing bits and pieces here and there and nobody quite pulling the strings if you know what I mean.... it's challenging there's a lot of interested parties to pull together and they are not always pointing in the same direction...' TNT, 16/11/17

However, despite these challenges, the RUGGEDISED project was considered as a collaborative effort and a vehicle to understand how different technologies could be integrated and the legal framework required to enable this technology roll out.

Thematic priorities within the project

All thematic priorities within the RUGGEDISED project aligned with the themes in Glasgow's Energy and Carbon Masterplan developed by GCC (these themes were identified in the secondary data analysis). For example, renewable energy and district heating (new planning requirements for local authorities enforced by the Scottish Government, included an options and appraisal for all new builds from January 2018 onwards) were key themes within the project and the city's sustainability strategy. Key areas of thematic focus included big data (this was a follow-on from previous Horizon 2020 funded bid on Smart Cities), transport and air quality (e.g., electric vehicle charging infrastructure within the City centre) and social housing and fuel poverty (this fed into the general carbon reduction agenda).

4.3.2 Stakeholder interaction

The research findings suggest that network structure and stakeholder interactions can influence the effectiveness of the project (policy implementation).

Stakeholders represented in the project

Firstly, four stakeholders mentioned the municipality as the 'number one' partner, as they were widely seen as leading the project. Most stakeholders in the project had worked with the municipality previously. Secondly, the universities involved were mentioned by stakeholders

as key partners (e.g., UOS and HWU who were procured into the project for the battery storage technology). Energy providers (SP) and technology providers (SIEM) were noted as important contacts, in particular SP who owned the energy infrastructure that the project required. Stakeholders working together in specific work-streams (e.g., Virgin Media, Hour Power) were mentioned less frequently, despite collaboration being written into the project plan. Lastly, public sector agencies (e.g., TS and GHA) were mentioned less frequently overall by stakeholders in the project. No stakeholders mentioned the need to engage with citizens in the project design or delivery.

The municipality (GCC) noted that they had worked with most organisations before, as evidenced by the project lead for RUGGEDISED:

‘They were mostly organisations we have worked with before in some capacity given that most of the organisations are Glasgow based so SP being the energy distribution power - we had to work with them, GHA have their housing stock in the area so we had to work with them, TS are the arbiters for EV so we had to work with them, the UOS as well are in the area. The only ones we have worked with before but aren’t necessarily located here are Siemens, and we worked with them because we worked in the smart city arena before on a technology basis plus they we were able to respond to the submission of the bid which was quite a short time scale.’ GCC, 22/01/18

For GCC, the engagement centered on previous collaboration with stakeholders and those who owned assets within the smart street as the municipality had to engage with them to deliver the project.

Stakeholder interaction with the municipality

All stakeholders noted that the municipality (and key individuals within the administration) were the lead partner in both the creation and implementation of the RUGGEDISED project (this result was confirmed by documentation on the project website). Participants elaborated on this, stating that GCC had good experience to carry the project forward and had already developed a relationship (or worked previously with) stakeholders in various capacities (e.g., projects) prior to RUGGEDISED. The municipality were perceived as responsible for the

operationalisation of the project (e.g., organising monthly meetings, action registers, common communication protocol and aspects of the delivery outcomes). Stakeholders claimed that the expertise they provided was to help GCC and not the other way around, as the municipality required information from the project partners to inform the wider city agenda, as evidenced by UOS:

'It's normally for the purposes of helping the council, it's not us wanting help from RUGGEDISED, generally [individual's name] will catch up every now and again but generally he would say I need some information so that might be details of our scheme, sizes, capacities, when it starts and when it finishes and he can for whatever reason, use that for questions [they] need to answer as part of RUGGEDISED.' UOS, 09/04/17

For all stakeholders, partnerships were perceived as essential to the success of the project and the ability to progress depended on such partnerships. Within these partnerships, stakeholders did not feel GCC were 'in charge' (but did note they had a 'good idea of what was needed') as everyone was seen as equal as they all were directly involved in the project, had an asset in the project, and had clear work stream remit. Specifically, the relationship the municipality was seen as a formal relationship in the context of RUGGEDISED as partners roles were formally written into a project, however, initially, the municipality informally invited stakeholders to participate (stakeholders noted informal relationships evidenced by the first names basis with public sector individuals). The previous work between stakeholders was seen as the main reasons for the strong relationships between partners as the project did not start from scratch (which was seen as a strength) and relationships could be developed further.

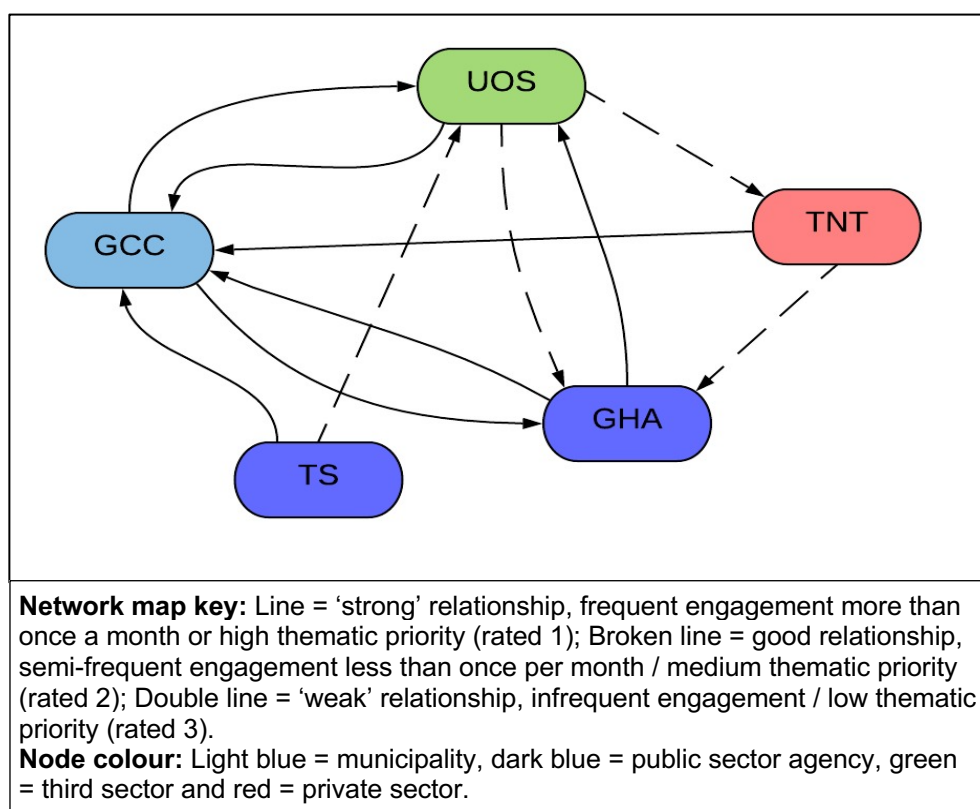
Stakeholder interaction within the project

All stakeholders mentioned their relationship with the municipality, stating they worked with GCC on a frequent basis (e.g., email communication and meetings), often describing their relationship as 'work[ing] closely' together.

Three participants mentioned their engagement with stakeholders varied on the work-stream activities, which largely determined who they have to collaborate with and therefore engagement was as and when required. For example, TNT noted their engagement with GHA over the district heating work as GHA owned the assets ('physical stake' [GCC]) within the smart street area. In addition, due to the needs of the project there was a close private sector collaboration in the project (e.g., SP and Charger Car). Stakeholders noted very little engagement with the Scottish Government, though they are not directly linked to the project (no formal role), participants felt there could be more interest or engagement as an example of a smart street that could be replicated elsewhere.

The stakeholder relationships were largely based on the previous work and collaboration, but all participants saw the opportunity to create their own partnerships with some new organisations as a key benefit of the project, as the project brought stakeholders together to support the decision-making process.

Diagram 8. RUGGEDISED stakeholder interaction network map



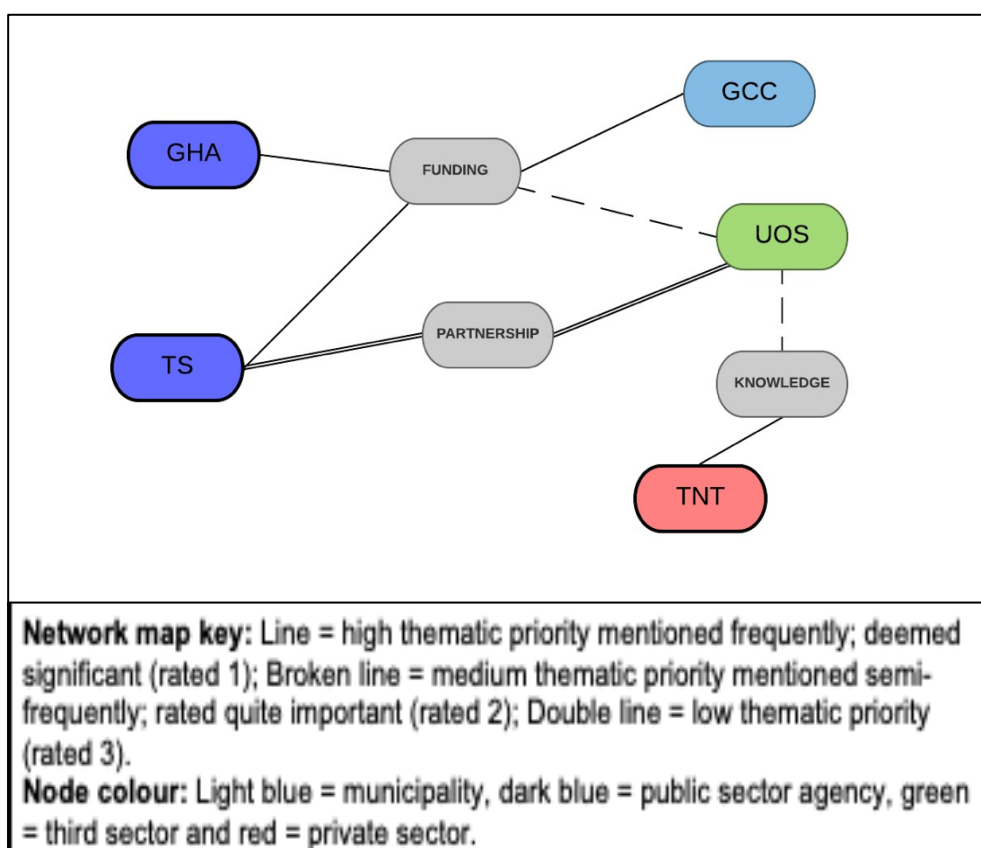
4.3.3 Project characteristics: Governance features

Research data suggests that through stakeholder interactions, specific key features (characteristics) of governance networks were more evident than others within the RUGGEDISED project.

Inter-dependency: Resources stakeholders provide to the project

The SNA diagram below highlights the main resources provided to the project: funding (in-kind time); knowledge (information and sectoral expertise), and; partnerships (access to new stakeholders and networks).

Diagram 9. RUGGEDISED interdependency (resources provided) network map



Stakeholders noted their contribution to the project was largely funding due to the nature of the project. Although they received funding for capital costs of materials, many did not receive

funding for in-kind costs for their time (and they did not want to bid themselves out of the project). The funding model covers overhead costs and stakeholders can claim varying amounts for their time, but this differed depending on the type of organisation involved. For example, public sector bodies can claim up to 100% of their costs (e.g., GCC), where the private sector (e.g., TNT) can only claim some of their time, up to 40%. This is due to the private sector developing products which they can then go on to sell after the project finishes.

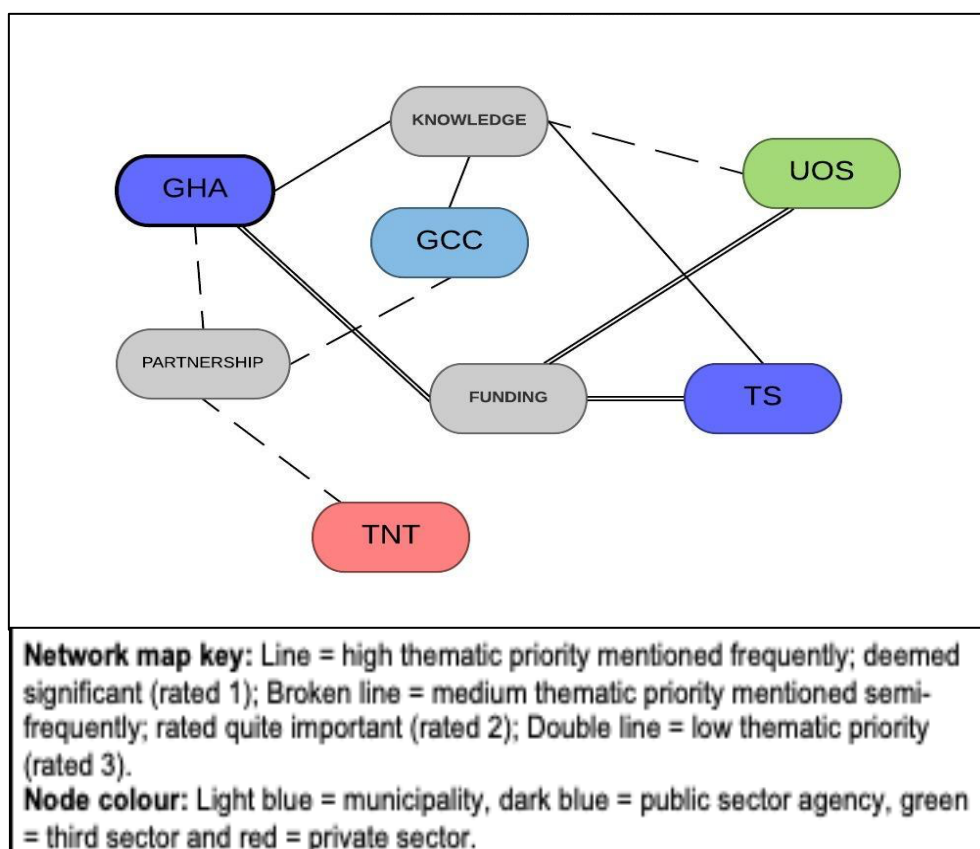
The knowledge provided to the project and to the municipality specifically was perceived as a key resource: technical information and expertise was passed between project partners and new relationships were developed as a result. Stakeholders noted that this knowledge exchange was not always funded.

The development of new partnerships and access to stakeholder networks was a key resource provided to the project. Stakeholders drew on examples of how this could be challenging (e.g., TNT relationship with GHA and SP regarding the district heating infrastructure that required updating to implement the project activities, yet SP were unwilling to update the infrastructure due to high costs associated).

Inter-dependency: Resources stakeholders receive from the network

The SNA diagram below highlights the main resources received: knowledge (information sharing, understanding solutions in order to upscale); partnerships (access to partners, networking, collaboration), and, funding (finance). The private sector (TNT) interests in developing partnerships rather than receiving funding from the project.

Diagram 10. RUGGEDISED interdependency (resources received) network map



A key aspect in receiving resources in the RUGGEDISED project was the knowledge exchange between stakeholders, such as understanding solutions in order to upscale and replicate them. The municipalities strategic ability to deliver infrastructure projects was keen as a valuable resource that other stakeholders benefitted from (in particular public sector agencies). Access to partners that stakeholders don't normally collaborate with, was perceived as a resource received as this collaboration shifted away from stakeholders working in their own sectoral silos. Funding was not prioritised as a key resource that stakeholders received by being part of the RUGGEDISED project.

Coordination: Stakeholder negotiation within the network

Three stakeholders claimed that there was very little need for negotiation within the project meeting discussions as the dynamics between participants was very relaxed. The project lead GCC did not have to refer to any issues between stakeholders and there was no controversy

mentioned during discussions. The remaining two participants noted this was largely due to the project logistics: objectives were set out at the beginning of the project and agreed by project partners in advance. Therefore, there was little deviation from the work stream plans (unable to change the purpose of the project).

The relationships between stakeholders within the project were generally perceived as very good and supportive as all partners were willing to facilitate discussions and meetings. There was a strong understanding of the benefits of such partnerships (e.g., knowledge exchange and learning). Nevertheless, the collaborative approach was regarded as unusual for such big projects. Stakeholders recalled how the strength of the relationships was largely based on the previous engagement between partners, especially with GCC on other projects as this meant that relationships had already been established, as evidenced by TS:

‘I would say because of the involvement that GCC have had in previous projects like that some of the relationships had already been established and they have able to learn from previous programmes as to what works and what doesn’t.’ TS, 21/12/17

The main element of negotiation occurred when there were deviations from the work-stream activity. Two specific challenges were referred to by stakeholders. Firstly, SIEM developed a commercial valuable product and wanted to protect the IP, whereas the IP belonged to the project. Thus, there was negotiation between SP lawyers and GCC to agree what was protected and by whom. Secondly, TNT partner activities required an infrastructure upgrade which can only be implemented by SP. However, they are unwilling to do upgrades due to the high costs, thus both partners are negotiating what activities can be done within the limitations as SP do not intend to make changes for another five years (out with project timescales).

Coordination: Stakeholder compromise within the network

When stakeholders were asked about the need to compromise within the project discussions, over half responded there was no need to use conflict resolution, though there was a need to

alter how they engaged with specific organisations (e.g., using different approaches when discussing issues with partners). Two stakeholders elaborated, stating that each project partner had different interpretations of how they envisaged sustainable development and the project activities. Many stakeholders noted that although there were benefits to this, as you could understand other partners perspectives (as each partner was engrained in their own work).

Participants claimed that there were no significant disagreements or drastic measures that the municipality have had to manage. If such disagreements arose, there was a clear willingness from stakeholders to support each other within their means (in some cases, solutions have not been found, but partners have demonstrated a willingness to help that is out with their remit within the project). This is evidenced by TNT issue with SP infrastructure: GCC and SIEM joined discussions in the break-out sessions with the team to brainstorm how the issue could be resolved - despite SIEM having little to do with the issue. When compromise was required, partners noted it was important to remember the aim of the project and identify the best solution.

Pluralism: Stakeholder interaction with specific types of organisation

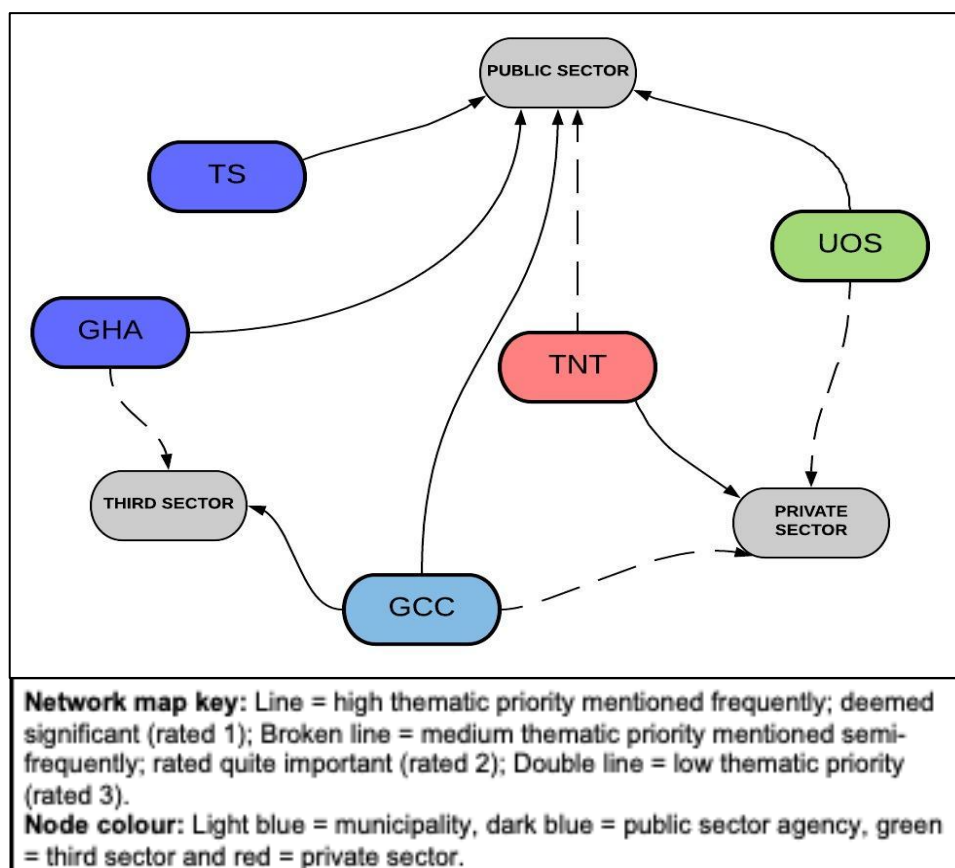
This section provides a network diagram to identify stakeholder's sectoral engagement (3.5.1) in RUGGEDISED, followed by key themes that arose from the interviews (3.5.2) on sectoral engagement and roles within the project.

'RUGGEDISED' pluralism network diagram

Within the RUGGEDISED project, the majority of stakeholder interaction are with public sector organisations, which had strong ties (rated 1 and 2) with all project partners. The private sector engagement amongst stakeholders is relatively frequent (rated 2). For example, strong ties exist between TNT and UOS in the project (due to work-stream activities within the project

which necessitates close collaboration). The municipality (GCC) engages frequently with other public sector organisations and third sector organisations (rate 1) and less so with the private sector (rated 3) in the context of the RUGGEDISED project.

Diagram 11. RUGGEDISED pluralism network map



'RUGGEDISED' pluralism: stakeholder interaction interview results

All stakeholders mentioned the municipality as the leaders of the RUGGEDISED project and also the partners with whom they engage with most frequently. However, the engagement with other partners was largely dependent on the work-stream activities and outputs. Some partners worked across work-streams (e.g., GCC), whereas other partners only participated in one (e.g., TS). Therefore, their engagement with partners in other work-streams overall was limited. Despite the limitations of the project logistics, there was strong cross-sectoral collaboration (e.g., public sector and academic interaction).

Both public and third sector stakeholders noted the role of the private sector in the project, engagement was relatively frequent as they often procured their services (e.g., specific expertise required) or they collaborated to address an infrastructure issue. There was a strong engagement with universities in the project as their role cut across work packages however, in addition, they had worked with stakeholders previously on funded projects.

Pluralism: Stakeholder roles assigned within the project

Roles were assigned within the project formation, with each partner in each work-stream agreeing the project plan and the majority of stakeholders were brought in for a specific reason (e.g., their area of expertise was required to meet the core deliverables of the project). The project plan detailed the deliverables and core milestones which were agreed by all stakeholders as evidenced by GCC:

'We then got the project partners to come back and really agree that they could hit those targets; naturally over time, those targets are going to be examined more thoroughly and they may have to be changed but by and large they are working to that end milestone, so that dictates what things we are working on.' GCC, 22/01/18

Part of the project remit was that all partners were required to provide evidence of meeting hard deadlines and targets (e.g., UOS had to provide information to GCC). All stakeholders were willing to work to plan but remain flexible without constraining the innovation process.

A third of stakeholders interviewed noted the difficulty in balancing their workload in their day job as well as the project requirements in RUGGEDISED, as the work was often delivered separately from the day job and not alongside it. Partners were working simultaneously on their own internal projects and RUGGEDISED.

4.3.4 Project management: Leadership and accountability

Formal network structure and stakeholder interaction evidenced through the formal nature of projects such as the planned activities, time dated deliverables and allocated leadership and stakeholders' roles influenced how the network operated.

Stakeholder leadership within the network

Within the RUGGEDISED project, specific individuals within the municipality were regarded as the principle partner who were responsible for the overall delivery of the project (this result was confirmed on the project website). The municipality were held by two thirds of participants as relaxed project leads as long as partners: did not deviate from the project requirements (e.g., no tangents), enabled a wider communication structure between stakeholders involved in the project (common communication protocol) and were transparent with their activities and progress. As evidenced by GHA:

'It would be GCC because they are the principle partner, but they have been fairly relaxed as long as whatever is happening enables this wider communication structure to work, so as long as you don't deviate and make complications for others or completely miss the point.' GHA, 08/11/17

Within the project structure, relationships between stakeholders and the municipality were formal (despite the informal nature of initial project discussions and the partnerships that already existed between most partners). The municipality were aware of their position in leading the project, but also noted '[we] couldn't progress [the project] without partnership' as all stakeholders brought assets to the project that were necessary for the project delivery.

Two stakeholders noted that there were a broad range of personalities involved in the project (e.g., quiet, intelligent, loud people). Despite the differing personalities of stakeholders, they all used their influence in the 'right direction' and appeared to have good intentions, genuinely working to a 'common goal'. Sectoral collaboration between stakeholders (despite differences)

was frequently referred to as the 'Team Glasgow' approach and was perceived as understood to have a positive effect on the ability of the group to meet project deadlines as the assets provided by partners to the project would benefit all partners involved and contribute towards the 'bigger picture' of the 2020 carbon reduction targets in Glasgow that could in turn, inform the wider city agenda.

There were some leadership challenges regarding disagreements and project demands beyond the municipalities control. For example, the municipality had difficulty influencing the private sector stakeholders as they were seen to answer to their own board in the first instance and the project leads second. In addition, the international project partners (e.g., Rotterdam) oversaw the whole RUGGEDISED project and frequently issuing requests for information which required another layer of bureaucracy for GCC. The municipality then had to liaise with stakeholders to gather the information. As a result, many stakeholders noted the resources they provided to the project outweighed the resources they received from the project as evidenced by UOS who mentioned '[it was us] helping GCC - not us wanting help from RUGGEDISED.'

There were differing opinions with who should be leading projects like RUGGEDISED and the project deliverables. For example, from the informal discussions with the SG, they thought municipality should be leading the delivery. However, stakeholders in the project expressed a need for national government to play a bigger role in such projects (and in some cases, should be leading them) as evidenced by UOS:

'I think the Scottish Government thinks the local authorities should be doing this, I think the councils argue it should come from central government so we certainly can't deliver it! We don't have the ability to do that, we don't own the streets, we don't have the funding available, we are a university.' UOS, 09/04/18

Some stakeholders (such as UOS) felt that they didn't have the necessary resources, assets or funding to deliver such projects whereas other stakeholders (e.g., TNT) felt that the local authority, though a 'natural' leading partner in this type of project, didn't have all the resources

required to deliver it effectively (e.g., TNT described the project team as small who didn't have a succinct plan to deliver it).

Stakeholder accountability for project activities and outcomes

From the interview data, four participants noted the municipality was seen as accountable for the project (e.g., regarding coordinating stakeholders, arranging meetings, reporting and meeting deliverables and contributing towards the wider carbon targets outlined in the city's sustainability strategy). GCC were aware of their accountability within the project, naming themselves as responsible for deliverables. The municipality was the only stakeholder within the project that had the power to escalate any project issues up to the international project managers and funders (e.g., the European Commission).

Stakeholders felt that they had the ability to approach GCC with any questions on the project, the workplaces were not seen to be 'set in stone' within the project. The open nature of GCC in this project was largely seen to be a result of the previous project work between partners in Glasgow and the fact that the majority of them were well experienced and knew their responsibilities.

Within the project plans, the municipality were seen as the formal leading partners, accountable to the European Commission for all project delivery. However, numerous stakeholders describe the role of the utility companies (e.g., SP) as accountable as they had assets 'what everyone needs to work' [TNT] and thus had the power to withhold information or assets that were necessary for project delivery.

The project remit brought up wider discussions regarding the level of governance required for low carbon energy (e.g., district heating). In other words, who funds it, delivers it, etc. Both local and national government were seen to be best placed to enforce such energy regulations

but there was a role for other stakeholders who could lead such initiatives within their organisation.

Capacity to influence the project

Stakeholders were asked if any one partner had the capacity to influence the project outcomes. Half of participants mentioned that it was unlikely that any one partner could influence the delivery or outcomes as the nature of the project meant all roles and remits were pre-defined and agreed. The project bid was written to reduce the ability of any one stakeholder to dominate or influence the project (e.g., workstream activity confined the activities of partners to meet specific project deliverables).

The municipality's role as project lead meant they were able to influence decisions, but it was open to ideas and remained flexible to solutions that could enhance the project and improve efficiency. Private sector stakeholders noted that utility companies had the ability to influence the project as much of their role within the project was dependent on SP to ensure their infrastructure was up to date; therefore, there was a reliance on the utility company.

There were conflicting statements regarding the ability of stakeholders to influence the project. For example, some stakeholders said influencing the project was restricted as the project was geographically curtailed (e.g., GCC). Therefore, stakeholders were geographically locked into one area as evidenced by GCC:

'I think the approach we have taken is good because it's geographically curtailed, the people who are involved are geographically locked into that area so if the UOG was to say, "Why are you working with UOS and not us?" Well it's their building that we are working at, they are there.' GCC, 22/01/18

Conversely, other stakeholders (e.g., TNT) noted that if an asset within the smart street did not work, this put obstacles in the way for other partners. Hence, the ability to influence the project was somewhat limited by assets within the RUGGEDISED project. In addition, some

participants that did not have resources to leverage mentioned the use of soft power in the project.

4.3.5 International engagement

Research data suggests that, apart from the formal international network links written into RUGGEDISED project, there was very little international engagement. Four stakeholders mentioned the project to their own international networks to share knowledge and expertise but did not formally associate this with the project. Given the project structure and limited resources, the data suggests these constraints limited the international engagement out-with the formal links, however, there was no mention that this had a negative impact the ability of the project partners to deliver the work-stream activities.

The RUGGEDISED project had an international element to it, with lighthouse city partners across Europe (as detailed on the project website). Yet, beyond the formal project links, there were no stakeholder relationships with other city networks or projects, per se. However, RUGGEDISED was important for the municipality to talk about as an exemplar project when it collaborated with other cities or municipalities on projects. The Sustainable Glasgow network was directly linked to the project as project partners were involved with both the network and the project, though it was delivered separately.

Individually, stakeholders mentioned the project to their networks and when they met with other municipalities (not linked to project but internally) to share knowledge and experience and learn from other cities doing similar projects (e.g., UOS met Scandinavian cities delivering district heating projects). The international aspects of the project largely required pulling reports together for stakeholders and funders as a means to control the project activities and deliverables.

The main engagement with international networks in the context of the project was through formal partnerships, such as learning trips to share experiences with other lighthouse cities (and their respective project partners) and project meetings where stakeholders could present their work-stream activities and deliverables to delegation related to RUGGEDISED as the aim of the project was to replicate successes elsewhere. However, beyond the project, formalities any international networks leveraged were individual stakeholders only.

The main reason for international network engagement was the project deliverables; stakeholders did not mention any other reason for engaging with international partners in the context of this project. The key benefits of liaising with international networks was sharing knowledge and learning how different cities implement similar projects in order to scale up solutions in other parts of Glasgow and within other cities in Europe.

4.3.6 Project evaluation: Effectiveness of governance networks

The main theme to emerge from the interview data regarding improving the effectiveness of the project delivery was the collective vision that was required by stakeholders to understand what the municipality was trying to achieve within Glasgow. Three participants stated the collective vision ('Team Glasgow' approach) which was hard to establish, as the older infrastructure and urban planning systems meant that new technologies and energy solutions could not be integrated, which made it more challenging to get stakeholders on message as evidenced by UOS:

'It's a collective vision that's needed and that's quite difficult to establish in an old city, that hasn't thought about that infrastructure requirements in that sense. Yes, it's an understanding this is what we are doing, and this is why it's important, and here is how we can all work together with the systems that we have got, without adding a huge amount of costs and effort to the whole thing.' UOS, 09/04/18

The established partnerships were widely perceived as a strength for the project (and the decision-making process) as GCC worked with known partners, there was a level of trust that each stakeholder would deliver. The municipality saw this as a sensible approach as it reduced

the risk of working with new partners and the resources and funding provided to the stakeholders would be utilised for the R&D activities (no-one was making a profit).

Another theme to emerge from the data was the balance between the internal and external organisational remits (specifically referring to the private sector). For example, the municipality was aware it needed private sector involvement in the project but was aware of such companies each had a 'different master to answer to' [TNT] therefore the business objectives came before the project objectives, as evidenced by GCC:

'The public sector is finding it challenging to manage how to collaborate and innovate with the private sector without the fear of being challenged; ultimately we are trying to deliver a holistic approach to energy solutions and the public good and we need some help from the private sector to develop those things.' GCC, 22/01/18

Working with the private sector required changes to how the utility companies for example, engaged with project stakeholders. Some stakeholders suggested service corridors for all stakeholders to have access to (e.g., asset owners such as utility companies for all infrastructure within a given area in Glasgow) as this would speed up any infrastructure challenges and enable the deployment of new energy efficient solutions. Nonetheless, it was unlikely for this to happen within the project timescales but was seen as necessary by project partners to deliver on the project objectives. Improving the effectiveness of project delivery with such solutions outlined above, required each stakeholder to have a line objective, clear goal(s) and remit within the project and would enable the project to be more 'joined up' as there was overlap in various aspects of the project.

Lastly, more resources were perceived as important for stakeholders to deliver project outcomes, specifically the staff costs covered (this varied for each partner) and didn't account for the reporting aspects which were time consuming and synonymous with European funded projects.

4.4 Sustainability sector: Glasgow

Interviews were conducted with ten stakeholders within the Glasgow sustainability sector, in order to understand stakeholder relationships between the wider city and the Sustainable Glasgow network and RUGGEDISED Project. This process provided an external perspective on the role of the city network and project which clarified for example, leadership in the network, or specific role of individual organisations. Key themes from stakeholder interviews are also identified and summarised below.

