Sustainable Urban Development - a Nexus of Understanding, Methodology, and Governance

by

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Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

I am the sole author of Chapter 1 and Chapter 6 of this dissertation. Chapters 2-5 are based on academic work and papers that were co-authored with other scholars and academic contributors. Chapter 2 is based on a book chapter on the concept of Sustainability Management (the book chapter was co-authored with Olaf Weber with me being the lead author). Chapter 3 was co-authored with Olaf Weber with me being the lead author. My contribution in chapters 2 and 3 includes conception, methodology and data curation, formal analysis, and preparation of the final draft. Olaf Weber supervised and reviewed drafts.

Chapter 4, of which I am the lead author, is based on the Cities Index Consultation Project which was co-authored with Cameron Mccordic and Bruce Frayne. I was responsible for the recruitment of participants, coding, and final analysis of interviews. I conducted all interviews, whereas Cameron Mccordic and Jeffrey Wilson participated in some of the interviews. I prepared the manuscript draft which was reviewed by Cameron Mccordic, Bruce Frayne, and Olaf Weber. Bruce Frayne was responsible for overall project coordination. Chapter 5, of which I am the lead author, is based on a paper co-authored with Olaf Weber. The conceptualized, performed literature review, methodology and data curation, formal analysis and prepared the final draft. Olaf Weber assisted in finalizing methodology and review of the final draft. Bibliographic citations for the paper and the co-authored chapters are based on the following:

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Abstract

Sustainability management requires facing tradeoffs between socioeconomic and environmental objectives, while integrating contextual variations into strategic and business goals to create a win-win situation. However, sustainability literature has shown a lack of consensus on the conceptualization, measurement, and operationalization of sustainability. Context-driven objectives demand multidimensional and multilateral synergies and tradeoffs that do not possess a simple generic pathway to achieve sustainable urban development. This dissertation explores the role of conceptual and methodological approaches in determining sustainability objectives, evaluating the policy development process and its implications, and identifying opportunities and constraints for local governance to localize sustainability. The study identified constraints to localizing Sustainable Development Goals and affordable housing that include distribution of authority, functional and geographic mapping, and assigning roles and responsibilities. These factors set a foundation for the subsidiarity principle, which guarantees delegation of commitment to a lower level of governance provided the federal government's role in ensuring systematic implementation of regulations and provision of necessary resources. Furthermore, the interconnectedness of SDGs requires synergies and tradeoffs to overcome potential hindrances and supplement multilateral efforts. Similarly, the complexity of the housing system demands a multidimensional approach, multisectoral integration, and a tradeoff between socioeconomic and environmental objectives. Such complexity wouldn't be easy to address without innovative and out-of-the-box solutions to address socioeconomic and geographic differences between cities. In a complex urban environment, policies developed without considering functional and normative objectives, intergovernmental relationships, and local capacity may lead to unaccounted outcomes. Findings from this research highlight that the housing policies developed and implemented without an integrated approach may fail to achieve their intended objectives. The study confirms that speculation taxes are not an effective tool in curbing house prices. Similarly, considering the role of property taxes in providing public services, delinking property taxes from a potential contributor to house prices would provide a better lens to develop local housing policies. Furthermore, the study also confirms that the housing market can be better assessed at a local scale, considering geographical influence in conjunction with investment trends. The research advances the knowledge and theory in housing system analysis, sustainable housing, and policy-related decision-making. It paves the way for a theoretical extension of the subsidiarity theory, facilitating local government to adopt the Sustainable

Development Goals framework. The evaluation further helps to generalize the conceptual approach for the subsidiarity principle in governing sustainability at a local level.

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All omissions and errors are my own. Thank you.

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Chapter 1
Introduction

Urbanization – a global sustainability challenge

Today, cities are at risk of facing the increasingly negative consequences of climate change while they are responsible for 75% of the world's emissions due to excessive energy use (Bai et al., 2018; UN-Habitat, 2016). Cities accommodate more than 55 percent of the world's population and contribute to more than 80 percent of the world's Gross Domestic Product (GDP) (UN, 2018; World Bank, 2022). Local governments are going to face the challenge of providing services to over 7 billion urban dwellers by 2050 (UN, 2018). Rapid urbanization and unsustainable development have contributed to social and environmental challenges and have become key contributors to socioeconomic disparities, housing unaffordability, unsustainable production and consumption, climate change, and environmental degradation (SDSN, 2016). Inherently interdependent urban functions, operational infrastructure, social structure, and geography influence urban sustainability in general and housing cost in particular (Yigitcanlar & Dur, 2010). Therefore, the quality and comprehensiveness of infrastructure and urban form expressly impact economic growth, reducing income inequalities and cost of living in many ways, such as provision and affordability of basic utilities, public transport and housing (Easterly & Levine, 1997; Mednoza, 2017; Ha et al., 2019).

In the pursuit of globalization, regions and cities are of core importance in the development process, and cities have emerged as a critical connector to the global network of production and consumption (Hudson, 2007). Locally, cities rely on geographical settings for material resources, waste disposal, and energy. It makes them an essential scale for industrial ecology regarding their comprehensiveness and manageability (Hertwich & Peters, 2009). Furthermore, natural ecological changes in the dynamic urban development process (Niemela, 1999) and the associated human dimension create a social metabolism that makes the urban ecosystem even more complex (O'Brien, Doig, & Clift, 1996). Additionally, the unboundedness of the socioeconomic metabolic activities and a complete assessment of cause-and-effect regional connections are imperative to relevant policies and informed decision making (Hellweg & Canals, 2014). Regions' multilevel perspective of both environmental and economic contextual and spatial settings, although it has garnered little attention, can provide a transition to innovation and sustainable development (Burch, Shaw, Dale, & Robinson, 2014; Geels, 2011; Gibbs & O'Neill, 2017; Hudson, 2007; Pearce, Markandya, & Barbier, 1989).

Cumulative social and environmental circumstances put cities and regions at the core of sustainable development. These interlinked actions and outcomes develop a complex situation of interwoven sustainability, development, governance, and policy challenges (Hudson, 2007; Vörösmarty, Green, Salisbury, & Lammers, 2000; Smil, 2000). For instance, housing, a central urban element, has a key role in human wellbeing, socioeconomic growth, and environmental protection (UN-Habitat, 2016; Hertwich & Peters, 2009; Tukker & Jansen, 2006; Holmstedt, Brandt, & Robert, 2017). Therefore, the housing sector's role in achieving overall urban sustainability is pivotal (Tupenaite, Lill, Gepele, & Naimaviciene, 2017). In his opening remarks at a high-level panel of eminent persons for the post-2015 session, the UN Deputy Secretary-General Jan Eliasson summarized the gravity of the matter by stating, "Cities are where the battle for sustainable development will be won or lost."

Housing and affordability – a connection to sustainability

Housing, a central urban element, has a crucial role in human wellbeing, socio-economic growth, and environmental protection. Housing structures, a significant consumer of urban land and primary resources, contribute to around 70 percent of ecological impacts (Hertwich & Peters, 2009; Tukker & Jansen, 2006). The housing sector plays a crucial role in investment circulation, resource consumption patterns, and labor market dynamics, making it essential for the stability of economic and financial systems. Furthermore, assets and wealth created through the housing sector significantly impact social segregation and inequality (Regeneris & Oxford, 2010). Embedded in an urban ecological system, housing operates in a dynamic and complex relationship with development patterns, knowledge and innovation, economy, social structure, the natural environment, and governance.

Housing availability, suitability, and affordability are major concerns for policymakers (Choi, Zhu, Goodman, Ganesh, & Strochak, 2018; UN-Habitat, 2016; Woetzel, Ram, Mischke, & Sankhe, 2014). Housing affordability is a relative term that relates to the ongoing cost of housing linked to household income levels (Leishman & Rowley, 2012). It has a strong social and environmental connection, which makes the governance of affordable housing entirely different from the institutional structure for other sectors (Zhang & Rasiah, 2016). Housing relies on cross-sectoral policies such as land-use planning, infrastructure, education, health, recreation, and financing mechanisms. Housing policy operates through a complex system of state, nonprofit, and for-profit actors. Furthermore, the inappropriate allocation of decision-making powers, access to funding, and operational capacity in a partially devolved system resulted in an increased reliance on market-based solutions that reduced

support for low-income households. For instance, the devolution of responsibility for social housing in Ontario needs to consider broader implications to meet the demand for affordable housing (Raynor & Whitzman, 2021).

Housing is crucial for people's welfare and should be considered a public utility accessible by everyone. Housing drives the Human Development Index and Multidimensional Poverty Index outcomes in health, education, and standard of living (Habitat, 2021). Therefore, it cannot be left entirely to the private sector as it can undermine the delivery of welfare services (Zhang & Rasiah, 2016). Reducing state support for public housing and the neoliberal approach leads to an increasing income gap and housing access (Dorling, 2014). The assessment of Habitat III highlighted urban inequalities resulting from a market-based approach to housing (UCLG, 2018), which puts housing at the center of the urban development agenda and is a significant component of the global quest to achieve Sustainable Development Goals. It requires decentralization of policymaking, resource accumulation, and moving away from sectoral financing and individual entitlements. It is further stated that an innovative local approach requires integration between governments, private actors, and communities (Turk, 2019; UCLG, 2018; Wakely, 2022).

Housing policies – system's complexity

Global societal and related policy issues are becoming a significant concern for policymakers and academia (Wetzstein, 2017). Local circumstances and national and international development objectives, such as sustainable development and smart growth, act as an external force to influence local policy objectives. Furthermore, global challenges such as climatic changes may further trigger an additional dimension to be considered in developing local regulatory policies. However, adapting national and international policy frameworks into local policy settings and balancing outcomes that suit the local context becomes a challenge for planning authorities (Hirt, 2007; Schuetz, 2009). Furthermore, policy variations across a region (administrative/policy region is a group of cities in proximity), and the way they react or are related to each other, is a largely ignored subjects (Furth & Gonzalez, 2019). The dynamics and complexity of the socioeconomic and environmental system demand careful and context-specific policies to avoid the problem shifting or a rebound effect that can offset mitigation measures (Hellweg & Canals, 2014; Finnveden et al., 2009).

The housing system and its complexity make it highly sensitive and resistant to policies (Sterman, 2000). Governments worldwide have used the housing sector to exercise various policies to

achieve various and sometimes contradicting goals. These goals are energy efficiency, reducing carbon emissions, tackling housing affordability, achieving economic goals through real estate and construction, and reducing social and health inequalities by market interventions (Macmillan et al., 2016). The conflicting objectives, primarily due to a lack of integration across government departments, are considered a significant barrier to progress (APPG, 2013). Interdisciplinary research in the housing industry was almost ignored for a long time. In political and institutional settings, the economic processes mediated by the state-market relationships are well justified in critically evaluating the housing affordability crisis, its emergences, consequences, and responses (Wetzstein, 2018).

Housing markets are subject to formal and informal regulations. However, the efficiency of housing regulations in achieving affordability is highly contextualized and debatable (Furth & Gonzalez, 2019). For instance, the policy outcome of the micro-politics of land use and environmental regulations, the most recognized political aspects, can still not determine victim and victor (Christopherson, 2011; Portney, 2013). Furthermore, the housing-human connection makes segregated housing policies subject to failure in achieving their desired outcomes (Gilbertson, Grimsley, Green, & Group, 2012). Furthermore, limitations of our understanding of housing dynamics and complex systems as well as incorrect design and implementation of policies, are subject to both intended and unintended negative consequences (Shrubsole, Macmillan, Davies, & May 2014; Davies & Oreszczyn, 2012).

There is no one solution; market actors and public institutions work together to provide housing within the socioeconomic circumstances, available resources, and governance structure. In a complex system of capacity, strategies, and motivation, it is tough to generalize any concept or theory to resolve contextual problems. For instance, some mixed-income housing development strategies have achieved long-term socioeconomic benefits and scalability. In contrast, some faced criticism such as privatization, state-led gentrification, inappropriate influence on public policy objectives, insufficient representation of marginalized groups, and compromising long-term policy development (Read & Sanderford, 2017).

There is a consensus that regulations and taxation have a distortionary impact on housing prices, and in some cases, contribute to increases in house prices (Glaeser & Gyourko, 2006; Gyourko & Molloy, 2015; Turner, Haughwout, & van der Klaauw, 2014). However, the relationship between regulation and house prices is circumstantial. For instance, the literature is divided regarding the relationship between house prices and property-related taxation, and no definite answer is available to

how helpful taxes are in controlling house prices (Benjamin, Coulson, & Yang, 1993; Fritzsche & Vandrei, 2019; Hoyt, Coomes, & Biehl, 2011; Wei, Chu, Hsu, & Hou, 2019). Similarly, Davidoff, Pavlov, & Somerville (2022) analyzed the City of Vancouver's rezoning of single-family areas, allowing high-density laneway homes behind existing residential structures. They found that even gentle densification causes negative spillover, whereas cost and benefits are highly contextualized depending on neighborhood type. Furthermore, Diamond & McQuade (2016) found a varying impact of low-income housing development on low-income and high-income neighborhoods. In contrast, (Turner, Haughwout, & van der Klaauw, 2014) found no negative spillover of density.

Similarly, disruptive evidence of housing subsidies indicates that they rarely contribute to higher homeownership rates. Kunovac and Zilic (2022) have shown that the housing subsidy made housing less affordable, especially for non-recipients. Furthermore, governmental programs aimed at generating additional housing demand can capitalize on higher housing prices if the housing supply is inelastic (Hilber & Vermeulen, 2016). Davidoff, Pavlov, & Somerville (2022) stated that it is best to evaluate redevelopment at a neighborhood level rather than the city level. Local authorities are fully aware of local economic conditions and population segregation, which would help them to analyze housing policies and their spillover effect (Ismail, Warsame, & Wilhelmsson, 2021).

Housing in Canada – a context

The Canadian urban population (82%), increasing housing costs, and declining affordable housing stock put cities at the forefront of the housing crisis. Canada's affordable housing stock accommodates less than 600,000 households (Tsenkova, 2022). Whereas Canada's rental housing market is dominated by private housing (96%), with a significantly smaller share (4%) of non-market, nonprofit, and cooperative housing providers (Bates, 2022). Although SDG 11 is the third most invested SDG in Canada, the core housing need is one of the most crucial challenges for the government (SDGFunders, 2022). Almost one in ten Canadians need core housing, accumulating to 1.7 million households. Therefore, rising housing prices and an inadequate supply of affordable and adequate housing result in increasing inequalities. It contributed to urban sprawl, often driven by housing affordability issues forcing lower-income families to move to the outskirts. Furthermore, the gap between indigenous and non-indigenous housing conditions is also growing. For instance, 21.7% of indigenous Canadians live in homes needing significant repairs compared to 6.8% of non-indigenous.

Similarly, the rise in chronic homelessness (Gov of Canada, 2022) and the closure of supportive federal housing increased local governments' challenges in dealing with the housing crisis.

The Canadian government is actively going out of public housing while moving towards a more marketized approach to the housing sector (Raynor & Whitzman, 2021). It has ceased public investment in public housing and shifted its focus to collaborative models providing subsidies to nonprofits, targeting tax incentives for private developers to provide low-cost units (Bates, 2022; Suttor, 2016). During this evolutionary phase, the government's neoliberal approach cut nonprofit and co-cooperative housing organizations from the policy consultation process, except for Quebec (Suttor, 2016). Similarly, Canada Mortgage and Housing Corporation (CMHC) has been taking measures to protect the private market from public and nonprofit sector competition (Bates, 2022), which led to a dualist rental market making, it difficult for nonprofits to compete with for-profit housing developers (Thomas & Salah, 2022; Kemeny J. , 2006). Therefore, DesBaillets and Hamill (2022) termed the Canadian housing policy highly individualistic.

Historically, the federal government acted as a principal policy formulator and financier. The federal housing programs operate with the help of provincial and municipal leaders and other institutions such as Canada and Canada Mortgage and Housing Corporation (CMHC). The federal government formulated a National Housing Strategy (NHS) in 2019 to address challenges across the housing sector. However, the NHS is facing some criticism regarding commitment and efficiency. Although NHS has shown signs of moving away from the private sector, reducing investment in social housing and failing to fulfill the promises made by NHS, make it challenging to solve the housing crisis (DesBaillets & Hamill, 2022). Furthermore, it is argued that it is difficult for the Canada National Housing Strategy to adopt a cohesive approach due to a lack of harmony between provincial and local governments (DesBaillets & Hamill, 2022). However, Canada's geographic, social, and economic diversity makes it challenging to find a one-size-fits-all approach. Although, provinces and territories can develop their programs under the federal financial steams. However, uncertainty still exists due to unresolved matters between the federal, provincial, and local governments, lack of coordination with the other market actors, and, most importantly, the absence of political will to take a firm hand on the housing crisis (DesBaillets & Hamill, 2022).

The land use planning system relies on institutional design. The Canadian governance structure is very complex and based on a hierarchical structure (Macdonald, Monstadt, & Friendly, 2021). For

instance, the Ontario housing delivery structure involves the federal institutions, provincial government, and municipal levels further divided between upper, lower, and single-tier municipalities. Municipalities must follow the Planning Act of the province of Ontario and conform to provincial green belt and growth plans. Multisector policies such as green belts and housing require coordination between policy domains, municipalities, and other market actors. For instance, greenbelt regulations imposed by the provincial government resulted in leapfrog housing development in some municipalities (Macdonald, Monstadt, & Friendly, 2021). Similarly, provincially administrated densification policy pushes municipalities to plan for more general densification, such as diversion or gentrification, without considering local density needs such as student housing (Revington & Wray, 2022). Therefore, the top-down approach ignores local conditions, causing problems for local policy planners, which makes the role of the province and regional governments crucial. In contrast, the Canadian provincial governments work as "regional government in absentia" (Macdonald & Keil, 2012, p. 141).

Thomas and Salah (2022) investigated the housing policy development in Nova Scotia. Their findings were two-fold: policy development and capacity. The provincial policy development disregards the involvement of non-profits and cooperatives, ignoring sectoral limitations and prioritizing financial objectives over social values. Furthermore, policymakers and non-market housing providers are experiencing significant capacity limitations due to their size, lack of experience, and unawareness of existing policies and programs. Consequentially, nonprofit organizations are in constant tension between state and market values, facing significant constraints in their capacity to thrive (Thomas & Salah, 2022). Furthermore, Raynor and Whitzman (2021) assessed the intersectoral policy networks and found that the Canadian government either lacks the capacity or willingness to develop evidence-based policies. Instead of a comprehensive framework for housing, the makeshift arrangements and fragmented policy approach in Canada made the housing sector operate in isolation from other sectors (Suttor, 2016; Thomas & Salah, 2022; Bates, 2022).

Sustainability and housing – dynamics and complexity

The concept of sustainability evolved from the conflict between ecocentric and humancentric approaches. The sustainable development approach follows the autonomy of human actions within the defined boundaries of the natural ecosystem (Fell & Mattsson, 2021). However, human autonomy relies on social ethics of freedom, justice, equality, and equity. The ethics of freedom depends on capability combined with the freedom of choice to operationalize contextual sustainability objectives. The

Amartya Sen's capability approach, combined with fundamental rights and freedom of choice, helps better understand sustainable development objectives and political policy choices. For instance, the local population's lack of access to essential services, such as security of tenure, access to insurance and credit, and lack of capacity, such as knowledge to judge outcomes and stakeholder involvement, would set a course for a sustainable development policy framework and operational strategies. Therefore, a contextualized approach within the principle of subsidiarity can be initiated by capacity and capability building to achieve distributional equity, not just wealth accumulation (Lynch, 2019).

Sustainable development targets are set to achieve human wellbeing while maintaining economic growth within the limits of planetary boundaries (Kates, Parris, & Leiserowitz, 2005). However, global consensus on objectives and unified goals is challenging due to differences in objectives, needs, and geographical settings (Griggs et al., 2013). The Sustainable Development Goals (SDGs) were developed based on past experiences (such as Millennium Development Goals (MDGs) to form a more comprehensive set of objectives, redefine priorities and quantitative measurement, and activate greater participation (Sachs, 2012). Integrating socioeconomic objectives to combat climate change impacts is widely acknowledged. However, the differences between economic and ecological perspectives and the lack of consensus on trade-offs between the economic, environmental, and social objectives are halting progress (Ayres & Gowdy, 2001; Sachs, 2012).

The sustainability of cities and communities is explicitly addressed by SDG 11. SDG 11 promotes equality within cities by realizing everyone's right to adequate housing, connecting housing with poverty. Whereas housing contributes to most of the SDGs, enabling household resilience and sustainability. Housing is sensitive to socioeconomic, environmental, and political circumstances, which can only be effectively managed at a local government level (Bates, 2022). Similarly, poverty is also localized, causing inequalities between territories and cities. Therefore, it would be tough to take everyone to prosperity without contextual understanding (UCLG, 2018). Consequently, housing affordability will remain a relative term varying geographically. Therefore, it would not be possible to have a unified definition of affordability at provincial, national, and global levels (Noring, Struthers, & Grydeho, 2022). In contrast, urban policies treat the city’s housing with a single lens, ignoring the rationality of urban form and social structure. Therefore, it requires a holistic approach and devolution of authority to local government (Wakely, 2022).

Housing is a multidisciplinary and contextually sensitive subject which requires horizontal and vertical integration of policies, actors, and knowledge to address local housing challenges (Morphet & Clifford, 2017; Turk, 2019; Potsiou et al., 2022; Zhang & Rasiah, 2016). The conventional makeshift approach to learning and innovation has been too narrow, in both functional and normative terms, and has lacked a territorial connection in addressing context-specific sustainability challenges (Healy & Morgan, 2012; Truffer & Coenen, 2012; Gibbs & O'Neill, 2017; Morgan, 2011). The socio-spatial dynamics and interaction of actors create both opportunities and challenges in regional development (Healy & Morgan, 2012). The geographic concentration of economic activities in one city can influence neighboring cities' development patterns. Local governments may simply mimic policies or allow policy diffusion ignoring local contextual requirements (Bocci, Ferretti, & Lattarulo, 2017; Schoenefeld, Hildén, Schulze, & Sorvali, 2023). It will lead to a spatial and economic interdependence within cities and regions, influencing local development patterns that may result in socioeconomic appreciation or backlash (Myrdal, 1957). For instance, housing affordability in peripheral regions is highly sensitive to the housing market behavior at the region's economic center.

Despite the growing recognition of sustainable development at the global level, incremental reforms led by the dominant culture are not able to challenge the new liberal economic approach to the consumer economy (Gibbs & O'Neill, 2017; Christopherson, 2011; Hudson, 2007; Morgan, 2011). The socio-technical configuration that either supports or hinders the emergence of new modes of transformation to sustainability requires a context-specific multidimensional and integrated approach (Truffer & Coenen, 2012; Gibbs & O'Neill, 2017). Such a complex set of nested scales and fuzzy boundaries makes it difficult to monitor changes in the development path and the factors that trigger those changes (Burch, Shaw, Dale, & Robinson, 2014). Nevertheless, the socio-ecological system contains complex properties that humans partially understand (Westley et al., 2011; Hudson, 2007). For example, human individual choices, collective behavior, and their ability to influence the natural environment through socioeconomic activities determine the development process and population sorting. The resulting manmade environment will define the population wellbeing, determinants of the natural environment, and transition to sustainability in the future (Odum, Odum, & Andrews, 1971; Westley, et al., 2011; Haberl, Fischer-Kowalski, Krausmann, & Winiwarter, 2016).

Development trajectories are rarely in control of any single urban function (for example, housing, education, health, transport, etc.). Despite its complexity, sustainable development is technically attainable (Dawes, 2020). However, the biggest challenge is conceptual understanding and

balancing functional and normative requirements within an operational capacity. Instead of a narrowly focused climate-specific policy, sustainable development needs multilevel governance and an inclusive decision-making structure. It is necessary to create enabling conditions that foster innovation and knowledge across functions and governance structures to facilitate synergies and trade-offs between local, national, and global priorities.

In this sense, cities and regions can be an epicenter of both solutions and problems that can regulate the desired outcome of overall human wellbeing. Furthermore, a trade-off between ethical concerns and economic challenges makes it difficult to operationalize sustainability in many urban functions. These challenges are susceptible to local capacity and political discourse. In this context, no solution will fit all, making the role of regional geography, policy configuration, and governance quite significant (Healy & Morgan, 2012; Hudson, 2007). It is, therefore, necessary to understand regional and urban sustainability from a system's perspective, incorporating contextual and spatial settings to find appropriate solutions for urban functions such as housing. Furthermore, development transformation requires manageable targets and a diverse set of tools to achieve them (Burch, Shaw, Dale, & Robinson, 2014).

Localization and subsidiarity – a way forward

The role of local government is crucial in the transition to sustainable development (Fei, et al., 2021; Smedby & Quitzau, 2017; Koch & Krellenberg, 2018). However, local actors are avoiding large-scale disruption, preventing them from realizing sustainable development's conceptual and functional requirements. The local preferences led to the difference in the understating and socio-technical translation of policies (Koch & Krellenberg, 2018; Smedby & Quitzau, 2017). There is a progressive realization, however, the the distribution of technical and financial support rarely matches the decentralization efforts made (UCLG, 2018).

UNDP-WBG (2016) report highlighted gaps in local delivery capacity as a significant factor in the performance of Millennium Development Goals. Centralized decision-making prevails in regulating the housing market, setting priorities, and distributing resources. Overlapping and competing functional and authority jurisdiction restricts the local government's capacity to spend adequate energy to promote affordable housing (UCLG, 2018). To successfully implement SDGs, it is essential to revitalize the urbanization process to achieve the target of inclusive, safe, resilient, and sustainable cities (UNDP-WBG, 2016). Which requires local government awareness of the conceptual and

operational framework of SDGs, shared vision, decentralization of authority, provision of required capacity, institutional integration, fiscal freedom, and encouragement of innovation (Smedby & Quitzau, 2017; Chatterji & Vaidya, 2020; Kitson, 2012).

Affordable housing sits at a critical nexus of economic, social, and political conditions and building a relationship between ecology and social sustainability (Bates, 2022; Fell & Mattsson, 2021). Affordable housing development acts like a place-based policy and can revitalize low-income communities (Diamond & McQuade, 2016; Revington & Wray, 2022). Tsenkova (2022) emphasized the importance of people-based and place-based outcomes for successfully integrating housing policies. Therefore, Local socioeconomic conditions and political and governance structures significantly affect the local authority's capacity to provide affordable housing. Morphet (2018) found that the principle of subsidiarity provides a customized contextual solution to deal with rising social and housing costs (Morphet, 2018).

The principle of subsidiarity defines the state and economic framework recognized as a norm and built on the ethical principle of freedom and justice. It is about decentralizing authority with more reliance on the competence of local authorities. (Dylus, 2021). The principle of subsidiarity strengthens democracy, encourages innovation, and sets accountability standards by defining clear lines of responsibilities and jurisdictions (Dylus, 2021; Spiller, 2022). Local capacity to make financial and development decisions would make them accountable for the outcome that will improve the community's welfare (Spiller, 2022).

Subsidiarity is considered a cornerstone of protecting human rights (Gawlowski, Nefas, & Makowski, 2020). Moreover, it aims to drive urban renewal policies (Kocak, 2022). For example, the aim of protecting human rights safeguards the social fabric against discrimination through gentrification and financialization of the built environment (Kocak, 2022). Therefore, the principle helps to align state interests and municipalities' actions (Gawlowski, Nefas, & Makowski, 2020), strategizing urban development on the concept of the right to the city principles emphasized in Habitat III, adopting the idea of leaving no one behind (UCLG, 2018).

According to the evolutionary theory of economic change, an analysis of institutional change is geographical and temporal (Nelson & Winter, 1982). Studies often based on single case studies overlook spatial and socioeconomic distributional considerations that potentially underestimate the simultaneous impacts and contextual differences (Tiznado-Aitken, Lucas, Munoz, & Hurtubia, 2022;

(Revington & Wray, 2022). Therefore, new and integrated approaches are required for decision-making in housing policy (Macmillan et al., 2016). The intra-discipline research emphasizes a transdisciplinary and collaborative learning process to understand the complex systems and integrated contextual impact assessment of policies at both local and regional scales (Shrubsole, Macmillan, Davies, & May 2014; Rydin et al., 2012).

1.1 Research Gap

Since the Brundtland Commission, various definitions and approaches have surfaced to define sustainability from economic, social and environmental perspectives. The different perspectives have led to varying objectives with distinct paths to achieving sustainability. However, the idea has remained fuzzy due to the complex form of interdependencies among its components, assertion of facts, normative valuations, and the thin line between description and prescription (Gladwin et al., 1995). A tradeoff between socioeconomic and environmental objectives and integrating contextual variations into strategic and business goals to create a win-win situation is always a challenge for sustainability management. However, the sustainability literature has shown a lack of consensus on the conceptualization, measurement and operationalization of sustainability (Khizar, Iqbal, Khalid, & Adomako, 2022; Gupta & Chauhan, 2021; Pesqueux, 2009; Nuchter, Abson, von Wehrden, & Engler, 2021). It is also suggested that exploring new possibilities of transdisciplinary context specific production knowledge is vital for the urban transition to sustainability (Norström, et al., 2020; Feagan et al., 2023)

Sustainability requires the assessment and transformation of current practices to incorporate sustainability objectives. However, sustainability transformation is influenced by contextual constraints, governance objectives, and local capacity. Therefore, rational thinking would be challenging for local governments to stay vigilant and responsive to rapidly evolving urban structures, continuously evaluate policy performance, and determine appropriate intervention points to achieve sustainability objectives (West, Haider, Stalhammar, & Woroniecki, 2020).

Further to the policy challenges discussed above, there is a need for unique research approaches in policy development and analysis. Conceptual clarity is necessary to determine objectives, evaluate the policy development process and implications in a local and regional setting, and identify opportunities and constraints for local governance to localize sustainability. Regional and local studies rely on a multidisciplinary lens, conceptual variance, and multi-theory approach to address contextual

sensitivity and universality (Pike et al., 2011). However, conceptual and methodological vagueness in qualitative regional studies requires consistent review and further investigation.

In a complex urban environment, policies developed without considering functional and normative objectives, intergovernmental relationships and local capacity may lead to unaccounted outcomes (Gilbertson, Grimsley, Green, & Group, 2012). Limitations of our understanding of the urban dynamic and complex system and the incorrect design and implementation of policies are also subject to both intended and unintended negative consequences (Shrubsole, Macmillan, Davies, & May 2014; Davies & Oreszczyn, 2012). For instance, the human-housing relationship influences people's prosperity, socioeconomic growth, and environmental protection (UN-Habitat, 2016), posing a great challenge for policymakers to balance diverse objectives (Wetzstein, 2017). The core of this issue is housing affordability, which has emerged as one of the major concerns in recent years (Choi, Zhu, Goodman, Ganesh, & Strochak, 2018; Perry, 2015). Governments are using several policy instruments that directly or indirectly impact housing affordability, including subsidies, taxation, housing market interventions, and policy interest rates. However, these policies may not have a uniform impact across geography and demography.

It has been well-recognized that the local achievement of the SDGs is essential to the universal triumph of the goals. Policymakers are likely to face challenges in integrating targets at all tiers of governance, such as the institutional capacity to operationalize indicators, data availability and reliability, benchmarking, consistent reporting, and conflict of interests (Simon et al., 2015). Since the emergence of SDGs, there has been a growing body of knowledge supporting the localization of SDGs in cities. However, context-driven objectives demand multidimensional and multilateral synergies and tradeoffs that do not possess a simple generic pathway to achieve sustainable urban development. Therefore, SDGs may constitute a normative framework demanding contextualized tradeoffs between multi-varied objectives (Zinkernagel, Evans, & Neij, 2018; Weitz, Carlsen, & Nilsson, 2018). Localization attempts have so far been heterogeneous and disconnected. More research is needed to assess how holistic, sustainable development can be met through integrated objectives suitable to governance, normative, and scientific contexts (Taajamaa et al., 2022; Klopp & Petretta, 2017). There is a gap in understanding the challenges and opportunities for municipalities in pursuing sustainable development goals that require cross-sector collaboration and multi-level integration (Linton & Clarke, 2021). Furthermore, the literature has been silent on investigating the relevance of the subsidiarity principle to the operationalization of sustainable developed goals.

It is recognized that revitalizing intergovernmental financial frameworks and regulatory jurisdictions is required to empower local governments adequately. Otherwise, it would be hard to channel funding to the neediest, making it highly relevant to the housing delivery system (UCLG, 2018). Despite growing recognition of the role of local and regional governments in localizing SDGs, the process is still immature, and more work is required for the active involvement of local actors in the process (UCLG, 2018). Zhang and Rasiah (2016) found a gap in understanding provincial and municipal governments' policy negotiation and coordination. Similarly, (Read & Sanderford, 2017) believe there is still a knowledge gap in finding an answer to the most appropriate housing governance and delivery mechanism. Similarly, there is a lack of research in understanding local government approaches to sustainability challenges and evaluation of policy effectiveness (Rohracher & Spath, 2013; Rozhenkova, Allmang, Ly, & Franken, 2019). For instance, the relationship between taxes and house prices is one of the areas of interest that has been considerably investigated, but no clear consensus has been achieved (Giertz, Ramezani, & Beron, 2021; Oliviero, Sacchi, Scognamiglio, & Zazzaro, 2019; Mo, 2019). Furthermore, there is a gap in assessing the aggregate impact of multiple tax instruments and their spatial variation in a regional setting (Tsoodle & Turner, 2008; Fischer, Huber, Pfarrhofer, & Staufer-Steinnocher, 2019; Murray, 2022).

1.2 Theoretical Framework

Sustainability is an interdisciplinary subject that requires a revitalization of existing policies and practices inviting a broader systemic level change (Clarke & Crane, 2018). Nevertheless, no comprehensive sustainable development theory or definition exists (Swain & Yang-Wallentin, 2020). There is no straight forward formula for a complex and cognitive integration of social, economic, environment, and governance objectives. I have tried to set a course of action to address challenges from a normative and functional approach to facilitate circumstantial trade-off in decision making. In this section, I have brought together the complex theoretical dimensions of urban functions (with an emphasis on housing) influencing urban sustainability objectives, policy development and governance.

Since the Brundtland Commission, the definition of sustainability has evolved with diverse understandings and approaches to balance economic, social, and environmental objectives. The different perspectives have led to varying objectives with distinct paths to achieving sustainability. The lack of consensus is dividing the intellectual and resource base, and it is failing to counter the sustainability challenges we face today and tomorrow. A methodological consensus and channelizing

knowledge would help to bifurcate global and local normative and functional challenges necessary to simulate contextual solutions.

The outcome of policies and actions relies on normative foundation, behaviors, institutional structure, capacity, mobility, and clustering at local, regional, and national scales (Giest, 2014). Urban governance policy's unintentional geographic implication and incapacitated policy accumulation may result in a negative trade-off with the existing practices (Tummers et al., 2015). To establish a theoretical base for an interdisciplinary subject, I have formulated a guiding framework to identify relevant theories to understand the conceptual base, policy accumulation, performance, and operational constraints to conceive, develop and implement sustainable development policies.

Sustainability and Sustainable Development have maintained distinct paths due to differences in conceptual origin and operational objectives (Purvis, Mao, & Robinson, 2019). For instance, Cocklin (1989) emphasized a system's approach to addressing development challenges by integrating social, environmental, and economic components and managing the trade-offs between them. However, a systems approach may not go well with a universal definition of sustainability (Purvis, Mao, & Robinson, 2019). Moreover, socioeconomic disparities and access to natural resources set different growth trajectories for developed and underdeveloped nations. Therefore, United Nations have taken individual dimensions of development objectives by specifying Sustainable Development Goals. However, it would still require a trade-off of varying objectives subject to operational constraints and value judgment (Purvis, Mao, & Robinson, 2019; Karoly, 2011). The scenario advocates to investigate distribution of authority and jurisdiction between upper and lower tiers of governance to address contextual obligations at local, national, and global scales.

A transition towards sustainability follows different trajectories across a variety of empirical contexts (Hansen, et al., 2018). The complex linkages between objectives, drivers and responses are driven by contextual definition, conceptual framework, relevant thresholds, and data availability. In such cases, the sustainability definition, objectives and measurement are more localized and differ from country to country (Verma & Raghubanshi, 2018; Zarghami & Fatourehchi, 2020). Furthermore, decisions may not be easy when choosing a trade-off without knowing the consequences. Therefore, sustainable development would require a multi-theory approach for conceptual clarity to set objectives and to choose an appropriate path to achieve sustainable development objectives.

The normative base of sustainability can be traced from the development theory that originates from an economic growth strategy and later incorporates human development as an integral part of achieving sustainability (Sen, 1999). Similarly, market social and environmental responsibilities have proven vital for lasting growth (Bansal & Song, 2017). Furthermore, sustainability has adopted a more comprehensive approach by restricting growth within ecologically permissible limits and emphasizing intra- and inter-generation social justice and equity (Costanza, 1989; Norde, 1997; Odum, Odum, & Andrews, 1971). In other words, sustainability sets normative values of society and the environment in economic activities.

Urban sustainability maintains and increases quality of life by integrating economic, environmental and social dimensions in development policies (Camagni, Capello, & Nijkamp, 1998). Urban sustainable development relies on governance, institutional structure, inherited urban form, and capacity to capitalize on socioeconomic and environmental potential (Yigitcanlar & Dur, 2010; Cloutier, Larson, & Jambeck, 2014).

Cities are defined by interrelated concepts and processes governed by institutions and organizations. Institutions are an outcome of an intended and unintended set of human actions, resulting in an established set of rules and principles (Haworth, 1957). Therefore, urban structure relies on a multi-theory approach that revolves around social structure, political-economy economics, and public policies. For instance, urban institutions have organizational logic influenced by values, norms and practices that influence political behavior and policies. Past academic contributions, such as Max Weber's Theory of Bureaucracy, Institutional theory (Friedland & Alford, 1991; March & Olsen, 1984), legitimacy theory (Suchman, 1995), and Karl Weick's (1995) sensemaking theory, would help to understand institutional and policy evolution process.

An institutional level analysis is required to understand governance structure, stakeholder management, and contextual externalities that influence policy development. Furthermore, these contextual pressures may shift policy focus from performance to survival, compromising sustainability objectives (Zucker, 1987). Therefore, it is necessary to understand how institutional elements have evolved over time and space within their relevant context (Puffer & McCarthy, 2015). Furthermore, institutional behavior and responsiveness to incorporate sustainability change are essential to innovate policies to address emerging challenges (Schot & Steinmueller, 2018).

Generally, public value definition and application have limited empirical verification (Hartley et al., 2017). Public values are not universal and require consensus from those who define and value them (Bozeman, 2007). They are geographically dependent and influenced by local and regional policies and institutional structures that influence normative context (Uyarra, Ribeiro, & Dale-Clough, 2019). Therefore, results and the process alone will be unable to prove outside the context in which values stand relevant (Hume, 2003). Critical Social Theory connects social theories to practice by adopting an empirical approach to diagnose the phenomenon in question and by interpreting dominating normative values (Benhabib, 1986). While applying Critical Social Theory to evaluate green growth and degrowth paths to sustainability, Cooke's (2006) framework confirms that normative validity will determine the contextual applicability of normative practices.

Schot and Steinmueller (2018) argued that sustainable transition requires innovation and competitiveness through a national system of research and knowledge creation coupled with socio-technical system transformation. They added that a sustainable transformation requires a shift in public policy focus to change the conceptual approach, the willingness to learn, adopt and adapt new partnerships, institutional arrangements, and governance structure cutting across existing stakeholders.

Sustainability transformation requires understanding existing policy contexts involving various objectives, functions, and instruments that draw on several rationalities. For instance, urban transformation requires careful integration of sustainability and resilience. Urban sustainability inherits normative values of society and the environment in economic activities. In contrast, resilience theory emphasizes more functional attributes of a system that accommodating both desired and undesired actions (Elmqvist, et al., 2019).

Similar to the policy jargon between sustainability and resilience, a profound sustainability transition across urban systems requires a context-relevant policy mix (Schot & Steinmueller, 2018). Kivimaa and Kern (2016) identified three operational approaches to policy evolution: layering as an assemblage of new goals and instruments; policy drift by adding new rationales to existing instruments; and conversion by using new instruments for existing goals. However, a single approach to new policies would not be enough. Simultaneous efforts to create new and withdraw incompatible policies would be required to achieve the right policy mix necessary for a rapid transition to sustainability (Kivimaa & Kern, 2016).

The International Council for Science defines the urban environment as "the natural, built and institutional elements that determine the physical, mental and social health and wellbeing of people who live in cities and towns" (ICSU, 2011, p. 8). Housing, an integral part of urban structure, operates in an urban system of social values, environmental implications, and institutional and governance structure (Scott & Storper, 2015). Therefore, the complexity of housing in an urban context can be better understood by developing a conceptual and theoretical framework of housing policy adaption and actualization, including the process of translation and assemblage of policies and ideas that move through time and space (Baker & Evans, 2016; Clarke, Parsell, & Vorsina, 2020). Therefore, a widespread adaptation of similar policies across diverse markets will not be able to deal with contextual housing affordability issues (Cheung, Day, Wu, & Tomlinson, 2019).

A recent shift in urban studies calls for a new methodological approach to address underlying structures and processes, such as network theory and assemblage theory. A concept of assemblage theory, introduced by Deleuze and Guattari (1987), embraces a continuously evolving web of interconnections and policy assemblage, translations, and adaptation, rather than sole reliance on a causal and dichotomic approach (Clarke, Parsell, & Vorsina, 2020).

However, the policy development process and outcomes may not be understood well without realizing socio-political objectives, economic constraints, governance structure, and regional connections. Furthermore, housing and affordability are greatly influenced by inward and outward demand and supply factors, economic performance, and institutional structure governing the housing market. The complexity and relevance of the housing system make it highly sensitive to sustainability performance.

Sustainability requires reconceptualizing policy narrative, transformation in operation and governance structure, and integration between institutions at a local scale. SDGs provide a relevant and comprehensive framework to combine efforts toward a common objective (Gustafsson & Krantz, 2021). However, local governments create a comfort zone around generic targets and objectives from local process groups (City of Surrey, 2016; OECD, 2016). Such targets are imperative to local objectives, capacity, and operational constraints and may not align with global standards such as SDGs.

Urban inclusive and sustainable growth would require a systems approach to address complex trade-offs in the local context (Pradhan et al., 2017). However, the successful methodology would not be so straightforward. It would require a solution specific to circumstantial challenges and a cooperative

stakeholder agreement and buy-in (Taajamaa et al., 2022). Hence, the localization of SDGs would be difficult to approach from a single perspective.

To operationalize sustainability and sustainable development goals locally, the theory of subsidiarity may help define the relationship between government stakeholders and the urban system's smooth functioning. Subsidiarity advocates that the lower level of associations is in a better position to identify and address local needs and, therefore, should be given priority (Golemboski, 2015). The concept helps remove barriers, work duplication, and efficient decision-making by increasing coherence between all the subsystems (Gawlowski, Nefas, & Makowski, 2020).

Additionally, governance and functional challenges emphasize place-based collaborative policy development in a multilateral and geographically dependent urban structure. A place-based policy would allow an adaptive policy framework to facilitate a collaborative process between multiple tiers of government to accommodate numerous objectives with a more significant local autonomy (Giest, 2014). However, local capacity deficiencies and institutional structure constrain the successful implementation of place-based policies. The missing resources, lack of knowledge, and lack of institutional collaboration would challenge the notion of the subsidiarity principle of decentralizing (Marshall, 2007). However, the distribution of responsibilities and resources to create a balance between placed-based needs and national interests may result in an inconsistent policy accumulation and responsiveness trap (Giest, 2014; Knill & Tosun, 2020).

Housing affordability in a systems approach relies on several economic and social theories. For example, housing prices reflect local economic factors that may converge if housing demand factors converge among connected cities (Rebelo, 1991). Housing markets interact at a regional scale. However, the level of convergence depends on spatial economic and administrative linkages and policy accumulation at a regional and local level. Therefore it would be appropriate to analyze local and regional housing markets by urban system theory (Henderson, 1974), theory of causation (Myrdal, 1957), growth pole theory, and core-periphery theory (Krugman, 1991; Perroux, 1950). Furthermore, the housing market is influenced by financial market practices and behavioral finance (Crotty, 1990) and rational expectations theory (Flood & Garber, 1980), driving investment behavior and financialization of the housing market (Aalbers, 2008). Additionally, regional economic theories explain the interaction between housing markets, economic agents, and administrative linkages (Muellbauer & Murphy, 1994; Pred, 1977; Holmans, 1995).

Interdisciplinary research, such as housing and sustainable development, requires multidisciplinary knowledge-sharing to address operational and policy issues (Silva et al., 2015). Interdisciplinary research topics are sensitive to the socio-spatial context and require an emphasis on objectives, values, motivations, and an understanding of existing practices (Verweij & Trell, 2019). This contextual sensitivity and uniqueness make interdisciplinary fields highly uncertain and dynamic (De Roo & Silva, 2010). Consequently, it is difficult to view from a singular disciplinary lens, concept, theory, and model (Pike et al., 2011). The contextual complexity and conceptual understanding influence researchers' understanding, adaptation, and interpretation of facts and findings in regional subjects. The fuzzy set theory (Zadeh, 1965) addresses vague and uncertain information to facilitate the representation of human knowledge and to quantify fuzzy information through rules and linguistic values. Later researchers, such as Pawlak (1982), Atanassov (1986), and Smarandache (1998), further enhanced the conceptual approach to quantify qualitative variables, weighting criteria, ranking alternatives, membership criteria, and decision-making preferences.

The theoretical approaches we have discussed indicate that a linear approach may not be sufficient to incorporate sustainability in a complex urban structure. Instead, it would require an innovative approach to consistently review and improve policies and outcomes. Moreover, innovation is a non-linear path that requires continuous improvement through a multidimensional and multilateral interactive feedback process (Edquist, 2006). Thus, constant innovation can help manage socioeconomic and environmental priorities in pursuing sustainable development goals (Schiederig, Tietze, & Herstatt, 2012; Forestier & Kim, 2020).

Continuous innovation in products, production technologies, processes, and diffusion across functions and geographies can help to decouple growth from the depletion of natural resources (Schiederig, Tietze, & Herstatt, 2012; Forestier & Kim, 2020). Policy and process innovation may require a Diffusion of Innovation Theory (DOI) lens to understand diffusion rate, that is subject to local acceptance, adaptability, capacity, and complexity of functions (Rogers, 1995).