The results identified four key themes: frequent stakeholder interaction with frequent stakeholder consultation on key sustainability policies within the city (and an interest in future collaboration); the development of new climate orientated networks and partnerships; general awareness of Sustainable Glasgow network and its activities; and, sound knowledge of the key themes (and various SDIs) within the Energy and Carbon Masterplan.

Table 9. Abbreviations of stakeholders in the sustainability sector, Glasgow

ABBREVIATION	STAKEHOLDER	SECTOR
UOG	University of Glasgow	Third
SUST	Sustrans	Third
SW	Scottish Water	Public sector - agency
GCPH	Glasgow Centre for Population Health	Third
UOS	University of Strathclyde	Third
SIR	Scottish Institute for Remanufacturing	Third
SNF	SNIFFER	Private
ZWS	Zero Waste Scotland	Public sector - agency
NHS	NHS Scotland	Public
CSIC	Construction Scotland Innovation Centre	Public sector - agency

4.4.1 Stakeholder interaction: Frequent sectoral and sub-sectoral stakeholder interaction and consultation

Stakeholders within the wider sustainability sector in Glasgow described the strong partnership, collaborative approach and frequent engagement between organisations. In particular, specialized sub-sectoral partnerships were evident.

The collaborative nature between stakeholders is evident as nearly all stakeholders (9 out of 10 participants) strategically worked with each other on key policies, projects and initiatives (all of which aligned with thematic areas of interest outlined in the city's sustainability strategy). For example, the Scottish Government (SG) noted the collaboration with stakeholders involved in the Sustainable Glasgow network through the 'LED street lighting' project where they worked closely to implement the project and showcase how national and local government could collaborate. This project directly related to the LED lighting sustainable development indicator (see 'Action 20') within the Energy and Carbon Masterplan. In addition, smaller sub-sectoral collaboration between stakeholders was demonstrated through the transportation focused stakeholders (e.g., SUST) who described their partnerships and engagement with other similar organisations (e.g., SPT, TS). The majority of stakeholders provided examples of engagement and partnerships with other organisations in the city, evidenced through projects and collaborations (e.g., such as Zero Waste Scotland's 'Circular Economy' project with the Chamber of Commerce and Glasgow City Council). In addition, the municipality frequently reached out to sectoral stakeholders to input into a variety of sustainability policy and projects when required. For example, Glasgow Centre for Population Health (GCPH) stated the municipality had asked them to input on local green development and carbon reduction plans. Four organisations interviewed expressed an interest in continuing their working with the municipality and strengthening those relationships, as evidenced by Scottish Water, 'we are keen to engage with GCC...about carbon management going forward'.

The results highlighted that generally, each organisation's remit, sectoral focus and internal objectives directly influenced the level (e.g., strong or weak links) and nature (e.g., one off discussions or formal project collaborations) of stakeholder interaction within the city. For example, NHS Scotland stated their objectives were largely around environmental compliance and legislation, and so their engagement was with SEPA (Scotland-wide environmental regulatory public sector agency) and with Glasgow City Council (e.g., on local legislation and compliance). In addition, other stakeholders developed deliberate strategic partnerships with sectoral specific organisations to collaborate and share knowledge, to further their own organisation's objectives and 'facilitate outreach to reach more people' [SIR]. For example, Sustrans partnered with Transport Scotland (TS) and Strathclyde Partnership for Transport (SPT) by embedding staff in these organisations to shape sustainable transport actions going forward. Cross-sectoral collaboration was evidenced within the participant responses but was not as frequent as sub-sectoral collaboration. GCC was the main stakeholder that encouraged cross-sectoral engagement as well as consulting stakeholders to input into relevant policies, etc.

4.4.2 Sustainability partnerships and networks

Results highlighted a variety of other sustainability orientated networks and partnerships within Glasgow. These networks tended to have a specific thematic focus (e.g., climate risk), rather than the holistic approach taken by Sustainable Glasgow.

Seven participants described their involvement in partnerships and networks beyond the Sustainable Glasgow network, such as Climate Ready Clyde [SNF], Clyde Green Valley Partnership [GCPH] and Scottish Cities Alliance [ZWS]. Such partnerships were similar to Sustainable Glasgow in that they were comprised of board level members. The partnerships and networks appeared to be relatively new initiatives to bring together stakeholders around specific issues (all developed since Sustainable began in 2010). For example, UOG noted their involvement with Climate Ready Clyde 'we are one of the paid-up members of that and we sit

on the board with the remit of developing an adaptation strategy'. In addition, SW mentioned their role within the Clyde Green Valley Partnership '...there are a number of people we interact with on the surface water side.' All stakeholders involved in such partnerships, linked this involvement with the municipality (GCC) and noted the accessibility as the network afforded them the opportunity to engage with senior people. This can be evidenced through GCPH's roles Clyde Green Valley Partnership: '...The board...gives me access to eight different local authorities....as well [as] fairly senior people within this...'

Most stakeholders participated in sustainability orientated networks and partnerships within the city and saw them as a vehicle to: develop partnerships and share knowledge on key sustainability projects and policies within the city; access stakeholders they otherwise may not have had the opportunity to, and, focus on specific thematic areas directly related to their organisational strategy. Specific sub-sectoral partnerships were particularly relevant as they had identified gaps within the municipality's [GCC] approach to sustainable development (e.g., flood risk and resilience) and attempted to fund research in order to better understand the problem. Although GCC were involved in the partnership, it was initiated independently. Generally, the partnerships and initiatives appeared to have enhanced collaboration and as such, strengthened relationships between organisations.

4.4.3 Sustainable Glasgow network and RUGGEDISED

Sectoral stakeholders in the city appeared to be aware of the Sustainable Glasgow network (and the role of the municipality) and its key activities, but not all had access to participate in the network discussions.

There was a general awareness of the Sustainable Glasgow network (mentioned by six participants), it's aims (e.g., holistic approach to carbon reduction within the city) and activities (e.g., projects and initiatives), though it was widely perceived as a senior board (e.g., with many noting their CEOs or Directors involvement with the network), which was further

evidenced by two stakeholders referring to the network as the 'Sustainable Glasgow Leadership board'. As such, general practitioners could not provide detailed insight into the specific activities or discussions. A select few sectoral stakeholders noted the 'broad' focus and aims, and some who were familiar with the network's activities, noted the recent hiatus due to local and national elections, stating that the new administrations may not support or prioritise the network.

It was perceived by participants that GCC played a key role in initiating and delivering the network's activities and outputs; the municipality was synonymous with the Sustainable Glasgow, with UOS stating: 'Sustainable Glasgow is just one example of how we work with the council.' Given the network's close association with GCC, it was perceived as a vehicle for the municipality to further their outreach and drive their wider agenda within Glasgow. Most stakeholders referenced the RUGGEDISED project as a flagship project for the city but did not necessarily link it to the Sustainable Glasgow activities, as such they were seen as separate entities.

4.4.4 Glasgow's Energy and Carbon Masterplan

Most stakeholders had a fair knowledge of Glasgow's Energy and Carbon Masterplan, demonstrating a clear understanding of the key themes within the plan (e.g., big data, district heating that were identified in the secondary data analysis) and their links to organisational strategies.

Stakeholders that were aware of the city's sustainability strategy tended to relate this to their own organisation's plans. For example, SW stated: 'our long-term plan is to reduce our impact on resources and driving sustainability for our own organisation...very much in alignment [with Glasgow's plans]. In addition, UOS went further to suggest that 'as a progressive institution [we] have our own strategies and objectives, our objectives and targets are probably more ambitious than the ones for the whole of the city.' Stakeholders could place their own expertise

and organisation's remit within the context of the city's strategy and could make their own assessment of whether or not it aligned with the objectives set by the city. Some organisational remits aligned with the city's sustainability strategy (with some either meeting and/or exceeding targets). Stakeholders tended to focus on their own thematic area of interest and expertise thus could not detail SDIs and/or specific projects in other thematic areas.

Stakeholders frequently linked their own organisation's strategy with the municipalities by discussing a variety of cross-sectoral sustainability projects, all of which aligned with the thematic areas outlined in the city's Energy and Carbon Masterplan.

Copenhagen

4.5 Network: Copenhagen Climate Panel

The table below details the abbreviations for each stakeholder in the Copenhagen Climate Panel and is necessary to understand the social network analysis diagrams.

Table 10. Abbreviations of stakeholders in the Copenhagen Climate Panel

ABBREVIATION	STAKEHOLDER	SECTOR
COCP	City of Copenhagen	Public
CONC	Concito	Third
RAMB	Ramboll	Private
SKF	Social Kapital Fund	Private
UOC	University of Copenhagen	Third

4.5.1 Network formation

Stakeholder perceptions of the formation and structure of the Copenhagen Climate Panel highlight features that can both help and hinder the networks ability to effectively design and implement sustainable policy within Copenhagen.

Network formation

The main theme emerging from the data was the selection of stakeholders involved with the Climate Panel network. All participants were personally invited (or 'appointed') by the Mayor and received a formal invitation to participate in the network, as evidenced by CONC:

'I was appointed personally by the Mayor of Copenhagen, he wrote me a letter...me or maybe it was Concito, it was probably Concito, but this was after we developed a good collaboration with the responsible Head of Climate in Copenhagen [municipality] and I guess they were finding out who could give some added value to their discussions...and they formally kind of invited us in a letter.' CONC, 13/02/18

Stakeholders were 'appointed' by the municipality, specifically, the TE Mayor (civil servants also advised the Mayor regarding who could 'add value' to the discussions). The data suggests there was criteria for the selection of individuals (and their affiliated organisations). For example, stakeholders were 'high level' and had a national and international profile within the sustainability sector. UOC emphasised the sectoral representation of the Climate Panel, the relationships between such sectors as well as the high-level nature of individuals:

'One of the nice things...and one of the strengths – coming from a country like Denmark is the fact that we have a small society and it's really good connections across from academic to business, from business to politics and politics to academia ... so it was a big high powered stakeholder; it was a high powered panel.' UOC, 27/02/18

The concept of a 'small society' was reinforced further by the participant (UOC) who stated that they had a 'national profile dealing with climate' and a reputation for being knowledgeable and experienced within in a specific sector, such as transport, finance or energy. It appears that other board experience or network participation was a common trend amongst the stakeholders selected. Additionally, most of the stakeholders selected for the Climate Panel were known in some capacity to the municipality, having collaborated on projects (e.g., UOC) or conferences (e.g., RAMB) previously. There was a clear interest from stakeholders in Copenhagen's sustainability targets and contributing towards reducing carbon emission as evidenced in most stakeholders noting the inspiration behind the Climate Panel formation.

Another theme arising from the interview data (mentioned by three participants) it was the municipality's role in initiating the Climate Panel: identifying the panels role, remit and how it could support the municipality achieve its own sustainability outlined in the Copenhagen 2025 Climate Plan. The municipality profiled its needs and organised all meetings, created a 'terms

of reference' for each stakeholder and hired an external individual (a well-known Danish journalist) to facilitate the meetings to ensure the TE Mayor could participate freely in the discussions. Agendas created by the municipality provided a structure for discussions and focused on thematic areas where the municipality required insight and input into policies, initiatives and projects. The municipality's perspective aligned with this, as COCP noted the need for dialogue with people behind the investments and the Climate Panel created the process to do so.

Frequency of network meetings

All participants stated that the Climate Panel network met approximately four times a year (on average) for a half day (three hours). Nevertheless, this was subject to change determined by the municipality's need for information or insight on specific themes. The Danish general election was noted by 28% of stakeholders as the network had not met since the new Mayor had been elected. Most participants expanded on this, stating that the election period cycles can impact the ability of the network to act as the Climate Panel is solely driven by the municipality. Stakeholder attendance at the meetings remained relatively consistent, but there were always one or two individuals missing. Only once did the meeting not go ahead due to low attendance.

Stakeholder motivations in joining the network

The interview data highlighted two different motivations for participating in the Climate Panel. For the municipality the motivation was leveraging ideas on how the climate targets could be achieved which would support the design and implementation of the Copenhagen 2025 Climate Plan. Specifically, the interest in local stakeholders' competencies was perceived as important for the Mayor as local ownership over the plan could speed up the implementation of low carbon ideas (this would influence the design of the 'roadmaps' created by the municipality to measure and track progress towards the city's carbon reduction targets). The

Mayor intended to give stakeholders some 'ownership' over the Copenhagen 2025 Climate Plan, in a bid to encourage them to invest in the city and implement the plan.

The stakeholders' main motivations were two-fold: firstly, three participants claimed they had a strong personal interest and feelings regarding climate issues and felt it was their civic duty to participate in the Climate Panel, and secondly, the other two participants mentioned their well-known profile in the sustainability sector (thus have influence and could leverage it). Therefore, they felt it was important to use their profile to promote Copenhagen as a sustainable city. The municipality was seen to have potential to be a world leader in the sustainability sector with its ambitious climate targets. This is illustrated through SKF's response:

'I think Copenhagen is a city with a lot of potential it's hugely important to Denmark, I feel very deeply strongly about climate change issues so if I in any way could contribute to make a difference in terms of making the city more sustainable through such things like the Climate Panel I feel it's part of my civic duty to do so.' SKF, 14/02/18

Although personally interested in sustainability, and displaying a sense of personal obligation, there was also a business interest in participating in the Climate Panel, as each organisation could bring sectoral expertise to the discussions, as mentioned by RAMB:

'We have been one of the founder[s] of this Climate Plan and vision 2025 emissions plans so I have personally been interested in this and we also from a business perspective are interested in doing projects within the climate change.' RAMB, 03/04/18

Therefore, participants tended to mention both personal and business motivations for participating in the Climate Panel (specifically RAMB a private sector organisation). Additional themes that weren't mentioned as frequently also include the opportunity to access and engage with the Mayor on climate policies and offering him new perspectives and ideas to achieve the Copenhagen 2025 Climate Plan.

Main objective of the network

Three participants stated the main objective of the Climate Panel was to contribute to the Copenhagen 2025 Climate Plan carbon neutral targets, both the design and implementation of climate policies, and how the decisions made by the municipality could affect the stakeholders on the panel. The remaining two participants noted the objective was to discuss and share ideas on sustainability - specifically, to bring stakeholders together to discuss issues, provide inspiration for the plan and swap ideas with the Mayor in a closed room. This was confirmed through interviews with sectoral stakeholders not directly involved in the network but aware of its remit, who stated the 'advisory board' [CONC] and 'implementation network' [CSL] role of the panel.

Another theme to emerge from the interview data (mentioned by two participants), was the definition of the Climate Panel as an action orientated 'think tank' by taking stakeholders expertise and perspectives on board as well as providing ideas for carbon reduction and the areas for greatest potential, as evidenced by SKF:

'The main objective was to be to be a think tank and inspiration group for the Mayor in terms of identifying policy action areas and ideas for new policies, so we were like an action orientated think tank where we would discuss what are the main arenas in terms of driving sustainable change in Copenhagen with specific regard to climate change, where action is needed and then we would say what kind of domain are.' SKF, 14/02/18

There was a general awareness amongst stakeholders that the municipality could not develop policies without engaging them in the process as they were all directly affected by the policies. Some research participants noted that the municipality 'needed them' to implement policies and get stakeholder buy-in, in the city.

The municipality had already implemented the 'low hanging fruit' [UOC] policies for carbon reduction in Copenhagen, but they needed fresh new ideas on what else could be done. Thus, they created this 'safe space' [COCP] to engage with external organisations, as expressed by

RAMB:

'I think it was put together by the Mayor himself...he was very interested in if CPH had to be CO2 neutral in 2025. It was not only [a] decision to be taken by the municipality itself, but also a lot of stakeholders have to be engaged in this because, they have for instance, the utility sector and the citizens [regarding] the CO2 emissions reductions in buildings and so on...' RAMB, 03/04/18

The stakeholder interaction would enable the municipality to 'set up a framework for [the Climate] Plan' [COCP] to ensure the stakeholders within the city could relate to the policies developed.

Stakeholder expertise in the network

Two research participants stated that the municipality's expertise was climate policy knowledge and that they possessed the power to implement such policies. However, participants noted that the municipality did not have complete knowledge of climate policies and lacked competencies and a budget to fully implement such policies. Therefore, the municipality required support from external stakeholders to identify new solutions.

The expertise brought by stakeholders to the Climate Panel covered all key themes outlined in the Copenhagen 2025 Climate Plan (e.g., mobility, infrastructure and other themes identified in the secondary data analysis). The municipality were strategic in the type of person they invited on to the panel, while still ensuring fair sectoral and expertise representation. With this in mind, research participants noted how the municipality was interested, first, in the individual's knowledge and expertise and, secondly, in the organisations perspective and influence within the sustainability sector. Participants highlighted the municipality's interest in both thematic topics of interest to the Copenhagen 2025 Climate Plan but also stakeholders who could provide a broad perspective ('knowledge of all scenarios' [UOC]) on sustainability issues.

In addition to thematic expertise, two stakeholders were selected as they were seen as a guarantee the panel wouldn't follow an incompatible direction. For example, UOC had extensive experience in working on various climate related committees and negotiations. It would make suggestions that were relevant for the city level and possessed a deep understanding how sustainability strategies were integrated with economic development plans, etc.

Lastly, stakeholders could tap into their networks and mobilise their organisations to act in alignment with the municipality's 2025 Climate Plan policies. The municipality did not have the scope to achieve this on its own.

Stakeholders' definition of 'sustainable development'

The main theme to emerge from the interview data (mentioned by three participants) was the 'sustainable development' triangle concept and how it linked to the Sustainable Development Goals (SDGs). Research participants focused on the triangle concept as a reference point, linking each concept to Copenhagen's definition of a sustainable city. In addition, participants frequently noted that sustainability was not just focused on environmental change but how it tied into economic issues as well, COCP:

'I think our basic understanding of sustainability is really the basic definition...it's the environmental issues, the social aspects and the economic...the Climate Plan is [basically] sustainability. The plan has to have a ... positive impact on citizens and...on the city but also involve the economic sphere with the stakeholders in the implementation [phase]...' COCP, 09/04/18

As such, 42% of participants also mentioned that the SDGs were increasingly important as they encompass not just climate but everything (e.g., quality of life, green areas), as expressed by UOC:

'Sustainable development in a generic context is really living within the available resources, that's for me, and I think that is the cities are going to be the easiest place to do it in the sense

that we don't have a lot of agriculture within cities and that's one of the biggest challenges so cities have to show the way here and also the fact that we have got over half of the worlds' population living in cities, you say sustainable development is going to be made or broken in cities so I define it as most effective or efficiency use of resources possible and that means. I guess if you want to do it in terms of the SDGs, this panel was not about sustainable development it was only about climate but I think climate has morphed recently into sustainable development and that climate is really just a proxy for the much larger problem that we have in terms of sustainable development.' UOC, 13/2/18

This definition not only refers to the SDGs but approaches the sustainability concept from a holistic point of view, detailing the resource use as key to addressing climate challenges in cities. UOC focused on what sustainable development meant at city-level specifically, discussing the potential that cities have in being the main driver against climate change as sustainability could be 'made or broken' in urban environments [UOC]. Participants also noted that it is possible to exploit synergies within cities and minimise negative effects of climate change as there are many inhabitants within a relatively small area; there is a huge potential to reduce carbon emissions.

Research participants mentioned the definition within the Copenhagen 2025 Climate Plan, though they did not explicitly state what the definition was. Instead, they referred to the sustainable development triangle and key themes (SDI categories) mentioned in the sustainability strategy. From this, participants mentioned the focus the Copenhagen 2025 Climate Plan provided for all stakeholders and how policies were created with the plan in mind.

4.5.2 Stakeholder interaction

Research data suggests that all stakeholders on the Copenhagen Climate Panel knew of each other prior to joining the network, therefore many already had strong relationships as they had engaged relatively frequently.

Stakeholders represented in the network

The municipality (COCP) mentioned their relationship with other public sector bodies, such as the utility companies that they owned, but did stress an openness and willingness to work with

a mix of stakeholders through the implementation of their climate projects (over 60 projects mentioned in the Copenhagen 2025 Climate Plan). Additionally, COCP noted their engagement with stakeholders was to engage with the 'people behind the investments for zero carbon in 2025' [COCP], such as with industry and different networks and stakeholders (not all stakeholders mentioned by the municipality were involved in the Climate Panel).

All participants mentioned COCP (the municipality) as the main stakeholder on the Copenhagen Climate Panel. Simultaneously, most stakeholders could recall all other organisations involved on the panel as most of them knew each other (even if they had not directly worked with each other previously). This led a few participants to point out that there were 'small circles' in Denmark, as stakeholders on the Climate Panel also sat on each other's boards. Additionally, although most stakeholders mentioned each other, many of them have changed positions since the board formed (many participants noted these changes).

The TE Mayor was mentioned by some participants as the person accountable for inviting stakeholders (suggestions were made by different council departments). There was uncertainty over whether individuals were appointed in a personal capacity or an organisational capacity. The municipality did note the sectoral representation on the Climate Panel, a mix of industry, third sector and public sector organisations. Citizen representation was not referred to by any stakeholder (including the municipality).

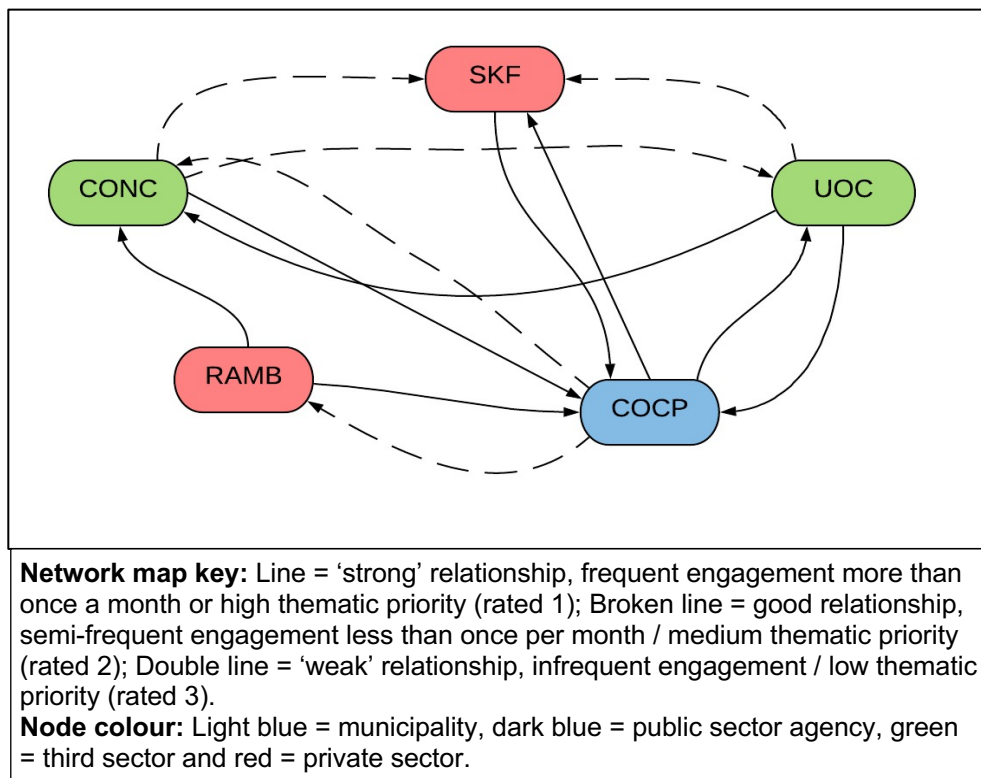
Stakeholder interaction within the network

This section provides a network diagram to visualises stakeholder interaction within the Copenhagen Climate Panel followed by key themes that arose from stakeholder interviews.

Within the Copenhagen Climate Panel, all stakeholders have a strong relationship with the municipality, COCP (rated 1 or 2). Weaker relationships exist between the private sector (RAMB) and the third sector organisations more generally (UOC and SKF). There are strong

ties between COCP and UOC in particular, as both partners equally rate their engagement as frequent. Third sector organisations (e.g., SKF, CONC and UOC) all inter-linked and have a relatively strong relationship / engagement (rated 2).

Diagram 12. Copenhagen Climate Panel stakeholder interaction network map



All stakeholders on the Climate Panel in Copenhagen either knew of each other or had heard of each other prior to joining the panel. Stakeholders 'weren't unknown' [COCP], as within the sustainability sector 'you get to know people' [RAMB]. Most stakeholders mentioned the 'little community' [UOC] in Denmark, as sectoral leaders were known to each other and most of them had engaged in project work, board work, at some point in the past. Stakeholders were able to draw on examples of previous engagement with other participants on the panel (e.g., UOC sat on the board for CONC and had known BIOR for a very long time, having worked on various projects together). Generally, all stakeholders mentioned UOC, Movia, DONG and NCC as key organisations on the Climate Panel with which they had worked with before in various contexts. As a result, the selection of stakeholders on the Climate Panel were perceived as relatively 'obvious' [COCP] as they each had strong reputations and influence within the sustainability sector and could clearly add value for the municipality in helping them

'see things differently' [SKF].

The municipality mentioned different relations with each stakeholder, as some of the same stakeholders had participated in previous iterations of the Climate Panel had some of the same stakeholders participating. COCP noted a process for partnership development for the selection of stakeholders who were invited to participate in different phases of the Copenhagen 2025 Climate Plan, such as the development of implementation plans and to help set the framework of work. Over time, the engagement with stakeholders was useful and the Mayor selected participants for the Climate Panel, though the municipality mentioned they did not just select climate experts but also new stakeholders to offer a new perspective on climate issues.

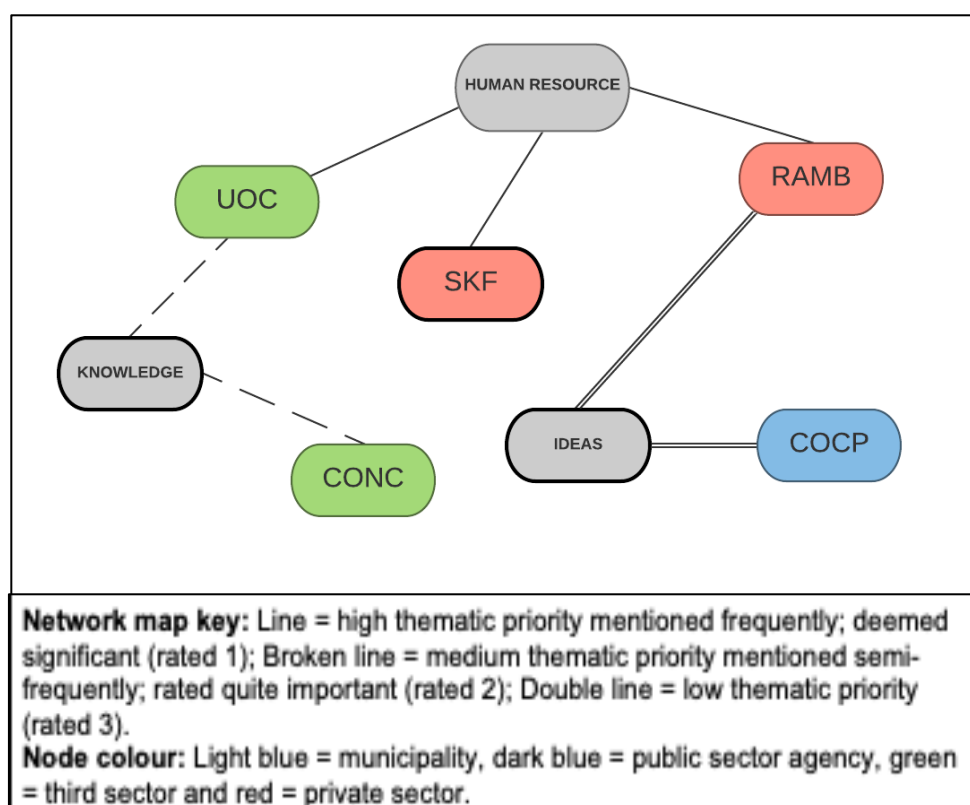
4.5.3 Network characteristics: Governance features

Stakeholder responses indicate that specific key features (characteristics) of governance networks were more evident than others within the Copenhagen Climate Panel.

Inter-dependency: Resources stakeholders provide to the network

The SNA diagram below illustrates the key resources provided to the network: human resource (people's time; voluntary capacity), knowledge (intellectual input, sectoral insight) and ideas sharing.

Diagram 13. Copenhagen Climate Panel interdependency (resources provided) network map



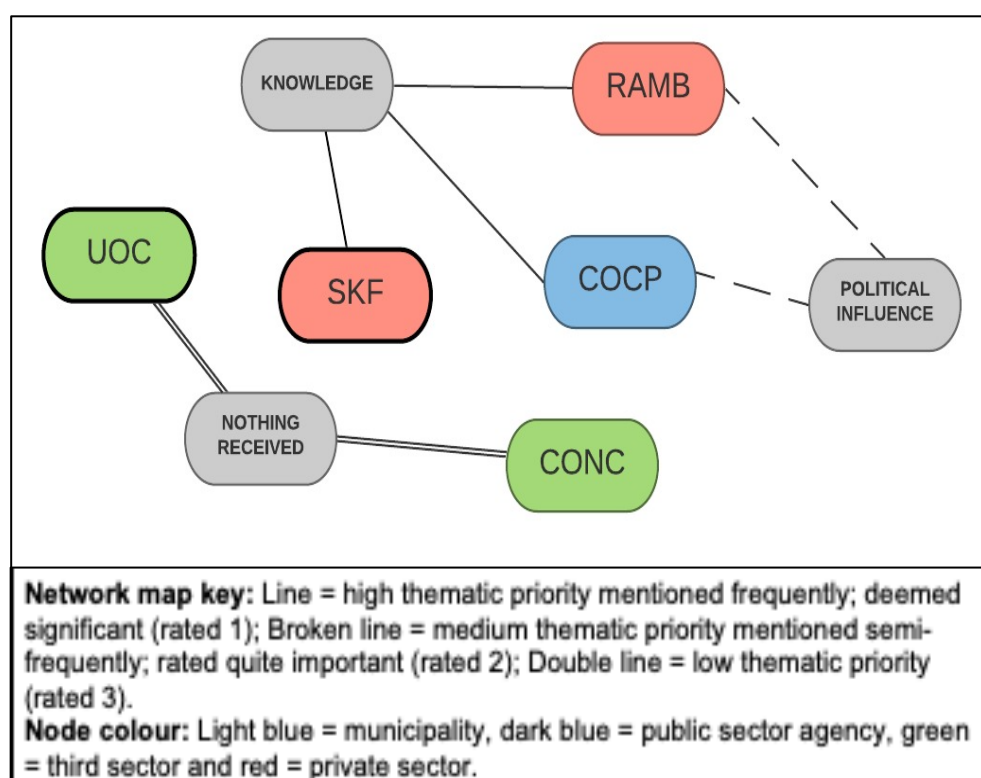
The municipality expressed a lack of human resources as a barrier to implementation which hinders the potential to meet carbon reduction targets. The COCP could describe the tasks required but needed insight into specific subjects and found value in discussing the ideas with external stakeholders. However, they did present ideas to the board prior to discussions, as this gave stakeholders time to draw on their organisational expertise and networks to provide more insight on a given topic, as evidenced by RAMB: ‘[I] talked to colleagues to ensure [a] greater perspective on the discussion’.

Any advice or insight provided to the Climate Panel could not be directly acted upon by the municipality as all sustainability policies have to go through set legislative processes. However, the board did provide a useful platform from which to gain insight and knowledge on key climate issues for Copenhagen and encouraged participation in the decision-making process.

Inter-dependency: Resources stakeholders receive from the network

The SNA diagram below highlights the key resources received from the network: knowledge (insight from other partners), political influence (influence the Mayor), and, nothing (no tangible resources received).

Diagram 14. Copenhagen Climate Panel interdependency (resources recieved) network map



The municipality mentioned the main benefit they received was the knowledge that the Mayor could use to justify specific climate policies and ability of the panel discussions to profile stakeholders needs and their value proposition. These, in turn, meant the municipality could ensure policies aligned with all stakeholders' interests. Stakeholder interaction therefore ensured that they had buy-in for policies as well as the opportunity to learn from partners. The ability of the panel to influence the Mayors viewpoints ensured that the decisions made were arrived at through discussion and were seen to be very open and transparent, offering insight into the city agenda. The 'closed door' [COCP] nature of the discussions ensured that stakeholders could discuss issues openly and provide honest opinions. Both third sector

organisation stated that nothing was received as part of the Copenhagen Climate Panel.

Coordination: Stakeholder negotiation within the network

The main theme from the interview data was the lack of negotiation within the Climate Panel. Four participants instead defined the discussions as a safe space to provide opinions and ideas on set thematic topics and 'political elements' [CONC]. Within the discussions there may be different opinions, but any disagreements are friendly and said with genuine intent to help the municipality. The informal nature of the discussions was described as 'genuine' as the municipality were open to different approaches to achieve the Copenhagen 2025 Climate Plan and could take inspiration for discussions and integrate them into the city's roadmap. Participants focused on the engagement on the Climate Panel as a way to support and encourage the municipality by working with specific players who could provide the right help and support to implement the plan. The only negotiation that was indirectly affiliated to the Climate Panel was the project specific roles, remits and grants. Participants noted the network itself was more discussion orientated however the projects required more negotiation to agree resources provided by each stakeholder. However, the panel itself did not tend to negotiate as that was not seen as its purpose as detailed by the participants.

Two participants stated that all meetings focused on one specific topic of relevance to the city of Copenhagen, which was decided by the municipality (the Mayor). Each meeting was comprised of the municipality detailing the thematic topic, providing an update on the city's progress or activities affiliated with the selected topic and drawing on external experts to present an overview of the theme for the stakeholders on the Climate Panel. Thematic areas include transportation, incineration plants and building partnerships to deliver the Copenhagen 2025 Climate Plan.

Participants from the City of Copenhagen specifically described the municipality's approach to the Climate Panel, explaining the process of gathering expert insight on specific 'subjects and

opinions' as well as 'mapping stakeholders' and 'describ[ing] the support required' [COCP]. The municipality were explicit in their aim to ensure some sort of stakeholder ownership over climate objectives that were set and led by the municipality and to develop a 'good value proposition' for future partnerships with external stakeholders [COCP]. The municipality hired an external facilitator to help manage, advise and provide ideas for the discussion, ensuring all stakeholders could put forward their opinions and the Mayor could contribute in the same way as all other participants. The municipality described their satisfaction with this process, explaining that the 'Mayor was happy with this approach' [COCP].

Coordination: Stakeholder compromise within the network

A third of stakeholders explicitly claimed that there was very little need for compromise as the discussions were informal and centered on sharing ideas and thoughts on climate policy. Participants could provide opinions and inspiration on thematic political matters set by the municipality, with the aim to encourage them and support the internal development of climate policies that align with the Copenhagen 2025 Climate Plan. Additionally, stakeholders on the panel tended to have specific areas of expertise and did not have knowledge of all areas. As such, there was no disagreement per se, as each stakeholder had sectoral specific knowledge.

The only mention of compromise was in the context of project development rather than discussions in the Climate Panel as stakeholders had different views on projects and expertise in specific areas (e.g., transportation and commuting issues) and therefore had limited ability to disagree over specific technicalities. However, participants did disagree over project roles and remit, but this tended to be out with the network.

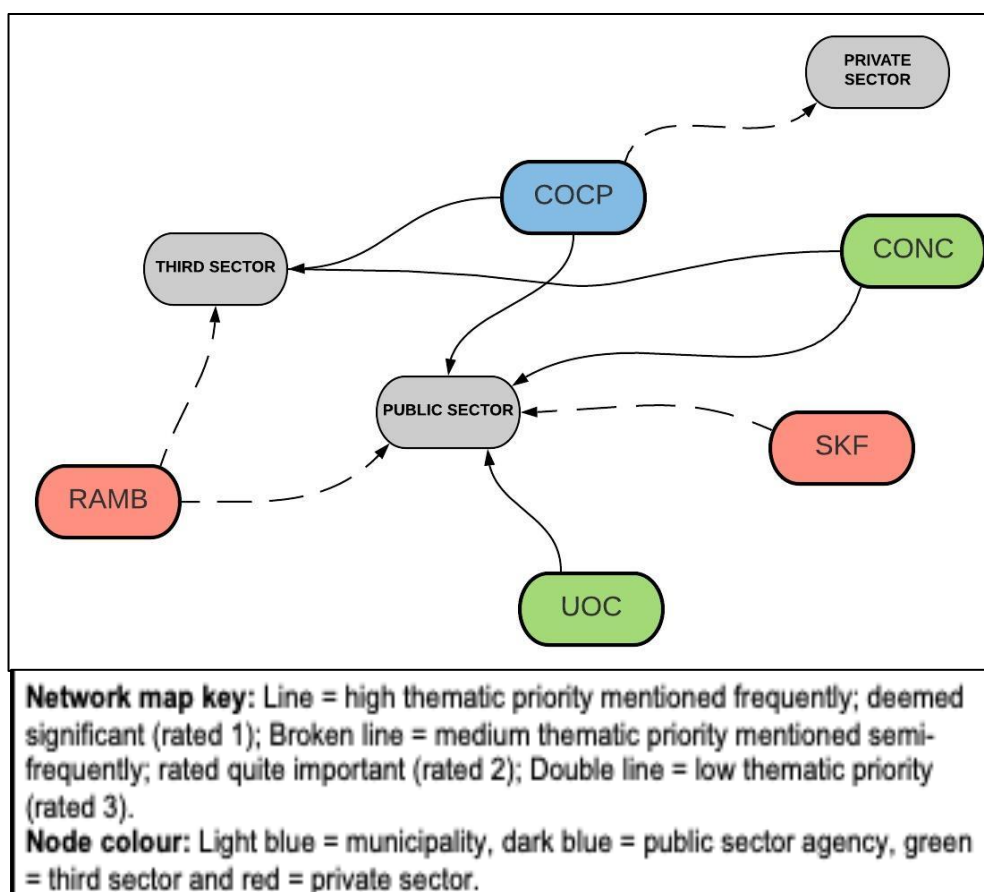
Pluralism: Stakeholder interaction with specific types of organisation

This section provides a network diagram to identify stakeholder's sectoral engagement (3.5.1) in the Copenhagen Climate Panel, followed by key themes that arose from the interviews (3.5.2) on sectoral engagement and roles within the network.

'Copenhagen Climate Panel' pluralism: stakeholder interaction network diagram

All stakeholders on the Copenhagen Climate Panel engage with the public sector most frequently, specifically third sector organisations on the network (e.g., UOC, SKF and CONC). Private sector stakeholders engaged more with public and third sector organisations (though ties were relatively weak). Data suggests RAMB did not engage with other private sector organisation the network despite two more business represented on the panel (but not interviewed). The municipality (COCP) appears to utilise the Copenhagen Climate Panel to also engage with the private sector, though described the relationship as relatively weak.

Diagram 15. Copenhagen Climate Panel pluralism network map



'Copenhagen Climate Panel' pluralism: stakeholder interaction interview results

As explored in the Literature, diagram 15 shows the pluralistic context of sustainability

decision-making within networks. This is reinforced by stakeholder interview responses that highlighted the pluralistic nature of working with diverse stakeholders. Answers as to how they engaged with each other were equally divided within the network: three stakeholders stated that engagement would change depending on the thematic area discussed, whereas two participants stated that engagement was the same across the board.

The main theme to emerge from the interview data was the informal engagement with different sectors participating on the Climate Panel changed depending on the task at hand. For example, the specific policy issues discussed and who could provide expertise on the issue, determined the level of engagement with that specific stakeholder. Despite this, stakeholders pointed out that everyone had the opportunity to put forward their organisations perspective on an issue.

Conversely, many stakeholders claimed that engagement with organisations on the Climate Panel was similar for everyone involved: they didn't interact more or less with specific individuals, the level engagement was the same as most participants were present at the meetings, with some stakeholders describing the informal engagement overall as a 'cosy relaxed discussion' as evidenced by UOC:

'We were a very small number of people on the [climate] panel so we all had a cosy discussion, relaxed discussion among us, so I don't feel like I interacted more with any particular group. You have to remember that all of us are already very involved in the public discussion.' UOC, 27/02/18

This was due to the stakeholders being involved in the wider public discussion; they were known within the sector already and many organisations had previous engagement prior to joining the Climate Panel.

The 'very frank and open' nature of the discussions ensured that every stakeholder could put forward their ideas and were open to cooperation and inspiration, as described by CONC:

'...It was a very frank and open discussion in an informal way so everyone could just put forward what they thought was important from their company's viewpoint.' CONC, 13/02/18

The Climate Panel approach ensured that all stakeholders could present their ideas and thoughts on climate policies to the TE Mayor in a safe space. Therefore, the very nature of the network facilitated and encouraged engagement between different organisations. The municipality stated that it was open to collaboration with all participants and wanted to support their ideas and listen to their knowledge. This was perceived as an important way to drive and set the climate agenda with stakeholders in mind. The municipality aimed to work with partners that had the same agenda and claimed it was 'very important' to the success of the Copenhagen 2025 Climate Plan.

Pluralism: Stakeholder roles assigned within the network

The main theme to emerge from the interview data was the different stakeholder and municipality perspective on assigning roles. City officials stated no formal roles were assigned to stakeholders and the Climate Panel was informal in nature. Stakeholders were selected due to their knowledge, positions in society and their ability to contribute towards climate policies and projects forward. The municipality were aware of their position initiating the Climate Panel and the need to keep their profile as open and to engaging with stakeholders, with the Copenhagen 2025 Climate Plan as the main driver for all municipal activities.

Conversely, four stakeholders stated that the municipality formally led the Climate Panel: they prepared all materials for the network meetings; the TE Mayor set the agenda and had direct insight on developing climate policies; participants were selected by the municipality; and, external participants were selected to provide a presentation on a thematic area important for the Copenhagen 2025 Climate Plan. Despite the formal organisation of the Climate Panel, the discussions were open and encouraged a roundtable discussion with stakeholders. There was an opportunity for direct insight from the TE Mayor on developing climate policies and getting stakeholder dialogue within a safe space (e.g., Chatham House rules) as evidenced by SKF:

'I think there were rules about making sure that the discussions were for internal use only so the discussions were Chatham House rules...some of the others may come from organisations where you know they would want to make sure what they stated was not necessarily the formal politics of the organisation...there were some Chatham House rules...at least that's how we were behaving.' SKF, 14/03/18

Despite the perception of formal rules, there were no formal roles assigned as every stakeholder was selected for their sectoral and thematic expertise and their role was to share this knowledge and help the municipality to develop new ideas, approaches and projects to enable the 'city to see if it fits into plans'. In other words, help to meet the Climate Plan objectives [COCP]. Regarding stakeholder roles, participants highlighted their role was as an individual and was not necessarily representative of their organisation. However, the municipality had consciously selected organisations that represented various sectors. Formal roles were assigned within projects rather than within the Climate Panel, as projects required agreement of tasks, project management roles and contribution from each stakeholder.

4.5.4 Network management: Leadership and accountability

Stakeholders perceived the City of Copenhagen [COCP], as leading the Copenhagen Climate Panel, as they had coordinated and facilitated the discussions and had developed the Copenhagen 2025 Climate Plan targets.

Stakeholder leadership within the network

The City of Copenhagen (specifically the TE Mayor) were largely seen by participants as leading on the Climate Panel organisation and delivering the Copenhagen 2025 Climate Plan (e.g., describing its core focus). Four participants claimed the municipality had set the climate targets and had the ambition which was beneficial to the Climate Panel. However, within the network discussions, a well-known Danish journalist was asked to facilitate the discussion to enable the TE Mayor to participate like a 'normal member' [COCP]. Therefore, no one single stakeholder was seen to be leading the discussions (of which the content was set by the

municipality). This resulted in one stakeholder stating that within discussions no one was leading per se. The lack of a formal chairman was seen as beneficial as it created a 'very informal environment' to discuss climate policies and projects [SKF].

The stakeholders on the Climate Panel were able to counsel and advise the municipality, which drew on their competencies and knowledge to progress the development of policies and projects. The City of Copenhagen was seen to have the right 'profile' to lead, as they were open to engage with external stakeholders and use their ideas and expertise to ensure their approach was of mutual benefit. The open approach taken by the municipality demonstrated leadership as stakeholders would approach them to participate in projects and other activities that would enable them to meet their climate targets. It was of mutual interest to make the Copenhagen 2025 Climate Plan work as everyone was seen to benefit from it and the municipality were perceived as best place to bring the stakeholders together to achieve it.

Stakeholder accountability for network activities and outcomes

The municipality were largely seen as accountable (both individuals within the municipality and departments) for the outcomes of both the Climate Panel and also the delivery of the Copenhagen 2025 Climate Plan. Two participants specifically mentioned the thematic approach to the plan, explaining that the municipality decided who the participants were (one participant for each theme in the Plan), the thematic topics that were discussed and then organised and prepared the meetings (and materials) for the Climate Panel. Their role in organising and preparing the topics for discussions within the meetings was regarded by stakeholders to be also seen as accountable for the outputs of the discussions.

Stakeholders did take some accountability within the Climate Panel, with two partners specifically outlining the initial process for participating: stakeholders were asked to sign a 'terms of reference' provided by the municipality prior to participating. By doing this, the participants noted their accountability within the Climate Panel, specifically, their responsibility

to actively contribute towards the discussions and provide support and ideas for the municipality, with some noting there was an 'informal positive pressure' to contribute (from all stakeholders around the table not just the municipality) [SKF]. However, stakeholders were aware that they could not directly influence decision-making as they were not elected officials, though they could provide ideas to the TE Mayor directly. Therefore, there was less accountability placed on stakeholders on the Climate Panel as this rested with the municipality who were driving the stakeholder interaction process and the climate policies.

Although the municipality are seen as accountable for the outcomes of the Climate Panel, both the municipality and stakeholders noted that there were limitations regarding what they could reasonably do within their own resource constraints. Stakeholders offered insight, sectoral expertise and ideas to the municipality (as they did not have this resource in-house). However, there was no guarantee that such ideas would be acted upon by the municipality. Participants noted different accountability dynamics within the implementation of projects in Copenhagen as set roles and project deliverables ensured clear management lines and responsibility.

Lastly, within the discussions there were no leaders per se, all stakeholders were able to freely talk. The meetings were facilitated by an external Danish journalist to ensure the discussion kept on track; there was no set leader within the meetings, yet the municipality was still perceived as accountable for panel outcomes.

4.5.5 International engagement

Research data suggests limited engagement with similar international networks and no formal partnerships. However, stakeholders claimed the Climate Panel had the ability to leverage contacts and networks if required. Overall, stakeholders mentioned that the Climate Panel drew on international experiences in order to learn from other cities and apply these ideas to Copenhagen.

The Climate Panel's link to international networks was limited, as four participants stated they did not have formal links with any other networks, and if they did, the links were those of the individual stakeholders and not necessarily tied to the Climate Panel itself. However, stakeholders did mention that the Climate Panel had the ability to leverage these links informally, if required.

The municipality claimed they were involved (or active) in other international networks, though this was not associated with the Climate Panel. For example, the municipality worked with the C40 Cities group, was a member of the CNCA network and Euro Cities, yet these were not affiliated with the Climate Panel.

The municipality's approach to the Climate Panel was to draw on external inspiration by asking new stakeholders (not currently participating in the panel) to present and provide insight and knowledge on specific topics that could help the city meet its climate targets. The Climate Panel discussions informed the municipality's needs and profile which informed the development of strategic partnerships on different subjects.

The TE Mayor did not appear to have specific international networks that he worked closely with, in the capacity of the Climate Panel, but rather, the stakeholders selected were there to provide insight, knowledge and inspiration directly to the TE Mayor and for the citizens. Stakeholders elaborated on this point, stating the Climate Panel was the TE Mayor's tool to get insight from sectoral experts that otherwise would not have been possible without the panel.

Stakeholders limited involvement with international networks (in the capacity of the Climate Panel) was the core theme to emerge from the interview data. However, they did mention the panel drew on international experience to learn from what policies and projects other European cities implemented. No formal agreements were in place with any international networks however, there were some opportunities within the Climate Panel to engage with politicians

around climate policies and projects, but this was not organised by the panel or the municipality.

There was no consensus why stakeholders (in their capacity as a network member) did not engage with international networks. However, through a stakeholder's own individual contacts, they could collaborate with such networks, predominantly to learn from other cities, share ideas and gain inspiration as well as tangible examples of scalable and 'best case' solutions. Stakeholders were keen to develop partnerships internationally (in a personal capacity as there were no concrete links with the Climate Panel), the main reason being to access new funding streams. One example mentioned by COCP included creating international logistics partnerships for Copenhagen to transport goods into the city in a sustainable and efficient way.

Stakeholders stated that any involvement with international networks provided many benefits, such as: knowledge exchange (the value comes from the broader perspective, discussions and sharing ideas); efficiency (learning from other cities to find solutions that don't waste resources); applying international experience in a Danish context (transferrable city solutions); and, getting buy-in from external stakeholders (credibility and confirmation that they are doing the 'right thing').

4.5.6 Network evaluation: Effectiveness of governance networks

Regarding the effectiveness of the Climate Panel in supporting the municipality meet its climate targets, the main theme (mentioned by four participants) to emerge from the interview data was the need for the municipality to prioritise its work and stay committed to the Copenhagen 2025 Climate Plan. The municipality stated its approach to collaborate on different projects and have many opportunities, but it had to stay focused on where the climate benefits were and align with the plan.

Stakeholders noted the local election cycles (four years) as a barrier to the Climate Panel's ability to support the municipality. Local elections could shift the political party governing Copenhagen; there was no continuity for the Climate Panel (e.g., it was unclear whether all parties would continue this approach to engage with stakeholders) as evidenced by RAMB:

'I think the huge problem with such a panel or general with climate change, it is of course that the local election period, the TE Mayor who is on the board here, he was there for four years I think, and then everything is re-organised and there comes a new Mayor and so on, who is different and from another party, so there's no continuity in this sense, and the investments you are doing within climate change is of course for much longer periods say 25 years or so, so there's a risk with that and at least last year you had the climate panel before the new election for the TE Mayor or for the City.' RAMB, 03/04/18

Stakeholders stated this disrupted partnership development and the opportunity to engage with new stakeholders. This was evidenced by the mention of the recent local elections and the newly appointed TE Mayor: it was unclear if they wanted a new Climate Panel. The governance cycles were widely perceived by stakeholders as hindering the effectiveness of the Climate Panel, but Participants noted the governance process could not be changed as it was the 'rules of the game' [RAMB].

Another theme to emerge from the interview data was challenges around attracting investment for Copenhagen's 2025 Climate Plan activities (mentioned by two participants). Stakeholders elaborated, stating investments were for long-term climate benefits. However, local election cycles were shorter, and decision-makers were largely interested in showcasing to the public things that could be delivered within these political cycles. Additionally, stakeholders mentioned the municipality needed to engage with the people who are able to invest in the city as otherwise there was a risk that no climate policies and would be implemented. There was a clear view from participants that the public sector should engage with stakeholders who can commit investment and have the right competences and profile to support the municipality. Stakeholders noted the importance in sharing lessons with other cities around the world and were also willing to share their own experiences and expertise. Participants stated that

Denmark had a good dialogue with stakeholders within the climate sector, however it was necessary to shift from sector thinking to systemic thinking as expressed by UOC:

'I think you don't really recognise the situation that we have in Denmark, I mean we have a really really close relationship between the municipality and the University of CPH for example, where i come from, and lots of people sit in different panels and so on...and I'm often phoned up by the people at the municipality on various things so you know I think one of the advantages of being a small country is that we really do have a good dialogue that goes across, I have a really hard time imaging how that dialogue could be better.' UOC, 27/02/18

Participants felt that the Climate Panel was a precursor to change; they noted that 'sunset clauses' should be integrated into their approach as needs change over time and climate change impacts all sectors - it is not exclusive.

The municipality's approach to stakeholder interaction and the formation of the Climate Panel was perceived as a 'good way to share ideas' [SKF]. The concept of the panel was need 'too out of the box for a civil servant' in composition or context and provided a safe space to engage with stakeholders and share knowledge and expertise. However, stakeholders expressed an interest in accessing more politicians and to engage more frequently with the TE Mayor on climate activities. The opportunity to communicate with stakeholders was perceived by the municipality as 'profiling' - an important way to be seen to be acting on climate change.

4.6 Project: Energy lab

The table below details the abbreviations for each stakeholder in the Energy Lab project and is necessary to understand the social network analysis diagrams.

Table 11. Abbreviations of stakeholders within the Energy Lab

ABBREVIATION	STAKEHOLDER	SECTOR
DANF	Danfoss	Private
BOH	By og Havn	Public - agency
HOF	Hofo	Private
ABB	ABB	Private
DTU	Technical University of Denmark	Third
COCP	City of Copenhagen	Public

4.6.1 Project formation

Stakeholders suggested that the development of the Energy Lab project was driven initially by the City of Copenhagen (funded by a Danish body, EUDP), then by DTU, who formally refined the scope and structure of the project, selected partners (largely based on expertise and previous engagement), agreed roles and set core deliverables.

Project formation

Both BOH and the municipality (COCP) initiated the Energy Lab project in 2008-9 as they opened a call as they wanted to donate an area of the Copenhagen (the harbor area) specifically for sustainable re-development (integrated energy systems) and the creation of a 'living lab', as detailed on the project website. DTU approached BOH and COCP designed a project and identified funders (EUDP a national Danish funding body) and selected project

partners. The project partners were approached as they were known to COCP and DTU who knew they had a good brand and the right expertise for the project, such as DANF who were well known industry partners within energy, climate systems and solutions. The Energy Lab project was formalised and all partners made a strategic agreement with DTU to collaborate for the next five years.

The project was perceived to meet the needs of all partners, BOH (which is owned 95% by the municipality, use their profits to finance infrastructure and sell properties to investors), whereas partners are funded (varying amounts) to participate in the project. For example, the project enables the COCP to promote low carbon solutions at city-level and aligns with their Copenhagen 2025 Climate Plan (energy production SDI category) as detailed by ABB:

‘It’s the largest [project] ever done under the EUDP funding ... it is a very large one, it’s showing that the Danish State and Copenhagen municipality mean business, that we need to do energy production and consumption differently and we need to test out which things work and don’t work.’ ABB, 23/11/17

However, for private sector stakeholders (e.g., ABB and DANF) it enabled them to test products whereas third sector organisations (e.g., DTU) could provide research and development solutions and manage the large-scale projects, partnerships and work-streams.

The COCP were formal partners within the project but were not active in the deliverables and work-stream, therefore they played a passive role once they had donated the land in Copenhagen. The project aimed to influence the development of energy regulation: how different energy systems could be integrated and what regulation was required to make that possible.

Frequency of project meetings

Project partners met on a monthly basis, but frequency depended on the work-stream activities and progress. Stakeholders stated they engaged with each other out-with the Energy Lab on other projects and activities.

Stakeholder motivations in joining project

The main theme to emerge from the interview data (mentioned by four participants) was the development of an integrated, intelligent future energy system that supported new technical components in new buildings and developed new innovative energy efficient solutions that could be useful for all project partners. All stakeholders were involved in the project as they felt there was a benefit to the organisation from participating in the project. For example, BOH could develop a framework for investors when they purchase property in Copenhagen, whereas the private sector organisations (e.g., DANF) were specifically motivated by the potential investment from testing their products and services in the Energy Lab. Also, the utility company (e.g., HOF) were interested in the development of new innovative solutions across infrastructures.

In addition, a third of stakeholders were motivated by the development of new partnerships (specifically the municipality who viewed the project as an opportunity to increase their stakeholder interaction and promotion of Denmark's low carbon projects worldwide). Access to funding was mentioned by participants, but this was not the main motivating factor in participation in the Energy Lab project. The municipality noted how the project contributed to the Copenhagen 2025 Climate Plan as the thematic priorities within the project (e.g., district heating) were integrated within the project.

Main objective of the project

The main objective of the Energy Lab for stakeholders was the potential reduction in carbon emissions as a result of the project. Supporting the development of scalable technological solutions that could reduce carbon emissions were deemed the most important objective for a sustainable future. Participants specifically noted how the project would enable collaboration with the municipality as well as align with the City's 2025 Climate Plan and climate targets.

Over two thirds of participants stated that the main objective was to develop an energy system and effective new technologies (and methods) that were cost effective in the long term and could reduce carbon emissions. For example, the Energy Lab composed of district heating for housing and companies, integrating energy systems with data and analytics to improve user's energy efficiency and reduce costs. This is evidenced by DANF:

'That is to demonstrate an integrated energy system and that data and analytics can be used to run an energy infrastructure across the different sectors of electricity, heat and transport. So, it's a living laboratory where we can show that by utilising the synergies between the different systems or different silos.' DANF, 11/13/17

The infrastructure ran across sectors of electricity and heat, participants noted the synergy between the different systems and how the project was improving efficiency. Participants responses focuses on the integrated energy system development for Copenhagen.

Stakeholder expertise in the project

All project participants involved in the project had a specific thematic focus (e.g., data and data management, electricity, data and district heating) that was required for the project and fed into the Copenhagen 2025 Climate Plan's thematic focus (e.g., Energy production and consumption). The nature of the project (e.g., integrated energy systems) necessitated collaboration between all stakeholders. Private sector organisations were largely involved in the technology development, as third sector organisations (e.g., DTU) focused on data and

analytics (research and EU laws around data storage) as well as project management and public sector organisations focusing on coordinating project partners. The municipality claimed they did not contribute many resources and were a passive partner in the project but were necessary to ensure the project aligned and contributed positively toward their climate policy and plans.

Project contribution to Copenhagen's 2025 Climate Plan

Three participants claimed there was a direct link between the Energy Lab project and the thematic focus outlined in the Copenhagen Climate Plan 2025 (e.g., such as district heating which was identified in the secondary data analysis) as all activities were working towards the 'big picture' - Copenhagen being zero carbon by 2025. This result was confirmed by the project website that specifically noted the project's contribution to the Copenhagen Climate Plan 2025. The project integrated energy systems and required collaboration between different sectors, enhancing participation in the decision-making process. The remaining participants noted the wider benefits to sectors within the city on the development of an integrated energy system.

The municipality used its influence on project partners, specifically HOF and BOH (public sector agencies, owned by COCP), in its quest to reduce reliance on fossil fuels and move closer to green energy production. The municipality directly influenced the strategic direction of both organisations in order to transfer areas of the city focusing on energy efficient buildings that they owned (a key target in the 2025 Climate Plan) and bringing key stakeholders together to develop an intelligent energy system.

Thematic priorities within the project

The key thematic priorities within the project were: district heating, big data and improving energy efficiency for buildings (all of which directly correspond with SDI categories and indicators such as 'energy efficient buildings in Copenhagen'). The development of

partnerships was rated as 'important' by stakeholders as the project required collaboration and each partner required input from another stakeholder. Hence, there was a dependency and a need to work together (e.g., BOH required energy data from HOF and ABB), for example BOH claimed:

'It's very important to get the data out of the project, to see how things are collaborating with one of them very nice details of the project is of course this partnership where the focus is not just on one technical solution, the focus is on how does the system work together and that's very important for ByogHavn to get these experiences.' BOH, 11/12/17

The municipality had a strategic role within the project, chairing the project steering committee. Nonetheless, they were perceived as 'passive' as they did not have a role delivering the project. The strategic role involved influencing the thematic focus of the project to ensure it aligned with the city's 2025 Climate Plan.

The project was largely solutions ordinated and focused on the integration of technologies (e.g., how energy systems work together). From this, project data was required to inform decision-making in the future.

4.6.2 Stakeholder interaction

Stakeholders suggested that the City of Copenhagen were key partners (frequent engagement on a monthly basis for most partners) within the Energy Lab project (despite not being active in the project), as well as the project leads, DTU.

Stakeholders represented in the project

All stakeholders mentioned the municipality as a necessary partner within the project (though not an 'active' partner, stakeholders generally felt that they could do more) and relations with DTU (the project manager) as also strong, naming key individuals within the organisation with which they liaise.

Over 80% of participants could recall the names of all project partners (11 in total, detailed on the project brochure online) and how many were involved overall – and within each work-stream - as well as their respective roles in the project. Stakeholders referred the 'hard' (formally written into the project) and 'soft' (informal, out-with the project but still affiliated with the activities, such as sub-contractor) partners. There were three categories of partners (private, third and public sector), though no citizens were directly represented. All partners mentioned the partnerships in the project were working out of normal silos towards a green energy system for the future.

Public sector agencies (e.g., HOFOR) were referred to frequently as they were more active than the municipality and played a key role in the infrastructure development and technological solutions. Private sector partners (e.g., ABB, DANF) were also mentioned frequently by stakeholders, and there were strong links between industrial players themselves. No stakeholder mentioned the lack of citizen representation and involvement within the project, despite locals being directly impacted by the development of a smart street.

Stakeholder interaction with the municipality

Four participants detailed their engagement with the municipality on the Energy Lab project, stating it was 'relatively frequent' with close relationships between them (e.g., meetings every month, on occasion it would be weekly depending on project requirements). The remaining third of participants described the municipalities approach to network discussions. As an official partner of the project, the municipality were known to ask stakeholders to engage with delegations from around the world and used the project as a 'role model' to showcase the new technological solutions, as evidenced by ABB:

'I meet with Copenhagen Municipality once or twice a month there is some delegation they might call me finding out who can do this from ABB, project wise it's not that much I talk to the municipality with some ideas and we are trying to get them to be a little more involved, we think they could do more...' ABB, 23/11/17

There only direct link between the project partners and the Copenhagen Climate Panel, was the municipality as well as the Energy Lab deliverables, that aligned with the panel's climate activities and it was noted in the discussions as an example of delivering the 2025 Climate Plan.

Project participants claimed the municipality had a 'good energy and momentum' [DANF] and implemented flexibilities (e.g., regulate change and facilitating links between stakeholders) which enabled the project to be delivered with ease.

'The municipality doesn't contribute that much we kind of took the area of the city and gave it the project and said you can use this area and we work as a, I would say a neutral ground for people to meet up and for all the industrial partners its easier if they have a neutral ground that's the word we call it, and then we of course help if there is any regulation or other things that are relevant regarding their technical solutions that they want to use, some of them aren't legal.' DANF, 11/13/17

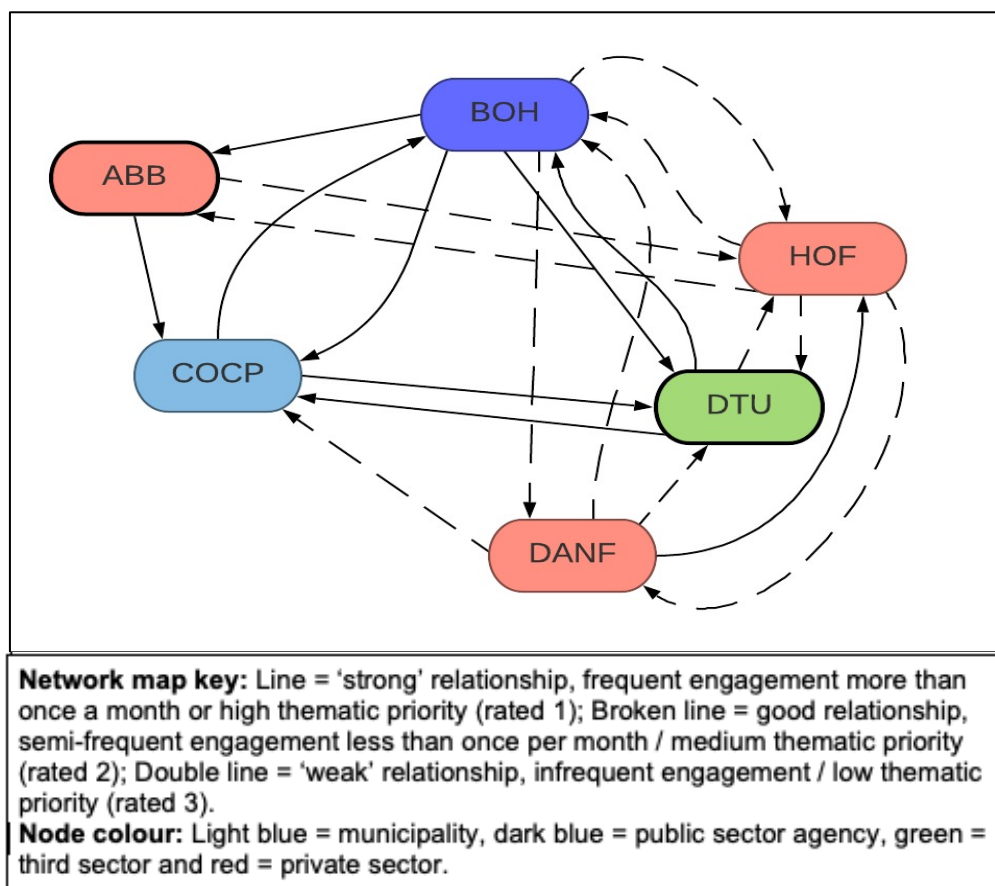
The municipality's flexible approach was perceived as important and necessary for the outcome of the project. Yet, their day to day involvement with the project was minimal. The public sector agency, BOH was more active in the management of the project and development of the 'Living Lab' deliverable.

Stakeholder interaction within the project

The relationships between stakeholders within the project depended on the partner and their workload. For example, stakeholders who had worked together on a previous project tended to have a strong relationship and would engage frequently (if involved in the same work-stream). This would directly influence the relationships.

Private sector partners were solely focused on a relationship that would achieve core deliverables with the projects and collaborations centered on the outputs of the Energy Lab as they were under financial and time constraints.

Diagram 16. Energy Lab stakeholder interaction network map



The diagram highlights the strong relationships between the municipality (COCP) and the project lead (DTU), both rated 1, and their engagement with other organisations in the project. Strong ties also exist between public sector organisations and agencies (e.g., BOH) as well as between private sector organisations.