Global solutions may not be suitable for addressing local challenges such as societal problems (Wanzenbock & Frenken, 2020) because societal problems are tacit due to their being multidimensional and multilateral and that they involve local institutions and practices (Asheim & Isaksen, 2002). However, local functions, such as housing and SDGs, may not be easy to isolate from regional, national, and in some cases, global processes (Gelauff, Grilo, & Lejour, 2008). In this case, actions and benefits

involving cross-border functions and spillover effects would require seeing the subsidiarity theory, place-based theory, and subsequent innovation policies from the perspective of conceptual understanding, stakeholder willingness, policy accumulation and integration, a realization of goals, and analysis of the outcomes.

1.3 Research Questions

The research objective is twofold. The first is to understand the conceptual approaches to sustainability to balance socioeconomic and environmental goals in a local context. Methodological challenges associated with the complex trade-offs to achieve sustainability require investigating the conceptual vagueness found in qualitative regional studies. The second objective is to examine the influence of conventional policies on housing affordability and the challenges to local governance in pursuing sustainability. There is a predefined set of questions for each manuscript to contribute to the literature on sustainability conceptual and methodological approaches, sustainable housing, localizing SDGs, and subsidiarity theory. It would help to understand contextual and governance challenges in delivering affordable housing by a local government. The following guiding questions are used to set the course of the research.

How are the conceptual and methodological variances influencing the adoption of sustainable development practices?

1. How does methodological and conceptual vagueness influence interdisciplinary qualitative studies?
2. What are the challenges and opportunities in localizing SDGs and affordable housing?
3. How well is subsidiarity theory understood in achieving sustainability objectives in a local context?
4. How are policy variances at a regional scale influencing sustainability in the housing industry?

The relationship between the study objectives, research questions, and the manuscripts is elaborated in Figure 1.

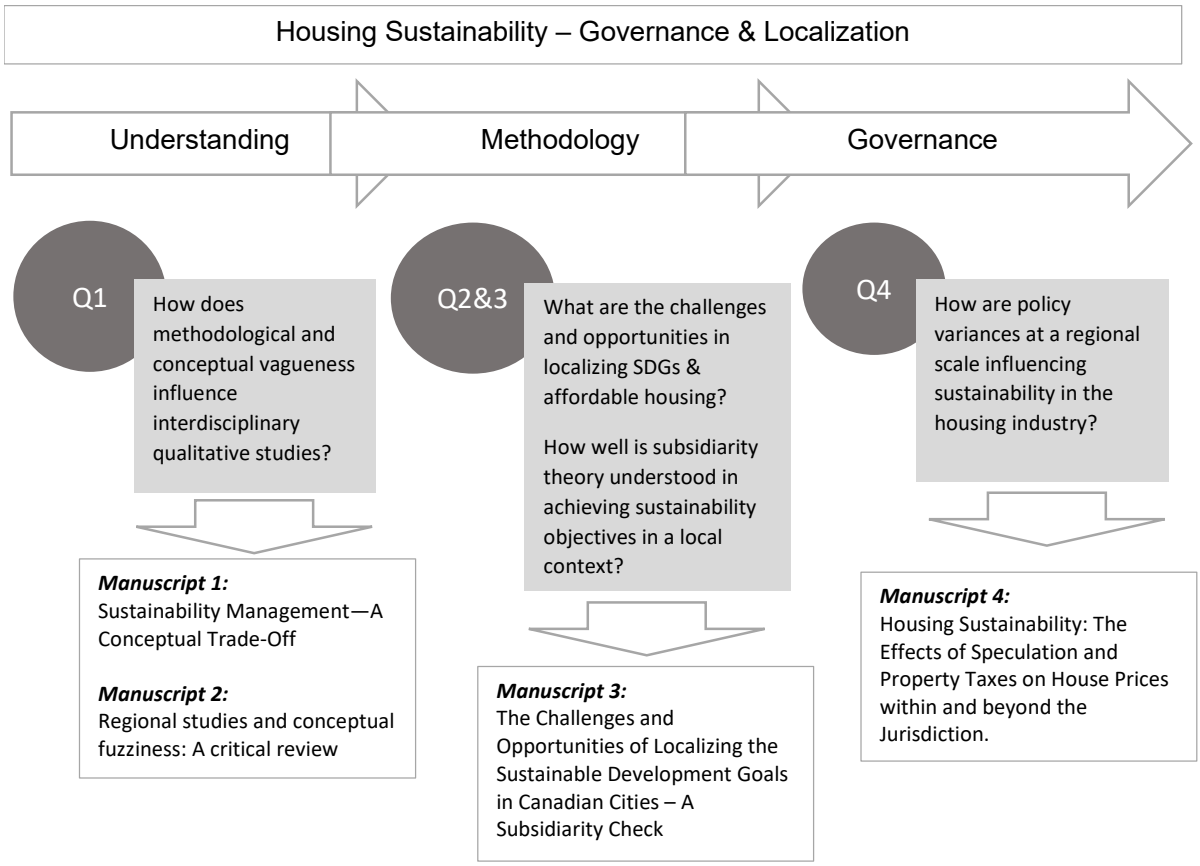

Figure 1: Research Questions

1.4 Contribution to Knowledge

Multiple contributions have been identified in the published manuscripts of this dissertation. First, the research provides a comprehensive review of the general theoretical and practical concepts in sustainability from a normative, functional, and contextual approach. Theoretically, the second chapter summarizes sustainability conceptual literature, categorizes functional and normative approaches influencing sustainability decisions, and theorizes a suitable conceptual definition to address theoretical application at an appropriate scale (Buyana, 2020; Droz, 2019; Ivan, 1997; Nilsson et al., 2016; Sen 1999; Tol, 2016; Walker et al. 2004).

The following chapter contributes to the literature by asserting that the qualitative research field still faces challenges from conceptual bias, methodological and operational constraints, empirical weakness, and prejudiced interpretation (Silva et. Al., 2015; Pike et. Al., 2011; Markusen, 2003;

Schneider & Wagemann 2010). Furthermore, the chapter contributes to the literature by dissecting the concept into conceptual fuzziness inherited from the contextual vagueness and the fuzziness bequeathed by a researcher's methodological and perceptual weaknesses. The review could help address the persisting methodological and perceptional ambiguities in regional studies.

The fourth chapter contributes to the literature on localizing affordable housing and Sustainable Development Goals (Zinkernagel, Evans, & Neij, 2018; Parnell, 2016). Analyzing the feedback from the interview with local administration would help municipalities operationalize Sustainable Development Goals. The study highlights the importance of subsidiarity (Gawlowski et. At., 2020; Hollenbach, 1979; de Vries, 2012), place-based (Giest, 2014; Marshall, 2007) and innovation theories (Schiederig et al., 2012; Forestier & Kim, 2020; Wanzenbock & Frenken, 2020) in pursuing sustainability agendas at a local level. The study also theoretically contributes to the subsidiarity principle facilitating its application in the context of urban sustainability (Wanzenbock & Frenken, 2020).

The fifth chapter adds to the literature on housing by evaluating the effectiveness of housing policies in an intra-regional setting against the speculative investment behavior of conventional financialized housing markets (Alexiou et. Al., 2018; Best & Kleven, 2018; Bimonte & Stabile, 2020; Lundborg & Skedinger, 1999; Meen, 1999; Mirrlees, 2011; Sterman, 2000; Scott & Storper, 2015; Stephens, 2020) . Our analysis provides a quantitative analysis of the cumulative behavior of multilevel taxation on a regional housing market. The research contributes to advancing knowledge in housing policy initiatives and paving the way for an integrated policy assessment in the housing industry.

1.5 Organization of The Thesis and Sub-Research Questions

This dissertation is organized as follows. Chapter 1 includes the introduction to the main purpose of this research, the research questions, and a brief on each of the five manuscripts. Chapter 2 presents a comprehensive literature review on the central bodies of knowledge relevant to the concept of sustainability, sustainable development, and sustainability management. This chapter clarifies conceptual and methodological approaches to facilitate trade-offs between normative and functional objectives to achieve sustainability. This chapter aims to understand: 1) how the conceptual variance in defining sustainability influences sustainability objectives; and 2) how contextual diversity can be accommodated to devise more relevant practices in sustainable development.

Chapter 3 provides a critical review of regional studies and conceptual fuzziness. The chapter discusses the relevance of conceptual fuzziness to multi-disciplinary qualitative research and its theoretical evolution and methodological development. The chapter summarizes the literature and ongoing academic debates on methodological approaches in regional studies. The research contributes to conceptual approaches, methodological relevance, and ways to overcome weaknesses in qualitative research.

Chapter 4 broadens the range of the existing literature on subsidiarity theory and localizing SDGs. This chapter aims to explore: 1) Challenges for local governments in localizing SDGs. 2) How are Methodological and Capacity Challenges, faced by Canadian Municipalities Stemming from the Localization of the Sustainable Development Goals, faced by Canadian Municipalities? 3) What are Common Approaches used by Canadian Municipalities to Localize the Sustainable Development Goals? 4) What are the challenges in localizing affordable housing? The chapter provides a comprehensive qualitative analysis of localizing affordable housing and Sustainable Development Goals and a comprehensive review of the subsidiarity principle, its conceptual evolution, and its relevance to the localizing of SDGs.

Chapter 5 details a case analysis of nine cities from multiple administrative regions in the province of Ontario. It makes a fascinating study in assessing the housing markets' response to regulatory measures in administratively different but geographically compact areas. The chapter examines how effectively the transfer tax policy implemented fulfills its intended objective of controlling housing market speculation. Additionally, the investigation assesses how geographical variation impacts the effects of real estate taxes and mortgage interest rates on house prices. The research contributes to advancing knowledge in housing policy development.

Chapter 6 summarizes the outcomes and contributions to theory, literature, and industry practices. Finally, the chapter assumes this by highlighting future research.

Chapter 2

Sustainability Management—A Conceptual Trade-Off

The technological advancements that have brought the fastest economic growth in the past decades have changed human activities and behavior. Global warming, driven by human activities, is having a catastrophic impact on the earth's ecosystems. Additionally, concerns have grown about the wellbeing of humanity due to threats imposed by population growth, such as diminishing natural resources, lack of access to health and education, inequality, climate change, and food insecurity (Sachs, 2012). Furthermore, the widening gap between the rich and the poor has created social instability. The population below the poverty line not only relies heavily on natural resources, but is also exposed to environmental risks (Brundtland, 1987). The magnitude of human-induced changes in the natural environment has pushed the system to a dangerous threshold. Growing socio-environmental challenges question the sustainability of the prevailing economic system. Subsequently, the concept of Sustainable Development, which has emerged over the past decade, only increases emphasis on its importance to human survival (Kumi, Arhin, & Yeboah, 2014).

The concept of sustainability and the importance of sustainable development are well recognized. Following the Brundtland Commission report, "Our Common Future" took a new turn by defining the concept of sustainable development in terms of meeting the needs of today and tomorrow (WCED, 1987: p. 43). It led to the creation of Millennium Development Goals (MDGs) to address socio-environmental challenges. After recognizing the shortcomings of MDGs and lessons learned from the past (Arico, 2014), Sustainable Development Goals (SDGs) expanded the focus to operational mechanisms and inclusion of all stakeholders at all levels of governance (Gellers, 2016). In addition, Sustainable Development Goals provides a framework to measure and monitor socioeconomic and development targets (Ruhil, 2017).

After recognizing the shortcomings of MDGs, the idea of SDGs stressed human-centered development along with environmental sustainability (Jayasooria, 2016). SDGs address the importance of a relationship between ecosystems and human wellbeing by adopting an integrated approach toward sustainable development (Martinez & Mueller, 2015). The environment and ecosystem resilience improvement can help remove obstacles to human development and thus cannot be treated in isolation (Mainka, McNeely, & Jackson, 2010). Therefore, SDGs advocate the integration of environmental

agendas into socioeconomic development in national and international planning processes (Martinez & Mueller, 2015).

The heterogeneity of urban functions and contextual variation create governance challenges. Rapid urbanization and population concentration stress the resources required to provide services. It makes urban governance challenging to justify and manage equitable trade-offs between environmental protection and meeting basic human needs. Financial and economic management are subject to negotiation and compromise. However, the socio-environmental components of sustainability are not easy to negotiate (Karoly, 2011). Moreover, the inclusion of economic and social objectives on the environmental agenda creates confusion in defining sustainability objectives.

The scale and scope of the economic accumulation and respective environmental dissipation forcing a complex trade-off threaten the optimum sustainable outcome (Verma & Raghubanshi, 2018). Similarly, a bidirectional association between growth and development prevents the immediate translation of economic growth into social and environmental benefits (Babu & Data, 2015). Although there is evidence of a positive relationship between financial strength and sustainable development, high natural resource consumption has shown a negative effect on sustainability. Cutting resource consumption may hamper future growth and affect living standards, particularly in developing countries (Koirala & Pradhan, 2020).

The resource and capacity limitations are forcing trade-offs between environmental, economic, and social objectives leading to significant policy variation between developed and developing countries (Swain, 2020; Swain & Yang-Wallentin, 2020; Nagendra, Bai, Brondizio, & Lwasa, 2018). Furthermore, functional efficiency necessary for sustainable development requires quality education, basic infrastructure, financial capital, national and regional connectivity, and strong governance. Therefore, contextual circumstances are vital to developing context-specific policies for relevant groups of sustainable development components to facilitate convergence across sustainability indicators. (Ulucak, Kassouri, Ilkay, Altintas, & Garang, 2020).

Urban sustainable development literature is broad and heterogeneous. Responding to social and environmental demands is not the only objective of urban sustainability. It requires an integrated approach across urban functions and the efficiency of governance and institutional structures (Krueger & Gibbs, 2008; While et al., 2004). Therefore, context-specific managed growth would be required to attain sustainable urban development.

The concept of sustainability has evolved through theoretical, disciplinary, and operational perspectives expressed in terms of vision for the future, redefining values, integration and transition to achieve desired objectives. The normative base of sustainability is widely accepted. However, the heterogeneity of the normative concept of sustainability makes it difficult to operationalize. On the other hand, the management perspective demands more active discussion and may not be understood without its theoretical and conceptual base.

Since the Brundtland Commission, various definitions and approaches have surfaced to define sustainability from economic, social, and environmental perspectives. Furthermore, these different perspectives have led to varying objectives with distinct paths to achieving sustainability. The idea remains fuzzy due to the complex form of interdependencies among its components, assertion of facts, normative valuations, and a thin line between description and prescription (Gladwin, Kennelly, & Krause, 1995).

In this chapter, we discuss the conceptual evolution of sustainable development and theorize a conceptual base for policy trade-offs. We have identified sustainability themes from two critical directional perspectives - normative to functional and functional to normative. It helps to facilitate decision-making and set directions to accommodate the sustainability challenges in prevailing circumstances. Additionally, the chapter provides a theoretical base to redefine sustainability and sustainable development, incorporating normative and functional objectives.

This chapter is adapted from:

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2.1 Abstract

The field of sustainability is facing challenges of conceptual openness, functional complexity, and operational ambiguity. A lack of consensus on these fronts is dividing intellect and resource bases, and it is failing to counter the sustainability challenges we face today and tomorrow. Sustainability management can be approached through normative, functional, and operational perspectives. Sustainability, being an integrated subject, will always bring in multidisciplinary aspects to address development challenges. On the other hand, the management perspective demands more operational discussion that may not be understood without its theoretical and conceptual base in a context. Similarly, in its normative terms, sustainability advocates ethical concerns based on the principle of fairness and justice towards nature, society, and future generations. However, the heterogeneity of the concept makes the normative objective of sustainability difficult to operationalize. Further to the normative heterogeneity, amalgamated remedial measures need to engage diverse stakeholders, perspectives, technology advancement, governance, and scale that render sustainable development even more complex and harder to operationalize. African countries' prevailing socioeconomic structure is important to study for its sustainability management's functional and normative approaches. Taking on a philosophical approach, we have discussed the prevailing theoretical and practical concepts in sustainability from a normative, functional, and contextual approach.

2.2 Introduction

In the developing world, where poverty and scarcity are of a high scale, it would be difficult to justify and manage the equitable trade-off between environmental protection and the meeting of basic needs. Financial dependency, budget deficits, economic growth, and measurement of inflation are all subject to negotiation and compromise. However, the ecological component of sustainability being non-negotiable creates more confusion while dealing with socio-economic objectives (Karoly 2011). Therefore, the transition towards sustainability follows different trajectories across a variety of empirical and geographical contexts (Hansen et al. 2018). The complex linkages between objectives, drivers, and responses are subject to contextual definition, conceptual framework, relevant thresholds, and data availability. In such a case, the sustainability definition, objective, and measurement are more localized and differ from country to country (Verma and Raghubanshi 2018).

Developing countries' resource and capacity limitations are forcing them to prioritize and trade off between environment, economic, and social objectives. The scale and scope of the economic

accumulation and respective environmental dissipation are forcing a complex trade-off and threatening an optimum and sustainable outcome (Verma and Raghubanshi 2018). Swain and Yang-Wallentin (2020) found a significant policy focus variation for sustainable development between developed and developing countries. The evidence suggests that socio-environment focus seems more beneficial for sustainable development in developed countries compared to socio-economic focus that benefits developing countries more (Swain and Yang-Wallentin 2020). In a similar context, Babu and Data (2015) found a bidirectional association between growth and development that prevented immediate translation of economic growth into social and environmental benefits.

In the African context, their colonial history and afterward perforated economic and political structure, under foreign influence, placed the Africans at a perpetual disadvantage. An unequal trade and exchange rate, financial dependence, capital and resource extraction, and inability to create production value have blocked Africa's broad-based development. This is quite evident from the African city prosperity index 2016, which was significantly lower than other major cities around the world (Nagendra et al. 2018). There is no one reason for this, and of course a blanket approach cannot solve the prevailing development challenges in Africa.

Most African countries lack the functional efficiency necessary for sustainable development. Functional efficiencies are driven by quality education, basic infrastructure, financial capital, and strong governance structure. Functional deficiencies lead to incapacity, inefficiency, unproductivity, and lack of integration across discipline and space (van Niekerk 2020), which means that strengths and weaknesses are not similar across geographies and functional components. For instance, environmental conditions, resource dependencies, varying liabilities, and regional non-convergence behavior in most African countries poses varying scale of sustainability challenges (Ulucak et al. 2020). Many African economies severely lack economic inclusivity which result in spatial inequality, uneven income distribution, and social disparities (van Niekerk 2020). Furthermore, weak governance and an underdeveloped financial structure make it difficult to materialize economic growth through financial development (van Niekerk 2020). In terms of contextual relevance, urban innovations in the context of developed countries may not fit well in the African context (Parnel and Robinson 2012). This is because scholarly influence from the global north has ignored capacities, geographic dynamics, and historic inequalities that predominantly influence perspectives in the global south (Nagendra et al. 2018).

Functional efficiency depends on the relationship between resources, financial and operational capacity, and standards. Resource and capacity limitations will define standards ethically justifiable in a contextual dimension. Standards such as defining prosperity, living standards, and social and environmental justice are normative. Similarly, a global approach to fair trade and burden-sharing of climate change may not be justifiable in a local context. In such a case, normative definitions are more local, influenced by socio-environmental conditions.

In such circumstances, sustainability challenges, particularly socio-environment sustainability objectives, cannot be achieved through common policies. Context-specific policies, for the relevant group of socio-environment components, are in order to facilitate convergence across sustainability objectives (Ulucak et al. 2020). In this review article, we have reviewed historical and current literature to identify emerging themes in sustainable development. We have provided a review on normative and functional approaches in sustainable development to enhance its theoretical and conceptual base in a context.

2.3 Sustainable Development – Emergence

Sustainability is about keeping the natural ecosystem intact, and human activities should be within the limits of the system's carrying capacity. It is about social justice and fair distribution of resources by maintaining intra and intergenerational equity (Costanza 1989; Odum et al. 1971). The economic system, fundamentally relying on increasing consumption and profit maximization, is not only extinguishing the natural resource capital of the planet, but also impacting the stability of its financial and political system (Jackson 2017). Furthermore, unconstrained economic growth and the prevailing financial system is disrupting the natural and social systems (Bansal and Song 2017). As described by Karl Polanyi (1944), instead of social values, markets are transforming societies by replacing the norms with rationality- and utility-raised ethical concerns.

The concept of sustainability first arose from the desire to determine the maximum sustainable yield in the forestry and fishing industry. However, an abundance of supply and slow economic growth kept the natural resources relatively inexpensive that ignored environmental and social consequences in the past (Smil 2000). In the mid-nineteenth century, Thomas Malthus diverted the attention towards the limitation of the earth's carrying capacity in a systemic approach, relating food production and population growth. Since industrialization, the increase in demand for natural resources has made

fundamental changes to the global socio-economic and socio-ecological system, hence raising concerns around future uncertainties (Devezas et al. 2008).

Social and environmental concerns have emerged respectively from two distinct approaches of market social responsibility and sustainability of natural systems (Bansal and Song 2017). Market corporate responsibility surfaced as a countermovement to unrestrained capitalism in an industrial era. Karl Polanyi (1944) was among those who highlighted the social consequences of the market. Meanwhile, environmental concerns were triggered after witnessing catastrophic changes in the earth's ecosystem. However, there was a fundamental difference between these two approaches. Market responsibility towards society was more normative, which further evolved into the concept of the triple bottom line and stakeholder management remained focused on corporate ethics for inclusive decision-making (Matten and Moon 2005). In contrast, environmental sustainability was more empirical, thus encompassing the broader system's perspective in which market, society, and natural systems interact (Bansal and Song 2017). These movements were somewhat against the contemporary management practices that were keeping humanity and truth away from nature and morality, respectively (Gladwin et al. 1995). However, both corporate responsibility and environmental protection had a narrow and disintegrated approach with the missing link to social equity and justice. The social and environmental disruptions caused by economic development gave birth to the notion of sustainable development that incorporated economic, environmental, and social perspectives. Brundtland (1987) came up with a conclusive idea and introduced the term of sustainable development by referring to the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p.6).

2.4 Sustainability Management – Concept

Sustainability management is expressed in terms of vision, changing values, moral development, social integration, and transitional process to achieve a better and desired future. Since the Brundtland Commission, various definitions and approaches have surfaced to define sustainability from economic, social, and environmental perspectives. The difference in these perspectives have led to varying objectives with distinct paths to achieving sustainability. In fact, the idea has remained fuzzy due to the complex form of interdependencies among its components, assertion of facts, normative valuations, and the thin line between description and prescription (Gladwin et al. 1995).

Ecology, economics, and sociology, each discipline has a different take on sustainability. Ecology and economics differ fundamentally on distinct focal points of dealing with the uncertainties and risks at the macro and micro levels (Ayres and Gowdy 2001). In economics, development equates income with human wellbeing and incorporates sustainability as a balance of income between present and future generations (Dietz and Neumayer 2007). Whereas, ecology looks at the functional stability of the earth's ecosystem, a precondition to human wellbeing and intergeneration equity (Griggs et al. 2013). The focus of sociology is on preserving community social and cultural values and their relationships (Ayres and Gowdy 2001). In addition to conceptual variation, Hammer and Pivo (2017) categorized the operational approaches to sustainability: Those linking economic growth and human wellbeing, those highlighting the importance of natural capital in sustaining economies, and those prioritizing the process of economic development. In short, economic objectives should not undermine natural resources. The challenge of sustainability management is to integrate these components into strategic and business goals and create a win-win solution.

2.4.1 Weak and Strong Sustainability

The debate over weak and strong sustainability revolves around the natural capital stock level – it either exists in abundance or needs protection - and its relation to wellbeing (Ayres and Gowdy 2001; Dietz and Neumayer 2007). Hartwick-Solow's model of substitutability assumed that both natural and manufactured capital stand equal in terms of the factor of production and generating wellbeing (Solow 1974). Furthermore, technological advancement can easily substitute natural capital faster than it depletes. Therefore, the aggregate stock of capital, that matters, should be maintained or reinvested to increase consumption later (Solow 1974; Hartwick 1977). However, this can stand true only if the natural capital is available in abundance, reproducible, or substitutable - perfectly elastic with produced capital - unlikely to sustain optimal growth in terms of perpetual provision of wellbeing (Dietz and Neumayer 2007; Daly 1990).

Ecological principles oppose substitution due to the irreversibility of the natural system and the qualitative difference that exists between natural and manmade capital (Ekins, et al. 2003). Furthermore, natural systems operate in cohesion to supply material, absorb waste, provide amenity service, and basic life support function for both humans and the system itself (Barbier et al. 1994). The life support function is a direct determinant of human welfare, and it holds the primary value that embraces everything together (Turner and Pearce 1994; Dietz and Neumayer 2007).

Degrowth is another approach for sustainable transformation. Degrowth advocates decoupling growth from the economy, focusing more on socio-economic rather than a socio-technical approach. It works with the bottom-up approach, relying on social experiments, motivated to make large-scale changes, including rejection of capitalism, and reverting to localization of the economy (Khmara and Kronenberg 2020). In contrast, technology dependence, delinking economy from nature and neglecting the scientifically proven limitations of resources, compromise natural and human equity. The ecological approach, on the other hand, is unable to integrate human and ecological integrity, resting purely on theoretical grounds that ignore social facts. Gladwin et al. (1995) were convinced that both technological dependence and strict ecological perspectives are unable to provide a strong base for sustainable development unless integrated to create a cohesion between ecology and human wellbeing.

2.4.2 Limits to Growth

The basic laws of nature have never been replaced; however, growing demand from an increasing population has changed the appearance and quantitative relations of the natural system (Odum et al. 1971). The continuously shrinking resources and increasing consumption restrict not only unlimited economic growth (Jackson 2017) but also its equitable distribution (Costanza 1989). To deal with scarcity and depletion of non-renewable resources, limits need to be applied to consumption (Costanza 1989; Daly 1990).

The laws of physics and the environment, such as conservation of energy and transformation, entropy, and the tolerance of the system, place physical limits on the growth. All these laws define constraints imposed by the ecosystem's function of energy creation, systems order, and maintaining production and consumption (Odum et al. 1971; Daly 1990). Furthermore, the human population structure depends on local habitat, weather conditions, reproduction process, and social attraction that result in aggregation. Similarly, Alee's principle and Shelford's law of tolerance emphasized the appropriate population size and relevant conditions necessary for sustainable development (Odum et al. 1971). These laws clearly describe the system requirements and functional constraints necessary for the ecosystem to maintain and grow.

The natural ecosystem response to varying external pressures is nonlinear, often abrupt, and sensitive around certain thresholds of key variables. Crossing these thresholds shifts the state of subsystems, such as changes in the monsoon cycle, land surface, rate of biodiversity loss, and concentration of greenhouse gases (Rockstrom et al. 2009). However, defining the thresholds for all

the subsystems is indeed a difficult task (e.g., water and land degradation) (Steffen et al. 2015). Several critical processes, such as climatic changes, loss of biodiversity, and biogeochemical cycle, have already passed their threshold (Rockstrom et al. 2009), whereas land system was also later included in the list (Steffen et al. 2015). These are the clear indications of misaligned development trajectories followed in the past.

2.5 Sustainability Management – Perception

There is a strong relationship between natural resource management, economic prosperity, and human wellbeing driven by the production, consumption, and waste management phases of products and services (Tukker and Jansen 2006). These socioeconomic and environmental processes carry both normative and functional approaches and adopt distinct methodologies for sustainability. Some of the sustainability themes are categorized from the two approaches listed in Table 1.

Table 1: Sustainability thematic approaches

Normative Approach	**Functional Approach**
Inter-Generation Equity	Regional Management, Resilience, and Capacity
Environmental Autonomy	Managing Environment
Wealth, Prosperity, and Decoupling	Managing Economy
Corporate Responsibility	Managing Business
Responsible Investment, Shared Value	Finance and Investment
Valuation – Internalising	Assessment and Measurement
Managing Consumption	Material and Production Management
Tragedy of Commons	Managing Commons
Regulation	Governance

2.5.1 Normative Approach

Researchers and policymakers are increasingly acknowledging the crucial role of normative dimensions and political contexts in addressing complex sustainability challenges (van der Hel 2018; Miller et al. 2014). Sustainability drives its normative aspiration from contexts of conflicting interests, the social base of knowledge, researchers' bias, and the tussle between politics and science. However, these contexts play a part in problem identification and analysis (van der Hel 2018). However, the extent of the role of values and political aspects in shaping sustainability knowledge and transformation is still debatable (van der Hel 2018; Meinherz et al. 2020). This debate is then further extended to the role of values in the sustainability of present and future generations.

Any decisions made today will have their future environmental consequences. There could be more than one way to address this: act based on a future value judgment, prioritize present value, or adopt best practices. In welfare economics, the fundamental problem in judgment is a difference in valuation at any point in time and space. Therefore, a conventional approach to future discounting seems controversial due to judgemental uncertainties, unknown behavior of future generations, and disparities among the present nations (Goulder and Stavins 2002). Temporal uncertainty and spatial disparities are thus preventing the discounting method to adopt a single formula, making it difficult to operationalize.

Bromley (1998) argued that intergeneration equity is not a matter of quantitative valuation of unknown future needs as the conventional sustainability approach follows; instead, a legacy of good practice of preserving the environment will provide equal opportunities to flourish. Ayres and Gowdy (2001) further added that the legacy of rights and opportunities for future generations can end the debate on substitution and marginal trade-offs. However, we disagree with Ayres and Gowdy; substitution and marginal trade-offs are functional approaches that cannot be abolished against a normative approach of legacy, just as a qualitative difference exists between material recycling and consuming less.

In terms of the present generation, sustainability also carries a normative foundation. Sustainability is to achieve a desirable state of the world, embodying social values and their relationship with the environment. However, human actions connect causality with logical necessity, adding descriptive and empirical connections (Kates 2001). Generally, scientific validity relies on empirical grounds, not a logical necessity. This was contested by Hume. Hume's analysis concluded that decisions

are somehow driven by norms of necessities (Wang 2011), supporting the argument of efficacious human actions necessary for the normative foundation of sustainability (Daly 1990).

According to Hume (2003), the current state cannot be determined solely by facts, it carries social values and preferences. This means results and the process by themselves will be unable to prove outside the context in which values stand relevant. Despite the difficulty of separating facts from values (Meinherz et al. 2020), it is, however, recommended to first acknowledge and then draw clear lines between facts and values (Potthast 2015).

Generally, public value definition and application has a limited empirical verification (Hartley et al. 2017). Public values are not universal, they represent those who define and value them. They are geographically dependent, influenced by local and regional policies, and institutional structures that influence normative context (Uyarra et al. 2019). From a critical social theory perspective, the normative dimension should be assessed in terms of its ideal and validity. Normative validity will determine the contextual applicability of the normative practices. For example, Cooke (2006) argued that the validity of a social or cultural norm is not just limited to a cultural attribute or subject to a specific authority. Normative validity should extend to the context-transcending capability to be accepted by a different cultural context. For example, equality as a social norm is embedded, enforced, or practiced while setting examples for others (Cooke 2006). Similarly, environmental norms may opt to different approaches to environmental protection, such as green growth and degrowth may or may not transcend the context (Sandberg et al. 2019). For instance, degrowth is further prioritized based on having a stronger normative justification (Sandberg et al. 2019; Cooke 2006), reflecting the difference invalidation.

In corporate sustainability, the normative dimension was also constructed first from social responsibility then extended to environmental values. Generally, corporate social responsibility (CSR) is adopted as reputation management. However, market normative and sociocultural systems may affect corporations' sustainable practices and disclosures (Tran and Beddewela 2020). In another approach, values also influence corporate decision-making. In conventional economic theory, a normative foundation assumes the capability of a decision-maker to make rational choices. For instance, values play a key role in supplier scrutiny and other procurement decisions (da Silva et al. 2020). Furthermore, according to da Silva et al. (2020), decision-making is considered as both empirical and behavioral, representing normativity and rationality.

2.5.2 Functional Approach

Complex and functionally distinct origins of sustainability make it highly contextualized and ontologically open. Therefore, the operationalization of sustainability depends on the way it is recognized and described (Purvis et al. 2019). Furthermore, sustainable development demands inclusive growth and a modified approach to design for environment, life-cycle assessment, full-cost estimation, system analysis, and purposiveness (Gladwin et al. 1995). Context-specific solutions may be useful in this quest to address variation in socioeconomic, environment, and geographical conditions (Gladwin et al. 1995). Similarly, to measure and operationalize sustainability, greater and practical decision-support tools are needed for the systematic inclusion of sustainability in management practices (Kates et al. 2005).

A function is generally defined as the intended use of something. This could be a device or a system. In both cases, the system will be formed from various elements in which relationships between the elements will define their values, significance, and even existence. Operation describes the method by which functions are performed and influence the produced value. In social, economic, and environmental interactions, functions will be described from their discrete elements and intended output. Whereas the operational framework will determine how the functional values will be realized, requiring careful consideration of both spatial and functional boundaries (Purvis et al. 2019). For instance, an electric vehicle's (EV) operational context will be changed by including or excluding the energy network system in the EV lifecycle analysis (Doufene et al. 2014).

In another example, political and normative disagreements often lead to a contested definition of justice, generally ill-defined (Dirth et al. 2020). According to Valentini (2011), the functional framework of justice is drawn from its normative base, empirical assumptions, and formal recognition by the social system it intends to serve. In this sense, the function of justice is inherently tied to the social structure that defines its contextual and operational constraints.

A process application depends on the delivery channels that hold public values. For instance, not all departments/institutions hold or are obligated to provide public values (Uyarra et al. 2019). The inclusion of definitions and decision-making is vital throughout the process of value judgment, institutional structure, embedded systems, and stakeholder engagement (Smith 2004). Uyarra et al. (2019) argued that conventional approaches to innovation policies are unable to solve societal challenges of poverty, climate change, and regional economic disparities. This has shifted the focus

from sole reliance on market interventions to a more responsible and transformative approach, incorporating normative values in policymaking. For example, responsible research and innovation rely on purpose, rationales, social and political structures, and development trajectories and paths (Uyarra et al. 2019). The same is true in the African context. As discussed earlier, a level of regional integration, local capacities, resource limitations, production functions, income distribution, social disparities, and prevailing challenges will determine the development trajectories most compatible to the local governance, population, and environmental structures (Ulucak et al. 2020; van Niekerk 2020; Nagendra et al. 2018). Furthermore, Masocha (2019) suggested that normative values, derived from social realities, have significantly influenced small businesses' behavior towards sustainable development practices in South Africa.

In another example, urban transformation requires careful consideration of both sustainability and resilience. Urban sustainability and urban resilience are often poorly defined, sometimes used interchangeably. Elmqvist et al. (2019) argued that this confusion is affecting urban transformation efficiency because sustainability and resilience objectives sometimes contradict or even challenge each other. Urban sustainability's objective is to optimize and enhance urban systems, whereas resilience is more about the system's restoration capability in the aftermath of a disaster. In contrast to the normative approach of sustainability, resilience is more functional in that it relies on the system's functions and operational structure. In certain cases, increasing sustainability may often lead to reduced resilience (Folke 2016). For instance, energy efficiency through densification may compromise the urban ecosystem which is vital for urban resilience in climate change (Frantzeskaki and Tilie 2014). Similarly, transportation and communication efficiency may result in redundancy, a key feature of urban resilience (Elmqvist et al. 2019). Elmqvist et al. (2019) further argued that the systemic attribute of resilience depends on the functioning scale, and the outcome may or may not have a normative validation. They further added that any undesired resilience may also contradict sustainability objectives.

Furthermore, the process of transforming science into practice is also context dependent (Buyana 2020). Parnel and Robinson (2012) argued that a recalibration of scholarly work from the global north is inevitable to accommodate the African cities' contextual realities. For example, according to Buyana (2020), the waste management system in African cities mostly rely on an informal system of waste transformation. The local system of waste vendors, in combination with the tools and techniques sourced from local resources, creates a nexus of innovation, local material, and employment. Such systems may not be very adjustable to advance technologies used in developed countries (Buyana

2020). A local intellectual capacity building is necessary for alternative ideas to address the challenges of the rapidly transforming African cities (Parnel and Robinson 2012).

2.5.3 Trade-offs and Synergies

Mori and Christodoulou (2012) argued that environment, society, and economy are nested hierarchical functions and cannot be treated as parallel (Mori and Christodoulou, 2012). Consequently, the benefit of one element could be a disadvantage to others. In sustainability objectives, particularly in the context of sustainable development goals, the synergies and trade-offs are driven by functional and operational dependencies between the objectives. These trade-offs and synergies are generally described in terms of opposing and favoring, respectively. In terms of Sustainable Development Goals (SGDs), the relationship between the indicators are highly contextualized and varies from country to country. These contextual relationships are highly dependent on trajectories, direction, governance structure, and technological framework. For instance, pursuing social goals will generally have negative environmental consequences. However, higher-income groups may have a greater advantage over others in investing in green technologies and reducing ecological footprints (Pradhan et al. 2017).

Efficiency improvement is generally regarded by sustainability. However, in a dynamic growth and with constant increase in emissions, improving efficiency is just not helping sustainability. In terms of the conceptual definition of sustainability, economic efficiency should be measured in terms of ecological impacts. Similarly, for social sustainability, income equality, prosperity, and wellbeing are the major indicators of sustainability. These indicators are driven by ecological sustainability. However, they are not directly influencing ecological sustainability (Karoly 2011). For instance, job loss or income inequality will have no direct implications on the environment unless the losses are connected to ecological damage due to a lack of infrastructure. In such cases, both economic and social sustainability are negotiable; however, environmental sustainability maybe nonnegotiable (Karoly 2011).

In terms of the human-environment relationship, human wellbeing is considered a multidimensional concept, yet we do not have a definitive answer as to what exactly is required to achieve it (O'Neill and Uebel 2015). It is sometimes defined as pleasure in the absence of suffering. In terms of the socioenvironmental relationship, maximizing return (wellbeing) and minimizing suffering (environmental impacts) will satisfy all concerns (Meinherz et al. 2020).

From the perspective of integrated decision-making, Raman et al. (2015) identified the incapacity of a single large-scale policy option – such as the policies dealing with the production of biofuel in the United Kingdom - to deal with the nexus of technological motivations, social and cultural values, prevailing economic system, and conflicting perspectives of localization. In another example, a blanket approach to largescale afforestation campaigns can do more harm than good in terms of loss of biodiversity, reduced carbon sequestering, and decrease in the density of soil organic carbon (Heilmayr et al. 2020; Hong et al. 2020). Similarly, the goal of sustainable land-use practice is not finding a single best solution for the socio-ecological problems associated to the land system. It is to understand the process of decision-making, associated trade-offs and implications, underlying values and norms, and to assess operational and normative outcomes to determine winners and losers (Nielsen et al. 2019).

Concerning Sustainable Development Goals, Pradhan et al. (2017) found both significant negative and positive relationships across 169 SDG targets in 227 countries around the globe. Although, SDG indicators have shown relatively greater synergies across the world, however, still a majority of countries are dealing with trade-offs between 40-50 percent of their individual and collective targets (Nilsson et al. 2016; Pradhan et al. 2017). For example, access to electricity through non-renewable means may hamper renewable energy share. Similarly, addressing material footprint may impact economic production of a country. These interdependencies may cause conflicting and diverging results that could possibly lead to a relationship where one goal may restrict progress in other goals (Pradhan et al. 2017). The characterization of the interaction between SDG indicators, from both normative and functional approaches, is still a subject underexplored. Nilsson et al. (2016) have characterized SDG interactions in indivisibility, consistency, and canceling behaviors of indicators, proposing a seven-point scale framework. The same framework was adopted by ICSU (2017) to explicitly test causal and functional relations within the progress of goals and targets (ICSU 2017). The trade-off is not just limited to the input values of the function. It is equally important for the process it takes and the valuation of corresponding outputs. Consistency in approach throughout the functional process will help to eliminate normative and functional conflicts.

2.6 Discussion

The human ingenuity gap remains a key barrier to transformation to fully understand the complex dynamics of problems, intervention, and adaptive compensation (Tol 2016). Similarly, sustainability demands logic of appropriateness rather than a logic of consequence (Bernstein and

Cashore 2007), clearly lacking in general policy trajectories. Furthermore, the lack of an integrated contextual approach is being held back from finding an appropriate development solution. In contrast, sustainable development is an aggregate outcome that could be achieved only through multiple sustainability management initiatives. Nilsson et al. (2016) suggested cross-sectoral and cross-goal collaborative policy development vital for the operationalization of sustainable development objectives. In addition to cross-sectional approaches, a directional perspective will help to determine the ideal decision necessary to be maintained throughout the process of implementation. Some of the sustainability themes are organized from two key directional perspectives - normative to functional and functional to normative- presented in Table 2.

Table 2: Sustainability thematic and directional approaches

Themes	Normative to Functional	Functional to Normative
Inter-Generation Equity	Future valuation, equal opportunities, consumption behavior, conservation, renewable/non-renewable	Present valuation, circumstantial opportunities, investment behavior, best practices, alternates, innovation, advancement
Managing Economy	Development, degrowth, equal, distribution, cost vs value	Growth, inclusive growth, decoupling, green growth
Wealth and Prosperity	Social wellbeing, social participation, immaterial and cultural engagement, physical and psychological growth, redefining prosperity	Income, employment, redefining necessity
Environmental Management	Environment autonomy, nature as a precondition, embedded society and market	Human interests come first; Resource for economic growth; Wealth to protect environment; increased wealth will decrease degradation

Business and Shared Value	Regulation, CSR, externalities, social cost, motivations	Bottom of the pyramid; investing in people to enhance productivity; shared value, social innovation, actions (empirical), efficiency
Finance and Investment	Divestment, responsible investment, devaluation, behavior	Innovation, opportunity cost, risk adjustment, rationality
Common Resources	Community-scale, common interests, nonmarket solutions	National scale, pricing commons, market driven
Impact Assessment	Internalize cost, non-market valuation, damage function, ecological footprints	Externalize cost, market valuation, fragility function, nonlinear and idiosyncratic, monetary value
Regulations and Policies	Taxation, prevention, maximum yield, optimal state, same objective, unified goals, socio-environment specific, systemic	Revenue to combat, carbon incentives, adaptation, resilience, inclusivity, socioeconomic, systematic, difference in objective-specific goals
Material Management	Reduce consumption, material costing, reduce supply, conservation	Substitution, material efficiency, recycling, substitution

Sustainability, in its normative terms, advocates ethical concerns based on the principle of fairness and justice towards nature, society, and future generations. However, the heterogeneity of the concept, associated with the fundamental challenges of valuation and generalization, makes the normative objective of sustainability difficult to operationalize. The normative objective of inter- and intra-generation equity, predominantly based on the assumptions drawn from the dominating behaviors, ignores the social facts and human volatility that depend on contemporary circumstances. Therefore, a

generalization of social values is quite difficult for the present generation and makes it irrational for future generations. Similarly, in a dynamic socio-economic system, the valuation of natural capital is also quite challenging in achieving common ground. However, equity in terms of justice towards nature is a global concern. As Hawken (1993) said, “leave the world better than you found it” (p.139) helps in operationalizing environmental justice.

The depletion of natural resources, although empirical, has some uncertainties from the perspective of ethics, valuation, and distribution remain debatable. There are some commonalities between the depletion of natural resources and climate change, such as both are driven by socio-economic activities. However, the interaction of socioeconomic activities with the natural environment is complex and context dependent. Similarly, environmental norms may be generalized for the present generation, but may not be more than setting a precedent for future generations. However, climate change impacts are very much current and global, and that carries a cost if neglected. Two approaches can be adopted in this regard: management or prevention. Management is responsive, incremental, and relies on capacity and technological advancement. On the other hand, prevention is predictive and enhances the system's capacity to be more resilient, adaptive, and transformative.

In socio-ecological systems, no one size fits all in developing strategies for sustainable development. It depends on the context, the current state, and the basin of attraction (Walker et al. 2004). For example, the definition of a region depends on its geographical and functional context altered by human behavior and community norms. The contextual approach will define the functional approach to management, such as dealing with common resources, material assessment, and finding socio-environmentally appropriate economic opportunities. According to Ivan (1997), rather than counterproductive, development should be context-specific and must be able to serve majority needs. Likewise, Sen’s notion of capability and freedom of development advocates development valued by communities (Sen 1999). It reflects that sustainable development is not what is perceived, rather it is the one valued. Droz (2019) added further by referring to the human choice of lives as self-determination, but with general ethical restrictions to be maintained for environmental autonomy.

2.7 Conclusion

From the discussion above, it is quite evident the conceptual definition of sustainability will remain fuzzy unless dissected from normative and functional approaches in their respective context. The socioeconomic disparities and the distribution of natural resources make it quite challenging to

achieve globally accepted principles for sustainability. It would be rather a moral relativism that could help to address the challenges of their respective normative and functional constraints. It is crucial to adopt ethical and reflexive approach embedded in a historical and present context to produce diverse knowledge system necessary to form environmentally and socially just urban future (Wijsman & Feagan, 2019). Environment, society, and economy are nested functions, and cannot be separated. The assertion of facts will determine priorities and consequent trade-offs. A sustainable trade-off requires not only functional input values, but the process, the path it takes, and the valuation of consequent outputs are equally important. A complete system's approach will help to eliminate the conflict between normative and functional approaches to sustainability. Furthermore, to achieve sustainable and relevant development, the recalibration of global knowledge to accommodate local facts is inevitable. Indeed, this will require developing local knowledge and operational capacity.

African countries' prevailing socioeconomic structure is an important case to study sustainability management from functional and normative perspectives. As suggested by Buyana (2020), the integration of science, policy, social norms, and prevailing practices is necessary to develop lasting solutions for the developmental challenges specific to the African context. This study provides a foundation to further develop sustainability management literature to address contextual challenges across geographies.

Economic growth can go hand in hand with sustainable development if the prevailing economic structure changes its parameters to be driven by socioecological values rather than driving them. This approach has more significance in terms of dealing with the type of challenges faced by Africa and other developing geographies across the globe. Overarching objectives, such as ethics and justice, can be adopted as a common approach, whereas a functional approach should incorporate ecological, geographical, and prevailing socio-economic conditions. In this context, sustainable development can be defined as development that is valued with freedom of choice and resilience (Local), without compromising the ability of the natural ecosystem to flourish (Global).

MANUSCRIPT ENDS

Chapter 3

Regional studies and conceptual fuzziness: A critical review

Regional and local development is a system of tightly knit functions. Interdisciplinary subjects such as spatial planning, energy planning, housing and infrastructure, and sustainable development require multiple disciplinary knowledge-sharing to address operational and policy constraints (Silva, Healey, Harris, & Broeck, 2015). Interdisciplinary subjects are susceptible to socio-spatial context and require emphasis on objectives, values, motivations, and existing practices (Verweij & Trell, 2019). Therefore, it would be hard to view regional or local subjects from a single lens, theory, or model (Pike, Rodríguez-Pose, & Tomaney, 2011). Value judgment influencing objectives that drive decision-making are highly normative. Similarly, contextual sensitivity and uniqueness make it highly uncertain and dynamic (De Roo & Silva, 2010). Many fields have adopted a systems approach to defining the configuration and relationships of systems' components to interpret complex interactions and explore approaches to multiple outcomes (Roig-Tierno, 2017).