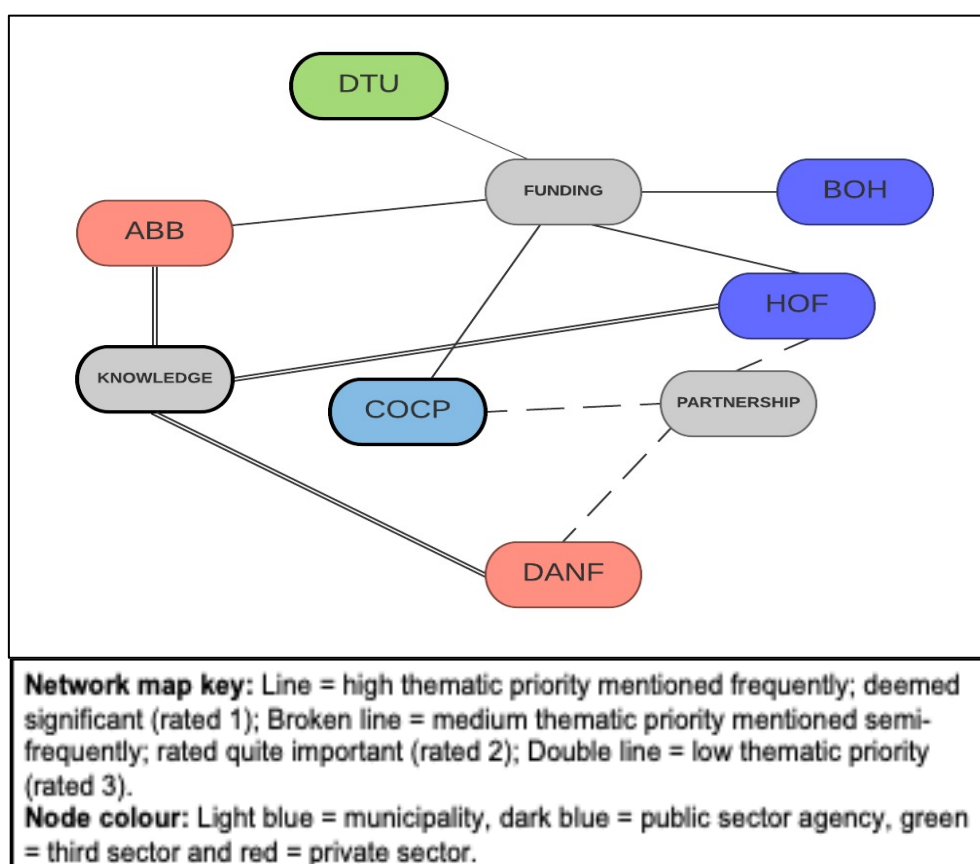
4.6.3 Project characteristics: Governance features

Stakeholders suggested that specific key features (characteristics) of governance networks were more evident than others within the Copenhagen Energy Lab project discussions.

Inter-dependency: Resources stakeholders provide to the project

The SNA diagram below shows the key resources provided to the project: funding (in-kind time, equipment), partnerships (increasing network) and knowledge (sector specific, technical expertise).

Diagram 17. Energy Lab interdependency (resources provided) network map



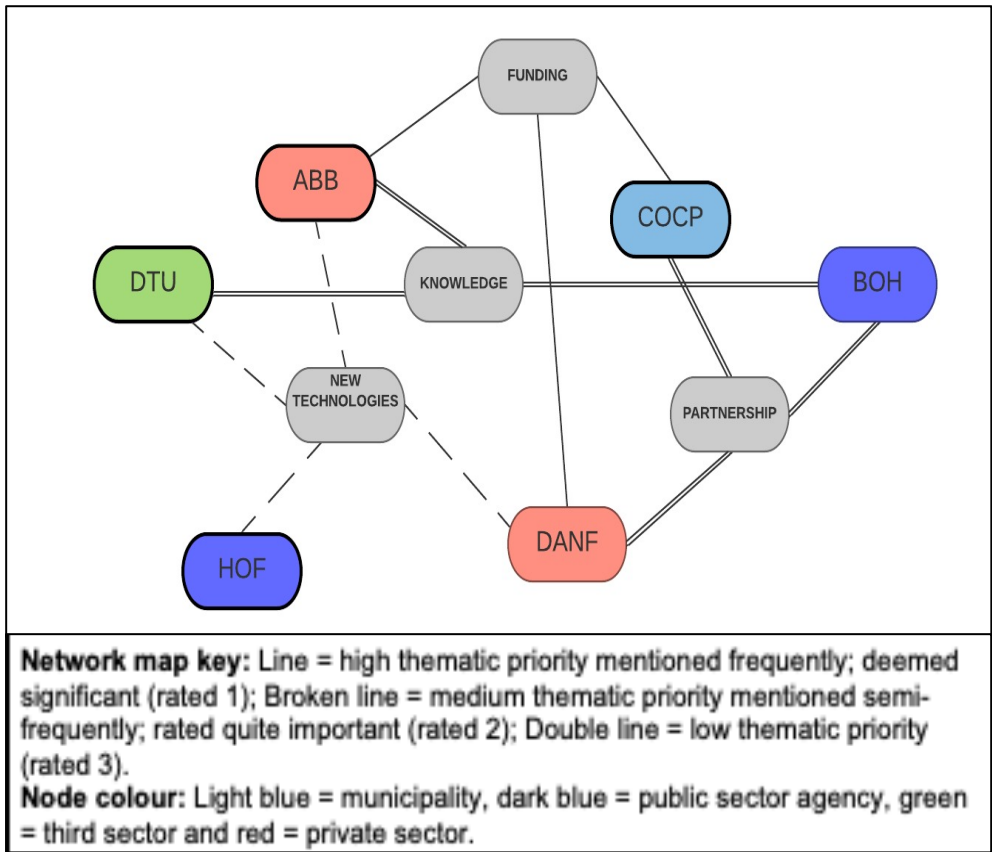
All stakeholders provided varying amounts of resources to participate in the project either through in-kind staff time, equipment or covering overhead costs associated with the project. Industry partners provided some equipment free of charge as the project was an opportunity to develop their own organisations products and services that could be commercialised in the long-term. This potential commercial value resulted in industry partners receiving less funding from the EUDP that other partners who could not sell any products arising from the project. However, funding was required for all stakeholders to participate.

The public sector provided networks and partnerships to support the Energy Lab project (e.g., facilitating relationships and identifying organisations who could contribute to the project but were not mentioned in the project bid) whereas the industry partners perceived their role as bringing knowledge to the project as the technology providers.

Inter-dependency: Resources stakeholders receive from the project

The SNA diagram below highlights the main resources received as part of the project: funding (staff costs), new technologies (new components for integrated energy system), and, partnerships and knowledge (networks and insight).

Diagram 18. Energy Lab interdependency (resources received) network map



Most stakeholders mentioned the funding provided by the project as the main resource for all partners in the Energy Lab project. However, the costs covered varied for each partner depending on their ability to participate in the project without any funding. For example, DTU

received 100% full funding as they do not have the income to resource the project, whereas industry partners such as ABB and HOF received 40% funding as they could develop their own products in the project to commercialised in the long-term, as evidenced by HOF:

'[Firstly] The larger industrial companies, they expect to come out of this kind of project with some new innovative components, products, solutions that they can then sell, so they need less funding...and secondly and more importantly it's that we have an environment where we together with key partners throughout ...the city, working towards developing new innovative solutions across infrastructures.' HOF, 07/12/17

However, there was an element of risk involved with the project as industry partners may not end up with new technologies that they can commercialise, therefore funding was necessary to mitigate the risk and get the partners involved in the project, in other words, 'you only get the funding as there's some level of risk in it so we would probably not do it without the funding' [DANF].

The public sector and industry partners noted the new technologies and partnerships as a key resource they received from the project. Integrating different energy systems was a core deliverable of the project; this was of most interest to the municipality who wanted to scale up the project in other parts of Copenhagen and showcase the project to international delegations. The organisation of the project with partners was perceived as a resource by the public sector partners.

Knowledge from the project was essential for both the project partners as a whole, but also the internal organisations remit. For example, the information gained from the project was useful for BOH as it enabled them to set the frame for new investors when selling property, for example: 'If we can get back the data and set the frame for the investors we can develop intelligent cities' [BOH].

Coordination: Stakeholder negotiation within the project

All stakeholders mentioned they had negotiated an issue with another partner involved in the project. From the interview data, negotiation was not perceived by participants as an inherently negative aspect of the project, but rather, was part of the process of working with different organisations who each have different demands placed on them. For example, BOH had negotiated with DANF regarding energy efficient technologies in the Energy Lab and tried to encourage the industry partner to select a specific technology (though DANF were not obliged to do this). Negotiation also occurred between public sector organisations as BOH and COCP regarding setting up electric chargers for electric vehicles in the harbor area as well as between DTU and ABB who had to negotiate the data collection and storage aspects of the project. There were other project negotiations on battery storage technology, metering and the legal framework in place - all of which required discussion and negotiation between many project partners. Within the examples of negotiation provided by stakeholders, most reach a consensus and showed a willingness to discuss and compromise.

Partners used their influence within the project to meet their own organisation's objectives but were aware that they could not 'make' partners do anything. Therefore, they focused on using their soft power (e.g., position) within the project to try to encourage them to compromise. Stakeholders noted they focused on identifying compromises and were solutions orientated: they 'played with open cards' [DANF] and do not always agree but aimed to find the right consensus for the project (this came before their own internal organisation's remit).

Coordination: Stakeholder compromise within the project

Compromise was mentioned alongside negotiation within the project discussions between partners. There was little compromise after any negotiation, except from one example of utility companies and public sector agencies regarding district heating at the early stages of project design and development. For example, COCP's compromise with building developments to

enable new technology integration, with BOH compromising with the financing of the 'Living Lab' showroom in the Energy Lab, as evidenced by DANF:

'I think one area that has caused some discussion is the showroom and the financing of the showroom, when you work with industry it is always expected that industry pays the most and for the showroom it was the idea what 'okay, let the industry pay for it' but there we had the opinion that it cannot be the industry that pays for it alone and it should be seen in relation to the activities in the project ... Still I would say that we are very good in figuring things out, but I just know from the industry side you must always be a little bit careful when it comes to who covers the cost in case there are additional costs.' DANF, 11/13/17

A third of stakeholders stated that general compromise was required as part of the project, with some partners stating specific requests and clarifications at the early stages of project development. This ensured that less compromise had to be made during project implementation and sought to avoid any issues further into the project.

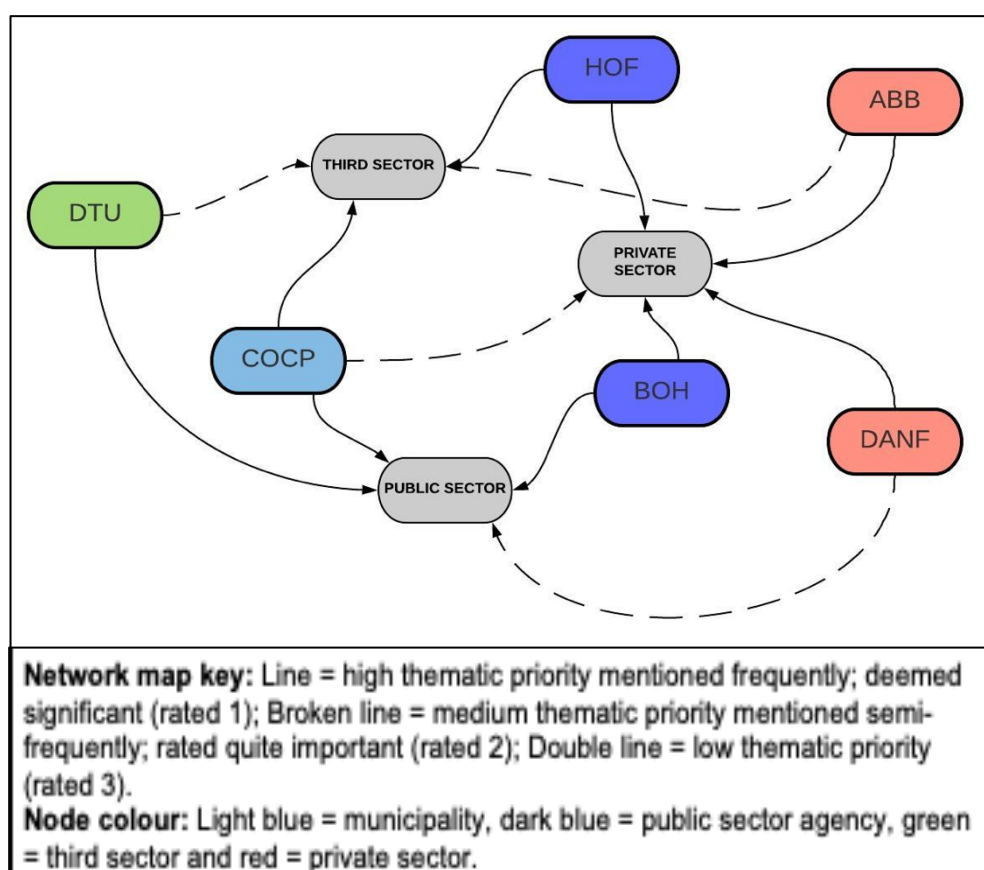
Pluralism: Stakeholder interaction with specific types of organisation

This section provides a network diagram to identify stakeholder's sectoral engagement (3.5.1) in Energy Lab, followed by key themes that arose from the interviews (3.5.2) on sectoral engagement and roles within the project.

'Energy Lab' pluralism: Stakeholder interaction network diagram

All stakeholders engaged frequently (rated 1 and 2) with the private sector within the Energy Lab project. COCP has stronger ties with the third and public sector (rated 1) than the private sector (rated 2) in the context of the project. There was frequent engagement between DANF, ABB and other stakeholders within the private sector in the Energy Lab project. COCP and public agencies (e.g., HOF and BOH) engaged relatively frequently with third sector stakeholders (rated 2). All project partners engaged with the public sector in some capacity (either COCP or agencies).

Diagram 19. Energy Lab pluralism network map



'Energy lab' pluralism: Stakeholder interaction interview results

Three participants engaged with the municipality (and BOH) relatively frequently, in particular at the start of the project during the development phase. However, their passive role during project implementation resulted in less frequent engagement with project partners. During project implementation, the municipality tended to engage with other public sector agencies and the project lead (e.g., DTU) and sub-contracted engagement with industry (through Climate-KIC). Secondly, during project implementation, engagement with DTU was naturally very frequent as they were the project lead and coordinated all project meetings and deliverables. Engagement with public agencies and industry partners were relatively frequently, though this depended on work-streams and the remit of each partner. Overall, there was a relatively high level of engagement between all partners, regardless of sector, with most partnerships developing between organisations that were not seen to naturally partner together (e.g., private sector and universities). Depending on work remit, partners developed close

relationships with specific partners offering a service or expertise (e.g., ABB and DANF) who collaborated on specific technological solutions.

Pluralism: Stakeholder roles assigned within the project

Stakeholder roles were clearly assigned at the start of the project development phase, and partners formally signed up to participate for specific roles to deliver the work-stream activities (detailed on the project website). All stakeholders were aware of DTU project lead role and specific individuals within DTU that coordinated the Energy Lab project. However, participants noted the difference between hard and soft partners with the latter organisations informally involved in the project and brought in to provide support or suggestions (e.g., COCP classed themselves as an informal partner as they did not have an active role in project implementation but they have a role on the project Steering Committee). As outlined in previous 'expertise' section, roles aligned with stakeholder's areas of expertise (e.g., private sector partners provided technological solutions, DTU provided research).

There were some issues expressed by participants that potentially challenge the formal project structure. Although DTU were the formal project lead, some stakeholders noted that BOH were the 'natural leaders' as they owned the harbor area and had close ties to the municipality (who partly own them). BOH clearly stated their motivation for the project as not only to reduce carbon emissions within Copenhagen but to make the area attractive for investment, hence they had a direct benefit for being involved in the project.

4.6.4 Project management: Leadership and accountability

The research results suggest DTU were the formal project leaders and were widely perceived by all stakeholders to be leading the Energy Lab project. However, some stakeholders claimed that DTU were co-leading the project with the municipality. This lack of clarity influenced network discussions and activities.

Stakeholder leadership within the project

DTU were the perceived leaders as of the project (by all stakeholders) as the municipality (who normally tend to lead such projects) stated they were 'hands off'. However, some project partners thought that DTU were managing the project in cooperation with the municipality as evidenced by ABB:

'The municipality has to be the main pusher to get things changed - absolutely!' ABB, 23/11/17

This was a result of the municipality's role as chairman on the project Steering Committee (DTU has a board member role) and the fact that both COCP and DTU approached private sector stakeholders (like ABB) to ask if they were interested in participating in the project.

Aside from the project lead, each work-stream had a lead, and the project developed a transparent system with key contacts, milestones and deliverables. Nobody was in doubt about status of partners (aside from DTU and COCP), as they were all kept accountable as per the project plan.

Stakeholder accountability for project activities and outcomes

Key individuals within the DTU were seen as accountable for the delivery of the Energy Lab project and were seen as successfully delivering the project with a transparent and methodical approach. A third of stakeholders noted how the DTU had many different roles within the project (e.g., Steering Committee lead, work-stream lead, advisory board meetings for the funders, annual reporting to EUDP, etc.).

However, work-stream leads were accountable for their own deliverables and every partner was seen as accountable for the finances (e.g., how money were spent) and to EUDP for reporting their respective costs. There were challenges with work-stream activities as the leads

were accountable for reporting to EUDP four times a year but did not have 'direct power' [DANF] over partners activities and could not enforce any work, as evidenced by DANF:

'I'm the work package leader for 10, but some of the resources I need it's not my direct reports, so we cannot give them any direct orders as a work package leader, saying 'now you do this, now you do that', so in that way I see that in this kind of project where you do not have the direct power for people, then of course there are delays because people have different agendas...' DANF, 11/13/17

Therefore, all partners had their different priorities (both projects related and internal); the project faced delays and the work-stream leads were limited in how they could respond.

Stakeholder capacity to influence partners in project

The municipality was aware of its ability to influence the public sector agencies (e.g., BOH), but stated that it could not 'make them' do anything, and instead was clear with them as to what they wanted to happen. For any large decisions within the project, the municipality aimed to develop the same goals and intentions to ensure both organisations aligned with each other's priorities. BOH claimed that they try to ensure organisational objectives aligned as they were partly owned by the municipality. The capacity to influence partners was largely based on soft power, aligning goals at the start to ensure all objectives were met.

Other public sector agencies such as HOF, who are the state-owned utility company (with private sector perspective) had a substantial ability to influence the Energy Lab project as they had a direct influence on the infrastructure and assets required for the project to success. Given they are the main utility provider, there was no competition, hence little incentive to implement costly infrastructure changes for projects in Copenhagen. Private sector organisations claimed that the state was not 'opening up' by controlling the utility companies, and therefore these organisations could impact whole projects.

DTU were seen to have a strategic political network (e.g., they participated on the Copenhagen Climate Panel and had access to other board members) and could tap into various stakeholders as and when required as evidenced by DANF:

‘Here are organisations that are able to change things, there’s no doubt about that ...DTU have a good political network as well and in that way quite good that they got all of the funding for the project, because they are doing well and in contact [with partners], showing their resources and what they have done and so on.’ DANF, 11/13/17

They had strong partners and had the ability to influence them due to their resourcing on the project (100% funded by EUDP). They also had the ability to nominate organisations on the project Steering Committee which influenced the direction of the project.

4.6.5 International engagement

Interview results suggest there are no formal international networks associated with the project, though many stakeholders work internationally and have partners they could leverage if required. Project deliverables include promoting the project outcomes. These were achieved by international delegations visiting Denmark and learning about the projects, rather than partners showcasing the successes to their international contacts and networks.

There were no official international networks associated with the Energy Lab project, though there were similar types of projects in other parts of the world doing similar work. Many of the private sector partners involved in the project worked internationally as part of their own organisational remit. As a result, therefore most partners had international links outside of the project. International delegations were a part of the project, and the municipality and DTU were frequently contacted by international organisations to learn from them and share ideas and expertise.

There was no collaboration with international networks or partners in the project, even though part of the Energy Lab deliverables required promoting the project. Therefore, there was some

cooperation around sharing and learning from the project, but this was achieved through international delegations visiting Copenhagen and did not require the project partners to proactively seek collaboration with international networks. No motivations for international networks were provided and no benefits associated with international networks were provided.

4.6.6 Project evaluation: Effectiveness of governance networks

The main theme to emerge from the interview data (mentioned by three participants) were the partnerships developed as they were deemed essential for delivering an effective project. For example, developing a good 'business case' [COCP] for all sectoral stakeholders within the project was necessary as they would not get involved if it did not meet their own organisational remit to some degree and if they were not interested in the overall goal, as explained by BOH:

'In my point of view, is it to make sure that there is a good business case for all of the partners whether the municipality of Copenhagen and its part of the Climate Plan [2025], whether it is BOH trying to develop intelligent city so we can sell the property... but also for private companies having a good business case by developing technical components that are being integrated in the new cities areas because it supports this Climate Plan [2025] and intelligent city. If it's a good business case for all whether private company or municipality, I think it is in everybody's interest.' BOH, 11/12/17

With this, the partners required strong communication with one partner to facilitate meetings and discussions, as well as social opportunities as it was seen as easier to build to build up a rapport with partners in a social setting. Stakeholders noted that the municipality was very effective at developing partnerships (despite their lack of resources) and were capable of creating the right environment to bring stakeholders together and design common goals (e.g., Copenhagen 2025 Climate Plan) for everyone to work towards.

The strong partnership and communication were necessary to overcome project challenges such as: data gathering and data protection for PhD students at DTU, etc. The different mindsets represented in each sector required long-term open communication to improve the synergy and understand the different perspectives in the project and move away from 'silo-ed thinking' [BOH] as climate issues require all sectors to work together on complex challenges.

For example, private sector (DANF) partners mentioned the differences between them and researchers in universities (who they were working with):

‘It seems that there’s a bit of a mindset differences between the researchers and those from industry and here industry is very good at looking at things that can be realised, that can be done within reasonable effort and also a more pragmatic way and I appreciate all the high level analytics that are done by the university, that it absolutely important but it would be good if they were even more in the way that they also want to realise things outside the disc of the university.’ DANF, 11/13/17

Therefore, there is a different mindset in each organisation and there was a need to understand the different perspectives and encourage sectoral collaboration over a common goal.

Two stakeholders mentioned that flexible timescales were required in projects as some deliverables were postponed. Private sector partners expressed concerns that some partners timescales were too slow - industry had deadlines to meet and focused on financial incentives, as set out with ‘high ambitions and go for everything that can make a difference’ [HOF], whereas the public sector organisations did not have those pressures, as described by ABB:

‘It’s very difficult to have all the types of different organisations because public organisations are very political and we in the industrial world we are very financial you know, we have a project, we do it, we finalise it and get the money then, see you! And that’s our business, whereas the public sector talk, talk and talk and don’t have the finalise anything so just those two need to find some kind of common ground to actually get things done, ...they will learn over time, they will be forced to be more efficient, actually get things done for the date they say they will do, so it will happen but it takes time’. ABB, 23/11/17

Therefore, collaboration took time - longer than all partners initially thought - as the public sector organisations were more politically orientated and had processes (bureaucracy) to follow as they had to remain transparent and accountable to the public.

4.7 Sustainability sector: Copenhagen

Interviews were conducted with ten stakeholders within the Copenhagen sustainability sector, in order to understand stakeholder relationships between the wider city and the Copenhagen Climate Panel network and the Energy Lab Project. This process provided an external perspective on the role of the city network and project which clarified for example, leadership in the network, or specific role of individual organisations. Key themes from stakeholder interviews are also identified and summarised below.

The research findings identified four key themes: sectoral stakeholder interaction and partnership development; community of trust in decision-making and close ties with the municipality (COCP); general awareness of the Climate Panel and activities, and, a clear understanding of the city's 2025 Climate Plan.

Table 12. Abbreviations of stakeholders in the sustainability sector, Copenhagen

ABBREVIATION	STAKEHOLDER	SECTOR
G21	Gate21	Private
CLEN	Clean Cluster	Third
CONC	Concito	Private
CSLAB	Copenhagen Solutions Lab	Public
C40	C40 Cities	Third
TN	Transition Now	Third
SHC	Sharing Copenhagen	Public
DEA	Danish Energy Agency	Public
C-KIC	Climate-KIC	Third
SUST	Sustainia	Private

4.7.1 Stakeholder interaction and partnership development

The main theme to emerge from the results is the strong ties between sectoral stakeholders

and the willingness between stakeholders to collaborate on projects and initiatives.

Within the Copenhagen sustainability sector, all stakeholders had developed strategic partnerships with other organisations to collaborate on projects and share knowledge. Each stakeholder was able to describe relationships with other organisations, specifically the municipality. It became apparent that participants mentioned the same organisations (e.g., COCP, CONC and DTU) highlighting that the sustainability sector in Copenhagen was not as diverse as in Glasgow. However, organisations had a specific mandate with many of them developed to focus on a thematic area, for example CSLAB: 'we focus on buildings and CO2 emitters' and, G21: '[we] develop and run projects that focus on energy, transport and buildings.'

The findings suggest there could be two reasons for such strong engagement: firstly, it was evident that the community was relatively small (e.g., the sector in general consisted of fewer stakeholders in general, compared to Glasgow), where sharing knowledge was prioritised. Limited partnerships with stakeholders and close ties between organisations suggested a cohesive sector, where individuals (as well as organisations) engaged with each other relatively frequently. In addition, stakeholders were sectoral specific and focused on thematic priorities within the city, which further encouraged cohesion. Secondly, the majority of stakeholders interviewed were part of membership-based organisations, or organisations that were created to fulfil a specific 'gap' between sectors to facilitate coordination between stakeholders. Hence, it was a key part of their organisational remit to engage with stakeholders and facilitate the exchange of information and/or ideas.

4.7.2 Sustainability decision-making: Community of trust in decision-making and with the municipality (COCP)

Within Copenhagen, sectoral stakeholder referred to a community of trust between organisations and with the municipality in sustainability decision-making.

The results highlighted that there was a general level of trust between stakeholders. For example, there appeared to be a general agreement that other stakeholders acted in good faith and with the right intention. For example, CLEN stated: 'There's more trust in Denmark – generally speaking the decision-making process is more transparent'. This supported network participants' claims, who also stated the trusting nature between organisations (e.g., UOC). The community of trust may be linked to the close-knit nature of the sustainability sector, as noted above. There was a high level of awareness of other stakeholders (at both an organisational and individual level) within Copenhagen. The trustful nature in the city was further emphasised in the decision-making process as stakeholders engaged with the municipality. For example, Climate-KIC [CKIC] stated that: 'We work closely with Copenhagen municipality ...they have recently asked us to join their Monday meetings with the TE Mayor as we can fund different projects'. This was reiterated by CSLAB who mentioned that: 'We do engage with the municipality when developing the policy at the moment it's on a very informal basis, bilateral.'

Participants noted the trusting environment within decision-making in Copenhagen and the openness of the municipality to engage with external stakeholders, fostered an environment of collaboration and partnership development. Informal and frequent engagement with the municipality (COCP) was clearly evident, with many stakeholders providing examples of when the municipality had consulted their organisations on key sustainability policies or projects. This engagement was frequent as many stakeholders interviewed described the informal relationships with individuals in the municipality (in addition to the formal relationships in the Copenhagen Climate Panel).

4.7.3 Copenhagen Climate Panel

Sectoral stakeholders evidenced an awareness of the Copenhagen Climate Panel, but highlighted the exclusivity of the panel (e.g., discussions were not open to the general public).

The Copenhagen Climate Panel itself was perceived as an 'advisory board' [CONC] and 'implementation network' [CSLAB] within the city, comprised of high-level sustainability experts who could act as a 'critical friend' to the TE Mayor [CONC]. The seniority of the panel resulted in external stakeholders lacking specific information on activities and discussions (e.g., no meeting minutes were circulated, and the panel had limited presence on the internet). However, network outputs in the form of projects were evident (e.g., Nordhavn Energy Lab) as it was considered a flagship project for the city. The informal contact with the municipality as evidenced by SUST: 'We have a lot of informal contacts with the municipality ...that's on a person to person basis' put stakeholders into contact with the municipality on a regular basis; thus they were aware of other partnerships within the city (e.g., SUST elaborated to mention the municipalities links to RAMB, who participate on the Climate Panel).

The limited of awareness between sectoral stakeholders on the Copenhagen Climate Panel discussions and core activities suggests the exclusivity of the panel challenges the municipalities accountability for network deliverables as there is no evidence of objectives and targets.

4.7.4 Copenhagen 2025 Climate Plan

There was a clear understanding of the city's 2025 Climate Plan, with many participants interviewed noting their direct involvement in both its design and implementation.

The results drew attention to the close involvement many stakeholders had in the initial concept of the Climate Plan, with SUST stating their role supporting the municipality: 'We did a guide for them [COCP]...they wanted to imagine how Copenhagen could look in 2025...we did a guide ..showing the different sectors...and some of the solutions.' Similarly, CONC noted: 'they [COCP] are very keen to talk to us and to discuss [the Climate Plan].' Therefore, the municipality approached stakeholders for their feedback when designing and implementing

their sustainability strategy. This is evidenced by CSLAB who stated that: 'We do engage with the municipality when developing the policy at the moment, it's on a very informal basis, bilateral.' Stakeholders were able to relate their own organisational remit and strategy to the plan and outline the key thematic areas identified (e.g., there was overlap in organisational strategies and the plan). Participants also critiqued the municipality's approach and identified ways to revise it going forward; this was frequently mentioned alongside the municipality's willingness to listen to the stakeholders within the sector in order to refine the plan.

The clear understanding of the Copenhagen 2025 Climate Plan was potentially due to the tight-knit community and international ambition set by the municipality, which appeared to bring people together. For example, SHC: 'We are all working towards the same agenda of the City of Copenhagen becoming CO2 neutral.' Nearly all stakeholders directly referred to the carbon neutrality target by 2025 and how their own organisation was contributing towards it positively.

4.8 Case study results: Summary

The results highlight the similar and different approaches taken by Glasgow City Council and the City of Copenhagen when designing and implementing sustainability strategies in their respective cities.

The formation of networks within each city are similar in their aims and in their stakeholder selection process (largely based on historical ties), which appears to be closed to the general public. There is a general consensus in each city on the definition of sustainable development. In addition, the stakeholder interaction within each network centers on the role of the municipality as key facilitators between all stakeholders. The inter-dependent nature is clearly evident within each network and is of mutual benefit, yet coordination is evident at varying levels within the case study cities though it is perceived differently in each city. The pluralistic nature of each governance is apparent as stakeholders engage with sustainability issues. The leadership approach in each network differs from the City of Copenhagen's attempt to take a step

back from being seen to lead. International links with other networks is minimal and based on an individual level, not a network level.

The implementation of policies through two projects RUGGEDISED and the Energy Lab have similar aims and set-up but differ in leadership and private sector roles (e.g., Glasgow focus on infrastructure whereas in Copenhagen the focus is on technology development). Stakeholders are clear about project aims and their link to the city's sustainability strategy. As with networks, the project leads are key facilitators within the project, though in Glasgow the municipality leads whereas in Copenhagen a university leads the project. The inter-dependent and pluralistic nature echoes that of the networks; coordination differs in each city due to perception changes and formal project structures. The projects are both seen to be innovative and involve the development of new energy systems that can be replicated in each city and beyond. Nonetheless, apart from a few formal obligations within the projects, there is very little engagement beyond the city boundaries. The next chapter explores these issues in more detail.

CHAPTER 5: COMPARTIVE CASE STUDIES DISCUSSION

5.1 Overview

The structure of this chapter facilitates a comparative analysis of each case study city, Glasgow and Copenhagen. Section 5.2 presents the discussion for both networks, Sustainable Glasgow and the Copenhagen Climate Panel. Section 5.3 details the discussion for both projects, RUGGEDISED and the Energy Lab. The sectoral analysis is incorporated throughout both parts of the discussion.

In 5.2 and 5.3, the section headings mirror those in chapter four (e.g., Network formation, stakeholder engagement, etc.). However, for each sub-section, the discussion chapter is now structured by sub-section thematic area (e.g., in the section heading 'network formation', a sub-section theme could be 'exclusive stakeholder selection process', etc.). This approach clearly identifies the main themes within each section heading, which enables an in-depth analysis on how these sections in practice, influence sustainability decision-making in cities and how they could contribute towards the effectiveness of governance networks.

5.2 Networks: Sustainable Glasgow and Copenhagen Climate Panel comparative analysis

5.2.1 Network formation

Part one of the discussion analyses two governance networks, Sustainable Glasgow and the Copenhagen Climate Panel.

Exclusive stakeholder selection and network formation was driven by the municipalities

Having defined governance networks precisely in chapter two, the research showed that the selection of stakeholders by the municipalities was a significant aspect in network structure and formation. Participants in both case studies agreed on the stakeholder selection process (e.g., municipalities selecting stakeholders). Criteria for stakeholders consisted of their 'seniority' (Glasgow), and importantly, the fact that they were 'known' to the municipality (Copenhagen) from prior work. All stakeholders selected in the networks had historical ties with individuals in the municipality and knew each other informally (often on a first names basis). Hence, they had a good understanding of how each organisation worked and what factors motivated them. This approach can be advantageous in a network setting as it can reduce the likelihood of conflict and ensure a degree of alignment with the municipality's network aims. Edelenbos and Klijn (2005) and Torfing (2019) support some elements of each city's approach and argue that stakeholder selection should be dependent on specific network objectives, resources required and the specific policy problem which were all defined by the municipality. However, the network does not represent all sectors and the process for selection is not transparent (no information is publicly available). The approach taken by Glasgow and Copenhagen have the potential to influence the transparency of the network formation from the outset and could risk influencing both the performance and outputs of such networks (Klijn and Koppenjan 2016a).

As such, this research argues that the stakeholder selection approach in each city could challenge the legitimacy of the policy process as it excludes specific stakeholders who do not meet such specific criteria (Torfing 2019). The municipality's role in selecting stakeholders resulted in them playing a 'gate-keeping' role, controlling access over network discussions and outputs (Klein 1999; Ostrom 2001). This 'gatekeeping' role implies that elements of top-down governance can exist within the networks and challenges the notion of horizontal governance where decisions are shared between stakeholders (Rhodes 1997). This raises questions of transparent democratic participation within sustainability decision-making as non-elected

individuals received direct access to senior politicians and could influence discussions as described by Bingham et al (2005). In contrast, sectoral stakeholders not selected were thus not represented within the network, as noted in Glasgow where the private sector and citizens were not invited to participate. A municipality's control over its network selection suggests the network does not necessarily represent the interest of citizens but rather a closed group of influential individuals (Risse 2004). This was confirmed by sectoral stakeholder interviews who stated the meetings were with senior individuals who had closed discussions that were not open to the public.

The stakeholder selection process resulted in participants perceiving networks as a vehicle for the municipality to profile their needs, set their agenda and engage with specific stakeholders on their sustainability strategies. Hansen (2001) details the benefits of this approach, arguing that working with known stakeholders can reduce the likelihood of conflict, foster trust and share ideas within decision-making. In addition, previous engagement can ensure the municipality has a better idea of whether stakeholders may agree with the network objectives and remit and proposed policies (Ramos-Vidal 2016). However, a key challenge in the stakeholder selection process was the unbalanced sectoral representation. This raises questions of the democratic legitimacy within closed networks, when citizens affected by policies do not participate in their creation – as evidenced in both cities (Klijn and Koppenjan 2016b). The research reveals that the selection criteria ('known to the municipality') does not indicate a legitimate and transparent process, but rather, the municipality selects individuals that they have met before, that operate in the same networks and share similar political perspectives on key issues. The stakeholder selection process adopted (e.g., selecting 'known' stakeholders) may be to mitigate risk by avoiding collaborating with 'new' stakeholders, as municipalities come to terms with new forms of governance. The following sections expand on this and assesses how frequently stakeholders in the networks met.

Frequency of meetings and the impact of election cycles on governance networks

For both case studies, stakeholders in the network met on a fairly regular basis, defined as 'quarterly' per year, for between two to four hours. A quarter of participants in Glasgow and Copenhagen brought up the disruption to the network's meetings caused by both local elections (four-year cycles) and general elections in the United Kingdom (every five years) and Denmark (every four years). Participants noted that changes in local administration tended to have an adverse impact on the workings of the network(s) as they are both largely driven by the municipality. Thus, short-term administration changes at both a local and national level can impede long-term sustainability planning within cities. Further, Klijn and Koppenjan (2016a) identified the challenges of four (local) or five-year (national) election cycles as they do not always correspond with the policy process in governance networks and sustainability strategy timescales (which were up to 2050 in both city's strategies). The results confirm that multiple levels of government have the potential to influence city-level networks. As such, the short-term local and national election cycles, coupled with the long-term planning necessary for sustainability planning, create barriers to designing and implementing sustainability policy (Lynn 2010). This can also be confirmed by participants noting previous iterations of the network in previous administrations and was reinforced by sectoral stakeholders interviewed who noted previous iterations of the networks under different political parties in the past. Thus, the lack of governance continuity within each city leaves the network at the mercy of elections which can impede the city's ability to plan for sustainability the long-term. The findings suggest that governance networks are vulnerable to changes in administrations elected to power within a city: networks can easily be created but also quickly abandoned, depending on the elected decision-makers needs and priorities. This is evidenced in Glasgow and Copenhagen where at the time of research both networks were on a hiatus due to administration changes. Thus, their effectiveness is directly linked to the municipalities' need for sustainability expertise, stakeholder interaction and how they prioritise this within each administration. The following section builds on the stakeholder selection process and frequency of meetings, to explore what motivates stakeholders to join sustainability orientated networks.

Personal benefits and alignment with organisation's goals motivated stakeholders to participate in the network

Stakeholders in Sustainable Glasgow were largely internally motivated with over half of participants stating it met their own organisation's objectives. These findings align with Powell et al. (2005) who identified a significant motivation for stakeholders was to use the network as a platform to further their own organisation's agenda and influence network outcomes. The collaborative nature of governance networks enabled stakeholders to develop strategic partnerships with other organisations (and high-level individuals), access expertise and knowledge that could be beneficial to their own organisation (Ansell and Gash 2012). In contrast, in Copenhagen, the municipality's intention was to develop more fruitful relationships with stakeholders. However, this differed for stakeholders who expressed a strong altruistic and personal interest in sustainable development whilst simultaneously building their personal network (Huxam 2003; Monge and Contractor 2003). Sectoral stakeholders in Copenhagen mentioned the development of strategic partnerships as a part of their own organisation's remit, stating it was a key motivation for stakeholders to join different membership organisations and networks. Participant motivations revealed a split between aligning with their own organisation's strategy and personal altruism - the results evidence a genuine passion to collaborate and work towards ambitious sustainability targets, but this has to be supported by the participant's own organisation, in order to justify participation. This raises questions of stakeholder perceptions as stakeholders could be operating in either an individual or organisational (representation) capacity, which was not always initially clear in the networks as one person's perspective cannot represent an organisation and vice versa (Backstrand 2008). Stakeholders noted both a personal and business interest in participating in the Climate Panel. The challenges around not being able to distinguish between the individual and organisational participation draws attention to the lack of clarity within the formation of a governance network (Klijn and Koppenjan 2016a).

The findings clarify the need to fully understand stakeholder motivations and this requires a better understanding of stakeholder roles and in what capacity they contribute to the governance network (Powell et al. 2005). It is possible that stakeholders act in both a personal and organisational capacity. In Glasgow, participants appeared to contribute in both capacities, yet in Copenhagen, stakeholders were selected as individuals (who were linked to a specific organisation but did not represent it). These findings were confirmed by sectoral stakeholders. This may account for the differences in results within each city, but it also emphasizes the lack of clarity of roles within the network which may be due to the relative infancy of the governance network approach. This, in turn, may need to be evaluated and revised by the municipality over time (Glasgow City Council wanted to do this and take away key learnings). In both case studies, the exclusive stakeholder selection may provide insight as to why there was no significant differences in stakeholder motivations for participating in each network. It is therefore unlikely that the municipality would select stakeholders who had vested interests which may be to the detriment of the network, but rather, historical relationships with stakeholders suggests otherwise: that their motivations may align to a degree. As such, the motivations do enable a better understanding of why an individual or organisation would participate in the networks and how this may influence their contribution. Stakeholder motivations and roles can influence their perceptions of governance network objectives which are explored in the next section.

Key network objectives were to develop partnerships and share knowledge between stakeholders

Once stakeholders had joined each governance network, there were different interpretations of the network objectives. The main objective of the networks in each case study differed slightly. Similar themes mentioned by both cities include the development of city-wide partnerships (e.g., minimise silo-ed thinking) and share knowledge (e.g., sectoral expertise) in order to promote the city's vision, sustainability strategy and progress towards sustainability targets. However, participants in Sustainable Glasgow noted that promoting the city's

sustainability vision gave the appearance of acting on sustainability issues, whereas participants in the Copenhagen Climate Panel defined the network as a 'think tank' that was utilised to leverage stakeholder's expertise. Although network objectives differed, key themes (e.g., partnerships, sharing knowledge) reinforced the municipalities need for such networks.

The differences in network objectives in each city provide insight into the role of the network in the wider decision-making process. In Glasgow, the network appears to have a broad network objective (e.g., sustainable development is perceived as a cross cutting issue). This is clear as stakeholders didn't specifically refer to the Energy and Carbon Plan in their response but referred to key themes within the plan. Whereas in Copenhagen, specific reference is made to the Climate Plan and the necessity to share information to meet the plan's sustainability targets. Within both networks, as Provan and Kenis (2007) argue, stakeholders should collaborate and listen to different perspectives on sustainability policies, thereby accelerating knowledge exchange and ideas. Such stakeholder interaction can, at times, be seen to be a safety mechanism to ensure network participants align with policies proposed by the municipality (Khan 2013). A lack of clarity on objectives can limit the ability of the network to deliver outputs (e.g., projects) as there may be a lack of coherence in the network discussions. Specific reference to the Climate Plan in Copenhagen focused discussions on how to achieve the city's climate ambition, implying a deeper understanding of city objectives and demonstrating the benefits of using sustainability strategies to guide the policy development and discussions as claimed by Leff and Peterson (2015). Conversely, in Glasgow, the broad remit of the network resulted in a more holistic approach to sustainability development and included discussions on the wider economic development and poverty reduction objectives in the city. This does indicate however, that stakeholders in Glasgow did not necessarily possess a detailed understanding (or rather, had different understandings) of the sustainability strategy which is a common challenge within sustainability decision-making as argued by Holden (2006). However, participants did refer to thematic priorities when interacting with other stakeholders in the network.

Key themes identified in the results reinforced the municipalities need for sustainability governance networks. Participants in both cities stated that the municipality could not develop policies without engaging stakeholders in the process and that networks were one vehicle to do this (see SNA diagrams 7 and 15 for cross-sectoral collaboration). Betsill and Bulkeley (2007) support this, stating the municipalities objective of developing such networks was to engage with stakeholders as they have limited resources to design and implement their sustainability policies on their own. Participants in Glasgow elaborated, claiming the network provided assurances to the municipality that stakeholders would align with sustainability targets and provided an outward appearance that the municipality was engaging with stakeholders on the issue, which was important for their reputation. Stakeholder alignment with network objectives implies that they may also align with the wider agenda set by the municipality in their sustainability strategies. Within this policy process, similar stakeholder objectives can help to set the agenda initiated by the municipality and can encourage stakeholder buy-in for policies. Therefore, this research recommends municipalities leverage stakeholder consensus for network objectives rather than the municipality setting the agenda independently. The following section explores the type of stakeholders invited to the network and their expertise.

Stakeholders provided sectoral expertise that aligned with each city's sustainability strategy

The majority of stakeholders in each case study could identify their unique sectoral expertise and contribution to the network objectives. Both research findings align with Klijn and Koppenjan's (2016a) argument that stakeholders were invited to participate within governance networks due to their area of expertise and the 'need' for such expertise to address the policy problem. For example, in Copenhagen the thematic areas mentioned by participants directly corresponded with the city's sustainability strategy, whereas in Glasgow participants could detail their sectoral (and sub-sectoral) expertise (due to the specialized sub-sectoral networks currently under development, detailed in chapter four). Such expertise could be leveraged by the municipality, which had the power to include or exclude specific stakeholders depending

on their sectoral representation, area of expertise and how this aligns with the cities policy objectives. The results suggest that despite different network objectives, stakeholder expertise is an important criterion for inclusion into the network within both cities. The type of expertise necessary within each network is largely determined by the municipality that plays a fundamental role in network formation by selecting stakeholders and setting the network agenda. In both cities, the objective of the network influences the expertise required and thus the stakeholders selected.

The importance of the municipality's expertise was highlighted in the results for both cities (e.g., sustainability departments that organise networks). Glasgow City Council defined their area of expertise as 'legitimacy' as they were the only organisation with the 'democratic mandate from the people'. Whereas in Copenhagen, over a third of participants identified the municipality's area of expertise was in 'climate policy knowledge' and referred to their power to implement such policies. Municipalities are often perceived as having both the democratic mandate and climate policy knowledge as their areas of expertise, which reinforced their role as leading and managing the network (Acar et al. 2008). There was a general consensus that municipalities possessed the democratic mandate to shape the network to suit their own agenda. In some respects, this mandate gave them the power to identify the areas of expertise required to effectively contribute towards sustainability decision-making, as the municipality can enable or withhold access to the network (Backstrand 2008). Understanding the areas of expertise that stakeholders bring to the governance networks, as well as the 'need' for such expertise, is necessary as it may impact the ability of stakeholders to participate and actively contribute to the network discussions. Aligning stakeholder's expertise to thematic policy areas ensures a level of focus and consensus in a network and the results illustrate that this was more evident in Copenhagen than in Glasgow. The motivations of stakeholders and the expertise they provide to the network, can influence how they perceive and define sustainable development.

Brundtland Commission and sustainability triangle definitions tend to frame stakeholders' perception of 'Sustainable Development' within networks

The last section showed that stakeholder expertise aligned with the thematic priorities outlined each city's sustainability strategy. By now exploring how stakeholders define sustainable development, this section will enable us to understand how stakeholders contextualise sustainable development. Participants in Glasgow focused on the Brundtland Commission (1987) definition of sustainable development and linked it to their own organisation's objectives and area of expertise. There was no mention the SDGs when discussing the sustainable development concept. In Glasgow the ambiguity of the WCED definition appeared to be beneficial as it enabled most stakeholders to align with the sustainable development concept and could be moulded to suit different organisation's objectives (e.g., from public sector organisations to the private sector). Although sustainable development has been established as a public policy goal, it could be described as 'political plastic', that is, interpretable in numerous ways (Bebbington et al. 2009). As such, no agreed comprehensive meaning has emerged, which scholars have claimed weakens the concept as it cannot be applied if there is no consensus (Kate et al. 2005). Conversely, many scholars agree with participants in Glasgow, arguing the all-encompassing nature of the WCED concept has given it political strength as it can be interpreted in various ways by sectoral stakeholders (Lele 1991; Bebbington 2009; Brown 2011). Despite no universal agreement on how to define sustainable development, the results highlight a commitment to broad universal definitions as mentioned by Giddings et al. (2002), as these go some way to understanding and implementing the concept. Participants were aware of the limitations within each definition but justified its application in the context of their own work and internal organisation's objectives. Such awareness suggests a deeper level of understanding surrounding the complexity of the concept and how each participant can contribute towards through their involvement with Sustainable Glasgow.

The majority of participants in Copenhagen referred to the 'sustainable development' triangle concept, with over a third of these participants then linking this to the SDGs. Following on from this, participants stated that the SDGs were increasingly important as they encompass not just climate, as they draw on wider socio-economic objectives at city-level (e.g., poverty alleviation). This may be due to the municipality's priority focus on Copenhagen's contributions to the SDGs (outlined in a publicly available report). The research findings align with the sustainable development triangle concept (and the research study definition of a sustainable city⁴), that is frequently referred to within the discourse by scholars such as Connelly (2007) Vos (2007). Many scholars argue that the interaction between the three pillars is seen as an imperative to achieve urban sustainability (Hassan and Lee 2015). Although the concept has been adopted quickly there is no universal agreement as to the details of the pillars (e.g., environment, economy and society) (Kates et al. 2005). In Copenhagen, the 'sustainable development' triangle framed stakeholder's perspectives of the concept as a universal definition rather than city specific. This flexibility within such definitions enabled each stakeholder to shape the concept to fit their world view or organisation's objectives, similar to the definition adopted by participants in Sustainable Glasgow. However, stakeholders did not critique the definition nor refer to the lack of a political element within the definition. This may reflect the lack of guidance for developing definitions of sustainable development within cities as argued by Imran et al. (2011). It also demonstrates a lack of awareness around the contested nature of the concept and the implications for how the concept is implemented within cities (Redclift 2006).

Differences in city definitions highlight variations in how sustainable development policies are designed and implemented within each city. For example, in Glasgow there was no link to the SDGs whereas stakeholders in Copenhagen could associate with these as they have been a focus for the municipality and integrated into sustainability decision-making. The lack of clarity overall regarding an agreed definition on sustainable development suggests there may be

⁴ UN (1992)

challenges regarding how to assess progress and how it will be measured in the form of thematic areas and or indicators. This research argues that the lack of consensus on the concept directly influences how participants define the concept differently within a sustainability strategy which could affect its implementation. Although there were no obvious differences in how the concept was defined in each sector in the network, which challenges findings from previous research such as Parto and Kemp (2005), most participants did link their definition of sustainability development to their area of expertise and their organisation's remit. Hence, stakeholders tend to select definitions that align with their own interests are priorities (Brown 2011). In addition, the types of stakeholders selected for each network (e.g., historical ties and similar perspectives on network objectives) may be a factor in the similar results from participants in both Glasgow and Copenhagen. This confirms that the network formation which is led by the municipality, can shape (and limit) the types of stakeholders and their ideas and perspectives on sustainable development and thus how stakeholders interact with one another within network discussions, as explored in the next section.

5.2.2 Stakeholder interaction

The previous section provided an overview of governance network formation. This section will address stakeholder interactions within networks to understand how such relations could influence sustainability decision-making.

Most sectors were represented in the network, with municipality perceived as key stakeholder by all participants

A key aspect in both Glasgow and Copenhagen was the importance of the municipality's involvement within each network. This is evidenced clearly as all participants interviewed noted this representation, referring to them as the main point of contact and detailing specific individuals that organised and facilitated meetings for the governance networks. This was reinforced by the municipality's responses which mentioned a willingness to work with a

diverse mix of stakeholders. These findings highlight the importance of the municipality's roles within governance networks and support Khan's (2013) argument that municipalities have been placed at the heart of sustainability decision-making within European cities and as such, are widely perceived within the network to be the organisation responsible acting on sustainable development. The representation of the municipality (and public sector agencies) is seen as essential for the governance network to operate, specifically their role in initiating the network and selecting stakeholders to participate in network discussions. This is reinforced by Rosenzweig and Solecki (2010) who detail the municipalities fundamental role in network formation and in coordinating stakeholder interaction. Results from sectoral stakeholder interviews reinforce the role of the municipality, who are perceived as the network leaders within the city with almost half of participants in Glasgow expressing an interest in working with them in the future.

Although the municipality are perceived as essential actors for network formation and management, the exclusion of specific sectors challenges the municipalities genuine willingness to work with different stakeholders. The results imply that the municipality possess the ability to directly influence agendas and discussions by hand picking stakeholders to participate (as demonstrated in the network formation section). This could be interpreted as contradictory and biased, evidenced by the fact that municipalities in both cities did not identify an approach to select representatives from civil society that could reduce or eliminate this bias. In addition, established relationships between stakeholders reinforces the 'closed' nature governance networks, as stakeholders represented are on first name terms with decision-makers (Risse 2004). Addressing challenges and bias in stakeholder representation could strengthen their role within sustainability decision-making as it would enable the municipality to leverage additional expertise and ideas ensuring the public voice was considered in sustainability policy design and implementation.

An important theme to emerge from the results suggest that most sectors were represented in the governance network, but this changed over time. Over two thirds of participants in Glasgow

and Copenhagen were able to identify the proportion of different sectors represented each network and specific stakeholders (individuals) that actively contributed to the network discussions. Within both networks, citizen groups were not represented, and national government was represented in Glasgow and not Copenhagen. In Glasgow, the Scottish Government was invited to participate but rarely did; in Copenhagen there was no such national government representation. The lack of national government participation in Copenhagen may be due to their decentralised power structures as the municipality have the political and fiscal power to design their own policies (more so than in Glasgow who require national government buy-in for specific sectors). In addition to the lack of sectoral representation, many stakeholders in both networks could detail historical changes in network stakeholders. For example, private sector representation was removed from Sustainable Glasgow as they were deemed by Glasgow City Council as too 'financially driven' and their motives did not necessarily align with the network's. In Copenhagen, the private sector was involved in the network and it was not perceived as an issue as they needed their expertise.

These results support Bulkeley and Kern's (2005) claim that governance networks bring to the table a diverse mix of stakeholder views and perspectives, as all participants could identify the different organisations represented. Many scholars argue that stakeholders perceive networks as an opportunity to share knowledge and engage in productive discussions with other named leaders in the sector (e.g., high level individuals) (Ansell and Gash 2012). The collaborative approach between different sectors in a closed network setting would not necessarily be available out with the network itself (Huxam 2003). The research identified that changes in stakeholder representation implies that any organisation whose characteristics (e.g., motivations, expertise) do not align with the networks can be removed by the municipality (Head 2008). This gives municipalities influence over the structure of networks as they control access to it, which could directly hinder network activities and outputs.

Stakeholders in both networks were able to provide detail on other stakeholder's profile and their contribution suggesting that they are keeping each other 'in check' and assessing those

who align and misalign with the networks objective(s). This in turn helps the network's purpose and strategy as noted by Clegg et al. (2016) as the characteristics of members from all sectors can directly influence network outputs (Head 2008). The decision to remove a stakeholder group was led by Glasgow City Council; this reinforces the idea that they are responsible for the management of the network and have the power to shape network discussions. In this respect, the power demonstrated by the municipality related to withholding access to the network and its resources align with the research perspective of power in relation to resource sharing between stakeholders (Held 1995). This is reinforced by the fact that the municipalities also had the ability to invite new stakeholders reaffirming their powerful position as the 'gatekeepers' of the network. The following section builds on the sectoral representation analysis, to identify how different sectoral stakeholders interact with each other during network meetings.

The municipality possessed the strongest relationships with all stakeholders in the network

In Sustainable Glasgow, all participants mentioned the need for stakeholders to engage with the municipality (engagement evidenced in SNA diagram 4). These findings emphasise the advantages of governance networks as stakeholders seek to actively engage with municipalities directly in a closed network setting, in order to cooperate, share information and resources (Girvan and Newman 2004; McAllister et al. 2015). In both networks, stakeholders utilise the municipality as an intermediary through which to engage with other stakeholders, this reveals the potential power dynamics (e.g., enabling or prohibiting access to resources) between the municipality and other stakeholders (Gordon and Johnson 2017). In the Copenhagen Climate Panel, all participants mentioned how other stakeholders (including the municipality) were known to them prior to joining the Climate Panel. These results align with Hansen et al.'s (2001) claim that many municipalities tend to select stakeholders that they have previously engaged with in some capacity. Many scholars argue that there are benefits to this approach as it can reduce the risk of conflict, foster trust as stakeholders already know how each member functions (Parker and Vaidya 2001; Hansen et al. 2001). However, this research

challenges the transparency of selecting stakeholders to participate in a governance network where criteria is largely based on previously engagement with the municipality as this limits access to the network (Ostrom 2001; Beach 2008).

Municipalities appear to maintain control over, or limit access to stakeholder selection, sectoral representation and stakeholder interaction within governance networks. This aligns with the research definition of power (Held 1995:170), in relation to resources as the municipality appears to be the only stakeholder with the capacity to exercise power openly within the network (e.g., their objectives and role in agenda setting are shared with stakeholders). The direct engagement between stakeholders and municipalities and the intermediary role they play between stakeholder's places them in a powerful position to control the flow of information and resources. The results highlight stable power relations within both networks and suggests that this network management led by the municipality may be necessary to create and sustain network stability with diverse stakeholders. As such, these findings align with Flyvbjerg's (2003) argument that stable power relations are more typical than confrontations within a policy setting. Coupled with the fact that municipalities are perceived as the core point of contact and have the credibility to enact specific sustainability policies and projects, the findings challenge the notion that governance networks are solely horizontal forms of governance, but rather, there are elements of traditional vertical governance still in play (albeit within an informal governance arena). Such elements by default, place the municipality in a leadership position, reinforcing their powerful position as they leverage resources from stakeholders and seek buy-in for policies and projects. These results also challenge the transparency of network sustainability decision-making, due to the informal nature of stakeholder selection.

The results from both Glasgow and Copenhagen clarify the role of municipalities and the central role they play in managing stakeholder interactions. The findings reveal that theoretically, governance networks are horizontal modes of governance, however, this research argues that vertical governance processes are apparent as municipalities not only form networks but are key point of contact for all stakeholders. Building on stakeholder

interaction within networks, the following section explores the key features of governance network.

5.2.3 Network characteristics; Key features of governance networks

Results thus far have shown the important roles of municipalities within governance networks. The following section uses governance network features to explore stakeholder engagement further.

Stakeholders' provide time commitment and sectoral knowledge to the networks

The similar results in Sustainable Glasgow and the Copenhagen Climate Panel reveal that within both governance networks inter-dependency largely equated to mutual resource dependency. The time and knowledge stakeholders contributed to each governance network was perceived as a necessary resource to sustain all network activities (see SNA diagrams 5 and 13). The findings echo Head's (2008) argument that sustainable development policy requires resources from stakeholders in the city (e.g., localised expert knowledge). This is further reinforced by Beck (2011) who claimed that each sustainability strategy necessitates a time commitment from stakeholders in a network. This is largely due to the fact that the municipality specifically cannot design and implement strategies alone, therefore dedicated stakeholder time and knowledge is essential (Rossi et al. 2000). For example, the 'intelligence, analysis and statistics' SPT (public sector agency) provided to Sustainable Glasgow shows a willingness to share information and pool resources together. Glasgow City Council directly benefits from these resources as stakeholders provide sectoral intelligence that the municipality do not necessarily have in-house. In Glasgow, the broad objective of the network may be a deliberate attempt to ensure that the majority of stakeholders can buy into and contribute to network discussions, rather than focusing on specific climate themes as evidenced in the Copenhagen Climate Panel.

Given Glasgow and Copenhagen municipalities manage the networks, they are the main recipient for stakeholder's knowledge and expertise and as such the power dynamics can play in their favour (Goverde and Tatenhove 2000). However, stakeholders' resource contributions to the networks may alter if the network objectives do not align with the stakeholder's own organisation's objectives. As such, stakeholders only volunteered their own time and knowledge when they saw a benefit in participating themselves. This suggests that underlying power relations are constantly being produced and reproduced within the network, as outlined by Flyvbjerg (2003) as resources are provided and withheld during the network discussions. Such vested interests can create challenges as Head (2008) argues that stakeholders participating in the network can behave opportunistically – though given the small number of stakeholders involved in the network and their regard for their reputation they may be more cautious in this respect. The results indicate that mutual resource dependency can create stable networks as stakeholders acknowledge the need for collaboration and resource sharing which can in turn, create long-term sustained network sustainability, providing that no one actor is taking advantage of resource allocation (at the expense of others). The research findings evidence a distinct level of resource inter-dependency between stakeholders within governance networks, specifically with knowledge sharing and sectoral insight that could enhance sustainability decision-making. The following section details the resources received as part of network participation and explores if these resources provided and received were balanced.

Stakeholders receive access to knowledge exchange and political intelligence as part of network participation

Within both governance networks in Glasgow and Copenhagen, inter-dependency largely equated to mutual resource dependency. Stakeholders provide their time and knowledge to the network and in return receive knowledge exchange from other stakeholders - and political intelligence (evidenced in SNA diagrams 6 and 14). This alludes to a 'trade off' between stakeholders and the municipality, as stakeholders receive 'benefits' (e.g., sectoral knowledge)

as stated by Beck (2011) previously. The inter-dependent nature of governance networks is essential to ensure its survival as Klijn (1997a:31) argues that resource dependency keeps networks together as it necessitates stakeholder interactions and sustaining relation patterns. However, the municipality appear to benefit more than other stakeholders as their role enables them to leverage specific knowledge and advice on issues outlined in their sustainability strategies. This reinforces that the power tends to be orientated towards the municipality, who set the agenda and direct network discussions (Goverde and Tatenhohn 2000).

In Glasgow and Copenhagen many participants mentioned 'political intelligence' as a key resource received as being part of the network. Stakeholders specified that 'political intelligence' received from the 'source' (the municipality) was not readily available beyond the network, due to the 'closed door' nature of the discussions. This was reinforced in sectoral interviews as stakeholders could not specify policy orientated Climate Panel discussions. Whilst this appears to have encouraged knowledge exchange and advice sharing between stakeholders, it also highlights the accessibility stakeholders have to decision-makers and the potential influence they could have on their decisions, which is not available to those not participating in the networks (Klijn and Koppenjan 2016a). As a result, the research findings align with Gordon and Johnson's (2017) claim that stakeholders can bring resources to a governance network but also intend to acquire resources, thus there are elements of dependency between stakeholders. The results confirm the inter-dependent component within governance network theory as demonstrated through two sustainability governance networks. The findings allude to the fact that power relations within a governance network tend to be orientated towards resource inter-dependency (in favour of the municipality), which may influence the effectiveness of governance networks if stakeholders do not continue to also benefit from participation (e.g., they may withhold information). The inter-dependent nature of resource sharing creates network stability and can potentially sustain relations over a longer period of time, if stakeholders see a benefit in participating, thus to a degree resources provided and received were balanced, which can enhance the sustainability decision-making

process. The next section examines the 'coordination' feature of governance networks to see if it is as evident as inter-dependency features within the governance network.

Negotiation not common in governance networks as stakeholders prefer to have informal discussions

The coordination of governance networks is analysed in this section. Participants in Glasgow stated the network focused on sharing knowledge for the municipalities benefit, rather than negotiating per se. Sharing knowledge was seen as one way to support the municipality, who set the agenda for network discussions in order to gauge their buy-in and alignment with the Energy and Carbon Masterplan. Similarly, participants in Copenhagen claimed the network was a vehicle to advise the municipality on their Climate Plan. Participants then stated that meetings focused on specific topics of relevance to the municipality, enabling them to gather insight on specific subjects and opinions. The municipality used the networks to set the city's agenda and get stakeholder buy-in for policies, rather than encouraging debate which could lead to negotiation. Although there may be elements of negotiation, the network formation and structure of the meetings do not lend themselves to an environment where stakeholders would have to pro-actively and formally defend their position. Instead, the informal conversations in the networks on specifically selected topics alludes to the network as more an advisory focus rather than debate and negotiation orientated.

Despite the network objectives centering on achieving sustainability targets or broad themes outlined in each city's strategy, the stakeholder's participating on discussions did not explicitly negotiate. This does not suggest that they therefore agreed on all sustainability policies or network activities, but that the networks were a 'space' to provide knowledge to the municipality who could then make an informed decision on a policy. This approach does not rule out the possibility of negotiation within future iterations of each network, but rather, the current network structure was an opportunity to gather resources and discuss ideas, from which a decision could then be made. Torfing (2007) claims there is always a risk of conflict within a network,

which may require negotiation and compromise. Currently, the informal and 'safe space' nature of networks may not warrant a formal negotiation between stakeholders however this approach may be intentional as municipalities aim to adopt informal modes of 'steering' group discussions within the network to suit their remit (Bevir and Rhodes 2011). The results imply that municipalities have created governance networks in a way that enables them draw on stakeholder expertise in an informal manner as stakeholders cannot be governed directly, as 'advisory board' as described by sectoral stakeholders [CONC]. These findings align with Bevir (2011) who argues that stakeholders involved have a degree of autonomy from the state, and discussions were largely informal, therefore 'negotiation' is perceived as too formal for some discussions within networks. Therefore, this research argues that the informality of governance networks mitigates the need for negotiation, which can be perceived as quite formal and instead there are general disagreements within the conversations. It could be deduced that governance networks are vehicles for stakeholders to provide informal advice on sustainability decision-making. The next section explores another component of coordination, the frequency of stakeholder's 'compromise' within a governance network.

Less compromise between stakeholders in the network with more focus on sharing knowledge and insight

Research findings emphasise the lack of compromise within network discussions in both Sustainable Glasgow and the Copenhagen Climate Panel. Participants in both networks noted the lack of compromise, relating this to a variety of factors discussed in this section. The informal, friendly and relaxed nature of discussions in a closed setting and focused on specific topics meant that no stakeholders had to formally compromise their position. This could be due to the small number of stakeholders involved in each network, as this reduced the likelihood of opting out of interactions with other organisations. This is reinforced by sectoral stakeholders wishing to be 'seen' acting positively on sustainable development, as well as the informal peer accountability and the emphasis on stakeholder's reputational in the sector. Such factors may play a role in the lack of compromise within networks and explain the softer approach taken of

advice giving and sharing information. In addition, participants claimed that stakeholders in the network had different areas of expertise so there was little need for compromise. This reduced potential conflict in network discussions as each stakeholder was perceived as an expert in their own respective area (e.g., no stakeholders mentioned clashing over specific policies or initiatives). In addition, the design of governance networks limited their direct involvement in formal, bureaucratic decision-making (e.g., less pressure and seriousness of decisions made). Although the discussions directly influenced key decision-makers in the city, the network discussions were not the final say on policies, which shifted the stakeholder's accountability to the municipality, which may also explain the lack of compromise.

The lack of stakeholder accountability in network interactions is especially true given that discussions are coordinated by the municipality as it improves communication and can achieve more democratic outcomes (Peters 2007). For example, discussion topics were set by the municipality in advance which potentially reduced disagreement and the need for compromise as there was no debate on what needed to be discussed (though participants noted contrasting opinions at times). Di Gregorio et al. (2019) argue that the more stakeholders within a network rely on one specific stakeholder (such as the municipality) to coordinate interactions, the more power that specific stakeholder has. This supports previous findings that the municipalities network management role creates stable power relations and can be evidenced through the municipalities role within each governance network as they select stakeholders that can bring specific expertise to the discussions as well as have the final decision on formally progressing with specific sustainability policies. As a result of this informal governance approach, municipalities may utilise their soft power to influence and shape stakeholder preferences and perspectives given they do not have the power or authority to manage them directly as alluded to in 'stakeholder interaction' section (Gordon and Johnson 2017). The next section examines another key feature, pluralism and analyses the pluralistic nature of stakeholder engagement within a governance network to examine this further.