In addition to normative and context-based decision-making and policy development, functional requirements would determine operational capacity. Sustainable urban development creates synergy between natural and urban ecology to incorporate socioeconomic, environmental and functional systems to achieve a cohesive and collaborative urban environment. This process requires multiple components of sustainability to be incorporated into planning and development policies (Dang, 2019). For instance, the relationship between energy, the built environment and functional organizations stress the integration of energy and spatial planning (Pascali & Bagaini, 2019). Energy planning requires integrated decision-making based on hybrid information (Xu, 2020) that requires the evaluation of energy sources, technology, and operational alternatives (Kaya, Colak, & Terzi, 2019). Furthermore, the energy-related decision would require evaluating multiple criteria, ranking alternatives, and critical trade-offs (Xu, 2020; Kaya, Colak, & Terzi, 2019; Arrizabalaga et al., 2019).

In addition to functional requirements, the normative and contextual aspect of energy and urban structures relies on the connection between urban systems, geography, and social behavior (Ratti, Baker, & Steemers, 2005). For instance, the connection between energy, poverty, and wellbeing is influenced by the availability of infrastructure, socioeconomic conditions, and local climate conditions, making it highly contextual (Jessel, Sawyer, & Hernandez, 2019). Similarly, determinants of energy poverty vary with geographical scale due to its complex interaction with the social landscape, built infrastructure, natural environment, and institutions (Mashhoodi, Stead, & Timmeren, 2019).

Therefore, research-based analysis of a single energy-related experience or intervention lacking spatial connection will lead to weak policies and plans (Pascali & Bagaini, 2019; Zanon & Verones, 2013).

Researchers have acknowledged uncertainty in the research, policy designs, and related decision-making in integrated subjects (Zavadskas, Govindan, Antucheviciene, & Turskis, 2016;Wu, Xu, & Zhang, 2018). The uncertainties exist in the selection of criteria, reliable weightage, and relative balance between the variants (Xu, 2020). Researchers (Gore et al., 2018; Mosier, Fisher, Hoffman, & Klein, 2018; Pascali & Bagaini, 2019) have endorsed the adoption of a multidisciplinary approach in research methodologies and theories to address complexities in sociotechnical decision-making.

The natural environment, social structure, and urban functions form a complex structure of systems and subsystems. In such a diverse environment, uncertainties do exist. Addressing uncertainties, fuzzy theories are combined with multicriteria decision-making to address nondeterministic conditions (Stojcic, Zavadskas, Pamucar, Stevic, & Mardani, 2019). Scholars' (Zadeh, 1965; Pawlak, 1982; Atanassov, 1986; Smarandache 1998) conceptual approach to fuzzy theories quantify incomplete and uncertain information, membership and weighting criteria, and define alternatives to facilitate decision-making in a complex urban environment.

The transformation of research into practice is subject to theoretical and practical evolution through knowledge-sharing and through comparing past and present practices (Booth, 2014). Furthermore, the efficiency of national and regional policy development and translation to local contexts are subject to theoretical choices and the quality of methodologies adopted for the research (Verweij & Trell, 2019). Such research vagueness often evolves out of conceptual and theoretical bias (Markusen, 2003). For instance, sociotechnical studies often rely on configuring conditions and causal directions, which are often ambiguous. From the researcher's perspective, these ambiguities could be enhanced due to the methodological standards followed and the researcher's ideological perception.

A professional ideology could develop from theoretical and policy preferences. This could then lead to overconfidence and potential insensitivity to alternatives and counterarguments, thus influencing the researcher's choice of methodology, selective exposure, selective avoidance, subjective preferences, and value judgment leading to a distorted perception and misleading outcome (Clark & Winegard, 2020; Cornwell, Jago, & Higgins, 2019; Honeycutt & Jussim, 2020; Jussim, Crawford, Anglin, Stevens, & Duarte, 2016).

Multidisciplinary subjects such as spatial and urban planning, urban resilience and energy planning require a systems approach and multicriteria evaluation to deal with sociotechnical uncertainties (Gore et al., 2018; Fu & Wang, 2018). However, methodological and scope inconsistency holds back any concluding argument about the relationship between intradisciplinary relationships such as built environment, urban resilience, and energy use (Ko, 2013; Fu & Wang, 2018). Therefore, policies developed based on research conducted with theoretical inconsistencies, methodological constraints and ideological bias may not be able to resolve contextual challenges. (Ko, 2013; Verweij & Trell 2019; Schlogl & Stutz, 2019).

This paper has reviewed the literature on conceptual and methodological vagueness and policy integration in regional studies. This review article has provided a comprehensive overview of the dominating practices in multidisciplinary qualitative research. The review enhances the literature by distinguishing between the two types of fuzziness and their effect on research outcomes. . For conceptual clarity, the research must differentiate between inherited and bequeathed fuzziness. Furthermore, it helps to highlight areas that need further emphasis to improve the quality of qualitative research.

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MANUSCRIPT BEGINS

3.1 Abstract

Regional and spatial studies, such as urban planning, energy planning, and sustainable development, address the complexity of the inter-disciplinary relationship between subsystems and their components. Such research requires multidisciplinary concepts, varied lenses, and differentiating approaches and models to address the conflict between contextual sensitivity and universal applicability. This paper reviews the debate on the research approaches adopted in regional studies and initiated by researcher Ann Markusen, followed by a review of contemporary literature on fuzziness in qualitative research. Markusen evaluated the conceptual fuzziness, empirical evidence, and policy dimensions of regional studies based on three fundamental aspects of regional and urban development studies; strong contestation of phenomena, empirical evidence to support the concept, and collective action to deal with the problems under investigation. As highlighted by Markusen almost two decades ago, conceptual fuzziness and methodological weaknesses in qualitative research persist in interdisciplinary qualitative research. In this study, we have dissected the concept of fuzziness to distinguish between inherited fuzziness derived from the configurational complexity of a case and bequeathed fuzziness that could be transferred ahead due to a researcher's methodological and perceptual weaknesses. Despite efforts to address the relevance, reliability, validity, and replicability of qualitative research, the field is still facing challenges from conceptual bias, methodological and operational constraints, empirical weakness, and prejudiced interpretation.

3.2 Introduction

Interdisciplinary research (Integrating multiple bodies of specialized disciplines), such as spatial planning, energy planning, housing and infrastructure, and sustainable development, requires multidisciplinary knowledge-sharing to address operational and policy issues (Silva et al. 2015). Interdisciplinary research topics are sensitive to the socio-spatial context, and they need an emphasis on objectives, values, motivations, and an understanding of existing practices (Verweij & Trell, 2019). This contextual sensitivity and uniqueness make interdisciplinary fields highly uncertain and dynamic (De Roo and Silva 2010). Consequently, many multidisciplinary research fields have adopted a system approach defining the configuration and relationships of system components to interpret complex interactions and explore multiple pathways and their respective outcomes (Roig-Tierno 2017).

From a multidisciplinary approach (urban specialized functions), sustainable urban development should create a synergy between socioeconomic and environmental systems and

subsystems to achieve a cohesive and collaborative urban environment. This process needs to incorporate multiple components of sustainability into planning and development policies (Dang 2019). Consequently, the relationship between energy, the built environment, and functional organizations should integrate energy and spatial planning (Pascali and Bagaini 2019). On the other hand, energy planning from an interdisciplinary perspective requires integrated decision-making based on hybrid information (Xu 2020) that necessitates an evaluation of energy sources, technology, and operational alternatives (Kaya et al. 2019). Furthermore, it requires multiple criteria evaluation, ranking of alternatives, and critical trade-offs for sustainable decision making (Xu 2020; Kaya et al. 2019). A long-term integrated energy planning involves holistic energy modeling capacitated to quantify multiple pathways to deal with the complex and evolving urban environment (Arrizabalaga et al., 2019).

Similarly, regional and local development also relies on inter-disciplinary relationships, making it difficult to not only view from a singular disciplinary lens, concept, theory, and model but also unable to address both contextual sensitivity and universality (Pike et al. 2011). This paper has conducted a review of methodological concerns in qualitative research in multidisciplinary studies such as spatial and regional planning. We have reviewed the literature, discussions, and debates that have come up in the past and present, highlighting methodological concerns related to fuzziness in qualitative research. We started with the review of the article published by Ann Markusen in 2003 and the debate that generated afterward. Ann Markusen (2003) critically reviewed the scholarly work in regional studies published between the mid-1970s and 2000. Markusen divided the study period into two eras: before and after the mid-1980s. Her review was based on the quality of research work conducted during these periods and highlighted the key differences in academic research approaches. She also discussed the dominating research approaches in regional studies before and after the mid-1980s. She highlighted the significance of the research outcomes with regard to their operationalization, policy relevance, and development (Markusen 2003). Furthermore, we have reviewed three significant contributions from Arnoud Lagendiji, Jamie Peck, and Ray Hudson in response to Markusen's work. Subsequently, we have reviewed recent work on theoretical and methodological development in qualitative fuzziness, such as fuzzy set theories and Qualitative Comparative Analysis (QCA), to understand the concept of fuzziness and the evolving practices in qualitative research.

Urban sustainable development involves synergies between urban functions to address normative and functional objectives for social prosperity and environmental justice. Therefore, sustainable decision-making and policy development require context-sensitive interdisciplinary

research, which makes methodological rigor a significant concern in qualitative research. The primary outcome of this review article is to revisit the methodological weaknesses in qualitative research highlighted almost two decades ago may persist in interdisciplinary qualitative research. Despite efforts to address the relevance, reliability, validity, and replicability that the qualitative research field still faces today, challenges from conceptual bias, methodological and operational constraints, empirical weakness, and prejudice interpretation remain. However, distinguishing between the conceptual fuzziness inherited from the contextual vagueness and the fuzziness bequeathed by a researcher's methodological and perceptual weaknesses could help address the challenges mentioned earlier.

The remainder of the paper is structured as follows. We present Markusen's core arguments in the first half, followed by our analysis, summarizing the critical debate generated afterward. The second part presents the prevailing methodological practices in academia to assess the significance of the concerns raised by Markusen decades ago. The paper concludes with a detailed discussion on contemporary approaches and the conclusion.

3.3 Markusen's Regional Studies and Fuzzy Concepts

Markusen reviewed three bodies of regional studies: flexible specializations, world cities, and cooperative competition in industrial districts (Markusen 2003). She evaluated the studies on the conceptual approach and empirical and policy dimensions of the problems investigated in each work (Markusen 2003).

Markusen based her argument on three fundamental aspects of regional and urban development studies: contestation of phenomena, empirical evidence to support the concept, and collective action to deal with problems under investigation. According to her research, most of the work carried out after the mid-1980s to 2000 was uncontested and based on "fuzzy concepts" with no or minimum evidence (Markusen 2003, p. 702). Markusen grounded her criticism based on the implications of these studies and further discussed some of the reasons that led to such practices in regional studies. As per Markusen, fuzzy concepts lack clarity primarily due to insufficient evidence and excessive reliance on predefined methodologies and conventional systemic connections rather than contextual relationships between institutions, agents, and behaviors. Such contextual disconnect could lead to difficulty in understanding and operationalizing theoretical concepts (Markusen 2003). Furthermore, research conducted under operational constraints and methodological preferences, such as accessibility and proximity focused, will limit the policy impacts that favor one region over others (Markusen 2003).

Markusen classified various types of fuzziness. The concepts can be fuzzy simply because they are bad concepts or used differently by different audiences (Markusen 2003). She also mentioned the unintentional fuzziness due to political and market power to influence the narrative. She provided an example of the concept of "sustainability" as a political bias (Markusen 2003, 704). However, the author did not outrightly reject the work carried out since the mid-1980s. Instead, she emphasized that researchers pay attention to the fuzziness of concepts. She also agreed that these concepts may develop and mature over time but that it is equally possible to be distracted from the core issues in finding an appropriate solution (Markusen 2003).

Markusen relies mainly on her belief that institutions, actors, and behaviors are the key drivers of an urban environment. She argued that the overemphasis on the process alone, as practiced, led to a disconnect from political and policy advocacy (Markusen 2003). Therefore, she emphasized the inclusion of political, policy, and planning dimensions into regional studies, greater conceptual clarity, and increased depth of relevant evidence (Markusen 2003).

Markusen also highlighted several motivations behind these approaches. Primarily these motivations are based on the researcher's approach and methods in conducting the research, such as choosing qualitative case studies to avoid statistical analysis, representation, and generalizability (Markusen 2003). She further highlighted that the choice of methods influenced by operational, resource, and accessibility constraints could affect the output quality. She provided an example of differences in the researcher's conclusion while studying the same phenomena, such as cooperative competition. Differentiating outcomes might result from ignoring certain actors or behaviors that could have a significant impact on the system (Markusen 2003). Table 3 presents a summary of her arguments.

Table 3: Fuzzy concepts in regional studies

Conceptual Approach (Contestation)	**Empirical Evidence (Relevance and Quality)**	**Policy Application (Operationalization)**
Fuzziness	Vague evidence	Lack of integration
Lack of clarity	Data availability	Ignoring relationships

Theoretical evolution	Data quality	Interdisciplinary compatibility
Industry relevance	Data bias – political influence	Inconsistency
Bias-political/market	Research operational constraints	
Bias-researcher	Preference of study area	
Methodological preference		

Source: Adopted from Markusen (2003).

3.4 The Old Debate

Responding to Markusen's critique, Gernot Grabher and Robert Hassink initiated a public debate (Hudson 2003). They invited researchers from regional studies to respond to her contributions. Consequently, this article reviewed three significant contributions from Arnoud Lagendiji, Jamie Peck, and Ray Hudson. We have also included Markusen's preceding response to her critics. All three authors - Arnoud Lagendiji, Jamie Peck, and Ray Hudson - have praised her work by agreeing with most of her arguments, but they have also shown some reservations. There was a consensus on her methodological preference of a quantitative approach for developing theories (Husdon 2003; Lagendijk 2003; Peck 2003).

Lagendijik agreed that the standards were slipping in the regional studies and pointed out the lack of academic standards of communication and knowledge sharing between the different fields (Lagendijk 2003). Whereas Peck (2003), to some extent, agreed that there was an overuse of qualitative methods, he did not agree with Markusen on the comparative uselessness of qualitative methods such as interviews. In contrast, Peck considered that many studies used interview methods quite responsibly. he also did not accept the intended and systematic shift in the methodological malpractices, as suggested by Markusen (Peck 2003).

Similarly, both Hudson and Peck agreed to the methodological issues that needed critical review in regional studies, but they did not outrightly reject the usefulness of a case study and

qualitative research (Husdon 2003; Peck 2003). According to Hudson (2003), Markusen's approach to political inclusion was "misconceived" (p.741). Both traditional theory and political economy might achieve political inclusion (Husdon 2003, 741). Hudson did somewhat agree with Markusen on the definition of fuzziness (the concepts that lack methodological rigor or possess political bias); however, he did not agree with her emphasis on validity and replicability (for instance interviews) as the basis for establishing a "one-to-one" relationship between the concept and the evidence (Husdon 2003, 743). Similarly, Hudson agreed to her call for more inclusion and applicability of the theory. Still, he disagreed with her approach to differentiating between process and links to agents because the process itself is the specification of internal and external links (Hudson 2003). Both Hudson and Peck appreciate Markusen's emphasis on the role of a concept. However, they further advocated emphasizing a contextual dependency and differentiating between the traditional and critical conception (Hudson 2003). Additionally, Hudson argued that the analyst's responsibility is to conclude based on the context (Hudson 2003).

In her response to the above critiques, Markusen once again voiced her concern about the "growing contempt of empirical work" and the lack of interdisciplinary linkages (Markusen 2003b, 748). Replying to Lagendijk's approach to inter-disciplinary communication, she argued that instead of selective use and exclusion of networking, a conversation should include stakeholders from practitioners, institutions, and communities (Markusen 2003b). She disagreed with the objection raised by all three critics on preferring the quantitative approach over the quanlitative. Conversely, she intended to segregate the utility and the role of data between qualitative and quantitative methods (Markusen 2003b). She again questioned the reliability of the construction of data due to the lack of methodological explanation. She emphasized the usefulness of secondary institutional data while underlying her concern regarding the institutional influence and the researcher's motivations behind the data generation (Markusen 2003b). Markusen further clarified Hudson's misunderstanding about her approach towards replicability (research design & methodology) in qualitative work should be more methodologically transparent with improved standards like quantitative evidence (Markusen 2003b). I have discussed QCA in detail to elaborate further on standardization of qualitative research to achieve methodological transparency and replicability.

3.5 Summary of the Debate

Starting with Markusen's core argument of isolating research from the policy pressures will form a fuzzy concept that will lead to difficulty in providing evidence (Markusen 2003). A lack of evidence will lead to accepting a "fuzzy concept and misguided policy" (Markusen 2003, p. 713), asking for studies with a contextual relationship to develop better policies. The growth and development of complex systems incorporate different social processes, interdisciplinary links, and differentiating disciplinary perspectives (De-Paula and Dymski 2005). Therefore, a single facet approach will be unable to capture the continuously changing whole. As stated by various researchers, there is no one way and no need to establish a singular concept or theory for development. In this approach (De-Paula and Dymski 2005; Rowe 2008; Pike et al. 2011), concept development seems to be a more evolutionary process to reach a conclusive theory or to make it operational, validating Markusen's call for collective action to deal with multidisciplinary fields such as regional studies.

Georgescu-Roegen's philosophy of the "arithmomorphic" and "dialectical" concepts distinguish these distinct and overlapping concepts (Georgescu-Roegen 1971, p. 44). However, a discretely distinct concept opposes the notion of an evolutionary process (Grabher 2006). An evolutionary process may not be decomposed into discrete components by ignoring the interdependencies (Whitehead 1938; Georgescu-Roegen 1971).

Although various fields of sciences have drawn results from each other, increasing isolation and departmentalization of multiple domains result in a "patchwork" of empirical investigation (Whitehead 1938, 131). Markusen's point seems quite valid (i.e., concepts are a generic and mandatory part of the evolutionary process), but it is being compromised by academia due to different constraints and motivations. For instance, methodological and ideological favoritism, subjective preferences, and political alignment may lead to invalid perception, biased valued judgement, and distortion of facts may end up with a misleading result (Clark & Winegard, 2020; Cornwell, Jago, & Higgins, 2019). (Honeycutt & Jussim, 2020).

A question raised by Pike, Rodriguez, and Tomaney (2011): "Does such a diverse and varied conceptual and theoretical backdrop allow academics and policymakers simply to pick the theories to suit their interests and justify their interventions?" (p.4). Instead, broad and interdisciplinary studies need to incorporate contested concepts by opening theoretical dialogues (Pike et al. 2011). Similarly, Sheppard and Plummer (2007) advocated for a diverse "engaged pluralism" for meaningful and

inclusive regional studies (p.2545). This approach encourages the inclusion of multi-agent models and multi-dimensions of politics, power structures, and dimensions of local normative values to develop an inclusive framework for local and regional development.

In local and regional development, context plays a crucial role in defining policy intervention, but, as noted by Beer (2008), "not all growth strategies work in all circumstances" (p. 85). Whereas, in a geographic context, development and growth profile is highly dependent on aspirations, institutional and governance structure, and other strategic dimensions (Pike et al. 2011, p. 4). Edwards (2007) advocates understanding shared characteristics to evaluate causes and solutions, "since they are increasingly integrated across borders and disciplines and revolve around common if differently-experienced patterns of change and the capacity to control it" (p. 3). He emphasizes conceptual and methodological coherence, which was lacking in regional studies, highlighted by Markusen.

The theory of sustainability and sustainable development is one of the examples of theoretical evolution. Strangely, the concept of sustainability was considered a political buzz by Markusen. It might be because when Markusen wrote the article, the theory of sustainability was still undergoing academic scrutiny. However, in subsequent years, the conceptual evolution of sustainability has been quite evident. The concept of sustainable development has extended beyond its deep-rooted quantitative and economic focus to include social and environmental dimensions with a more qualitative approach towards human wellbeing (Geddes and Newman 1999; Stimson and Stough 2008). Additionally, the initial unilateral approach of sustainability emphasizing the physical environment adopted a more cohesive approach by incorporating economic and social aspects of development (Jonas et al. 2011; Christopherson 2011). As Morgan (2011) said, "Despite its fuzziness as a concept, or perhaps because of it, the principle of sustainable development has resonated around the globe, being equally applicable in the global North as it is in the global South" (p. 87).

From the discussion above, we suggest two forms of fuzziness; inherited and bequeathed. Inherited fuzziness is mis-conceptualized by a researcher while studying the contextual configuration of a case under investigation. In contrast, bequeathed fuzziness is associated with methodological and perceptional ambiguities that influence the research process. Inherited fuzziness is embedded in the contextual configuration of a case under investigation, such as non-deterministic conditions associated with complex and dynamic circumstances. A researcher passes on bequeathed fuzziness due to methodological weaknesses and the researcher's bias that could influence the conceptual interpretation

and the research outcome. The following section discusses the relevance of conceptual fuzziness to multidisciplinary qualitative research, theoretical evolution, and methodological development to address inherited and bequeathed fuzziness.

3.6 Inherited Fuzziness, Theoretical Evolution, and Methodological Development

Fuzzy concepts primarily deal with uncertain conditions due to a variation of conditions and the lack of precision to evaluate and quantify. Such complexities, associated with multidisciplinary and multicriteria research, could influence the researcher's conceptual understanding of the matter under investigation. Fuzzy theories combined with multicriteria decision-making can address non-deterministic conditions to address uncertainties. Stojcic et al. (2019) reviewed 108 papers published between 2008-2018 in sustainable engineering in urban development and energy-related fields. They concluded that decision-making research is primarily reliant on the theories of uncertainty (e.g., fuzzy sets, grey, and neutrosophic theories). The complexity of the integrated problems forces researchers to use more "flexible and simpler methods ignoring multicriteria requirement of the subject (Stojcic et al. 2019, p.18).

Zadeh (1965) was the first to introduce the fuzzy set theory to address vague and uncertain information. The theory facilitated the representation of human knowledge, quantifying fuzzy information through rules and linguistic values. Later researchers, such as Pawlak (1982), Atanassov (1986), and Smarandache (1998), further enhanced the conceptual approach to quantify qualitative variables, weighting criteria, ranking alternatives, membership criteria, and decision-making preferences. Various qualitative methods such as Qualitative Comparative Analysis (QCA) adopted fuzzy set theory successfully. This paper discusses QCA methodology in detail, including the basic concept, application, limitations, and best practices.

QCA is a methodological approach defining data analysis techniques to deal with conceptual vagueness and fuzziness (Schneider and Wagemann 2010). QCA uses fuzzy set theories to combine cases and conditions to represent vague knowledge and quantify causal relationships to generalize the analysis (Kaya et al. 2019; Roig-Tierno et al. 2017). Historically, QCA has been more popular in politics, business, economics, and sociology. However, since 2010, the methodology has gained attraction from other regional and energy planning (Roig-Tierno et al. 2017) and sustainable development (Dang et al. 2019).

Comparative case analysis provides a robust interpretational base to address its complexity and contextual uniqueness (Ragin 1987). QCA enables planners to draw lessons to facilitate evidence-based multilevel policy interventions (Hamidov et al. 2015; Verweij and Trell 2019). QCA methodology sits well within complexity theory due to its sensitivity to context, bridging the gap between quantitative and qualitative analysis, and addressing the conjunctural causation (Verweij and Trell 2019).

However, some methodological concerns could impact the outcome of QCA methodology. QCA is sensitive to the configuration of cases and their conditions (Schneider and Wagemann 2010). Additionally, outcomes' logical explanatory power and connection to case configurational conditions are the critical concerns of QCA methodology (Jordan et al. 2011). The interpretation of these relationships is subject to the researcher's description and understanding. Furthermore, understanding outcomes is also subject to the audience's relevance and knowledge (Gerrits and Verweij 2018).

There are a number of ways identified in the QCA literature to improve qualitative research. QCA emphasizes methodological knowledge and the researcher's familiarity with the case and conditions under investigation (Schneider and Wagemann 2010). It is also imperative to ensure the logic and relevance of the proposition (Roig-Tierno et al. 2017). Another critical aspect is the methodology, data reliability, and replicability. QCA recommends using multiple methods and multiple datasets to ensure the reliability of results (Roig-Tierno et al. 2017). Furthermore, a clear description of the methodological process, data processing, and analytical emphasis is necessary to ensure replication of the study (Schneider and Wagemann 2010; Roig-Tierno et al. 2017). Another important aspect is to maintain QCA qualitative focus. Researchers should avoid excessive use of quantitative statistical approaches not to lose the qualitative component of the QCA (Schneider and Wagemann 2010). Schneider and Wagemann (2010) have proposed standards of good practices for QCA adopting fuzzy sets. These standards are regenerated and presented in Table 4.

Table 4: The standards of good practices for QCA

Pre-conditions and Methodologies	**Analysis and Presentation**
Multi-case and Multi-conditions	**Analysis and Interpretation**
Familiarity with cases and characteristics	Priority of analysis
Relevance	Multiple solution formula

Parameter selection	Choice of solution formula (center of interpretation)
Interpreting results	Occurrence and non-occurrence of the outcome
Valid causal relationships	Exploratory - Dialogue between ideas and evidence
Explicit and justified – Selection and rejection, scope conditions, causal relationships	Degree of complexity and precision
Balance between cases and conditions	Logical equivalence
Explicit Justification	Limited diversity
Multi-method and multi-data	Link to the case and the theory
Causal relationships	Avoiding contradictory simplified assumptions
Comparison – similarities and differences	Intimacy
Description of methods used	Avoiding overinterpretation & superficial statistics
Sufficient and necessary conditions (Variables)	**Presentation**
Re-specification and adaption	Case- and conditions-oriented aspects
Calibration – Quantification of conditions	Relationships
Appropriate threshold	Reflecting data and methodological structure
Consistency and Coverage	Theoretical relevance
Research and theoretical specificity	Generality and functional argument
	Narrating causal links
	Connection between empirical results and theory
	Providing datasets and solution formulas

Providing consistency and coverage measures

Source: Adopted from Schneider and Wagemann (2010)

The objective of the standards developed by Schneider and Wageman (2010) is to standardize the methodological process in qualitative comparative studies through validity, reliability, and replicability. Adopting standard practices of explicit case justification, prior knowledge, data calibration, data consistency and coverage, empirical justification, dialogue between idea and evidence, multiple outcomes, theoretical relevance, generality, and replicability can ensure the outcome (Schneider and Wagemann 2010). Although it is impossible for every publication to meet the high standards proposed for QCA methodology, methodological consistency and quality awareness will facilitate standardized methodological practices (Schneider and Wagemann 2010).

The discussion above shows that significant work has addressed the configurational complexities associated with the case study. Such methodologies can help reduce the conceptual fuzziness inherited due to the contextual complexity or the researcher's inability to interpret the configuration of the case under investigation. The fuzziness generated by the researcher's methodological approach and political bias, as highlighted by Markusen (2003), is thoroughly reviewed in the next section. We will also review the adaptability of standard practices discussed above and their relevance to multidisciplinary and interdisciplinary qualitative studies in the next section.

3.7 Bequeathed Fuzziness and Prevailing Practices

Energy and urban structure are highly integrated, and efficiency will vary with geography, urban size, urban design, land use, building design, urban design, transportation system, energy distribution system, and social behavior (Ratti et al. 2005). For instance, the connection between access to energy, poverty, and wellbeing is influenced by different aspects, such as available infrastructure, socioeconomic conditions, and local climate conditions. They make the connection highly contextualized and configurational (Jessel et al. 2019). Similarly, determinants of energy poverty vary with geographical scale due to its complex interaction with the social landscape, built infrastructure, natural environment, and institutions (Mashhoodi et al. 2019). Research based on the analysis of a single energy-related experience or intervention lacking spatial connection will lead to weak policies and plans (Pascali and Bagaini 2019). Inefficient integration of energy and spatial planning affects the efficiency of policy designs (Zanon and Verones 2013).

Researchers have acknowledged uncertainty in the energy-related decision-making environment (Zavadskas et al. 2016; Wu et al. 2018). Uncertainties exist in selecting criteria, reliable weightage, and the relative balance between the variants (Xu 2020). Researchers (Gore et al. 2018; Mosier et al. 2018) have endorsed adopting a multidisciplinary approach in research methodologies and theories to address complexities in decision making in a sociotechnical environment. However, limiting energy planning to sectoral research and ignoring energy-spatial research has led to a widening gap between theory and practice (Pascali and Bagaini 2019).

The transformation of research into practice is subject to theoretical and practical evolution through knowledge sharing and comparison of well-known procedures (Booth 2014). Lessons learned are essential for policy translation; however, valuable lessons are subject to good practices in research. Verweij (2019) found that qualitative comparative research did not always follow good spatial planning research practices. We further discuss some of the research limitations that have dealt with the integrational and contextual complexity of interdisciplinary fields. Our focus is on the literature of conceptual and methodological vagueness and policy integration that could influence both the research outcome and the lessons bequeathed.

The sources of conceptual vagueness identified by Markusen (2003) revolve around conceptual and theoretical biases. Sociotechnical studies often rely on the configuration of conditions, and causal directions are often ambiguous. From the researcher's perspective, these ambiguities grow due to the methodological standards and the researcher's ideological perception. This professional ideology could lead to overconfidence and potential insensitivity to alternatives and counterarguments (Clark and Winegard 2020). Clark and Winegard (2020) evaluated the ideological influence of social studies and highlighted two types of favoritism: methodological and ideological. Methodological and ideological bias influences the researcher's selective exposure and selective avoidance (Clark and Winegard 2020). Ideological influence inherited from professional closeness influences the researcher's preferences and valuation, leading to a distortion of reality, invalid perception, and misleading outcomes (Cornwell et al. 2019). Honeycutt and Jussim (2020) further added that a political bias could deviate research objectives, distort facts, and mislead results. A masked interpretation can also gain prejudiced theoretical, methodological, and practical scoring by achieving specific ideological and political alignment (Jussim et al. 2016).

Other primary concerns are exaggeration and stereotyping. The researcher's preferences, contextual narrative, selection of variables, and emphasis on selective outcomes will influence the results. For example, in racial studies, ignoring or controlling certain pre-existing conditions of the study groups (Stoet and Geary 2012) and misleading proxy measurements (Reyna 2018) will provide a misleading interpretation. Similarly, ignoring alternative hypotheses only because they will negate a particular group's beliefs leads to biased outcomes (Clark and Winegard 2020).

In another example, studies criticized Ewing and Rong's (2008) work for selective exposure and ideological interpretation. Their research has used housing size, housing type, and density to statistically analyze the impact on energy consumption. Staley (2008) and Randolph (2008) reviewed the study regarding methodological and data legitimacy, interpretation, and ignoring critical factors. Randolph (2008) indicated weakness in the data and methodology due to missing variables such as technological interventions, market-based alternatives, policy choices, household energy behavior, and other demographic factors such as quality of life and social choices. Randolph (2008) further added that the conclusion derived through the selective use of variables and ignoring alternative hypotheses would be misleading for policy designs. For instance, the decisive conclusion that low-density houses are more energy-intensive and the recommendation of high-density development could be misleading (Randolph 2008.

Furthermore, Ewing and Rong framed their study from an environmental perspective (Randolph 2008). Additionally, Staley (2008) criticized the legitimacy of the methodology used and the conclusion drawn. The study's quantitative analysis based on unrelated data sets rendered their conclusions doubtful. Furthermore, they overlooked other crucial aspects such as travel behavior, housing envelops, and appliances energy performance. Alternative methodological options such as engineering analysis could show more meaningful results. Descriptive analysis with an absolute statement is also misleading in the absence of a range of crucial factors such as house and household size, levels of efficiency, and behavior (Staley 2008).

Schlogl and Stutz (2019) pointed out methodological and data deficiencies, such as precision, accuracy, reliability, and spatial and temporal uncertainties in their review of data uncertainty. Their work highlights multiple data discrepancies such as accidents under-reporting, damage estimation, and differences in reporting through the use of numerous methods (Schlogl and Stutz 2019). In another attempt to achieve methodological representativeness in assessing energy access, Seuret-Jimenez et al.

(2020) proposed a fuzzy logic methodology. However, their study was based on three variables - transport, cooking fuel, and electricity expenditure - while ignoring socioeconomic, environmental, and behavioral factors. Furthermore, using a single data source and a single unit of measurement completely neglected the possible data reporting discrepancies and alternative units that may have shifted the focus. Although the study has acknowledged the limitations, the decisive conclusion of achieving representativeness may not be justified, especially when fuzzy logic is highly sensitive to the configuration of conditions.

Multidisciplinary subjects, such as spatial and urban planning, urban resilience, and energy planning, require a system's approach and multicriteria evaluation to deal with sociotechnical uncertainties (Gore et al. 2018; Fu and Wang 2018). As discussed earlier, normative and functional trade-off addressing socioeconomic and environmental objectives will not be easy without an integrated system investigation. A system's approach may not be free from bias but it will ensure convergence of multidisciplinary knowledge. However, methodological and scope inconsistency holds back any concluding argument about the relationship between intradisciplinary integration such as urban form and energy use (Ko 2013) and integrated urban resilience (Fu and Wang, 2018). Ko (2013) reviewed the literature on methodological trends in evaluating the effects of urban form on energy use. He found a dominating behavior of prioritizing a data simulation method over an experimental or statistical analysis. The methodology provided easy control on variables and less reliance on primary data. Similarly, Verweij and Trell (2019), in their comprehensive literature review on spatial planning, found that the researcher's objective is often missing or vague.

In general practice, researchers spend 80 percent of their time cleaning data (Schlogl & Stutz, 2019; Wickham, 2014). However, most works fail to provide comprehensive information on methodologies adopted in data processing and their implications on the analysis (Wickham, 2014). Researchers have warned of using raw data without considering their characteristics and limitations that could lead to biased interpretation (Schlogl and Stutz 2019). Furthermore, the lack of methodological and data processing descriptions will make it difficult for readers to assess the reliability of the process adopted and the quality of the outcome. This problem will make a study or a methodology impossible to replicate that would fail the objective of knowledge transfer and methodological evolution.

To assess the adoption of QCA best practices, as discussed in the previous section, Verweij and Trell (2019) conducted a comprehensive literature review from the perspective of spatial planning research. They found that most of the studies had failed to comply with the criteria set by Schneider and Wagemann (2010). For instance, less than 50 percent of the studies had applied QCA in combination with other quantitative or qualitative methods; and only 42 percent had used multiple data types for calibration. Similarly, 58 percent of the studies did not analyze the necessity of the conditions (Verweij and Trell 2019). This failure reduces the clarity over research objective and contextual relevance (Schneider and Wagemann 2010). The quality assessment of the studies was also quite difficult because nearly 42 percent of the studies did not report consistency scores.

Similarly, more than 70 percent had reported only one solution type, making it difficult to assess how they reached their conclusions (Verweij and Trell 2019). Lack of descriptive evidence of multiple outcomes could lead to a wrong interpretation that may contradict the theoretical evidence (Schneider and Wagemann 2010). According to Verweij and Trell's (2019) review, over 50 percent of the studies failed to report the raw data. Additionally, vague or lack of information on calibration rules adopted in the study will further question the reliability of the data (Verweij and Trell 2019). In this scenario, the quality of the data and the conclusion drawn will reduce the research reliability, validity, and replicability (Schneider and Wagemann 2010). Although complete elimination of uncertainties is impossible, case configurational clarity, methodological best practices, and reporting description of data, and steps taken to process the data are very vital for knowledge transfer and utility (Schlogl and Stutz 2019; Schneider and Wagemann 2010). Adherence to methodological best practices will ensure research quality and reduce the risk of bequeathing fuzziness.

In addition to bequeathed fuzziness, a theoretical inconsistency, methodological constraints, and ideological bias may not produce results capable of guiding policy design to solve context-specific issues. For instance, most of the methods and frameworks considered in the resilience literature cannot assess the integrated urban system, nor may not be able to guide integrated decision making (Fu and Wang 2018). Similarly, Markusen (2013) has criticized the indicators-based assessment due to its conceptual fuzziness and reliance on irrelevant proxy data. For example, in creative placemaking research, an evaluation based on research conducted in different circumstances and proxy data cannot justify the varying conditions. In addition to contextual variation, people's value judgment will also vary from place to place. Therefore, generalizing indicators based on case studies would not capture the dynamic socioeconomic structure and geographical variations (Markusen 2013). She further added

that it would be better to commit to honest evaluation with increased coordination and technical assistance. Generally, studies avoid tailored evaluations due to budget constraints (Markusen 2013), and any intervention lacking contextual connection may lead to a weak policy design (Pascali and Bagaini 2019). However, the level of scope and complexity involved in multidisciplinary spatial studies requires knowledge to build on previously studied cases. Comparative studies can thus facilitate the knowledge sharing and translation of research into actions by evaluating contextual and operational similarities between cases. Furthermore, comparative studies built on historical knowledge will help to address scope and complexity challenges and address methodological and conceptual weaknesses in multidisciplinary qualitative research (Booth 2014; Verweij and Trell 2019).

3.8 Conclusion

We would agree with Markusen's call for collective efforts and Grabher's approach to encouraging constructive linkage and dialogue to promote inclusive spatial studies rather than developing a singular solution (Markusen 2003; Grabher 2006). Standalone studies, relying on an isolated context, may not be instrumental in resolving interrelated issues and contextual challenges of sustainable development (Roig-Tierno 2017). Contextual variation, resource limitations, and institutional bias coupled with the discrete concepts and methodological discrepancies have undoubtedly influenced both past and present academic literature (Wickham 2014; Verweij and Trell 2019; Schlogl and Stutz 2019). However, conceptual fuzziness does not stop the evolutionary process. For instance, the concept of sustainable development is one of the great examples that have evolved out of a limited scope of the environment and corporate social responsibility to a more cohesive principle of development equally applicable across the globe and generations (Bansal and Song 2017). However, a conceptual variation in sustainable development, due to contextual differences, operational constraints, and uncertainties in the decision-making process, poses a challenge for a standardized research methodology (Verma and Raghubanshi 2018). The methodological approaches in sustainable development and other multidisciplinary studies are going through an evolutionary process. In addition to methodological standards, another challenge posed by the credibility of the outcome has resulted from research produced under the influence of ideological bias, perception of choice, and prejudiced interpretation (Clark and Winegard 2020).

Political and operational interventions based on ideologically biased opinions would waste resources and create polarization. The negative consequences result in losing the public's confidence in

expert knowledge and impartiality (Clark and Winegard 2020; Nichols 2017). Honeycutt and Jussim (2020) proposed a model to detect ideological and political bias in research. Analyzing research questions, measuring bias, interpretation, repression of ideas and conclusions, influence on citations, and canonization of research findings are the model's bases (Honeycutt and Jussim 2020). Further complying with the best practices, researchers should enhance reliance on self-creativity, consciousness, analysis, and adaptability, leading to the consistency of the mindful advancement of the methodological process (Clark and Winegard 2020; Schneider and Wagemann 2010).

This review article has provided an overview of the dominating practices in multidisciplinary qualitative research. As interpreted by Markusen (2003), the conceptual fuzziness is due to the lack of clarity, relevance, and researcher bias. However, Stojcic et al. (2019) also define fuzziness as uncertain conditions associated with the scope under research. For conceptual clarity, we need to differentiate between inherited and bequeathed fuzziness. Inherited fuzziness can come from non-deterministic states of the case under investigation, whereas methodological weaknesses and researcher bias create bequeathed fuzziness. The former has significantly evolved theoretically and methodologically, such as fuzzy concept theories and qualitative comparative studies. However, standardization of methodologies to address methodological vagueness still needs integrated efforts to overcome bequeathed fuzziness. The fuzziness produced due to lack of conceptual and methodological clarity, a paucity of explicit reasoning of choices, vague evidence, and the researcher's ideological bias could influence the quality of process adopted and results produced. Methodological weaknesses highlighted decades ago persist in interdisciplinary qualitative research. Despite efforts made to standardize qualitative research methodologies, such as the standards of good practices for QCA proposed by Schneider and Wagemann (2010), the challenges of conceptual fuzziness continue to exist due to ideological bias, choice of inclusion and exclusion, operational constraints, data quality, and prejudice interpretation. Politically and professionally influenced research to achieve preconceived objectives can distort facts and mask interpretation (Jussim et al. 2016). Recently, Honeycutt and Jussim (2020) have proposed a model to detect systematic political bias in social science research. However, the model needs a comprehensive review of academic and publication standards and processes. For independent and cognitive evaluation of reality, it is necessary to keep researchers free from undue pressures exerted by institutions, peers, and superiors (Clark and Winegard 2020). Hence, conceptual fuzziness needs to be addressed from both theoretical and ethical aspects.

In this review, we have highlighted challenges and responses to qualitative research in the past and present. It is evident that multidisciplinary approach is vital to achieve normative and functional balance in a complex urban environment which will keep qualitative research at the core of policy investigation. It may not be possible to completely eradicate political and professional bias but a methodological rigor and a unified ethical standards would help to achieve informed policy decisions. Future research is recommended to systematically investigate common themes adopted in qualitative research to propose a unified framework that can be adopted across disciplines.

MANUSCRIPT END

Chapter 4

The Challenges and Opportunities of Localizing the Sustainable Development Goals in Canadian Cities – A Subsidiarity Check

In an urban environment, governance policies and institutional structure play a critical role in managing economic growth and balancing socio-economic and environmental objectives. Political motivations and operational capacity vary geographically, defining the pathways to sustainability (Morgan, 2011; Brundtland, 1987). Consequently, the complexity of the housing sector and significance of its role in achieving sustainable urban development made housing adequacy and affordability difficult to achieve. The prevailing functional and operational structure of housing system has failed to address diversity of housing needs, geographic and economic variation, balancing priorities of public and private actors, and resolving capacity challenges to delivery affordable housing at local level (APPG, 2013; Hilber & Schoni, 2022; Wetzstein, 2018).

In new political dynamics, the role of a state, in terms of power to purchase and capacity to mobilize resources, became significant in the sustainability transition (Healy & Morgan, 2012; Hudson, 2007). Human relationships with built and natural environments are more about politics than technology. For instance, political awareness and contextual circumstances influence political priorities in a continuously changing political power configuration at the upper and lower tiers of governance. Therefore, the social dimension of politics determines socioeconomic dimensions of sustainable development. For instance, the policy outcome of the micro-politics of land use and environmental regulations, the most recognized political aspects, can still not determine victim and victor (Christopherson, 2011). Similarly, it is believed that regulated land use undermines the ability of local economies to grow, in contrast to the belief that the economy depletes the environment when it grows (Portney, 2013). The regulatory environment is also believed to provide innovation opportunities (Healy & Morgan, 2012). However, balancing socio-economic and environmental needs, such as housing by increasing the supply and protecting the environment with land-use regulations, will always be challenging for policymakers (Portney, 2013).

Institutions' capacity to think and act determines pathways to sustainable urban development. Urban functions operate in a tightly knit system of institutions, knowledge-sharing, policymaking, operations, technology, and data management. In a multilateral and multi-dimensional environment, policy development and performance evaluation would not be accessible at all. There is no question

about the importance of all urban stakeholders. However, their functional role, operational capacity and jurisdiction would determine their influence on the outcomes. For instance, financial institutions can create a cohesive relationship between business objectives and positive social and environmental outcomes by facilitating investments in social and efficient housing (Weber & Feltmate, 2016). Similarly, significant to human prosperity and the environment, housing development is not a unilateral subject. It is subject to local government's economic and geographic circumstances and their relationship with upper tiers of government in securing efficient policies and resources to meet sustainable housing objectives.

Sustainable development is to achieve inclusive, safe and resilient urban growth. Local governments around the globe have adopted different methodologies to plan and act on sustainability agendas. However, the complexity of urban functions and contextual diversity makes it challenging for urban governments to assess their progress towards sustainability. SDGs provide a comprehensive and integrated framework to facilitate local governments to set their goalposts (Kanuri, Revi, Espey, & Kuhle, 2016; Parnell, 2016). However, the multiscale and multi-dimensional broad scope of SDG indicators makes it methodologically complex (Allen, Metternicht, & Wiedmann, 2019). SDGs require a systemic approach to achieve horizontal and vertical integration of policies (Kanuri, Revi, Espey, & Kuhle, 2016; Parnell, 2016).

Some of the methodologies, such as SDG indexes, dashboards, and SDG nationalization and localization, serve as a facilitation tool to examine and track the status of sustainable development goals at all tiers of governance (UNDP, UN-Habitat, GTF, 2015). The definition and development of indicators rely on political objectives and economic structure. However, the indicators of operational problems are associated with policy development, policy accumulation, local operational capacity, and the functional jurisdiction of local governments. Furthermore, the success of goals and targets is subject to responding efficiently to the rapidly evolving urban environment. Without efficient data collection, analysis, and reporting mechanisms, it would not be easy. The reality check is that the local government is struggling with the availability of standardized data, data collection institutions at the city scale, and stakeholder proprietorship (Klopp & Petretta, 2017).

In such cases, the role of local government is crucial in localizing SDGs and achieving sustainability targets. However, local government's performance relies on operational capacity and their functional and policy mandate. Cities are good at knowing local circumstantial challenges and

opportunities (Klopp & Petretta, 2017; Graute, 2016). However, to what extent they can capitalize on the local information depends on local government clarity over applicable jurisdiction with corresponding power to develop and implement locally relevant policies (Tremblay et al., 2021). Although cities are keen to pursue sustainable agendas, a research gap persists in determining why and how cities are engaged in localizing SDGs (Fox & Macleod, 2021; Leavesley, Trundle, & Oke, 2022). Furthermore, a comprehensive review is required to assess the methodology and theoretical framework appropriate to implement and monitor global and national goals utilizing local data while safeguarding local objectives (Fox & Macleod, 2021).

In this chapter, we have conducted a case study to assess local governments' response to the global call on sustainability and the opportunities and challenges they see in localizing sustainable development goals and affordable housing. Municipalities are host to some of the most significant sustainable development challenges in Canada, such as climate change and affordable housing, while also representing an impressive potential for instigating action on the SDGs. Considering the vast difference between municipalities' socio-economic conditions and governance structures, it is necessary to have an opinion of the various size of municipalities across Canada. The objective was to understand municipalities' administrative approach to SDGs, localization, value judgment, barriers to affordable housing, and operational and governance constraints.