Stakeholder interaction is influenced by the formality of discussions

Stakeholder interaction was largely determined by the formality of discussions within the governance networks, though there were differences between Glasgow and Copenhagen. Ultimately, how the network discussions were managed and coordinated by the municipality (e.g., setting agendas to focus on thematic areas of interest to them), appear to significantly influence the type of stakeholder interaction. Thus, the municipality took a lead role in the development of the structure and stakeholders within the network as argued by Goss (2001), and, in addition, played a coordination role between stakeholders to ensure discussions are focused and that policy objectives are achieved. The municipality were widely perceived to be the 'focal point' within the network and have the ability to facilitate between stakeholders, which aligns with the 'facilitating leadership' approach utilised within this research (Ansell and Gash 2008). However, Levi and Stoker (2000) challenge the notion of this coordination role and research definition, by stating that the municipality is only one of many stakeholders participating in the network. This reduces the municipalities ability to 'steer or regulate' other stakeholders, as they increasingly require resources from these stakeholders as argued by Klijn and Koppenjan (2016b). The different results in Copenhagen (e.g., though the same interaction across the network) may be due to the municipality's approach to network discussions as they hired a facilitator to ensure each network participant could contribute equally to discussions, whereas in Glasgow senior figures in the council facilitated meetings. Research findings imply that municipalities still tend to coordinate and govern networks through interactions between more formal (Glasgow) and informal (Copenhagen) 'spheres of authority' (Rosenau 2009; Di Gregorio et al. 2019). Girvan and Newman (2004) and McAllister et al. (2015) argue that the formal governance approach driven by the municipality in a closed setting can hinder stakeholder interaction as discussions and thematic topics all align with the municipalities agenda thus all interactions are focused on the municipality. As such, participants appeared to prefer the City of Copenhagen's approach which was informal and relaxed, in comparison to Glasgow City Council's, as participants noted the accountability felt by having to report back to the leader of the council (though the seniority did bring a certain

kudos to the city's sustainability commitments). The different approaches to stakeholder interaction taken by cities reflect the alternative ways that municipalities utilise governance networks.

No formal roles were assigned to stakeholders, except the municipality who were perceived as leading the network

Having discovered stakeholder interaction is influenced by task and formality of discussions that are largely set by the municipality, this section explores the allocation of roles within the network. The lack of formal roles assigned to stakeholders within Sustainable Glasgow and the Copenhagen Climate Panel, as stakeholders' roles were perceived as informal, to provide expertise in a closed network setting. Two thirds of participants in both networks stated a lack of formal roles for stakeholders which proposes that the municipality did not allocate specific tasks to stakeholders. Some participants referred to a 'terms of reference' in each network, produced by both municipalities. These terms provided information on network objectives and guidance on discussion covered, rather than allocating specific stakeholder roles⁵. The only formal role allocated was the municipality who were considered as formally leading the networks and discussions in both cities as identified previously. The lack of formal roles for other stakeholders may be related to the informal nature of network discussions and the inability of municipalities to govern stakeholders directly (Khan 2013). Therefore, this necessitates their leadership role as they tend to be accountable for both developing the network itself as well as gathering the information for their respective sustainability strategies and getting the 'rubber stamp' for stakeholder interaction [COC] (Borzel and Panke 2007). The informality shifts accountability from stakeholders and 'on to the shoulders of the council' [GCC] and enables the municipality to remain flexible in order to see how stakeholders' expertise 'fit into plans' [COCP].

⁵ An analysis of the 'terms of reference' conducted and found no clear 'rules' for stakeholders on how they should behave, though it was perceived as a formal document as stakeholders (particularly in Copenhagen) claimed they had to agree to it prior to network participation.

The findings revealed that the only formal roles within both networks were the municipalities' leadership role. In Glasgow, stakeholder roles were to provide 'advisory' knowledge and expertise [SE] to the municipality. Glasgow City Council's role was perceived by stakeholders as accountable for all actions arising from discussion. Participants in Copenhagen also mentioned the municipality's role as formally leading the network and they understood the Climate Panel as an opportunity for direct insight from the Mayor on developing sustainability policies. These findings were confirmed by sectoral stakeholders who referred to the municipality as initiating and leading stakeholder interaction in each network. Many scholars such as Pierre and Peters (2005) argue that this form of network pluralism, where municipalities leading stakeholder interaction as essential for network to function effectively as clear leadership can be a necessary component within a horizontal governance structure. As such, the lack of formal roles was not seen as a hindrance to network outputs, as the municipality was deemed accountable for all decisions made (Gillard et al. 2017).

The municipalities' perceived leadership roles within each governance network can capture different frequencies of power that operate when stakeholders seek to produce coordinated sustainability policies and projects (Allen 2010; Bulkeley 2012). The municipality may deploy their power within the network by not assigning specific roles to stakeholders' as this enables them to manage network activities and outputs (Gordon and Johnson 2017). However, lack of roles could also signify an inexperience with the governance network approach, as municipalities seek to understand the best way to interact with stakeholders, given that they do not have the ability to govern them directly. There were different opinions between stakeholders in both cities regarding assigning roles: some felt it would give the network more structure whereas other did not want to be accountable to decisions beyond their day job. The formal roles of stakeholders within governance network could be explored in future governance research to fully understand why municipalities do not allocate clear roles within the network as it was not evident from the results that it contributed towards more effective decision-making in the network. The research builds and expands on previous results that show the municipalities in Glasgow and Copenhagen do not assign specific roles to stakeholders, but

rather, leverage their expertise to contribute towards sustainability strategy design and implementation. Municipalities' roles are perceived as formally leading the networks and they were ultimately responsible for actions arising from discussions. The next section explores the role of the municipality further in managing each governance network.

5.2.4 Network management: Leadership and accountability

Having explored the key features of the governance network concept, this section explores network management within Sustainable Glasgow and the Copenhagen Climate Panel.

Municipalities play the leadership role within each governance network

The leadership role of the municipality within governance networks in Glasgow and Copenhagen is evident, given their role in managing and coordinating stakeholders and facilitating negotiations to deliver specific target-driven sustainability policy outcomes that align with city-wide objectives (Goss 2001). Glasgow City Council's leadership role was confirmed by sectoral stakeholders who also stated that the municipality were synonymous with the Sustainable Glasgow network, which could further their outreach and drive their city-wide agenda. Overall, the leadership style of the municipalities was similar in that they were perceived as key 'nodes' in discussions, which was a result of previous stakeholders' engagement (whereas other stakeholders had not necessarily engaged with each other before) (see SNA diagrams 4 and 12). This can be fully accounted for in the stakeholder interaction section. This leadership approach somewhat echoes Ansell and Gash's (2009) facilitating leadership style, which is frequently used in governance networks. However, in Glasgow, the Leader of the Council formally led network meetings, which participants noted made them much more cautious of making recommendations. In Copenhagen, an external facilitator led discussions (the mayor could participate as a 'normal stakeholder'). This finding suggests that the mayor in Copenhagen did not want to lead the discussions; this was perceived favourably among participants. The unique approach taken by the City of

Copenhagen may be a deliberate attempt to encourage horizontal collaborations, given their leadership role in network formation and agenda setting.

Networks were seen as vehicle for stakeholders to influence the decision-making process, though the municipalities' leadership role did present both opportunities and challenges. The network increased the likelihood of stakeholders disagreeing with the municipality's approach or withholding resources if the policy objectives did not align with their own. However, given the informal and voluntary nature of network discussions, the likelihood of disagreement, negotiation or compromise was reduced. Conversely, there are advantages to municipal-led networks as multi-stakeholder collaborations within networks can facilitate the exchange of knowledge and ideas between different stakeholders which can improve the range of creative ideas about how to solve the climate challenge. In addition, given the municipality were perceived as leaders of the network, regardless of how they facilitate network meetings, stakeholders placed accountability on them to deliver on network outputs. This could be due to the lack of assigned roles in the network for all other stakeholders and the fact that the municipality were the only stakeholder to have a formal position.

The leadership role played by municipalities is largely due to how the network was initially formed and managed. There are elements of top-down governance within the governance network approach that directly influences network discussions (evident in network formation in both cities, and network management in Glasgow). Despite the top-down nature of network leadership in general, municipalities have limited power in that they cannot formally govern stakeholders. As such, they require their buy-in in order to develop more effective sustainability policies and the informal approach enables them to do this, without formally assigning roles to stakeholders. There are relational power imbalances for the municipalities between leading the network agenda and discussions but also dispersing power in order to leverage stakeholder's expertise (Flyvbjerg 2003). The research results highlight this dichotomy within governance network theory and practice as the approach is neither horizontal nor vertical governance and requires further research to understand the specific stage the networks are at

within this transition. Hence, the municipalities' leadership role does 'work' for each network, but the following section examines if this leadership position is synonymous with being accountable for network objectives.

Municipality is perceived as accountable for meeting governance network objectives

Most participants in Sustainable Glasgow and the Copenhagen Climate Panel placed accountability on the municipality. This finding was reinforced by sectoral stakeholders who stated the municipality was the main stakeholder within the city that was accountable to deliver on each city's sustainability strategy. Therefore, the municipality was perceived as accountable for network activities, actions and outcomes. Different levels of accountability can influence network relationships that are based on uneven and shifting power relations. For example, within both networks, it appears that the leadership role of the municipalities directly impacted their accountability for outputs, managing stakeholder interactions and network performance which altered the power relations further in favour of the municipality (Abbott et al. 2015). Stakeholders perceive that leadership (and accountability) assigned to the municipality can establish clear power hierarchies in that the municipality can directly influence the scope, structure of the network and the associated resources (e.g., who has access to the discussions). This is evidenced by the municipality who provide specific thematic material prior to network meetings to stakeholders and involve senior decision-makers within the networks as a way to steer stakeholders towards particular policy objectives (Gillard et al. 2017). As such, the municipalities' leadership role also requires formal accountability to deliver on sustainability strategies and stakeholder engagement is one way they reach their sustainability targets. Formal accountability placed on the municipality reinforced their leadership role within the governance networks (and vice versa), shifting the power dynamics in their favour and reinforcing elements of top-down governance within the network.

The nature of the network also placed some informal accountability on network stakeholders who felt 'peer accountability' to be seen to be adding value to discussions. For example,

stakeholders in Copenhagen took some accountability (e.g., outlined in the terms of reference) to actively contribute towards discussions and provide support, SKF stated it was an 'informal positive pressure'. In Glasgow, very few stakeholders mentioned any accountability, with only one public sector agency (SPT) mentioning the accountability they felt when sitting in front of the Leader of the Council in network meetings. It is unclear why these differences exist. The nature of each governance network identified within the 'network formation' section (e.g., a closed group of high-level individuals with sectoral expertise) created an environment where stakeholders felt they were accountable in that they had to 'add value' to the discussions as evidenced in Copenhagen. Therefore, although there is an informal pressure on stakeholder participation in each network, formal accountability and leadership of the network ultimately lies with the municipality.

5.2.5 International engagement: Global links

Limited formal links between governance networks and international cities, networks or organisations

There were limited formal links between city governance networks and other international cities, networks and organisations. Any connection to international networks were in an individual stakeholder, rather than in a governance network capacity. This result is surprising, given the global ambition mentioned by each network (in particular the municipalities) and their desire to scale up successful city initiatives and projects. Two thirds of participants stated no clear links between the city-led governance networks and international / transnational networks (e.g., except through projects, both RUGGEDISED and the Energy Lab were voiced for the international components). The lack of international network collaboration in each governance networks suggests that within the capacity of the discussions, the focus is on city-level sustainability decision-making and not necessarily making connections and networking with other cities. The shift to municipal decision-making is evident in the literature as cities increasingly have authority to implement their own sustainability policies and projects (Pierre

and Peter's 2000). However, with this shift, many international networks (e.g., C40 Cities, ILCEI) and organisations have formed to support cities specifically develop robust sustainability strategies and share knowledge and expertise (Khan 2013). In contrast, the research identifies that governance networks in Glasgow and Copenhagen have focused on horizontal governance with various public and private actors, rather than collaborating with international networks or national level organisation (vertical integration approach), per se (Rosamond 2007; Kern and Bulkeley 2009). This, in part, may be due to the lack of network formality as this may have limited the networks ability to actively participate (as an 'entity') in vertical governance at national and international scales.

Although the network as an entity did not participate in international linkages, stakeholders in both cities noted their individual involvement in such networks and noted how they drew on that expertise for the governance network discussions. Municipalities did mention engaging with international networks beyond the governance network discussions too, which highlights that there may have been some initial links made, but this has not been considered within the governance network activities or discussions. Therefore, other stakeholders would have little knowledge of such linkages. Despite such limited global involvement, engaging with the international community can give city officials more leverage to action specific policies if it is perceived as improving international rankings and progressing towards sustainable development (Klijn and Koppenjan 2016b). Therefore, there appears to be a mismatch between the municipality working with international networks, but not necessarily linking up with the discussions in the city governance networks. This is particularly important as the rise of transnational networks such as C40 Cities, ICLEI and Euro Cities seek to benchmark, and support decision-makers in developing sustainability strategies. This is a core aim of the city-led network with most stakeholders identifying the benefits of working in such international networks (Acuto and Rayner 2016). For example, all stakeholders were aware of the benefits of participating in them (e.g., raising the city's profile, networking and provide financing). Reasons for this mismatch remain unclear, however the data for Copenhagen suggests that involvement with city governance networks is at an individual level rather than organisational

level. This can be evidenced in the results as stakeholders themselves mentioned working with international networks in their own organisational capacity but drawing on this knowledge to contribute towards the city-led network discussions.

There is a distinct lack in any formal engagement between governance networks and international cities, networks or organisations in both Glasgow and Copenhagen. Both networks tended to focus on developing relationships with organisations in each city rather than looking for international networks to leverage knowledge and resources. At an individual level, stakeholders appear to have some engagement with international networks; at the network level, there is little formal engagement. Engagement may be due to the current international focus on city-level decision-making, with respect to developing sustainability strategies. However, engagement between city networks and international networks could benefit each city and expand knowledge exchange and learning. The lack of formal links between city-international networks could hinder the effectiveness of the governance networks. For example, such connections can speed up the deployment of new technologies, providing finance and resources for projects which could support the city's sustainability strategy.

The research study has explored network formation, key features (characteristics), management and normative issues to understand the role of governance network theory within sustainability decision-making. The following section evaluates how the networks could be improved going forward.

5.2.6 Evaluating governance networks: Network effectiveness

Structural and management improvements could enhance the effectiveness of the network

Participants considered a variety of ways both Sustainable Glasgow and the Copenhagen Climate Panel could be made more effective, including: more formality; enhanced clarity on

network objectives; reducing the role of the municipality within the networks, and, local elections and short policy timescales. Participants claimed more formality was required network (e.g., dedicated staff, budget, roles assigned) to ensure that there were clear actions arising from discussions that could be acted upon and traced back to the SDIs outlined in the sustainability strategy. For example, two thirds of stakeholders in Glasgow mentioned the need for more formality within the network. This approach sought to formalise the governance network, which ironically relates back to previous governance approaches from the 1980-90s (as discussed in chapter two) that aimed to be more outcome orientated in order to improve efficiency and effectiveness of decision-making (Rhodes 1996; Enroth 2011). This suggestion from participants stands in contrast to the relatively informal nature of governance networks which seek to leverage knowledge and expertise from a variety of local stakeholders. Formalising the governance networks may ensure more accountability is placed on stakeholders participating rather than the municipality to act on ideas, which they may struggle to achieve due to lack of resources (Goss 2001). Conversely, many stakeholders specified the informal and voluntary nature of involvement as their main reason for participating in the network, as they are not accountable for decisions made but can contribute their expertise to the discussions. Increasing the formality may have adverse effects on the stakeholders who already have to account for their actions to their own organisations boards which may not improve the effectiveness of the network (which focuses on stakeholder collaboration as defined by Provan and Kenis 2008:230). This research finding contradicts the informal and voluntary nature of governance networks; it advises that the governance network concept necessitates some level of formality to manage the network interactions and inter-dependencies between stakeholders. Even though the municipality initiated the network which may provide some formality and structural legitimacy, network rules, budgets and stakeholder roles can formalise the network and help it to gain traction.

Further clarity on the governance network objectives and actions are required to improve the effectiveness of network discussions. The collective collaboration between stakeholders in a goal orientated network, require clear objectives and actions to ensure progress is being made

(Provan and Kenis 2008). For example, two thirds of stakeholders in Copenhagen noted the clarity required from the municipality, to stay committed and focus on the Copenhagen 2025 Climate Plan delivery. Similarly, participants in Glasgow emphasised more clarity was required on the network's activities so stakeholders could understand how they could contribute more effectively. This suggestion from participants echoes various debates within this research given the diverse stakeholders involved and the different perspectives they bring. Though the different perspectives are seen as beneficial to share knowledge with other stakeholders, different perspectives on how to 'act towards' sustainable development and can cause confusion as well as influencing how the concept is implemented within a city (Lele 1991; Kates et al. 2015). Improving the clarity of specific network actions and how they link to indicators (and actions) enables the municipality to assess progress towards sustainability targets as they are meaningless without a shared vision between stakeholders (Kates et al. 2005; Yvon 2013). Therefore, clarity on network objectives, how sustainability is defined and the SDIs utilised to assess progress are all necessary to improve the effectiveness of governance networks.

A key aspect noted in the results and discussion was the need for the municipality to play a smaller role in the governance network as both case studies highlighted concerns around the network being a sounding board for the municipality. Both networks were synonymous with their respective municipalities; they play a significant role in network formation, stakeholder interaction and management. However, Gillard et al. (2017) argue that if municipalities are seen as leading the network, this can be to the detriment of the network if it becomes too focused on the municipality and their agenda - not the needs of the stakeholders participating. This, in turn, can influence stakeholders' involvement and motivation to join, if they do not receive tangible benefits. The result raises wider questions of who would then form, manage and lead the network. Stakeholders did not provide answers to these questions, which implies that they would like the networks to move away from just the municipality's agenda, rather than significantly reducing their role. It does suggest that municipalities need to shift from traditional modes of governing (top-down) to more horizontal governance approaches. The network

formation is closely aligned with each city's sustainability strategy and necessitates a credible and legitimate stakeholder to drive forward. Lastly, the impact of local election cycles was also mentioned by stakeholders however this has been discussed previously.

This section has discussed the research findings of two sustainability-orientated governance networks (policy design), Sustainable Glasgow and the Copenhagen Climate Panel. Both case studies have provided insight into how such networks form, their characteristics, management, internationalisation and other normative issues. The following section discusses two governance networks (policy implementation) in the form of projects, RUGGEDISED (Glasgow) and the Energy Lab (Copenhagen), where the same themes have been employed (for the most part) in order to draw comparison from each case study.

5.3 Projects: RUGGEDISED and Energy Lab comparative analysis

5.3.1 Project formation

Part two of the discussion explores two policy implementation projects: RUGGEDISED (Glasgow) and the Energy Lab (Copenhagen). The network and project analyses run thematically parallel (for the most part), thus section 1 - 6 mirror the themes covered in the networks, part one. The project formation identified a variety of themes, many of which aligned with the network results.

Exclusive stakeholder selection and project initiation driven by the municipality

Regarding project initiation, two thirds of participants noted RUGGEDISED was initiated and led by the municipality who had informally approached stakeholders in the city that they had worked with previously. Similarly, over half of participants in Copenhagen claimed that the municipality and other public sector agencies (e.g., BOH) initiated the Energy Lab project by donating land to develop a 'smart street'. One third of participants thought that the Technical University of Denmark had initiated the project. This was largely due to the Technical University of Denmark approaching the municipality with ideas on how to develop the street and identify 'known' project partners. The results suggest that both the City of Copenhagen and Technical University of Denmark's involvement in project design led to uncertainty for stakeholders, some of which were unclear on who initiated the project. However, overall, the university largely managed the project implementation with municipality as a board member. This created further confusion for participants as they had initially perceived the municipality as leading the project.

Both municipalities led the design of the projects by selecting 'known' stakeholders to participate (e.g., had worked with them previously). The municipalities' ability to include or exclude stakeholders, based on previous collaboration, implies a lack of transparency. The informal nature of selection, being frequently based on personal relationships, aligns with

Hansen's (2001) claim that this was often the case in city-level networks and projects. Working with 'known' project partners with the right expertise can reduce the risk of conflict during project delivery and increase the likelihood that the stakeholder will have similar objectives and perspectives. Furthermore, historical ties with stakeholders provide assurances to the municipality as to how they will work and if they will meet project deadlines and deliverables, which is essential for flagship projects in both Glasgow and Copenhagen. 'Known' project partners can provide a detailed understanding of stakeholder motivations (e.g., how to get their buy-in), which can improve the effectiveness of project delivery as there are higher levels of trust. However, the approach is not transparent and open to all stakeholders within the city and the historical ties between stakeholders' contrast with new forms of governance explored within this research. Klijn (1997) contests this stakeholder selection approach, arguing that the 'gatekeeping' role played by the municipality demonstrates a lack of transparency, inclusivity and ultimately, a lack of legitimacy in the stakeholder selection process. These findings mirror those found in the networks and this research argues that to a degree, sustainability policy design and implementation within cities is a relatively exclusive and at times, a top-down process, which may be due to the municipalities lack of experience with governance network approaches.

The majority of stakeholders in both case studies mentioned their buy-in to the project. All stakeholders in RUGGEDISED referred to this as they were asset owners or technical providers and were invested (physically) in the project. Over half of Energy Lab stakeholders noted the project met the needs of all partners involved, as it played to their expertise. In both cities, stakeholders co-designed the projects as evidenced in their upfront resource contributions and project thematic focus (drawing on stakeholders' expertise). Co-designing such projects required a commitment from stakeholders, which ensured their support, and accelerated the deployment of projects. This approach was reinforced by Roberts (2000) who states that stakeholder buy-in to projects can create a 'joint commitment' to implement new solutions with such projects. For example, working with new stakeholders can bring relevant resources that the municipality does not possess (Torfing 2019). In both case studies, the

municipalities are necessary in projects in the design phase (selecting stakeholders), but don't necessarily need to be 'active' during the implementation phase. Nonetheless, their engagement with 'known' partners can limit participation and ensures project design work is only for those directly involved in its creation (Hartley 2010). This research recommends more transparency is assured in stakeholder selection, given that it can have a potentially negative impact on project outcomes. Following this section on stakeholder selection and project initiation, the next section discusses the frequency of stakeholder engagement in each project.

Project stakeholders met frequently and were flexible with engagement

In Glasgow, two thirds of participants confirmed the project team met on a monthly basis, with other participants noting engagement with stakeholders outside the project. Participants indicated it was difficult to engage everyone involved as they all had their own priorities within and out with the project; this may explain why some engagement was outside the formal project meetings. Similarly, in Copenhagen, all participants noted the project team met on a monthly basis, but frequency depended on work-stream activities and progress. Stakeholders stated they also engaged with each other outside the project, too. This was reinforced by the sectoral stakeholders in Copenhagen who mentioned individual engagement with project participants and informal contact with the municipality. In general, stakeholders interacted frequently on project activities, though there was no set plan for engagement as it was led by both project needs and stakeholder workload. Goss (2001) suggests that differing stakeholder priorities and interests can influence engagement as each project partner has different commitments and contributes different resources. This may be used to the stakeholders' own advantage, as they seek to prioritise activities that directly contributes towards their own organisation's objectives (Powell et al. 2005). As such, stakeholder engagement was not just limited to the projects, but rather, the project provided one platform for engagement. The following section builds on project initiation: stakeholder selection and frequency of engagement between project partners, to explore what motivated stakeholders to participate in the projects.

Stakeholder's own organisation's objectives and city-wide benefits motivated project participation

Participants in both projects stated that access to knowledge and the 'best practice' was a key motivating factor when participating in the project. Over half of stakeholders referred to the development of scalable solutions for the city. As well as internal organisational motivations, there was a genuine desire and altruism from stakeholders to support both cities and their sustainability vision (though they did not refer to the city's sustainability definition). This aligns with Ostrom's (2001) and Monge and Contractor (2003) findings that stakeholders are frequently altruistic and see it as their 'civic duty' to play a part in the transition to a sustainable city by reducing carbon emissions and contributing to the city's global profile.

Altruistic motivations were implied but were not conveyed as strongly as the internal motivations. For example, although stakeholders expressed an altruistic desire to develop a new energy system that would bring various benefits to the city, the development of solutions were those that they would also benefit from directly. Such vested interests can create tension and a shift in power dynamics, as relational power occurs through the interaction between stakeholders with the aim of acquiring new resources (e.g., technologies) for the benefit of their own organisation. The focus on attaining resources may enhance the capacity of stakeholders to influence the project, suggesting varying levels of power between project partners (Held 1995). A significant motivating factor for private sector organisations was to test out infrastructure (Glasgow) and new products (Copenhagen) that could be sold following the project completion. The infrastructure provided in Glasgow and the technologies provided in Copenhagen were critical for both projects, and at points in the RUGGEDISED projects, these resources were temporarily withheld which stalled project progress. Therefore, the ability of a stakeholder to influence the project in their favour can also influence their ability to claim authority and influence within the network and can produce and reproduce power relations within the project (Flyvbjerg 2003; Torfing 2019).

The internal organisation's objectives appear to be another recurring theme, as stakeholders seek to gain funding and knowledge (RUGGEDISED) and develop strategic partnerships (Energy Lab). Stakeholders in Glasgow noted funding and knowledge as a motivating factor; the public sector agencies (who were 100% funded on the projects) stressed the importance of funding as they relied on it. The municipality noted access to knowledge as a key motivating factor. Many stakeholders in Copenhagen were motivated by the opportunity to develop partnerships. The City of Copenhagen, in particular, mentioned partnership development as these were a necessity to deliver on the city's sustainability targets. Huxam (2003) and Ansell and Gash (2012) both argue that this was primarily due to the collaborative nature of projects (and networks), which facilitate access to different kinds of expertise and potential funding. The internal motivations of stakeholders to join the project can influence how they perceive the project objectives, as discussed in the next section.

Development of a 'smart street' was the main objective of the project

Two thirds of participants in RUGGEDISED and the Energy Lab claimed the main aim of each project was to develop a smart street. The remaining one third in each city emphasised the projects ability to contribute towards the city's carbon emissions reduction targets and linked the project to the city's sustainability strategy. The integration of different technologies within each project required diverse sectoral representation; this links into the pluralistic nature of such collaborations. Both project and sectoral stakeholders demonstrated a collective understanding and agreement on project objectives and implementation.

Participants in both cities referred to the positive contribution the project could make towards each city's sustainability strategy and the projects scalability within other contexts. Each city's sustainability strategy provided a collective reference point for such initiatives as the stakeholders referred to the strategy for guidance and to track progress towards carbon reduction targets. The findings suggest that sustainability strategies can be incorporated into long-term strategic planning as they provide a high-level view of a city's progress as argued

by Hernandez-Moreno and Hoyos-Martinez (2010). The intention appears to be sharing knowledge between different cities and developing a blueprint that can be scaled up and replicated elsewhere in the future (Boyko et al. 2012; Hiremath et al 2013). As such, flagship projects can improve the city's image on the global stage and provide a blueprint for sharing knowledge and learning from other cities, as argued by Keil and Desfor (1996), though there was no mention of specific international links. This could encourage more competition between cities, where municipalities use projects to showcase their work on climate change. This is reinforced in both Glasgow and Copenhagen as they claim that their ambition is to be world leading with their sustainability targets (e.g., Copenhagen states it's ambition to be 'the world's first carbon neutral capital') (City of Copenhagen 2016:35). Although there are benefits to implementing such a project, this research argues that stakeholders may prioritise internal motives, as they benefit from exposure to a wider audience (Huxam 2003). Despite no explicit mention of the organisation's internal motivation and objectives, improving the city's global ranking and image would in turn, prove beneficial to the organisations located there. The following section builds on network objectives by exploring the expertise stakeholders bring to the network, in order to understand how such projects are comprised.

Stakeholders provide sectoral expertise and insight that aligns with each city's sustainability strategies

Having discussed stakeholder motivations and project objectives, this section marries these themes and closes the gap in understanding what expertise stakeholders bring to the project. All participants detailed the key areas of expertise required in the project and partners were assigned roles based on their insight and expertise. There was a balancing act for stakeholders in the project, regarding the need for their sectoral specific knowledge (as one stakeholder cannot possess all of the sectoral expertise required in the project) and their willingness to openly acknowledge this need. As such, the results align with Head's (2008) argument that each stakeholder alone cannot possess all knowledge required for the project. In both cities, the nature of such projects evidently necessitates collaboration between stakeholders, as

argued by Goss (2001). The thematic expertise each stakeholder possessed directly influenced their role within the project and helped to shape the project priorities and planning during project formation.

Participants specified how their expertise contributed to the wider discussions with the city and frequently linked their expertise to the city's sustainability strategy. For example, participants in Copenhagen claimed that their involvement was to ensure the project contributed positively towards the city's 2025 Climate Plan. Sustainability strategies are developed by municipalities to provide objective evidence for assessing progress towards sustainability targets, and as such, projects can directly contribute towards carbon emission reduction targets (and SDIs) (Li et al. 2009). In Copenhagen, both project and sectoral stakeholders had a clear understanding of the 2025 Climate Plan and its aims and objectives. Reference to sustainability strategies within the results provides direct links between how each project supported the vision and objectives outlined in the strategy. In both cities, the projects focused on developing energy efficient technologies as well as providing wider socio-economic benefits for citizens. For example, Glasgow aimed to reduce energy costs in order to reduce fuel poverty and dependency on fossil fuels, this would improve the quality of life and well-being for city dwellers (which was also outlined in each city's sustainability definition). This tailored approach to project development is, in turn, the result of the project partner selection process, as the municipality's role in the project initiation can largely determine the type of stakeholders approached to participate in the project and what expertise they can provide. Stakeholder expertise in the project demonstrates the need for projects to have different stakeholders involved, in order to facilitate a pluralistic approach to governance network formation. The project could not proceed without collective action and commitment from all stakeholders involved - this enhances the decision-making process. Additionally, the links to each city's sustainability strategy reinforces the necessity that strategy implementation needs to relate to project delivery.

Direct link exists between projects and each city's sustainability strategy objectives

Over half of stakeholders in RUGGEDISED and the Energy Lab claimed that the project was an opportunity to play a part in supporting the implementation of their sustainability strategy and to roll out new technologies (the other half of respondents detailed the integrated energy system, which was also part of the city's sustainability strategy). The results emphasise the fact that sustainability strategies can directly influence the development of projects. Stakeholders can assess progress towards sustainability targets through project implementation as the project objectives in each case study aligned with each sustainability strategy. Often, SDIs and actions are tied to projects to ensure there is a clear link between sustainability policy and actual carbon emission reduction. For example, in Copenhagen's 2025 Climate Plan and accompanying document 'Copenhagen Climate Projects 2016', there is direct reference to the Energy Lab. In addition, in Glasgow's Energy and Carbon Masterplan, there is an action to develop a specific project on integrated energy systems like RUGGEDISED. This clear link between project and policy enables stakeholders to ultimately hold municipalities to account for policy decisions, even if they are not directly involved in their implementation, such as in the Energy Lab (Kitchin et al. 2015). In both Glasgow and Copenhagen, sectoral stakeholders had sound knowledge of their city's sustainability strategies, were able to describe their role in its development and how their organisation aligned with it.

As well as referencing each city's sustainability strategies, over half of the stakeholders in each project also made reference to the role of the municipality in the project. Glasgow City Council's role was leading the development of the project; the City of Copenhagen's role as a board member in the project implementation phase was to influence project partners to align with the 2025 Climate Plan and participate in the project. Such findings suggest the municipalities role within projects is significant as they have the ability influence project partners selection process (which is largely based on previous engagement, similar to the networks approach), and they can also choose to lead the implementation of such projects. It could be deduced that the

municipality's involvement is somewhat necessary for large-scale flagship city projects as they are positioned to facilitate engagement between project partners and can mobilise relevant stakeholders. This is supported by Beatley (2003) who states that municipalities require stakeholder interaction to implement sustainability strategies; therefore, multi-sectoral projects are necessary for policy implementation. However, Bingham et al. (2005) identify challenges with this approach such as a lack of consensus in multi-sectoral groups. Kitchin et al. (2015) claim that this lack of agreement can create more problems when reducing the sustainable development concept into performance indicators and metrics as detailed in chapter two. In each project, municipalities have the ability to facilitate the delivery of specific target driven sustainability policy outcomes to ensure that they align with city-wide objectives. In many respects, project delivery is seen as 'policy in action' and clearly emphasises the importance (and challenges) of selecting SDIs and how this directly results in specific projects being implemented. The municipality's role in each city project is reinforced by their ability to ensure implementation aligns with wider city objectives as well as influence stakeholders to deliver specific objectives or fulfil a specific role.

Big data, heating, transport and energy were thematic priorities in both projects

Having discussed project links to sustainability strategies, this section explores the project's thematic areas in order to understand fully how these align with each city's sustainability strategy. The thematic alignment between the project objectives and each city's sustainability strategy embeds the project within the strategy (and in some cases, the project is explicitly mentioned as a specific indicator in the strategy). This suggests a direct link between sustainability policy design and implementation and supports Goss's (2001) argument that projects are fast becoming an effective way to implement sustainability policies. Many scholars have expressed the need for sustainability strategies to align with project implementation. Voula (2005), Holman (2009) and Yvon (2013) all regard thematic priorities and indicators as 'tools of actions' that directly correspond to a specific political function. Through sustainability strategies, thematic topics (e.g., transport, data) that relate to sustainability can be quantified,

assessed and the corresponding project or action can be implemented, thereby directly contributing to carbon emission reduction. In many respects, sustainability strategies act as 'reference points' to determine whether progress can be made towards specific thematic targets, as argued by Hiremath et al. (2013). In Copenhagen specifically, a key theme identified was the need for partnerships within projects: a pluralistic approach. Stakeholders had to collaborate to develop an integrated energy system, drawing on expertise from a variety of stakeholders. The thematic expertise, as highlighted previously, demonstrates the need for diverse sectoral stakeholder engagement for policy implementation. In some cases, the thematic priorities for each project have wider implications than just sustainability: they play into the wider socio-economic objectives in the city. For example, in Glasgow, the energy efficiency and district heating objectives within the RUGGEDISED project seek to also address fuel poverty within lower income households, ensuring a just transition towards a sustainable future. This sustainable development approach is integrated to social and economic needs in the city, similar to the sustainability triangle of economy, society and environment (cited by two participants in Glasgow, and most of the participants in Copenhagen); thus, it could thus justify exploration in future research.