The research adopted a qualitative approach to get feedback from municipalities' administrative and technical leadership. The study then reframed voluntary local reviews as the application of the subsidiarity principle to the SDGs (as global goals), using the study as an investigation into the challenges of applying this principle in Canadian cities. Because sustainable development is so multi-dimensional (including services often outside the jurisdiction of Canadian municipalities, demonstrating how the governance structure of Canadian municipalities is a challenge) and requires capacity that the cities do not have (often requiring support from higher levels of government).

The additional objective of the interview was to assess the utility of the SDGs Cities Index in charting municipal progress on the SDGs, identifying recommended modifications to the SDG Cities Index for the next iteration, and discussing the challenges and opportunities in SDG localization.

The outcome of the interviews was assessed from the perspective of subsidiarity theory. Although participants agreed on a unified and comprehensive framework necessary for the performance

analyses, cities' capacity for developing policies at a local scale, materializing local objectives and performance analysis are vital for the successful adoption of sustainability approaches in the local government ranks. In such circumstances, the subsidiarity principle helped to analyze local policy development and governance structure necessary to localize SDGs. The study is unique from the case study context and the assessment of localizing SDGs incorporating delivery of affordable housing from the perspective of the subsidiarity principle.

As a result, the interview process yielded helpful information and enhanced the utility of the SDG framework. The interviews indicated an overwhelmingly favorable review of the Cities Index and dashboard. That said, one consistent piece of feedback was that, for the index to influence municipal policy, it needed to be based on data commonly recognized as reliable. The Canadian municipalities were motivated and keen to transform to the SDG framework. However, local administrative capacity and expert knowledge have kept them from taking local KPIs to the goal level. Since the emergence of SDGs, the knowledge base has increased, facilitating staff motivation at the local scale. However, individual and disconnected attempts are not enough to achieve the sustainability targets set for 2030. Furthermore, municipalities are facing jurisdictional and resource challenges to deal with affordable housing within their socioeconomic and geographical context. Provinces should take the lead, facilitate overcoming resource deficits, motivate municipalities, and embed sustainable development policies through provincial legislation.

This chapter is adapted from:

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MANUSCRIPT BEGINS

4.1 Abstract

Since the emergence of the Sustainable Development Goals, there has been a growing body of knowledge to support the localization of SDGs in cities. However, localization attempts have so far been heterogeneous and disconnected. The study explored a case study of Canadian cities to localize SDGs and their governance, and operational challenges. The study focused on SDG 11 with an emphasis on housing affordability. The study has assessed localization from the perspective of the subsidiarity principle, which provided a unique context. The study confirms that the localization of SDGs would not be possible with devolution alone. It would require subsidium for lesser associations, proprietorship, accountability and support from upper levels of government to overcome jurisdiction and capacity challenges. In addition, the study confirms that the localization of SDGs and affordable housing requires an innovative approach to dealing with local circumstances and horizontal and vertical relationships. It is also suggested that the localization of SDGs would require a nexus of the subsidiarity principle, place-based policy, and innovation theory. Furthermore, the study clarifies the definitional ambiguity of the subsidiarity principle facilitating its purposeful application in the context of urban sustainability.

4.2 Introduction

Sustainable development involves quantitative economic growth strategies with an equal focus on qualitative aspects of human wellbeing and environmental protection (Mozas-Moral, et al., 2020). Whereas as sustainable urban development and suitable and affordable housing explicitly impact economic growth, public health, and achieve equity and equality (Eker et al., 2018; UN-Habitat, 2016; Yang & Gao, 2022). The role of sustainable economic development in achieving prosperity and wellbeing is well recognized, which in turn helps to accomplish SDGs. Subsequently, it is also well established that the vital role of process and product innovation in sustainable economic development are the key enablers of most of the SDGs (UNCTAD, 2017). The targets set out in the United Nations 2030 Agenda require coordinated efforts at all levels of governance and a willingness to explore new ways and means to achieve inclusive sustainability (Schot, et al., 2018).

Context-driven objectives demand multidimensional and multilateral synergies and tradeoffs that do not possess a simple generic pathway to achieve sustainable urban development. Furthermore, urban complex structure poses a significant challenge to local impact measurement. Therefore, finding a suitable methodology to assess local circumstantial challenges and measurable indicators would come

first to simply finding answers (Pradhan, et al., 2017). Although there is a growing body of SDGs localization literature, knowledge and practice gaps persist in localizing SDGs (Taajamaa, et al., 2022).

In addition to the right policy and appropriate technology, finding solutions for urban challenges wouldn't be easy without broad scale realization of issues and a methodological consensus among the stakeholders (Fox & Macleod, 2021; Oliveira-Duarte, et al., 2021). Generally, a city's continuously evolving and organic structure would require responding to transforming the natural and built environment and changing social behaviors in coordination with a national and global vision of a sustainable future (Alberti, et al., 2019). Considering the dynamics of sustainability and sustainable development goals in an urban context, the localization of SDGs will put governance at the forefront.

Canadian municipalities are keen to transform the SDG framework into local action. However, limited local administrative capacity keeps them from taking local Key Performance Indicators (KPIs) to the goal level. Since the emergence of SDGs, there has been a growing body of knowledge supporting the localization of SDGs in cities. Whereas housing being an integral part of sustainable urban development is the core policy concern for cities around the world (Hilber & Schoni, 2022). However, localization of SDGs and affordable housing policy development have so far been heterogeneous and disconnected (Weitz, Carlsen, & Nilsson, 2018). More research is needed to assess how holistic sustainable development can be met through integrated governance (Taajamaa, et al., 2022). It would require a comprehensive and unified effort to assess the local capacity, challenges, and governance relationship between the tiers of governance in Canada. The situation described above would call for a subsidiarity lens for the localization of SDGs. However, in the literature, the concept of subsidiarity is very limited in the Canadian context (Walzenbach & Alleweldt, 2021; Brouillet, 2011). This paper assesses how Canadian municipalities have attempted to pursue the SDGs given local circumstances, capacities, and governance framework in relation to upper tiers of government.

4.3 Literature Review

4.3.1 Localization of Sustainable Development Goals

The Sustainable Development Goals have shifted the common view of cities as the predominant cause of sustainability issues to viewing cities as catalysts for sustainable development (Zinkernagel, Evans, & Neij, 2018; Parnell, 2016). However, humanity's path to global sustainability is inconsistently measured, commonly misunderstood, and largely unevaluated. Within this space, the

Sustainable Development Goals (SDGs) are a helpful guide toward sustainable development and have been operationalized into over 230 indicators (UN, 2015). However, since their adoption in 2015, tension has emerged in implementing the SDGs. This tension is represented by the imperative to compare aggregated indicator data on SDG achievement and localization at the sub-national level. This tension has illuminated apparent inconsistencies in how the SDGs are monitored and evaluated globally.

The SDGs, specifically SDG 11 (Sustainable Cities and Communities), aim to make cities inclusive, safe, resilient, and sustainable. The targets of SDG 11 are focused on the transformation of cities towards sustainable and resilient societies by providing safe, adequate and affordable housing, and access to basic services. The cities being center of socioeconomic and environmental issues, the SDG 11 emphasizes equity and positive social, economic, and environmental linkage (UNDP, 2016). The SDG also targets the resource efficiency, reduction of per capita environmental impact of cities, mitigation, and adaptation to climate change through integrated and inclusive development planning and implementation (UNDP, 2016). Therefore cities, and housing as a major part of the urban form, holds a prominent role in the achievement of SDGs. The multiscalar and multidimensional scope of the SDG indicators makes them methodologically complex (Allen, Metternicht, & Wiedmann, 2019). They require a systemic approach to achieve horizontal (intercity and interdepartmental) and vertical (levels of governance/authority) integration of policies (Kanuri, et al., 2016; Parnell, 2016).

The SDGs' objectives, implementation, and monitoring at global, national and local levels involve a variety of approaches and methodologies. Some of the methodologies, such as SDG indices and dashboards, serve as facilitation tools to examine and track the status of sustainable development goals at all tiers of governance (UNDP, UN-Habitat, GTF, 2015). The localization of the SDGs is one of the most critical elements for the successful pursuit of sustainability objectives emphasized in Agenda 21 and by the SDGs (1992). However, localization is highly context-specific, requiring localized data and resources to map and measure progress on relevant SDG indicators (Weitz, Carlsen, & Nilsson, 2018; Allen, Metternicht, & Wiedmann, 2019). A locally evolved process would complement and facilitate effective policies and program development decision-making. Due to socioeconomic and geographic differences, most of the data collected at the local level may not be comparable across communities. However, a systematic and standardized approach to data collection and reporting across communities will improve measurability and comparability (Weitz, Carlsen, & Nilsson, 2018). Furthermore, it will help align local and national objectives and performance evaluation

and set realistic local community development targets (Gustafsson & Krantz, 2021; Tremblay, et al., 2020).

Sustainability at a local scale requires aligning local policies and practices to create sustainable growth by integrating social, economic, and environmental goals. The SDGs provide a relevant and comprehensive framework to combine efforts toward a common objective (Gustafsson & Krantz, 2021). Generally, municipalities are more comfortable with their indicators and targets emerging from local process groups (City of Surrey, 2016; OECD, 2016). However, such targets are imperative to local objectives, capacity, and operational constraints and may not align with global standards such as SDGs.

There are several challenges inherent in SDG localization. These challenges broadly comprise the local context's definition, alignment, and measurement of indicators. In addition to socio-economic structure, the definition and development of indicators rely on political will and preferences. Therefore, the localization of the SDGs and their indicators are collectively constrained by the availability of standardized data, lack of data collection institutions at the city scale, and diversity of actors and socioeconomic structures (Klopp & Petretta, 2017).

It has been well-recognized that the local achievement of the SDGs is essential to the universal accomplishment of the goals. Policymakers, however, are likely to face challenges in integrating targets at all tiers of governance, such as the institutional capacity to operationalize indicators, data availability and reliability, benchmarking, consistent reporting, and conflict of interests (Simon, et al., 2015). Agenda 21, a precursor to the SDGs (United Nations General Assembly, 1992), emphasized a multi-sector, multi-level and multi-actor approach to sustainable development. Since adopting Agenda 21, scholars have identified some necessary requisites for localized Agenda 21 actions. These characteristics include a science-policy interface, managing social responses to environmental changes, and integrating long-term objectives in prevailing short-term political and economic structures (Glass & Newig, 2019; Meuleman & Niestory, 2015; Meadowcroft, 2011). These characteristics guide our research to assess local government response to SDGs. Furthermore, cities are more efficient in evaluating local challenges and providing practical solutions to implement sustainable solutions because they can sense and measure local challenges and outcomes better than the upper tiers of governance (Klopp & Petretta, 2017; Graute, 2016). Therefore, it justified our scale of local government to find out the SDG response framework at a local level

To operationalize localization, the local government needs a clear mandate with corresponding powers to develop and implement policies at a local scale (Tremblay, et al., 2021). Furthermore, the localization of SDGs would require upper-tier capital and human resource commitments (Krellenberg, Bergsträßer, Bykova, Kress, & Tyndall, 2019), multi-actor engagement, and enhancing institutional capacity (Kanuri, Revi, Espey, & Kuhle, 2016; Tremblay et al., 2021). Targets developed at a local scale are usually vague due to a defragmented approach and lack of measurability (Valencia, et al., 2019). The uncertainty is due to the complexity of the urban ecosystem, which may not be easy to address by an individual indicator or a composite index (Allen, Metternicht, & Wiedmann, 2019). Similarly, SDG targets simultaneously cut across complex functions and geographies. This situation poses an additional challenge for a single target's cross-functional and jurisdictional management. Furthermore, the operationalization of the SDG framework faces constraints due to service jurisdiction, relevance, and administrative-political alignment of objectives (GTF & UN-Habitat, 2016; Edquist & Espey, 2019; Ho & Runnalls, 2018). Therefore, it would be challenging for local governments to adopt the UN global set of indicators without finding complementary metrics adjusted to local circumstances (Valencia, et al., 2019). However, the targets' multidisciplinary and intra-municipality integration is not very straightforward (Edquist & Espey, 2019). It requires a high level of accountability, transparency, a clear definition of jurisdiction, and allocating responsibilities between all stakeholders. Furthermore, top management commitment would be necessary to initiate multiservice coordination (Jones, 2013; Gustafsson & Krantz, 2021). It would be efficient to build on existing practices to gradually migrate to the SDG framework (Gustafsson & Krantz, 2021; Tremblay et al., 2021). Valencia, et al. (2019) argued that the localization of SDGs is not easy without a thorough review of indicators and processes and acknowledgment of limitations.

A complicated city environment and varying objectives make it more complex to find a suitable way for sustainability transformation. One of the challenges is to negotiate between designing indicators suitable to a political and administrative context that may also cater to scientific objectives (Klopp & Petretta, 2017). Initially, some SDGs, such as climate action, were perceived as global issues to be addressed internationally (Lo, 2014). This opinion might have changed due to increased awareness and proven political and economic benefits on a local scale (Kostka & Hobbs, 2012; Lindseth, 2004). However, the mismatch between global policy frameworks and local realities persists (Wijsman & Feagan, 2019). Professionals and researchers are investigating aligning local targets with the SDG framework, though synergies exist between local indicators and SDG targets (Weitz, Carlsen, &

Nilsson, 2018; Tremblay et al., 2020). However, a combination of reporting platforms and circumstantial challenges and opportunities create a unique context (Lo, 2014). Therefore, a deliberate effort at an urban scale would be required to align localized targets and structure data to align with the SDG framework. For instance, Tremblay, et al., (2021) suggested modifying SDG target labels without distorting their meaning to achieve a more local feel. Similarly, a silo approach restricts vertical and horizontal multiservice integration (Tremblay, et al., 2021). Additionally, SDGs may constitute a normative framework demanding contextualized tradeoffs between multi-varied objectives (Zinkernagel, Evans, & Neij, 2018; Weitz, Carlsen, & Nilsson, 2018). Considering local data management capacity, targets complexity and their relevance to local context would require well-thought-out tools to determine priorities (Zinkernagel, Evans, & Neij, 2018; Tremblay et al., 2021)

Various actors have made several global, national and sub-national efforts to measure SDG progress. The United Nations is at the forefront of providing a quantitative assessment of SDGs at a global and regional scale (UN, 2021; Allen et al., 2017). Comparative analyses by independent sources in the form of regional and global ranking through a variety of SDG Indexes have also emerged in the past years (Sachs, et al., 2021; Lafortune, et al., 2021; Schmidt-Traub, et al., 2017). Similarly, internal efforts have been made to perform national and local volunteer reviews on SDGs' performance and to compare cities and provinces. (McArthur & Rasmussen, 2017; Lynch, LoPresti, & Fox, 2019). Although the importance of SDGs in achieving overall sustainability is well recognized, adopting SDGs at national and local scales is still inconsistent in selecting appropriate data sources and data collection and measurement methodologies (Ruan & Yan, 2022). Academic literature on SDGs implementation in cities has grown (Bibri & Krogstie, 2017; Graute, 2016). However, the gap still exists in finding the most acceptable method to implement SDGs locally (Thwaites, Glover, & Kestin, 2020; Fenton & Gustafsson, 2017; Allen, Metternicht, & Wiedmann, 2019; Krellenberg, et al., 2019). Given this context, this investigation will evaluate the challenges faced by Canadian municipalities in localizing Sustainable Development Goals within their jurisdictions.

4.3.2 Theoretical Framework

Urban inclusive and sustainable growth would require a systems approach to address complex tradeoffs in the local context (Pradhan, et al., 2017). However, the successful methodology would not be so straightforward. It would require a solution specific to circumstantial challenges and a cooperative stakeholder agreement and buy-in (Taajamaa, et al., 2022). Hence, the localization of SDGs would be

difficult to approach from a single perspective. In this paper, we took a combined lens of the subsidiarity principle, place-based policy development, and innovation theory.

The principle of subsidiarity fits well in defining the relationship between all the public governance stakeholders and the urban system's smooth functioning. The principle of subsidiarity exemplifies relationship between state, municipality, and the public to respect freedom of choice and action, distribution of resources, inclusive decision making, and protection of fundamental rights (Gawlowski, Nefas, & Makowski, 2020). Subsidiarity advocate that the lower level of associations is in a better position to identify and address local needs and, therefore, should be given priority. Therefore, local governments would retain autonomy in addressing local needs (Golemboski, 2015). The concept helps remove barriers, work duplication, and efficient decision-making by increasing coherence between all the subsystems (Gawlowski, Nefas, & Makowski, 2020). The system promotes an organic relationship between the subsystems and the decision-making, incorporating local context, efficient feedback, and participation of all factions of the society (Plummer, 2006). Subsequently, the decision-making process will be more innovative, flexible and responsive, with greater accountability and stability of the political and administrative functions (de Vries, 2012).

However, delegation of tasks does not mean a lack of ownership and accountability. On the contrary, the principle of subsidiarity is based on the proprietary responsibilities and devolution of authority in a social governance structure. However, matters that exceed the local capacity would require upper-tier government assistance. Subsequently, it would justify upper-level interventions to support local governments to overcome local challenges or exploit common goods beyond the local capacity (Hollenbach, 1979). Therefore, the subsidiarity principle not only helps the devolution of authority and responsibility but also calls for the proprietorship of tasks (Golemboski, 2015).

Messner (1952) proposed a threefold framework for implementing the subsidiarity principle: provision of an enabling environment for subsidiaries to perform, distribution of rights and responsibilities by law, and providing support to overcome local performance deficiencies (Messner, 1952). Therefore, a comprehensive concept of subsidiarity requires devolution and subsidium for lesser associations and federal protection by a legal framework. The upper tier of government must support local government and communities in their efforts to provide public goods. It would require promoting the concept of co-production with upper-tier support to overcome local capacity and performance deficits (Drew & Grant, 2017).

Governance and functional challenges emphasize place-based collaborative policy development in a multilateral and geographically dependent urban structure. A place-based policy would allow an adaptive policy framework to accommodate changes at a very local scale. However, policies may require a consistent path to reap their potential outcome fully. Place-based policies facilitate a collaborative process between multiple tiers of government to accommodate numerous objectives but require greater local autonomy (Giest, 2014). However, local capacity deficiencies and institutional structure constrain the successful implementation of place-based policies. The missing resources, lack of knowledge, and lack of institutional collaboration would challenge the notion of the subsidiarity principle of decentralizing (Marshall, 2007). Local mandate setting within the national interests would require upper-tier resources necessary to cater to placed-based needs in the most beneficial way (Bartik, 2020). However, the distribution of responsibilities and resources in an attempt to create a balance between placed-based needs and national interests may result in an inconsistent policy accumulation. Additionally, (Giest, 2014) identified regulations, institutional structure, capacity and behaviors as crucial barriers to place-based policies.

In contrast to place neutrality, matters that have geographic relevance, referring to local knowledge of social and institutional characteristics, can be served better with place-specific policy development (Barca, McCann, & Rodriguez-Pose, 2012). However, it may not be appropriate to disregard the spatial effects of place-neutral subjects, such as policies based on mobility and clustering urban sectors (Barca, McCann, & Rodriguez-Pose, 2012). Policies may have an unintentional geographic implication that does not disregard the necessity of path dependency on coherent long-term policies at provincial and national levels.

Another dimension to the subsidiarity principle is a policy accumulation and responsiveness trap at a local scale (Knill & Tosun, 2020). In the absence of a formal framework, a combination of vertical and horizontal local policy exposure driven by regulations, financial incentives, or simply an individual's understanding and access to information would undermine the responsiveness and effectiveness of policies. Furthermore, in the case of incapacitated policy accumulation, new policy directives may result in a negative tradeoff with the existing practices (Tummers, et al., 2015). Knill, Steinbacher, and Steinebach (2021) proposed policy integration processes that accommodate local feedback in the bottom-up approach for policy effectiveness and resource allocation in the top-down loop to enhance policy responsiveness.

Whereas the connection between urban sustainability and housing affordability implies its significance, functional heterogeneity, and operational complexity. To ensure, prosperity, social peace and equality, it is a global consensus that access to suitable and affordable housing is a fundamental human right (Kocak, 2022; UN-Habitat, 2017). In contrast, prevailing policies and market delivery system has failed to provide affordable housing for all. Evidence suggests that failure to achieve housing affordability has multiple reasons that includes ineffective policy design, inability to assess local market conditions, lack of coordination, inefficient resource distribution, inability to counter distributional effects, and lack of political will (APPG, 2013; Hilber & Schoni, 2022; Wetzstein, 2018). In continuation to the discussion above, the principle of subsidiarity could be suitable guiding principle to enable local governments to device strategies to deal with multisector and multidimensional challenges of affordable housing.

Our discussion to this point indicates we may not have a straight path to localizing sustainable development goals and to provide a simple solution to solve housing affordability challenges, which requires methodological and process innovation. Therefore, technology and innovation policy are vital to sustainable development (UNCTAD, 2017). Continuous innovation in products, production technologies, processes, and diffusion across functions and geographies can help to decouple growth from the depletion of natural resources. Moreover, innovation is a non-linear path that requires continuous improvement through a multidimensional and multilateral interactive feedback process. Thus, constant innovation can help manage socioeconomic and environmental priorities in pursuing sustainable development goals (Schiederig, Tietze, & Herstatt, 2012; Forestier & Kim, 2020).

From an innovation policy approach, global solutions may not be appropriate to address local challenges such as societal problems (Wanzenbock & Frenken, 2020) because societal problems are tacit due to multidimensional and multilateral policies that involve local institutions and practices (Asheim & Isaksen, 2002). A global solution based on a standard definition of a problem may disregard local knowledge, values, and challenges (Borras & Edler, 2014). Local government, more aware of the local circumstances, would be in a better position to contribute to the policy innovation process by conforming to a user innovator approach (von Hippel, 2006).

Contextual diversity and heterogeneity of objectives and their understandings would favor the local lens over the high levels of governance. However, local functions may not be easy to isolate from regional, national, and in some cases, global processes. For instance, economic criteria are the most

followed approach to assess the scope and outcome of interventions (Gelauff, Grilo, & Lejour, 2008). Similarly, a generic approach may not be able to address affordability challenges with a specific socioeconomic and governance challenges defining local motivation and capacity to act. In this case, actions and benefits involving cross-border functions and spillover effects would require seeing the subsidiarity principle and subsequent innovation policies from a different perspective. Similarly, socioenvironmental positive and negative externalities may favor decision-making on a national and global scale. However, it is not yet clear to what extent policies and actions bearing cross-border implications should be initiated at national and supernational levels (Wanzenbock & Frenken, 2020).

4.4 Methodology

4.4.1 Research Questions and Sample

The vast difference between municipalities' socioeconomic conditions and governance structures made it necessary to get an opinion from the various cities. In contrast to international comparison, an intra-national assessment would provide a better lens to understand operational constraints to localization under a singular national agenda. In addition, the Canadian economic status and land size provide unique circumstances to study municipal response to SDGs. The objective was to understand municipalities' administrative approach to SDGs, localization, value judgment, and operational and governance constraints. The research adopted a qualitative approach to get executive and technical leadership feedback. As described earlier, the paper set its course on assessing to what extent Canadian municipalities are exposed to the SDG framework and how local circumstances, capacities and governance affect their efforts to achieve SDG targets.