The project formation has provided insight on the type of stakeholders in the project, their motivations, perceptions of the project and the expertise they provide. The following section, stakeholder interaction, builds on this to fully understand how the formation influences how stakeholders engage with each other.

5.3.2 Stakeholder interaction

Stakeholder interaction emphasised the role of the municipality as a necessary partner in both governance networks, with all other sectors represented with the exception of citizens.

Most sectors are represented in the project (with exception of citizens) with the municipality perceived as a necessary partner

Nearly all participants mentioned the municipality as the number one partner in both projects. In Glasgow, they were widely seen as leading the project. However, in Copenhagen, participants mentioned the municipality as a necessary partner in the project, though not the most 'active' one (stakeholders noted the Technical University of Denmark as project lead). The importance of the municipality's involvement in each project was reinforced by sectoral stakeholders in each city, which confirmed the necessity of the municipality's involvement. Municipal representation was evident in both case study cities and their buy-in was necessary to deliver such projects, as argued by Khan (2013). This was largely due to the initiating role played by the municipalities in the project design (perceived as necessary to set the project up), though not necessarily with project implementation (in Copenhagen, they did not play an 'active' role during delivery). This could be due to the municipalities being seen as the 'credible' (and legitimate) organisation that could initiate such partnerships, as Goss (2001) argues. Therefore, this is seen as key to facilitate discussions and frequently manage stakeholder engagement and dynamics.

Stakeholder representation was balanced in each project, with engagement based on work stream activity due to project design. In RUGGEDISED, with the municipality leading, other stakeholders represented in the project were universities, energy providers and technology providers (see SNA diagram 8). In RUGGEDISED, there were also formal links to international cities which were implementing energy system related projects. Similarly, in the Energy Lab, with a university leading (DTU), other stakeholders included public sector agencies and private sector partners (see SNA diagram 16). Universities appear to play a key role in providing knowledge and expertise and are widely perceived as having an influential role within projects (Cortese 2003). Public sector agencies tend to play a role on behalf of the municipality (e.g., representing their interests) and private sector organisations tend to bring new technologies to test in project conditions (Rossi et al. 2010; Ricard et al. 2017). Stakeholder representation

appears to support Hansen's (2001) argument that representation is based on previous engagement with project partners. This can often reduce conflict and foster trust within a project (Parker and Vaidya 2011). In addition, representation appears to also align with stakeholder resources provided to the project (e.g., many partners have an asset in the smart street, such as Scottish Power (SP) in Glasgow who own the energy infrastructure, and By og Haven (BOH) in Copenhagen, who own the land).

The research identified a distinct lack of citizen representation in each project, though the findings did clarify that the projects sought citizen input through workshops and consultations during the project delivery phase. This research argues that the hand-picked project partner process excludes citizens which begs the question how such projects can be 'for the people' if they are not designed by the people. In the networking findings (part one), the municipalities were seen as having the democratic mandate from the people which may suggest that they work on behalf of citizens. However, Evans et al. (2005) argue that reducing citizen involvement in a project tends to have an adverse impact on sustainable urban development. These findings challenge democratic participation and so the legitimacy of sustainability projects, a recurring theme within this research, particularly in the network and project formation. The legitimacy of participation in the projects are questioned as the structure of both projects require revisions to accurately reflect residents' perspectives (Backstrand 2008). The exclusion of sectoral groups will limit the project outputs and activities as not all perspectives are integrated.

Stakeholder representation in projects directly influences project outputs and their contribution to sustainability targets. Although there has been an attempt in each project to work with a diverse mix of stakeholders (which can improve the decision-making process), the lack of formal citizen participation could hinder the effectiveness of projects - this sectoral group are not formally integrated into the project and do not have a say in a project that may directly affect them. This echoes the same challenge within governance networks and civil society participation in each city, and feeds into the wider academic debate on this type of stakeholder

engagement which challenges notions of democratic participation within sustainability decision-making (Haas 2004). Having explored stakeholder representation in this section the following section discusses stakeholder interaction within both projects.

Municipality perceived as natural project leaders and had historical ties with the majority of stakeholders

Stakeholders engaged with the municipalities as they were the lead partners in the design phase of projects in both Glasgow and Copenhagen. In Glasgow, all stakeholders noted that Glasgow City Council, as the lead partner in design and implementation of RUGGEDISED and stakeholders claimed they already had engaged with the municipality informally prior to formal project engagement. In contrast, in Copenhagen, all stakeholders had previous engagement with the City of Copenhagen who led project design, but not project delivery. In most cases, the municipality had an established relationship with stakeholders and the majority of project stakeholders also knew each other also. This resulted in strong relationships between all stakeholders in RUGGEDISED (see SNA diagram 8). Similarly, the results define the relationship in the Energy Lab project between stakeholders and the City of Copenhagen as 'strong' (rated 1) (see SNA diagram 16).

Stakeholders generally perceived Glasgow City Council and the City of Copenhagen as key stakeholders in projects and thus engaged with them frequently. This may be due to their previous work with the municipalities as they had established relationships with nearly all stakeholders involved. As such, municipalities are often perceived in a leadership role and are frequently seen as largely responsible for the delivery of sustainability policies within cities (Rossi et al. 2000). Therefore, the municipalities' formal role in initiating both projects, and facilitating engagement between stakeholders, placed them in a key position to influence the project design and the allocation of resources. In Glasgow, stakeholder perceptions of the municipality's leadership role in project design and implementation influenced how they engaged with them, as their decision-making authority put them in a powerful position

compared to the rest of the project partners (e.g., they have more leverage in terms of choosing whether to include or exclude stakeholders). In Copenhagen, the municipality did not deliver the Energy Lab project, but played a leading role in the project design process and in the implementation process; their board member role gave them oversight of the project (stakeholders also noted that the relationship with the actual project lead, Technical University of Denmark, was strong). Therefore, stakeholder perceptions of the municipalities as natural leaders suggests that not all stakeholders in the project are equal. Both structural and relational power dynamics exist: the municipality's role in the design of projects enables them to decide the project design, those stakeholders involved and how to allocate resources as identified in the network formation section. The result also confirms that a municipality's strong relationships with stakeholders and previous stakeholder engagement place them in a powerful position as a key 'node' for project facilitation, regardless of their role during project implementation. Having established stakeholder interaction with the municipality, the following section explores various factors that can influence interaction between project stakeholders.

Stakeholder interaction was dependent on historical ties and project activities

In Glasgow, stakeholders noted their strong relationship the Glasgow City Council due to previous collaborations, though some relationships with other partners were based on project activities only (see SNA diagram 8). However, in Copenhagen participants stated stakeholder interaction (including the City of Copenhagen) was based on previous engagement only (see SNA diagram 16). Project partner relationships with the municipalities were consistently mentioned first, revealing that participants understood these relationships as more significant than those with other stakeholders. This is despite the fact that the municipalities' role is not always necessarily leading the project. This further confirms the general stakeholder perception of the municipality as a key player, as argued by Pierre and Peters (2005). One reason for this could be the historical ties each stakeholder has with the municipality. The 'relationship history' is an important factor that determines engagement frequency and the type of relationships within projects. In Copenhagen, relationships that had a history tended to be

stronger and this would influence project dynamics positively. The majority of stakeholders stated previous collaboration with the municipality only enhanced engagement in the project as there was more trust and less risk of conflict. Relationship history has not been explored fully in the governance network theory literature; it is a relatively under researched theme to emerge from the data, specifically within the context of policy implementation (e.g., projects). Sectoral results in Glasgow and Copenhagen reaffirm the historical stakeholder interaction and each organisation's focus on partnership development and developing initiatives, networks and projects to work together. The impact of historical ties within governance networks appears to have a substantial role in both the network and project stakeholder selection process and this study recommends further research to fully understand the wider implications of this approach.

Project activities (often pre-agreed) also appear to play a role in determining stakeholder interaction, specifically in RUGGEDISED. Such roles were often agreed by the municipality as they were involved in the design of such projects. Utilising project activities to manage engagement and coordinate stakeholders can provide clarity on project partner roles which is deemed necessary within multi-stakeholder settings when addressing complex policy problems, as argued by Rossi et al. (2000). This stands in contrast to the governance networks in each city, where stakeholders had no clarity due to the lack of assigned formal roles. This did not appear to impact stakeholder interaction negatively but was met with mixed responses from stakeholders regarding the affect it had on network activities and outcomes. The design of projects can significantly influence the structure and thus the interaction between stakeholders (Held 1995). The municipalities' role in project formation suggests that they play an influential part in the structure of such projects. This structural power within a project can affect all stakeholder interaction. Based on these findings, the effectiveness of governance network policy implementation is largely determined by historical factors such as ingrained perceptions and previous engagement, rather than current factors such as day-to-day project activities.

5.3.3 Network characteristics: Key features of governance network

Having discussed stakeholder interaction in each project, this section explores key features of governance networks in such interactions. Identifying such themes will help assess how governance network theory works in practice, helping us to understand their role within sustainability decision-making.

Funding, knowledge and partnerships were the main resources given to each project

The majority of stakeholders in Glasgow and Copenhagen noted their contribution to the project was largely funding, in the form of in-kind staff costs and equipment (see SNA diagrams 9 and 17). Stakeholders also mentioned they received some project funding in return, though this was largely dependent on the type of organisation (e.g., sector). The understanding that resources would be acquired in return suggests a level of inter-dependency within the projects, as described by Klijn (1997:31) who claimed that it can 'sustain relation patterns' between stakeholders. The inclusion of stakeholders in the project was largely based on their ability to provide resources, but stakeholders felt this was on the understanding they would then receive resources in return. The results draw attention to the expectation that stakeholders would receive project resources. In both cities, there was a willingness from stakeholders to formally allocate a variety of resources to the project through assets such as land, equipment, staff time, access to knowledge and expertise. In addition to funding type resources, in both projects, one third of participants provided information to their municipality, specifically technical and sectoral specific expertise, which was not always funded. This knowledge resource sharing enabled stakeholders to directly influence project activities, as they could divulge or withhold information if any activities did not align with their organisation's objectives and motivations.

Stakeholders also provided access to new partnerships and received new contacts in return, which implies a level of (formal) inter-dependency between project stakeholders, specifically,

resource dependency (Goverde and Tatenhove 2000). For example, a third of stakeholders in RUGGEDISED and half in the Energy Lab identified that their own organisation's contacts and networks were an important resource which contributed to the project. These findings align with the governance network feature that there is an inter-dependent nature with resource sharing. However, within projects the approach is more formal and required a commitment from stakeholders. Such resource contribution could shift stakeholder power and influence within the project itself as the resources provided were formally incorporated into the project activities. The ability of a stakeholder to deploy their power and withdraw resources could have formal project implications (e.g., stall delivery) which in turn, could create conflict (Hoff 2003). Project partners that owned large assets in the city, such as SP in Glasgow who owned the electricity grid, could significantly hinder the project progress if they withdrew. However, such conflict tends to be avoided in policy processes as argued by Flyvbjerg (2003).

The initial contribution to the project appeared to be based on an understanding that stakeholders would then receive additional benefits from participating within the project. They would not necessarily provide resources if the project did not meet their organisation's wider objectives (Girvan and Newman 2004). This approach was similar to networks, where stakeholders would provide sectoral expertise in return for access to political intelligence and partnership development. The inter-dependent nature of resource sharing sustained stakeholder buy-in. However, project stakeholders were more explicit when stating their expectations, potentially due to the formality of the project and assigned roles; it was perceived as a given that they would receive resources in return. Stakeholder resources provided to the project confirm two key features of governance network theory: inter-dependency and pluralism. The initial upfront resources provided by stakeholders to enable them to participate in the project suggests an effective approach to such projects as they have demonstrated a willingness to provide resources. In return, they also expect to acquire new resources to the benefit of their own organisation's objectives. The next section specifically explores the resources received by stakeholders in each project.

Knowledge exchange and partnerships were the main resources received from the project

The majority of resources (with the exception of funding) came from other project stakeholders, which indicates a willingness to provide resources that other partners could then acquire to support project delivery, as well as their internal organisational objectives. For example, in Copenhagen, a private sector organisation was able to use publicly owned land to test out new innovative technologies – even though this was part of the project, the organisation could use these for commercial gain following the project. The focus on technology development was essential for both project deliverables which focused on creating a ‘smart street’. However, the results suggest that there was an incentive for some stakeholders to participate in the project if the resources could also contribute positively towards their own organisation’s needs (Scharpf 1997; Bevir 2011). Private sector organisations were the main beneficiaries of technological development as other stakeholders tended to provide information, equipment or assets rather than commercial products. As such, there is a risk of vested interest for private sector organisations in participating in such projects, as noted by Hoff (2003).

Many resources were required for the project to function, such as partnership development and sharing sectoral knowledge and expertise (see SNA diagrams 10 and 18). The development of new partnerships is a key part of governance networks as it encourages a variety of stakeholders to collaborate on an agreed policy issue, as outlined by Bulkeley and Schroeder (2011). These findings align with the sectoral findings in each city, which state that all organisations aim to develop more collaborative partnerships which could be a way for stakeholders to leverage more resources from each project. Vested interests are a possibility in any resource dependent relationship, though within the context of projects, where stakeholders have historical ties and developed relationships, the likelihood of conflict is reduced (if not omitted entirely) (Crook and Combs 2007). This may be one explanation as to why both municipalities seek project partners they have worked with previously.

There was a distinct lack of focus on the financial resources from both RUGGEDISED and the Energy Lab. The reason for this was unclear; it may be due to the allocations of finances depending on the type of organisation (e.g., private sector receives less; third sector receives more). No one stakeholder appeared to benefit more the other as the allocation was dependent on the organisation's ability to generate income. However, the results align with Klijn and Koppenjan's (2016a) claim that within projects, mutual resource dependency is evident as stakeholders rely on each other for resources. This is evidenced in the results which detail the inter-dependent nature of horizontal stakeholder collaboration in projects. The findings also align with Klijn (1997), who states that the inter-dependent nature of such collaborations requires a level of cooperation and sharing to ensure the project meets its objectives, and that at times, this requires a certain willingness from stakeholders to provide resources before receiving them. Despite slight differences in the type of resources mentioned in each case study, the results do confirm the inter-dependent nature of collaborations between sectoral stakeholders and therefore, this research argues that it is an essential component of governance network theory. The inter-dependent nature of multi-stakeholder collaborations and highlight the complex nature of acquiring resources that benefit the project and, at times, the individual stakeholder. The results reflect the altruistic nature of collaborations, as well as the vested interests of stakeholders which play out in smaller political arenas such as projects. The following section explores the coordination features of each project.

Lack of negotiation within each project due to historical ties and stakeholders using their soft power in discussions

Similar to the network results, analysis of the project coordination drew attention to the lack of stakeholder negotiation as a result of how it was defined in each city. Both case studies perceived the concept of 'negotiation' differently: it was alluded to in Glasgow that it had an inherent negative meaning and was seen as synonymous with conflict in the network. Stakeholders in the project were keen to clarify the lack of conflict (due to close relationships) and noted general discussions to reach any agreements. In Copenhagen, negotiation was

taken to mean an in-depth discussion, and was seen as a natural part of the project process when delivering outputs as a group. The concept did not appear to have negative connotations. In both cities, the clear parameters of the project did appear to limit the possibility of negotiation as roles and activities had been pre-agreed in advance. However, the perception of the concept in each city slightly altered the results as it was construed slightly differently.

Negotiation was a factor in the project discussions, though it was evident to varying degrees. One third of participants in RUGGEDISED noted negotiation only occurred when there were deviations from project activity; this wasn't often as all project workstreams and roles had been pre-agreed in advance. In fact, two thirds suggested there was no negotiation as discussions were largely based on the historical interaction between project partners which strengthened relationships through more frequent engagement between stakeholders. Stakeholders appeared to have a good working relationship. Historical ties between stakeholders (evidenced in the project formation) reduced the likelihood of conflict and the need for negotiation, as described by Torfing (2007), as stakeholders had an idea of stakeholder motivations and how they would interact with others. Thus, in Glasgow, there was little need for negotiations as project partners discussed ideas with known stakeholders rather than disagreeing with each other and trying to find a compromise. These results align with Bevir's (2011) argument that within governance networks negotiation can be perceived as too 'formal' as in practice, stakeholders have discussions with partners they have worked with before and understand their motivations.

In the Energy Lab project, where in-depth discussions were required due to deviations from the project activities, then negotiation occurred. For example, stakeholders claimed they used their influence in the project (e.g., soft power) to negotiate outcomes, but stressed that their focus was on providing solutions for the project. This was seen by many in Glasgow as a formal process, as argued by Bevir (2011). However, in Copenhagen, it was a natural part of the project dynamics, the focus was on in the type of leadership within each project and how they could help to avoid any conflict within negotiation process (Peters 2007). Stakeholders stated

a genuine willingness to work together in order to reach an agreement for the benefit of the collective; negotiation could be used to do this. From the results, it is not possible to confirm if the frequent negotiation in Copenhagen was a result of stronger ties between stakeholders or not. Participants did note their ability to use soft power (e.g., influence over others) in the project to negotiate. Soft power was referred to as a natural part of the project when discussing key issues with stakeholders; it was not used to the detriment of the project overall. This aligns with Gordon and Johnson's (2017) argument that the informal discussion approach within each of these projects may result in soft power being used by stakeholders; this can enable them to have more successful negotiations. Elements of negotiation are evident within each project, which confirms that the key feature 'coordination' is present within sustainability policy implementation. The varying levels of negotiation are due to a variety of factors, such as historical relationships, perceptions of the concept and use of soft power (relating to resources) in project discussions and should be incorporated into future revisions of governance network theory. Another element of coordination, compromise, is explored in the next section.

Compromise was not necessary in the project, due to effective communication between stakeholders

This section explores the second element of coordination in governance network theory: compromise. Multi-stakeholder collaborations such as projects, naturally bring different perspectives and areas of expertise to the project. As evidenced by participants, this is one of the main reasons to do such collaborations - it enables stakeholders to understand different approaches, share and learn from each other. Coordination is therefore required to some degree as there are widely different preconceptions of the roles of organisations in setting and delivering the sustainability agenda (Rossi et al. 2000). However, over half of stakeholders in Glasgow stated there was no need to compromise on their positions, as partners had learned how to effectively engage with each other due to previous collaboration. Therefore, the results in Glasgow suggest there was no need for conflict within the project as it was perceived as more of a sharing and learning opportunity rather than an opportunity for stakeholders to push

their own agenda. In both cities, one third of participants claimed no significant disagreements occurred, and when compromise was required, all parties reflected on the aim of the project to identify the best solution that benefitted everyone involved. The lack of compromise implies that explicit power relations were not as evident within project discussions thus stakeholders may appear to be more 'equal'. However, stakeholders in Copenhagen implicitly implied that negotiation and compromise were synonymous: there were always elements of one in the other. This supports Sorensen and Torfing (2007), who argue that the coordination within governance networks (e.g., projects) does require elements of both. However, diverse partners and complex technical project issues will most likely result in different levels of coordination.

Within both project there was a general willingness between stakeholders to collaborate with each other to come up with a fair solution for all. In both cities, the project partners tended to design the project carefully in order to minimize conflict during project implementation. Any conflict during the implementation phase could lead to project disintegration which is to the detriment of everyone involved (Peters 2007; Torfing 2007). However, an element of negotiation and compromise can be beneficial in the project, as argued by Koppenjan (2007), who claims that consensus can suppress important problems and interests. Therefore, coordination is a somewhat necessary part of the policy implementation process as it can bring to the fore challenges and disagreements which can then be resolved through discussion between stakeholders in the project. Elements of compromise within the project appear to complement the elements of negotiation as multi-stakeholder collaborations require them (at low levels) for network effectiveness. Within governance networks, coordination is a part of project design and implementation, however due to project formation, there is little need for formal negotiation and compromise. The research suggests projects take a more informal approach to discussions due to the established relationships between stakeholders. The next feature of governance networks, pluralism, is now discussed.

Stakeholder interactions are dependent on project roles, leadership and historical ties

The following section explores the pluralistic feature of projects which differed in each case study. Within RUGGEDISED, the majority of stakeholder interaction is with public sector organisations, who have strong ties with all project partners. Glasgow City Council in particular, engaged frequently with public sector agencies and third sector organisation (see SNA diagram 11). This may be due to the municipality leading the project design and the stakeholder selection process which was based on historical ties at an individual level. However, they engaged less with the private sector in the context of the RUGGEDISED project. This may be due to the tradition of the municipality not always working alongside the private sector as their aims and objectives were perceived by sectoral stakeholders to be divergent (e.g., risk is part of private sector remit whereas public sector tends to be risk adverse) (Rossi et al. 2000). The private sector engagement between other stakeholders was relatively frequent and confined to the project roles and assets rather than historical ties. There was a strong engagement with universities in the project, specifically with the municipality and other public sector agencies, who had worked together previously on a variety of European funded projects. In contrast, in the Energy Lab project, nearly all stakeholders engaged frequently with the private sector (with the exception of the municipality) (see SNA diagram 19). Private sector organisations had historical ties with stakeholders and were seen as a way to leverage new technological development in the project (given that private sector organisations are more open to risk). The City of Copenhagen had stronger ties with the third and public sector than the private sector within the context of the project. For example, the municipality and public agencies engaged relatively frequently with third sector stakeholders and both organisations were fundamental to project design and implementation. Half of project stakeholders engaged with the municipality (and public sector agencies) relatively frequently, in particular at the start of the project during the development phase.

Leadership roles also influenced stakeholder interaction in both projects. For example, in the RUGGEDISED project, the majority of engagement (and strongest ties between stakeholders)

were with the public sector organisations (municipalities) - two core partners in the project who have frequently engaged previously. Glasgow City Council in particular, was formally the project leader and was also perceived by all as the appropriate leader to deliver on project outputs. This is often the case in other European cities where municipalities are seen to lead the sustainable development agenda as they are perceived to be credible partners (Goss 2001; Kemp and Parto 2005). This may be due to fact that they have a democratic mandate, unlike all other project partners, and so offer a neutral ground to make decisions for the benefit of the citizens. In contrast, in Copenhagen the project leader was the Technical University of Denmark (therefore had the most frequent engagement with stakeholders), with the municipality playing an observation role on the board. Despite this, the stakeholders still rated the engagement with the municipality as 'frequent', particularly at the start of the project, when they played a larger role initiating the project. This aligns with Rossi et al. (2000), that municipalities are responsible for acting on sustainable development within cities as not many stakeholders are in the position to strategically plan and implement such policies within a city.

Both municipalities had strong ties with the public sector and the third sector, but less with the private sector. This may be due to a lack of previous engagement and different ways of working between the two; they are not necessarily 'natural partners' as stated by Fischer et al. (2007) and by SPT in Glasgow. The ways of working and knowledge in each sector can differ with the private sector bringing the technological expertise to the project (delivering in short timescales). The municipality can bring the policy insight, partnerships and democratic mandate, but cannot always work to short timescales (Ricard et al. 2017). In Copenhagen, the private sector engagement was necessary as the project remit focused on energy technology integration, though the municipality (and By og Havn) were needed to leverage funding and provide critical infrastructure for the project. Thus, the remit and coordination of the project can significantly impact stakeholder interaction. In both case studies, stakeholder interaction was frequent and there were strong ties between project partners and new relationships between stakeholders that were not initially seen to be 'natural' partners. The research revealed that multi-stakeholder collaboration is a key feature in policy implementation and a necessary

element in delivering complex projects with a variety of sectoral stakeholders. Having explored the variety of factors that can influence pluralistic collaboration within projects, the next section analyses project roles, to understand how these affect stakeholder collaborations.

Project roles are pre-assigned and are combined with each stakeholder's own organisations role

The project design phase determined stakeholder roles in the project and influenced stakeholder interaction throughout the project implementation. It is common in European funded projects such as RUGGEDISED, to formally agree stakeholder roles in advance, in order to allocate work effectively (Torning 2007). Stakeholders are frequently selected to participate in the project, based on the resources and expertise they can provide. Howlett (2009) ascertain that changes in project structure (due to the nature of horizontal collaboration) do not often occur sequentially as planned during the project design stage. Therefore, stakeholders are often required to retain an element of flexibility in their project roles as evidenced in Glasgow where stakeholders were willing to work to the project plan but are aware of the need for flexibility within the project. Some of these stakeholders may be formally written into the project (as in Copenhagen) and were defined as 'hard' partners. Some partners are informally associated with the project to provide input where necessary (defined as 'soft' partners).

Despite pre-agreed roles, stakeholders in both projects identified challenges in maintaining the same role within the project. In Glasgow, over a third of stakeholders noted the difficulty in balancing their daily workload associated with the project and their day job. In Copenhagen, half of participants claimed any changes to the project structure or preconceptions of stakeholder roles could hinder the project activities (e.g., initial perceptions of the City of Copenhagen as project leads). Roles within the project can change, but stakeholder roles outside of the project (in the 'day job') can also change. This can place pressure on project partners as they seek to balance the two roles simultaneously, which can impact their ability

to meet project deadlines. These results differed from the network findings, where there were no formal roles assigned to external stakeholders.

Stakeholder perceptions of partner roles, and their actual roles, can differ; this can create confusion during the project implementation stage. For example, in Copenhagen, participants noted the partners perceived the municipality and By og Havn (BOH, public sector agency) as the lead as they owned the land, yet the Technical University of Denmark (third sector) were the formal project leads. Although this didn't lead to conflict within the project, stakeholders engaged relatively frequently with both organisations throughout the project. This could alter project outputs if either partner lobbies for a different approach or change to the project, as project partners may align with the stakeholder that they perceive to be leading the project. Thus, Head (2008) argues that all project challenges (in particular structural changes on stakeholder roles) can hinder the project outputs. However, in both case studies, in line with Clegg et al.'s (2016) perspective on the commitment of project partners, the majority of participants implicitly stated a general willingness to balance the workload and to remain flexible when delivering the project. They elaborated, stating that their intention was to align with project objectives and activities in order to contribute towards the 'bigger picture' which advocates a level of cohesiveness in each project.

5.3.4 Project management: Leadership and accountability

The discussion on governance network features in each project identified the extent to which the concept plays out in practice. Building on this, the management of each project is explored.

Project leadership dependent on how the project was designed but created challenges

There was a general clarity around leadership partners with Glasgow City Council leading RUGGEDISED, however project leadership in the Energy Lab was initially unclear. Leadership can profoundly affect the coordination of the project and its ability to deliver project outputs.

Therefore, it is critical to ensure leadership is clear from the beginning as argued by Metcalfe et al. (2006). Municipalities tend to lead initiatives at project conception stage, yet not always during the project implementation stage – this can influence stakeholders’ perceptions of who actually leads the project (*ibid* 2006). This is largely due to municipalities being expected to lead at project conception stage (often as it relates directly to policy design) and so their role has been to accelerate the sustainable development agenda and bring together stakeholders who can support this agenda (Kern and Bulkeley 2009). In Glasgow, the municipality’s project management role aligned with their network leadership role, reaffirming their powerful position in both policy design and implementation and creating the stable power relations within local decision-making. However, in Copenhagen, the municipality was initially perceived as the project lead, as they developed the project concept, provided the land for the project and, alongside Technical University of Denmark, liaised with stakeholders in the city to invite them to participate. As the project developed, the municipality transitioned into a non-active role (as a board member) and the Technical University of Denmark lead the project. This transition was mentioned by stakeholders who still perceived the municipality to be the co-lead with university (strong ties with both COCP and DTU evidenced in SNA diagram 16). Municipalities are still perceived by stakeholders as necessary to be involved in a project as a way to push forward the sustainability agenda. This is evidenced by Gillard et al. (2017) who stated that municipalities are frequently perceived as leaders as they are able to steer climate governance in their own favour. In addition, they have decision-making authority which other stakeholders do not, and this in turn, lends them an element of credibility and influence that somewhat separates them from the other project partners (Loifeld and Schneider (2012).

Project leaders’ coordination and delivery of project outputs can also influence the effectiveness of projects. In Glasgow half of participants saw the municipality as ‘fairly relaxed’ [GHA], and transparent. Glasgow City Council’s open communication, transparent nature and mediation role between stakeholders aligned with the ‘facilitating leadership’ style outlined by Ansell and Gash (2008). The municipality was perceived as enhancing the collaboration for policy implementation (Ricard et al 2017). In Copenhagen, half of participants thought the

Technical University of Denmark was working in collaboration with the municipality to deliver the project as they are the 'main pusher' to get things changed [ABB] (see SNA diagram 8). Stakeholders felt that the university took a facilitative leadership approach as they were open to communicate with stakeholders and welcomed new innovative ideas. However, DTU were not seen as having the authority to be the 'main pusher' to get the project implemented. This could be due, in part, to the lack of clarity on project leader at the initiation project stage, the university not having an asset in the project or due to the project set up, where all workstream activities had their own 'lead' who was accountable for specific deliverables. The formal accountability for project outputs placed on the Technical University of Denmark was then dispersed between stakeholders, as project work streams each had their own leader. These findings do challenge Ansell and Gash's (2008) definition of leadership, as the Energy Lab findings suggest it wasn't initially clear who led the project overall (e.g., DTU, COCP or work stream leads), therefore the 'facilitating approach' was not immediately obvious.

Participants in Glasgow revealed a variety of leadership challenges, such as balancing their project and day to day workload and preconceptions about leadership within the project. This links to the project formation and roles assigned to stakeholders as they balance project commitments and their own organisation's commitments. Often stakeholders who lead the initial design of the project can be perceived as leading the implementation of the project (this is frequently the municipality); this can create confusion for participants and blur lines of accountability. Given most stakeholders have a close relationship with the municipality prior to project formation, such projects can strengthen relationships and reinforce these challenges - as experienced in Copenhagen with the municipality and the Technical University of Denmark as the project lead. The municipality will always play an initial role in the leadership in a project (this can be either at the conception or implementation stage, or both). This can influence stakeholders' perceptions of leadership in projects if other partners take up the role. These findings contrast with the governance network approach, which emphasises that network management is horizontal and does not necessarily have a 'lead'. The results clarify the leadership roles utilised and elements of top-down governance approaches, specifically in

policy implementation. The following section discusses project accountability in relation to the stakeholder's roles.

Project lead perceived as accountable for project activities and outputs

Within the governance discourse, the accountability of project partners has not received much attention (Backstrand 2008). There are different accountability mechanisms in projects, such as peer accountability, which has already been evidenced in Glasgow and Copenhagen's governance networks. In RUGGEDISED, the majority of participants noted the municipality was seen as accountable for the project. The results suggest that Glasgow City Council was aware of their accountability role in the project, evidenced when they identified themselves as responsible for deliverables. Project partners claimed that the municipality was approachable, due to the relationship history with stakeholders; they had all collaborated before in different capacities and therefore the municipality were seen as best placed to enforce any changes in the project. In Glasgow, each stakeholder was accountable for the resources and assets they brought to the project; in Copenhagen, accountability was dispersed as each stakeholder was somewhat accountable to deliver on specific workstreams (though the Technical University of Denmark were accountable for all workstreams). Two thirds of Energy Lab participants noted that the Technical University of Denmark was accepted as accountable for the delivery of the Energy Lab project and was seen as successful in delivering the project with a transparent and methodical approach. The other third of stakeholders specified how the university had a variety of roles in the project (e.g., project led, research), which compounded their accountability as they took ownership over key elements.

This research argues that accountability was synonymous with project leadership. This may explain why the municipality (who are normally associated with leading the sustainability agenda within cities) is perceived to be the project leader and accountable for decisions and are kept in check by external stakeholders within the project. Accountability specifically relates to delivering the project objectives, activities and meeting deadlines successfully (in time and

within budget) as they represent flagship projects for each city's sustainability strategy. This reputational accountability is important within projects as it is built upon stakeholder interaction and historical relationships which the municipality appears to have developed prior to the project starting. These in turn, can influence perceptions of project management such as leadership and accountability between stakeholders in projects, as evidenced in these results (Noordegraaf 2013). Nonetheless, other partners also are accountable to deliver on their own objectives (also a form of 'peer accountability'), which Backstrand (2008) claims is a necessary element of pluralistic collaborations between a variety of stakeholders in a project. For example, in Glasgow, stakeholders were quoted as saying that other project partners were also accountable as they had key assets. Similarly, in Copenhagen, other project partners were accountable for their own deliverables and every partner was seen as accountable for the finances and for reporting their respective costs. Therefore, accountability is linked to leadership of a project, but alternative accountability mechanisms exist for other stakeholders who all bring their own resources and expertise to the project. Peer accountability in the project is part of the pluralistic nature of horizontal collaborations with a variety of stakeholders. Leaders of the projects hold the largest accountability; but all partners to a degree and have a responsibility to other project partners, to be responsible for their activities and assets. In many respects, this accountability keeps partners in check as it ensures they meet project objectives and maintain a good reputation on behalf of their organisation and within the sector more generally. Leadership and accountability challenge notions of how governance network theory plays out in practice as the concept is traditionally understood to be horizontal governance where all stakeholders share the burden and responsibility. However, during policy implementation this research indicates that elements of leadership and accountability are evident, though peer accountability has dispersed the some of the responsibility on to other project partners.

Stakeholders use of soft power (asserting their roles and assets) can influence project activities and outputs

Clearly defined project structures in both Glasgow and Copenhagen intended to reduce the likelihood of stakeholders exerting too much influence over the project activities and outputs (e.g., in Copenhagen work streams each has one lead to disperse project management). Structure and formality are necessary to ensure stakeholder roles are clarified as this can mitigate any confusion or conflict within the project. This can be evidenced in the RUGGEDISED project, where half of the participants claimed it was unlikely that one partner could influence the delivery or outcomes as the nature of the project meant all roles and remits were pre-defined and agreed. However, stakeholders can exert influence by leveraging their project role, or project assets and their relative importance within the project (Goverde and Tatenhove 2000). This was also evidenced in Glasgow where some participants stated that they could influence others if they had assets that they could use as leverage.

This research identified stakeholders' utilising their soft power as a means to influence projects. In the RUGGEDISED project, many participants noted the municipality's role as project lead meant they were able to influence decisions and were share ideas between stakeholders. In addition, as project leads, DTU was seen to have a strategic political network (e.g., senior connections) and had strong partners that it could influence. The informal municipality role in the Energy Lab meant that they could use soft power to influence project partners but could not 'make them' do anything. Both project leads were perceived as having the ability to influence partners due to the project structure, as they managed the project activities, partners and could facilitate engagement between them (Goss 2001). They also hold accountability for all project deliverables and have direct links with the funders, therefore they retain an element of authority over the other stakeholders. Rather than assert this power and authority over stakeholders, both project leads tended to use their soft power over stakeholders, to co-opt rather than coerce project partners to align with their vision. Thus, power relations changed over time depending on stakeholder motivations.

Stakeholders participating in the project also deployed their soft power. The resources provided to a project can strengthen a stakeholder's ability to influence partners, as they can withhold such resources ('veto power') if the project activities do not align with their objectives. For example, in Copenhagen, HOFOR [HOF] had the ability to influence the Energy Lab project as it had a direct influence on the infrastructure and assets required for the project to success. Therefore, there is a reliance on stakeholders to bring resources to the project, though this can equip them more leverage, as they can withhold them if the project does not align with their own objectives. The resources a stakeholder brings can influence a stakeholder's claim to authority and influence (Goverde and Tatenhove 2000). This can lead to power imbalances related to the perception of resources in the project (Klijn and Koppenjan 2016a). There are elements of inter-dependency as stakeholder's resources are necessary for the projects; this can enhance a partner's ability to influence the direction of the project to meet their own organisation's needs (Gordon and Johnson 2017). Aside from the formal project structure, features such as project roles (in particular leadership roles) and stakeholder resources brought into the project can enable partners to influence other organisations as well as shift power dynamics during project implementation. Stakeholder involvement can bring many benefits to the project, but their participation requires acquiring resources for their own internal remit. There are therefore elements of inter-dependency within such projects.

5.3.5 International engagement: Global links

Having discussed the internal management of the project, the research examines how the project collaborates externally with international projects, network and cities is examined. This provides context as to how these projects are scaled up and how they link with each city's global ambition.

Lack of engagement between project stakeholders and international projects, networks and cities

Within the RUGGEDISED and Energy Lab project, there was a lack of engagement between stakeholders and other international projects, networks and cities. The RUGGEDISED project had an international component built in, with lighthouse city partners across Europe. One third of participants stated, that beyond the formal project links there were no stakeholder relationships with other city networks. Over one third of Energy Lab participants noted no official international networks were associated with the project, though, most partners have international links outside the project. There was little formal engagement between project partners and international networks (e.g., C40 Cities, ICLEI). This may be due to these city networks focusing on municipality engagement rather than engaging with other stakeholders, such as the private sector. In addition, as a 'entity' itself, the project could not necessarily engage in an international setting as it focused on policy implementation with a city specific objective (embedded at the urban level) and had a clear structure and deliverables (the formal structure of the project did not necessarily enable it to participate internationally). If international engagement was part of the project, such as RUGGEDISED, that as part of an international network of cities implementing similar technologies, then this could encourage the development of international links. However, in Glasgow, beyond the other lighthouse cities, there was little engagement with other international organisations. The Energy Lab project had no elements of internationalisation, but stakeholders did mention using the project to promote the city globally and to share their experiences of developing a new integrated energy system that could be upscaled and replicated. For example, international engagement was limited to delegations visiting the Energy Lab or learning trips to similar smart city projects around Europe, though this was not formally part of the project.

Stakeholder engagement with international networks was mainly in an individual capacity. As Khan (2013) stated, stakeholders can actively engage in local, regional and international policy design and implementation in a variety of networks. However, individual stakeholder capacity

does not tell us much in terms of the project context (Goss 2001); but it does highlight the lack of international engagement at project-level. This indicates that stakeholders involved in such projects are selected to leverage such networks and global insight, but this cannot be confirmed. This type of engagement could hinder the effectiveness of the projects as they miss out on the many benefits of sharing information and scaling up tried and tested solutions (Goverde and Tatenhove 2000). Lastly, there were mixed results regarding the motivations and benefits on international network engagement, which contrasts with perspectives in the network formation, where stakeholders could see a clear value with engaging with international organisations. For example, in RUGGEDISED stakeholders communicated the benefits of sharing knowledge and learning from other cities (this was built into the project design and formation). Energy Lab participants did not bring up benefits. This may be due to various factors, such as the context of the project; international elements were built into RUGGEDISED, though not necessarily into Energy Lab. Stakeholders focused on using the project to highlight how integrated energy systems could be upscaled within cities as a way to showcase their global ambition, rather than sharing knowledge with networks per se.

At project level, there was limited engagement between project partners and international projects and networks (no mention of city engagement). At an individual level, stakeholders had their own contacts and networks globally (though there was no evidence that confirmed that this information was drawn into project discussions or activities). This could be for a variety of reasons: project structure, policy implementation is city specific, there are little known benefits of engaging at a project level; municipalities are still getting used to new governance approaches and haven't looked beyond the city boundaries. This research argues that encouraging stakeholders to leverage these contacts and resources may improve the effectiveness of the project as it can share and learn from other cities which may accelerate project implementation.

5.3.6 Evaluating governance networks: Project effectiveness

Improved stakeholder partnerships and project design could enhance the effectiveness of project

This last section evaluates the effectiveness of governance networks and asked participants what could be done to improve each project.

In Glasgow, a collective vision ('Team Glasgow') between project partners was seen as a key requirement for projects to be effective. It was perceived as essential by over half of RUGGEDISED stakeholders, that they should understand Glasgow City Council's ambition for the city. This relates to the wider discussions on city definitions of sustainable development and the challenges in defining the concept as detailed by Lele (1991), Bebbington (2009) and Brown (2011). The fact that no network stakeholders mentioned the city's specific definition, suggests that project stakeholders may not have been fully aware of the municipality's vision. Stakeholders specifically referred to the 'collective vision' of participants to ensure all partners were on the same page, which, as argued by Head (2008) is a key component in network effectiveness. In the governance discourse literature, such as Lele (1991) and Giddings et al. (2002) claim that the vision of a project is seen as essential to the success of its implementation. Reaching consensus is a common challenge in governance networks where a variety of stakeholders collaborate on a policy problem (Lele 1991). Therefore, ensuring partners all agree in advance on the project objectives and gain their buy-in to participate at project inception, can improve the effectiveness of a project as it reduces confusion and conflict during implementation (Powell et al. 2005).

Half of stakeholders in RUGGEDISED stated partnerships were a strength of the project as Glasgow City Council had worked with 'known' stakeholders. There was a level of trust that each stakeholder will deliver. In Copenhagen, half of participants stated partnerships were deemed essential for delivering an effective project. With stakeholder interaction, strong

communication with partners was necessary to facilitate meetings and informal discussions to overcome any challenges. Strong partner relationships were a key component in both RUGGEDISED and the Energy Lab. Specifically, they stressed the element of trust between stakeholders which was strengthened if they had collaborated previously. However, this is a relatively under researched area within the governance discourse. The concept of trust within a governance network was particularly noted from Copenhagen's sectoral stakeholders specifically, as they highlighted the benefits of having a 'community of trust' within decision-making. Strong communication between partners directly impacts network dynamics as does the characteristics of stakeholders (Head 2008). The range of stakeholders participating in such projects can ensure that different perspectives are represented in the project; this can improve the synergy between stakeholders and can strengthen communication. However, different characteristics can also lead to conflict and disagreements if partners do not align, as evidenced by Clegg et al. (2016). Therefore, open communication is necessary to ensure alternative approaches and ideas are communicated clearly to all project partners.

Many practical considerations in project design were mentioned by stakeholders - specifically, project timescales, resourcing and balancing workloads. The diversity of stakeholder involved meant that their approaches to projects varied considerably, resulting in different timescales for project activities. For example, some private sector organisations in both projects noted that public sector stakeholders did not progress fast enough. Other project partners detailed their experiences of learning about different ways of working and how relationships evolved and improved over time. The learning process was perceived by stakeholders as critical to the success of the project. In addition, acquiring and utilising project resources was fundamental for the project success. Nonetheless, partners stated they required more resources to deliver objectives. Project delays were not always covered by the funder and small delays were quite common. Results suggest that the lack of resources could hinder the effectiveness of the project. Other practical considerations included balancing project activities with stakeholder's own day jobs which also hindered the project as stakeholders were unable to commit all of their time to it. This links back to the stakeholder roles within the project, as they balance

competing demands and as such, projects necessitate more resourcing to ensure stakeholders can dedicate their time.

There are a variety of changes that could contribute to the effectiveness of projects in Glasgow and Copenhagen, some of which are easier to implement than others. Developing a collective vision for the city and improving stakeholder interactions (e.g., fostering trust) take longer to implement. The results clarify that the newness of the governance network approach, the involves a diverse selection of stakeholders working closely together can engender challenges. The different approaches in each sector can influence how they approach and perceive sustainable development. However, given the relative newness of the governance network concept, similar to networks (policy design), these challenges can be explored further or be overcome over time, as municipalities learn to adopt a horizontal approach within policy implementation to achieve sustainability within cities.

This section has discussed two sustainability-orientated projects (policy implementation): RUGGEDISED and the Energy Lab. Both case studies have provided insight into how such projects form, their characteristics and management, along with the challenges these bring, such as the lack of international cooperation and other normative issues. The next chapter, the conclusion, draws on the comparative analysis of both network and projects and identifies similar and different themes and outlines how they help or hinder the effectiveness of policy design and implementation.

CHAPTER 6: CONCLUSION

6.1 Overview

This study has provided an in-depth empirical exploration of governance network theory applied to comparative sustainable urban development policy, which has never been done before. This original urban comparative case study approach provides an empirically supported theory which enables the examination of critical factors that influence the sustainability decision-making process (Azarian 2011). As the climate crisis worsens, and carbon emissions accelerate globally, progressing towards sustainable development is crucial for 21st century cities. This research is necessary to understand how we can enhance sustainability decision-making in urban areas to address this complex policy problem.

This chapter provides a robust synthesis of the thesis. It initially revisits what the researcher aimed to achieve, followed by an exploration of literature on key aspects of the research: governance network theory, sustainable development and measuring the two in an urban context. A reflection on the research approach is also provided, outlining the main line of enquiry and how this will help answer the research question. Following this, the importance and relevance of the original empirical data is revealed, which contributes to academic debate around network governance and identifies key themes that answer the research questions. A series of recommendations are then proposed concerning how future studies could further confirm, build on or enrich these research conclusions.

6.1.1 Research aims and objectives

This chapter presents the findings of research conducted over a four-year period, 2016-2020. The aim of this research was to further understand the role of governance networks on the design and implementation of sustainability strategies of two European cities – Glasgow and Copenhagen. These governance networks were devised to respond to the ‘sustainable

development' concept which has arisen as a key focus for both social and government action. This new governance approach reflects the acceleration of municipal intervention following an increase in citizen awareness of sustainability issues, government sustainability targets and pressure from international sustainability commitments.

This research has evaluated the challenges to governance network theory and its normative assumptions, in order to enhance and refine our understanding of the concept by examining it in practice. As such, the first research objective necessitated mapping stakeholders involved within governance networks to clarify network structure. The key characteristic of governance networks is the collaboration between stakeholders (e.g., public, private and third sector organisations) and municipalities in both the design (networks) and implementation (projects) of such strategies. The network structure and collaboration were explored further in the second research objective, through three features of governance network theory, namely: inter-dependency, coordination and pluralism. The nature of the relationship between municipalities and external stakeholders was explored and explained, specifically their roles in maintaining, influencing and coordinating interactions that make up the process of governance itself. In addition to exploring network structure and stakeholder relations, the third research objective then examined normative issues in relation to network leadership, power and accountability challenges, in order to better understand the nuanced and complex stakeholder interactions and their role within sustainability decision-making. The study aimed to enhance and connect governance network theory and provide practical implications for sustainable policies in cities. To this end, the sustainability policy design and implementation processes in Glasgow and Copenhagen were evaluated through six areas of analysis: network formation; stakeholder interaction; governance network features; network management; international links, and; network evaluation. The research findings identified that governance networks can enhance sustainability decision-making by increasing stakeholder participation and resource sharing, however, cities are still grappling with how to effectively implement new forms of governance and as such, are in a transition from traditional government approaches to networked governance.

6.2 Research approach and reflection

This section identifies the research contribution to governance network literature and reflects on the research approach.

The research question necessitated a review of the governance network theory, the sustainable development concept and the sustainability strategy literature. Evaluation of this literature highlighted the importance of governance and governance network theory in cities, stressing the need to examine relationships between the municipality and external stakeholders in the policy process as outlined by Rhodes (1997) and Bevir (2011). The literature review furthered understanding of governance network theory as recurring features of such networks (e.g., inter-dependency, coordination and pluralism) were identified and then applied within this research study. For example, Betsill and Bulkeley (2007), Klijn and Koppenjan (2016a), and Torfing (2019) all referenced these elements when describing the theory. The key features identified then informed the definition of governance network theory selected for this research (Klijn and Koppenjan 2016a). The literature allowed an examination of governance network theory through an urban lens, exploring its theorisation in relation to leadership, power and other normative issues associated with the concept, as discussed by Sorensen and Torfing (2007) and Backstrand (2008). This review highlighted the need for further consideration of how these concepts manifest in governance networks. As such, this research incorporated concepts of leadership and power in the research design. The governance discourse provided a theoretical and practical understanding of governance network characteristics - how they are formed, managed and evaluated. The research explored these concepts within two case studies in order to understand how the current theory works in practice. The exploration of the definition of sustainable development from Redclift (1987) to Lele (1991), Rees (1998) and Rossi et al (2000), illustrated the different conceptual perspectives from academics and practitioners alike, highlighting the contested nature of the concept and the impact this had on stakeholder interaction within the policy process. The research then probed further by examining stakeholder definitions of the concept within two

governance networks. The research question necessitated the evaluation of Holden (2006), Boyko et al. (2012) and Hiremath et al. (2013) in the literature on sustainability strategies and indicators as both Glasgow and Copenhagen sought to govern through such measurement indicators in order to meet their carbon emission reduction targets. This review furthered our understanding of indicators and the concept of 'measuring' sustainable development within cities, given its contested nature. The sustainability strategies provided the foundations for both network and project discussions and thus it was essential to review each city's strategy to fully understand how stakeholders could help shape and implement it.

The following section reflects on the research approach. Within the research methodology, the comparative case study approach enabled a detailed examination of two cities, producing context-dependent knowledge that furthered our understanding of municipal sustainability decision-making. Comparative case studies provided similar cities with similar variables (e.g., geographical size, population size), similar governance processes (governance networks), that produced different policies and outputs (e.g., sustainability strategies that detail accelerated carbon emissions reduction targets). The approach focused on the governance network and sustainability strategy variables within two urban systems, as a means to more fully understand key steps within the policy process that can influence policy outputs. This approach enabled the researcher to produce knowledge that could be applied more generally, rather than focusing on the traditional (single city) case study approach which may not be representative of all cities and limits multiple insights for theorisation. The analysis of different urban contexts acknowledges the 'located-ness' of theory development which lies at the heart of comparative urbanism as detailed by Robinson (2016). The findings identified the need for more flexibility within the governance network concept and corresponding key features (inter-dependency, coordination and pluralism). However, the limitations of focusing on specific key features and normative concepts of leadership, power (in relation to resources) and accountability, only provided a limited lens through which to view the research question and provided only one of many possible ways of conceptualising both governance systems. In addition, the research did not explore alternative components (e.g., trust, soft power) that may play a role in the

governance network concept and was limited by the three features throughout the study. As the concept develops, future studies may wish to explore and analyse other components in order to further revise governance network theory and build on the practical research findings also. Applying the comparative case approach to governance networks is a relatively new approach within the urban studies discourse.

The sequential qualitative approach provided different layers of data (secondary and primary data sources, network maps), which offered a variety of ways to answer the research question. This enabled a nuanced understanding of stakeholder motivations, intentions and the wider ecosystem, as data was transcribed, screened, assessed for frequency and relevance, then quantified into network maps (using SNA). The resulting data analysis provided network maps to present complex relationships in addition to exploratory data to deeper understand and analyse such relations. However, sequential data can be prone to researcher bias, and if focusing on one line of enquiry of interest to the researcher, can skew results to fit that narrative. To overcome this, the researcher evidenced all key themes identified, ensuring they were all mentioned by more than one stakeholder in each network or project. In addition, although the comparative case study approach employed enabled an in-depth analysis of governance networks in practice, results are localised within a European context and do not necessarily represent other regions globally.

The research focus on specific governance networks and projects as key arenas of decision-making certainly provided detailed data and enabled various levels of analysis and different ways to view the data (e.g., SNA diagrams illustrated stakeholder interactions and their thematic priorities). This approach identified steps within both city's decision-making process that had a significant impact on policy outcomes (e.g., exclusive stakeholder selection process during network formation). However, the networks only offered *one* aspect of governance and were not necessarily representative of all the governance challenges and nuances playing out at city-level. To address this, the research explored the wider sustainability sector within each city (which could also support or challenge specific results) and explored links with national

government and international organisations. Within these key arenas of decision-making, Sustainable Glasgow and the Copenhagen Climate Panel are the main vehicles from which the municipality engaged with stakeholders regarding their sustainability strategies. However, short-term electoral cycles can stall such engagement suggesting that wider governance processes can directly impact networks negatively. Although such networks are not permanent within the policy process, if they did not exist, there would be a distinct gap (in relation to stakeholder interaction) that cities would need to address.

The research chose not to hypothesise the governance network approach and sustainability decision-making in urban systems, and instead sought to elucidate and understand the networks respective role rather than establish a causal relationship between the two. This was to avoid researcher bias and perceptions of governance networks as inherently 'good' or 'bad'. This perspective was not then transposed on to the case study cities. In addition, the research explored similarities and differences within both case study cities as they were apparent throughout the research process (e.g., focusing on similar cities, different outcomes or vice versa, could influence researcher bias). Therefore, the researcher intended to record similarities and differences when they were apparent and make a judgement once all evidence had been presented. As such, the results provided insight into each case study entity, and in addition, produced knowledge that could be more generalised and contribute towards theory development and refinement.

The comparative case study approach provided a nuanced understanding in the functionality of the sustainability policy process. The research design brought insight from different urban contexts together into the same analytical framework, highlighting the structural and relational differences between municipalities and stakeholders in each governance network. The qualitative research design provided robust and reliable data to describe stakeholder interactions (in SNA diagrams) as well as exploratory narrative to help understand how such interaction affect the policy process and to explain key differences within each urban system (Sellers 2002; Pierre 2005; Ward 2008).

6.3 Contribution to governance networks studies

The following section summarises the specific contribution of the research study to governance network theory, then demonstrates the relevance of the original empirical data collated and identifies key themes from the discussion, linking them to the research question.

This research has contributed to governance network theory; it demonstrates that the key features examined are evident within both governance network case study cities. Networks enable municipalities to engage with stakeholders to leverage knowledge, sectoral expertise and enhance participation in the sustainability decision-making process. Research data revealed mutual resource sharing in governance networks, suggesting that it is necessary to maintain stakeholder interactions. However, resource dependency can at times shift power dynamics and benefit the municipality more than others, as it plays a key leadership role in setting the network agenda, inviting stakeholders to participate and managing stakeholder interaction. As such, power relations can be produced and reproduced throughout the policy process, directly related to the sharing (or withholding of) resources. The coordination aspect of the governance network theory was evident in the research, though not as pronounced as the other features. Compromise and negotiation were perceived as formal processes in the network; they were rarely required due to the informal nature of discussions and the close and agreeable relationships between stakeholders. Research findings show the pluralistic nature of governance networks encouraged cross-sectoral collaboration. As such, stakeholders shifted away from working in silos to collaborating with other organisations (some of which they had never engaged with before). The cross-sectoral collaboration was perceived by stakeholders as enhancing the sustainability decision-making process. Overall, the exploration of governance network theory within European cities offered insight into stakeholder participation in the decision-making process and identified aspects that require further research in the future. The following section demonstrates the relevance of the original empirical data collated and identifies key themes from the discussion.

Empirical research data revealed that the sustainable development agenda is largely set by the municipality and is established in each city's respective sustainability strategy. The document sets the policy agenda for the city and influences stakeholder interactions and perceptions of the policy problem. The policy commitment to ambitious carbon emission reduction targets mobilised stakeholders to collaborate on networks and projects that contributed towards such targets. The main implications from the research data is that, in practice, the ambition committed to by the municipality has a significant influence when mobilising stakeholders to contribute towards such targets as it provides the framework from which many stakeholders plan their involvement and assess progress towards it, using indicators. The data confirmed Leff and Peterson's (2015) claim that indicators can provide decision-makers with an accurate view of progress. However, the data also identified that different perspectives on the sustainable development concept can limit understanding of such indicators, as argued by Holden (2006). The application of SDI proved useful as a tool to assess policy design and implementation as it enabled a thorough exploration of how stakeholder interaction was guided and influenced by indicators and targets (the projects themselves were distinct indicators in each city's sustainability strategy). The discussion revealed that the lack of consensus on the sustainable development concept as outlined by Redclift (1987), Lele (1991) and Giddings et al. (2002) did hinder policy design and implementation and the lack of a coherent collective vision slowed down sustainability progress. This was more evident in Glasgow than Copenhagen, as the research identified that Copenhagen committed to an ambitious zero carbon emission target by 2025 which accelerated progress. The clear vision and target encouraged stakeholders to contribute and was the focus in both network and project discussions. Since the research data was collected, in May 2019 Glasgow City Council announced its intention to be the first carbon neutral city in the UK (Reuters 2019). This shows promise, however, the timescales for achieving such targets are still 2045, and as such, it is still not as ambitious as the City of Copenhagen's targets.

The primary data on the stakeholder selection process challenges the democratic transparency of policy design and implementation in governance networks. The discussion identified the 'closed nature' of networks and projects with the municipality as the 'gatekeeper' exclusively selecting known and trusted senior stakeholders, as critiqued by Heclo (1978) and Rhodes (1997). Historical ties between stakeholders pervaded stakeholder selection throughout the policy process, contrasting with the 'new' forms of governance emerging within the cities we see today. The empirical data on stakeholder representation highlighted that more stakeholders in general participated in the policy process, however there was a lack of citizen representation throughout the policy process, raising concerns of democratic participation and legitimacy of governance networks. As the sustainability agenda receives more media attention, with increased public awareness of climate change, municipalities will be required to account more for their decisions and improve transparency. It is therefore strongly recommended that municipalities evaluate the impact of such approaches and develop stakeholder selection processes that successfully engage civil society.

Original empirical qualitative data collected on stakeholder relations and interaction within networks and projects (that was illustrated in SNA diagrams) enhanced our understanding of governance network theory. In both networks and projects, inter-dependency was essential to sustain stakeholder relations. Stakeholders acknowledged their inter-dependencies regarding resource sharing and demonstrated a wider governance shift from working in silos to collaborating with other organisation, which could improve the decision-making process. The primary data contributes to the academic debate by evidencing the importance of structural and relational power dynamics between stakeholders when acquiring resources within a governance network, as detailed by Held (1995). The data also aligns with Flyvbjerg's (2003) claim that power relations are produced and reproduced throughout the policy process, directly related to the sharing (or withholding of) resources. However, the research recognised the impact of municipalities leading the formation of networks and projects which shifted power dynamics in their favour as they were perceived as key points of contact for stakeholder interaction. These findings deepen our understanding of the wider sectoral engagement

between stakeholders and how this influences network interaction and power relations: these factors had not been explored simultaneously within the current discourse and, as such, this is a new contribution. The research data discovered the lack of coordination within networks, where the informal interaction between stakeholders resulted in different perceptions of negotiation. Therefore, cultural perceptions of key concepts within the governance network concept need to be revised to clarify meanings to suit different localised contexts. On the other hand, in projects, coordination was part of formal project structure. The data presented clearly confirms the pluralistic nature of governance networks. However, stakeholder roles differed in the policy design (lack of roles) and implementation (formal roles) process, which created challenges as the former shifted accountability to the municipality and the latter created tensions for stakeholders between project roles and day jobs. Following the analysis of governance network features, the main implications from this research data is that the current theorisation of governance network by Klijn and Koppenjan (2016a) does not adequately reflect current practices. The definition needs to include elements of both vertical and horizontal governance, given the approach is in 'transition' between the two types of governance. This critique necessitates further research to fully understand the key concepts that should be included within the revised definition. This research recommends that scholars incorporate more flexibility for each key feature, in addition, to clarifying the network formation approach (which is frequently top-down), will ensure the concept can be adapted, context-dependent. The research data collected also draws attention to the multiple levels of interaction both inside and outside governance networks (and evident in the examination of key features), and, although solely interested in those at the level of network discussions, it was evident that historical, external and vertical (national government) interactions were all brought into focus within governance networks.

The management of networks and normative issues were examined within the research study. The research data supported both Avolio and Luthans (2006) and Denhardt and Denhardt (2011)'s claim that municipalities lead and managed the network (which was confirmed by external sectoral stakeholders in both cities). The municipality set network meeting agendas,

initiated projects and was the key facilitator between stakeholders, providing an oversight role as the strongest relationships existed between the municipality and stakeholders. The discussion exposed the municipality's leadership challenges (top-down hierarchy) and opportunities (key facilitator and initiator role). The leadership role suggests there are elements of hierarchy still within governance networks, despite a municipality's attempt to introduce horizontal governance approaches (e.g., Energy Lab meetings), engaging more stakeholders within the decision-making process. This suggests that municipalities are coming to terms with new forms of governance as they attempt to shift away from traditional government approaches. In general, the data identified that this approach, taken by Glasgow City Council and the City of Copenhagen, aligned with Ansell and Gash 'facilitating leadership' approach as they sought to bring stakeholders together to collaborate.

The data explored different spatial scales of governance within the same analytical framework, exposing the lack of international links within Glasgow and Copenhagen. There was little engagement with other levels of vertical governance, which may be due to lack of network formality, the idea of the 'urban' scale being embedded within the network or, the fact that international linkages were only in a personal capacity - not as a network or project. This study challenges an increasingly important area for academic investigation: the assertion that sustainability accounts for a significant proportion of city diplomacy initiatives (Acuto and Rayner 2016). If this was true in Glasgow or Copenhagen, one would expect that the sustainability governance networks global links would play a bigger role than the data suggests. Further research is required to fully understand the limited interconnectedness between local, national and international governance as they can provide multiple benefits for cities.

The qualitative research data on participants' evaluation of the decision-making process enhances our understanding of the application of governance network theory in practice. The data emphasised the need for more formality (e.g., roles assigned) in each network as the lack of roles limited stakeholder interaction and accountability. To better understand the

implications of these results, future studies could address the effect of assigning stakeholder roles on the network objectives as this research study suggests more formality is required (though a few stakeholders preferred the flexibility and lack of accountability in the network). Within each project, the focus on stakeholder relationships based on trust and open communication was necessary for implementation. These findings connect to the formation of projects where the selection of stakeholders was based on historical ties with the municipality, as it appears to be beneficial for project implementation. As such, the results confirm the advantages of this approach within sustainability decision-making, but this research predicts that the increased public awareness on sustainable issues will necessitate improvements in the current governance approach.

6.3.1 Recommendations

Through the lens of governance network theory, this research has shown that the key features (inter-dependency, coordination and pluralism) are evident in both governance networks. These networks have enabled municipalities to engage frequently with stakeholders within sustainability decision-making. Municipalities can leverage knowledge, sectoral expertise and stakeholder buy-in for sustainability policies and projects. Future studies could consider integrating more flexibility in each of the key features to account for the varying degrees to which some networks may have one feature more evident than the others. At present, the definition refers briefly to elements of the features (e.g., 'mutually dependent actors'), but could be more explicit in clearly stating the benefits of mutuality, and what this contributes to the governance network. In addition, the 'patterns of social relations' between stakeholders also requires clarification, as this research has demonstrated, the formality and coordination of interactions significantly influenced network outputs. Lastly, current governance network theory used is based on the assumption that stakeholder interaction within networks is predominantly horizontal collaboration whereas, in practice, there are elements of both vertical (e.g., national government) and horizontal governance (e.g., stakeholder collaboration). Thus, the definition requires updating to reflect this transition.

Research findings suggest that within governance networks there are elements that can be perceived as 'effective', such as developing trusting relationships, setting clear agendas and objectives and encouraging stakeholder interaction to address complex policy challenges. However, these elements also bring to the fore key challenges such as exclusivity within decision-making, lack of citizen participation and democratic legitimacy. As such, there is no recipe for a 'successful' decision-making process in either city as it much more nuanced or context dependent. For example, the horizontal governance approach taken in the Copenhagen Climate Panel meetings was perceived as favourable as it ensured the discussion was informal, however in the network formation, the horizontal approach is critiqued as the stakeholder selection process is exclusive. In Sustainable Glasgow, on the other hand, the top-down approach for facilitating network meetings was seen to somewhat limit stakeholder interaction, yet participants mentioned their desire for more formality in order to improve the effectiveness of discussions. In general, it is evident that there are clear benefits to stakeholder collaboration and pooling together resources (e.g., knowledge, partnerships, infrastructure and funding), which can justify municipalities adopting this new governance approach (given the wider socio-economic challenges as noted in the literature review). However, it is clear that municipalities are still grappling with *how* to implement effective governance networks. Saying that, without such networks, it is unclear how the municipalities would design and realise their sustainability strategies to the same degree (and who else would fulfil the role of governance networks), as they require stakeholder resources, buy-in and expertise. As such, municipalities seek to revise their governance network approaches, with both Glasgow City Council and the City of Copenhagen expressing an interest in these research findings and suggesting a follow-up workshop to learn from each other and enhance their engagement with stakeholders in order to accelerate the implementation of their sustainability strategies.

The research findings identified the contested nature of the sustainable development concept within a governance network. The research then recommends that city-specific definitions

need to be clearly communicated to stakeholders in networks to minimise the risk of competing definitions that align with stakeholders own organisational objectives and interests. As noted in the research's working definition of governance networks outlined by Klijn and Koppenjan (2016a:21), a collective definition for sustainability is necessary for stakeholders to effectively 'cluster around' sustainability policies in such networks. Although stakeholders in Glasgow and Copenhagen were aware of network objectives, there was a distinct lack of detail on the city's own definitions, which requires further investigation.

One implication from the findings is the need for cities to set ambitious carbon reduction targets in their sustainability strategies, in order to encourage stakeholder's involvement in governance networks. The research data from Glasgow and Copenhagen revealed that there could be a greater momentum in cities where there were more ambitious targets (e.g., Copenhagen's zero carbon emissions by 2025 target) which was a focus for network discussions. Furthermore, the research recommends that cities should consider revising SDIs as stakeholders tend to refer to thematic areas in the strategy, rather than detail specific indicators (as detailed in chapter two). However, SDIs were useful for municipalities who utilised them to focus their activities within the city. It is suggested that municipalities use indicators internally whereas externally, they promote key thematic priorities for their cities. All of the research recommendations proposed would enhance the governance network approach in Glasgow and Copenhagen, enabling both cities to progress towards carbon emission reduction targets as outlined in their respective sustainability strategies.

This research contributes towards the wider discourse as urban studies scholars have long argued to develop new practices for global urban theorizing and develop new concepts for 21st century cities (more recently, Robinson 2016). This research utilised an urbanism comparative case study approach to revise governance network theory, to identify new conceptual understandings of European cities and the wider urbanization processes. Contributing to theory development from different contexts has ensured new concepts resonate with different localities, or network outcomes, whilst simultaneously respecting the limits of such located

insights (*ibid* 2016). This research does not attempt to overhaul the current definition of 'governance network theory', but rather, offers regional insight as to how the concept currently plays out in practice through sustainability decision-making. The 'third term' of comparison, as noted by Jacobs (2006), has enabled the grounds for thinking across different urban contexts and has explored the interconnected processes that now shape 21st century urban theory.

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Diagrams

Diagram 1 Source: Office for National Statistics., (2017) Glasgow City Council – Municipal boundaries [online]. Available at: http://geoportal.statistics.gov.uk/datasets/07194e4507ae491488471c84b23a90f2_0 Accessed 13/01/2020

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