Additionally, the interview was focused on assessing the utility of the SDGs Cities Index in charting municipal progress on the SDGs, identifying recommended modifications to the SDG Cities Index, discussing the challenges and opportunities in SDG localization, and barriers to affordable housing. In particular, the interview discusses options for university collaboration with municipalities on SDG localization. We have set the following guiding questions to achieve our objectives. The first two questions are formed from the perspective of the subsidiarity principle and the relevance of place-based policies to assess local constraints and responsiveness to SDG localization. Similarly, the third question helps us to understand the local methodological responses to global goals.

- What challenges emerging from the Canadian municipal governance structure hinder the localization of the Sustainable Development Goals?
- How are methodological and capacity challenges, stemming from the localization of the Sustainable Development Goals, faced by Canadian municipalities?
- What are common approaches used by Canadian municipalities to localize the Sustainable Development Goals?
- What are the challenges in localizing affordable housing?

The interview process adopted a two-step approach. First, the research team conducted a detailed literature review of academic publications, and then corporate report was prepared.). The objective was to gather information on the challenges municipalities face in Canada and around the globe. There was not much literature on municipalities' approach to municipalities reviews of SDGs in the Canadian context. The second step involved collecting primary data by interviewing key informants from the municipalities. We approached City Managers to get their opinion about administrative challenges they are facing in localizing SDGs. Additionally, it would help us to understand the organizational interest in SDGs.

Table 5: Interview invitations and responses

Description	*Nos.*	
Cities Invited	37	Ten Provinces and 3 Territories
Provinces Participated	08	Ontario, Prince Edward Island, Manitoba, Alberta, Quebec, Saskatchewan, New Brunswick, British Columbia
Cities Participated	13	Brampton, Waterloo, Mississauga, Peterborough, Charlottetown, Brandon, Calgary, Edmonton, Quebec City, Winnipeg, Regina, Fredericton, Victoria
Interview Sessions	14	Edmonton (2), Waterloo (2), Others one session per city.

Written Responses	02	Regina, and additional written response from Quebec City
Interviewees	16	Brampton (1), Waterloo (2), Mississauga (1), Peterborough (1), Charlottetown (1), Brandon (1), Calgary (1), Edmonton (2), Quebec City (1), Winnipeg (2), Fredericton (1), Victoria (2)

In the interview process, City Managers and Chief Administrative Officers from the selected municipalities were identified and approached electronically. The sample size and response rate are provided in Table 5. Thirty-seven invitations were sent to City Managers in cities purposively sampled according to geographic region and city size (CMA level) representing all provinces and territories and availability of contact information. The criteria used in the selection of cities include provincial and territorial capital, population greater than fifty thousand, and single and lower tier municipalities. Of those invitations, thirteen interviews (35 percent response rate) were conducted with sixteen participants (one participant sent written answers to our interview questions). Out of sixteen, three city managers and one deputy city manager were interviewed. Other participants were of different departments assigned by their city managers.

The interviews were first planned in a face-to-face format in the spring 2020 term. However, due to the pandemic, the project was delayed, and later the mode of interviews was changed to online video conferencing using Microsoft (MS) Teams. The invitations along with the list of questions were sent electronically using the email IDs of administrative assistants of the City Managers. All interviews were scheduled between July and September 2021 and coordinated by email. Interviews were conducted by MS Teams for a minimum duration of sixty minutes each. All discussions were audio/video recorded with the consent of the participants obtained before beginning. In addition, a digital copy of MS Teams transcriptions was obtained for data analysis.

A semi-structured questionnaire included five main questions with several sub-questions to guide the discussion. The first question ("How have sustainable development-related policies been designed and implemented historically in Canadian municipalities?") included sub-questions covering the role of all tiers of government in policy initiation, cooperation, and motivation for sustainability. These questions were guided by discussion probes focused on existing reporting frameworks, reporting

team structure, data collection and analysis challenges, and managing conflicts of interest. The second question ("Which structure will be more appropriate for SDG implementation?") captured respondents' opinions on resource requirements for localizing SDGs. The third question was to understand challenges and opportunities in localizing the Sustainable Development Goals. The interview ended with a final question probed the challenges Canadian municipalities are facing to address housing affordability.

4.4.2 Analysis

Interview transcriptions were obtained from MS Teams. The transcriptions were thoroughly reviewed to remove errors. The interviewees were provided the list of questions in advance to enable them to come prepared for the interview. Additionally, we used a PowerPoint presentation to list all the questions in sequence. It provided a framework for interviews and later made it easy to group responses. Follow-up questions were recorded manually on a separate sheet. The qualitative data analysis followed the most common methodology of data reduction (Huberman & Miles, 1994; Mezmir, 2020). The semi-structured format of the interview questions provided the initial themes and facilitated the data's conceptualization, including follow-up questions and responses. In addition, the methodology helped to reduce unintended bias. After multiple rounds of reading, the data were arranged into categories and sub-categories through inductive coding (Thomas D. , 2006). A separate spreadsheet was used to list participants' words, sentences, and quotes reduced to unique bullet points (Thomas, 2006) The data was recategorized into newly emerged themes that included policy development-governance, jurisdiction, influencing factors, priorities, existing reporting structure and exposure to SDGs, Data and resource challenges, and common approaches to and motivation for localizing SDGs and affordable housing. Several rounds of reduction, categorization, and integration to achieve minimum number of distinct categories that facilitated the development of a narrative to address the research objectives. Several quotations were selected from the coded interview transcripts to facilitate understanding of the arguments. Prior permission was obtained from interviewees to use the quotation while maintaining the anonymity.

4.5 Results

What challenges emerging from the Canadian municipal governance structure hindering the localization of the Sustainable Development Goals?

Canadian municipalities have official community plans to guide land use, community, and economic development, providing a necessary space to influence sustainability objectives. However, in some cases, geographic and jurisdictional mandates restrict the kind of sustainability objectives that municipalities can set. For example, while crucial for local community development, SDGs related to housing, health, and education are out of the local government jurisdiction of Canadian municipalities. In addition, local municipal bylaws can influence housing affordability on a local scale. Still, municipal housing policies are subject to planning and economic directives from the provincial and federal governments. One of the interview participants described the situation in the following way: "In Ontario, there is a stronger provincial hand on planning……sort of a hardwire into the planning process". Ontario municipalities may be mandated to take action (for example, structuring building codes to support further urban intensification) or not to take action. For example, Ontario municipalities have limited scope to regulate energy, which the Ontario Energy Board manages. At the same time, a municipality's jurisdictional mandate and financial constraints often necessitate greater provincial support for cities to adopt the SDG framework. That said, many of the Canadian municipalities consulted in this project were leading in designing and implementing sustainable development policies independent of provincial and federal directives.

The inter-jurisdictional nature of SDGs requires a multi-level governance approach. For example, large-scale initiatives such as climate action and carbon reduction, initiated by federal and provincial governments, are subject to financial assistance municipalities would require to address these objectives. Provinces may also have an overarching goal for sustainable development (as in the case of British Columbia). Similarly, regions also play an essential role in facilitating coordinated efforts between municipalities. For example, a recent unified housing assessment report, initiated by the Capital Regional District of British Columbia, was helpful to local municipalities but was only possible because of a combination of grants and volunteer participation. Local constraints and priorities drive municipalities' decisions in these cases.

As a result of this context, the consulted municipalities were generally at the early stage of devising methodologies to create a reporting framework to integrate SDGs with local policy plans. That said, some cities are taking the lead on sustainability initiatives. For example, Brampton declared a climate emergency by setting an ambitious target of 80 percent GHG reduction by 2050. Similarly, the City of Victoria has taken a lead role in taking the initiative on GHG emission reduction by initiating several measures at a local scale on their own, such as introducing bike lanes and energy step codes for

buildings. To some extent, local sustainability initiatives and related targets and indicators are aligned with SDG targets. However, Victoria, Brampton, and Calgary participants acknowledged that a conscious effort to align local indicators with the SDG framework is rare. One participant noted that "as a city, we have programs that target multiple parts of SDGs, but I don't believe we've actually gone and targeted each and every one of them." The missing piece is the prior intentional alignment of programs with SDGs instead of the ad-hoc serendipitous alignment of programs with the SDGs.

Some of the challenges confronting the localization of the SDGs in Canadian cities also stem from how municipalities develop policy. Multiple factors have an influence on policy development at the local scale. These factors can be grouped into stakeholders who are crucial in taking initiatives and functional elements that define policy trajectories. Three stakeholders (the council, municipality staff, and the community), in particular, are key players in setting priorities and initiating policies at the local scale. The views of these stakeholder groups can play a decisive role in shaping SDG localization. As stated by a one participant "local views on sustainability are less of policy and more the character of the Council." It is also true with the municipality staff, acknowledged by all the participants, staff personal interests and knowledge have played an important role in local sustainability initiaties. People from diverse backgrounds are taking a lead role in sustainability initiatives in municipalities. Stakeholders aspired to sustainability due to the lasting benefits or financial incentives attached to the policies and actively advocated for and embedded sustainable development practices in the service delivery. As said by a participant, "It seems like it's more about that one individual who's keen who understands it and sees the value versus an organizational or a CEO office approach to the leadership. It's challenging to get the buy-in just with the existing hierarchical structures that exist".

Public and stakeholder engagement help municipalities gather information on local conditions, community priorities, and values. Increasing public awareness of sustainable development has influenced political decisions, especially among the young generation. Community-led initiatives are also helping municipalities lagging on the subject. For instance, the municipality's slow response to sustainability in Peterborough persuaded local not-for-profit organizations to take the lead in defining the local sustainability framework. Sustainable Peterborough, a community-led organization, initiated by a group of individuals, efforts led to the development of the Sustainable Peterborough Plan (Sustainable Peterborough, 2022). When discussing this program, one participant noted that "Fleming College" (a local applied arts and technology college in the city) "and their sustainability team had

early gone down that road. They were a big player helping the other groups facilitate the localization process."

Although Canadian municipalities act within their mandate and in coordination with the provincial and federal governments, conflict may arise due to priorities driven by jurisdiction, operational priorities, and individual beliefs. For example, community preferences for private transport and single-family housing are influencing the progress towards achieving the objective of low carbon and affordable communities. One commonly cited conflict that the interview participants raised was the distribution of administrative responsibilities and priorities between municipalities and higher tiers of government. For example, Regina is committed to achieving a net-zero renewable city by 2050, contrasting with the provincial government's levying tax on electric vehicles and the provincial government confrontation with the Federal Government on reducing coal power generation. As stated, "In contrast, the provincial government is committed to an oil-based economy in Saskatchewan. Although it is transitioning from coal-based industries, it has taken an aggressive path with the federal government to reduce its dependence on coal. It has fought the federal government's carbon pricing scheme in the Supreme Court of Canada. It has also levied a new annual road fee of $150 on electric vehicles and promised to refund the carbon price on fuel at the gas pump, which arguably removes any incentive to change drivers' behavior." The discussion indicates differences in priorities between local, provincial, and federal governments. .

How are methodological and capacity challenges faced by Canadian municipalities stemming from the localization of the Sustainable Development Goals?

Data collection and reporting is one of the crucial components in localizing SDGs. Cities set targets based on administrative capacity and political buy-in. Within this context, some municipalities report on multiple reporting frameworks (requiring extensive resource allocation). That said, explicit efforts to align local indicators to SDGs are uncommon. The lack of engagement with SDG indicators may arise from the difficulty of integrating those indicators into municipal reporting frameworks. Still, some consulted municipalities also noted concerns regarding the feasibility of achieving SDG targets, given the constraints many cities face.

Many Canadian municipalities follow different national and international reporting frameworks. Most reporting frameworks are voluntary, and some frameworks, such as the (Municipality Benchmarking Network (MBN) and World Council of City Data (WCCD), have

included review processes. Similarly, the federal gas tax fund (GTF) (now Canada Community-Building Fund) provides a reporting framework to municipalities. The participating cities must provide periodic outcomes reports to the federal government indicating GTF's progress toward the national objectives (Government of Canada, 2022). Respondents from Charlottetown and Brandon highlighted that the reporting on the federal gas tax fund has a financial motivation that attracts municipalities to follow the reporting structure. The other frameworks and facilitating organizations that frequently appeared during the discussion are reported in Table 6. Reporting on existing frameworks involves input from multiple disciplines, making it complex to consolidate. In some instances, external reporting requirements may cause complexities at the local scale. For example, WCCD and International Standard Organization (ISO) require an audit that may ignore local priorities. Municipalities primarily rely on third-party data to plug into these reporting frameworks. Furthermore, ignoring contextual circumstances and processing cross-disciplinary data makes these frameworks difficult for the public to understand.

Table 6: The most common reporting frameworks

Abbreviation	*Reporting Frameworks*
MBN	Municipality Benchmarking Network
WCCD	World Council on City Data
FCM	Federation of Canadian Municipalities
ISO	International Standard Organization
PCP	Partners for Climate Protection
NPRI	National Pollutant Release Inventory
IFRS	International Financial Reporting Standards
GTF / CCBF	Federal Gas Tax Fund (now Canada Community-Building Fund
NSWBI	National Solid Waste Benchmarking Initiative

FIR	Financial Information Return
CIW	Canadian Index of Wellbeing
CDP	Carbon Disclosure Project
ISSD	International Institute of Sustainable Development
UN	United Nations
SDG	Sustainable Development Goals

Municipalities such as Brandon, Winnipeg, and Regina also have service level Key Performance Indicators (KPIs) and scorecards for internal performance evaluation and decision making. For instance, Winnipeg has developed a Peg community indicator system led by local partners in a consortium with IISD and the United Way of Winnipeg (ISSD, 2022). The Peg has used the SDG framework to measure and track community wellbeing in nine key sectors, including poverty, basic needs, health, education, social vitality, governance, built environment, economy, and natural environment (CIC, 2022).

Many Canadian municipalities set their targets based on their strategic objectives and community development priorities influenced by geography and socio-economic conditions. Additionally, municipalities' lack of capacity restricts them to targets based on measurability and access to data. Such factors create an ineptness between cities and upper and lower tiers of governance to have a comprehensive and integrated target setting and reporting framework. Further contextual constraints such as municipality size, preferences, motivation, and resource capacity would make it challenging to benchmark and compare municipalities.

Cities are struggling to take internal performance indicators to the goal level. Reporting inconsistency between municipalities and all tiers of government is one of the constraints. Most data come from third-party service providers or is collected and processed by upper-tier government or national institutes. These sources of data may overlook the geographic and structural circumstances of cities. In addition, methodological differences may occur between upper and lower tiers of government and institutions such as Statistics Canada and ISO. For example, municipalities' Statistics Canada population count has excluded the student population, misrepresenting the actual population in cities

that host large universities. Similarly, the combination of district units may misrepresent disaster impacts in municipalities when counting the number of people missing, dead, or directly affected raised by the participant from the city of Fredericton.

The misalignment between various reporting regimes also creates inefficiencies in reporting mechanisms. For example, the MBN covers thirty-six municipality service areas with performance measurements that have some alignment with the SDG framework. As a result, the data collection required by MBN introduces significant strain on participating municipalities. Additionally, data collection and reporting are split between upper and lower-tier cities based on service jurisdictions, creating fragmented data sources and reporting structures. As a result, resource allocation for data management can be a constraint for smaller municipalities wishing to participate in these reporting frameworks. At the same time, larger cities have a capacity and culture for data collection and reporting. For example, large municipalities (like Quebec City, Calgary, and Mississauga) have existing indicator frameworks to report on and partnerships with universities to support the measurement of any new indicators/targets.

What are common approaches used by Canadian municipalities to localize the Sustainable Development Goals?

The localization of SDGs is constrained by these resource constraints that municipalities face. The SDG framework requires a comprehensive data analysis from multiple sources such as upper tiers of government, social actors, academia, and Statistics Canada. There was a mixed response to Voluntary Local Review (VLR) management. In partnership with United Cities Local Governments (UCLG), UN-Habitat has created the VLR to facilitate cities and local and regional governments to track and report SDG progress. Since its inception in 2018, VLR reporting has increased exponentially. Last year alone, ninety-four VLRs were released in twenty-six countries (UN-Habitat & UCLG, 2021). Surprisingly, not all the participants were acquainted with the terminology of VLR. Local initiatives on VLR depend on municipalities' capacity and resources. Some prefer to have a dedicated team, while others believe that existing departments can manage it well. Smaller Municipalities may not have the ability to manage VLR with existing departments. However, as discussed above, personal interests and individual efforts drove the local review process within the existing reporting structures.

There is no single structural approach to managing sustainability within municipalities. Most participating cities use departmental resources to report on their relevant domains and plug them into

the final report. Some have a dedicated sustainability team, and some have staff assigned to coordinate and consolidate departmental-level efforts on data collection and to report on sustainability. Generally, the most common departments taking ownership of sustainability reporting and management include planning, engineering, environment, operation, finance, and the city manager's office. The planning and Environment departments are more familiar with hosting sustainability management. Regina's corporate strategy department develops and monitors targets and indicators. They are responsible for tracking progress and modifying processes based on suggestions from service and business departments. Some municipalities have a sustainability coordinator appointed in the City Manager's office. Some are exceptional and driven by personal interests rather than functional requirements. For instance, the Mississauga sustainability ownership is embedded within the finance department due to their interest and relevant knowledge.

Sustainability and SDG reporting involve cross-department information sharing, which may require a dedicated team to develop policies and procedures. Some municipalities have a centralized coordination team or individuals gathering information from all sources for further reporting. However, the decentralized approach is the most common in cities. A departmental embedded network of teams is used to coordinate and gather information. For instance, Quebec city has no dedicated assigned team; all departments contribute. At the same time, Winnipeg has an office of sustainability comprised of people deputed from different departments. Similarly, the city of Victoria and Charlottetown have central staff for data coordination. On the other hand, Mississauga appoints a dedicated project leader to oversee project-based sustainability objectives.

The participating municipalities unanimously agreed to have a dedicated “inter-municipality working group” at a regional scale to standardize and coordinate between cities and provinces. As said by one participant, "A dedicated team would be required. Ideally, this team would be comprised of a multidisciplinary team from the municipal and provincial governments and community and academic partners.” Municipalities had a mixed response from the operational perspective at the city level. First, a dedicated team is considered necessary for developing consistent and coherent policies across the board. It would include aligning policies to the SDG framework, analyzing data sources, and setting review and evaluation processes.

Similarly, interdepartmental coordination would also require a particular staff assignment. It is sometimes challenging to balance departmental mission and values to coincide with sustainability

objectives. Therefore, data collection and reporting are best managed by existing departments. Additionally, providing a consistent framework for municipalities at the provincial or national level would help cities track and compare.

What are the challenges in localizing affordable housing?

Municipalities' role in affordable housing in Canada is limited and varies provincially. Generally, it is a part of the provincial or regional government's responsibility. Municipalities' role is more about land management and convening and facilitating the delivery of housing projects initiated by federal or provincial governments. The concern was about policies' effectiveness in the prevailing distribution of authority and the capacity of actors. All respondents emphasized the importance of the role of the Federal and Provincial governments in addressing housing affordability issues. Three significant roles were highlighted concerning federal and provincial governments: provision of resources, regulations, and coordination between municipalities and functions. Participants have shown concern about the insufficient role of Federal and provincial in affordable housing. At the same time, the cities are not equipped to address housing issues independently due to financial and operational constraints. As stated, "A big part of allowing municipalities the capacity and financial means to respond to some of these crises and critical."

Multiscalar policies are necessary to address multidimensional governance challenges. In the current governance structure, cities rely heavily on provincial and federal governments to allocate resources for housing programs. Therefore, Inter-government and inter-departmental collaboration are vital but require a clear framework and allocation of appropriate resources. As stated, the firefighting approach prevails in affordability policies. Another participant said, "The multiscalar policies have done a kind of stopgap measures but could have been more effective."

Furthermore, participants highlighted a need for coordination between upper and lower tiers of government that restricts cumulative positive outcomes of the assessment of condition, policy development, and execution in the housing sector. For instance, multiple federal funding channels exist, including direct funding to nonprofit organizations competing in the same city (Brandon). As mentioned, "There is a lot of like passing the buck back and for in terms of who needs to stand up and make some changes." Similarly, Prince Edward Island's role in issuing short-term rental permits without consulting cities "will remain good on paper, not in practice."

The federal government is offering various levers through the National Housing Strategy, which is not enough to overcome the decade of backlog, meet the current demand, and compensate for the rising construction cost. Furthermore, participants have shown concerns about time constraints, sufficiency, and frequent changes in the federal and provincial housing programs. Further added that the funding uncertainty creates issues with long-term planning for municipalities. For instance, one participant mentioned that housing solutions could not be time-constrained and require consistent effort. Another participant noted that "the amount of interest received through the rapid housing initiative far exceeded the supply." Furthermore, the program's prerequisites take a lot of work to fulfill, as "negotiations are long and arduous."

Political roles and commitment at all levels of governance are vital in understanding community needs and defining a broader lens to devise strategies required to solve affordable housing challenges. However, pro-growth objectives bend political interests in favor of developers. Participants further added that multiple political parties, different political purposes, shorter political tenure, and continuously changing priorities at all three levels of government resulted in a lack of commitment to affordable housing. The government has proven a consistent trend in de-investing and deinstitutionalizing affordable and public housing and shelter homes. For example, shutting down mental hospitals creates more problems for local governments by putting more people on the road.

Similarly, the government is not keen to invest in public housing, instead actively selling the existing stock. Such approaches define a lenient and pro-market approach of the Federal and Provincial governments, which makes it harder for municipalities to counter affordability challenges. The participants added that the role of city councils and the general public is crucial to dealing with local challenges such as removing planning and administrative barriers and shaping public opinion for inclusionary zoning.

Participants have expressed concerns about the housing market's financialization and the pro-growth development policy, which causes tension among the housing stakeholders to offset conflicting objectives. For instance, balancing suburban development and intensification, a trade-off of environmental standards with construction costs, and balancing revenue needs with restrictions to regulate the market is challenging. As said, the public and developers are keen to accumulate profits, and "we are kind of facilitating speculation" by avoiding restrictions. But, on the other hand, it is not easy to convince developers to scarify their profit margins if the market demonstrates the ability and

willingness to pay. Furthermore, municipalities' resource constraints and lack of ability to generate revenues motivate them to reserve local resources to fulfill their economic objectives rather than investment in no-return projects such as affordable housing.

An aggressive and collective approach would be required to address pressing issues like housing. Regulations and taxation can play a role in controlling housing speculation. As said, there is an opportunity to put "brakes on things" by taxing land transfer, but most municipalities do not possess these powers. There must be more than regressive property taxes to influence the housing market. It requires harsher approaches such as capital gain tax, sales tax, vacant home tax, and transfer restrictions. However, such taxes are politically not appreciated (Mississauga). Municipalities have little control over legislation, regulations, and taxation. In contrast, the provincial role is more lenient towards the market. As stated, "we don't have a provincial government that is supportive of policies that intervene in the market. Therefore, political will at upper and lower levels is vital to devise aggressive policies to overcome housing affordability challenges.

Participants agreed that a combination of factors contributes to affordability. However, the effectiveness of partial subsidies remains a question. The participants mentioned that it is convenient for municipalities to adopt a less risky path of managing grants rather than developing housing. Some participants think government policies supporting market supply are more effective than government-run non-market housing. In contrast, others are convinced that marketized approaches, such as density bonusing, capital grants, and tax exemptions, do not produce numbers equivalent to non-market housing. Similarly, time-bound incentives for affordable units cannot bring a lasting solution. Further added that housing developers' role in affordability is very shallow compared to nonprofit housing, which goes deep into affordability by having the right mix in each building. As said, "I do not believe that we will achieve the type of affordability we need through policies that just target market rental housing." Similarly, financial support to first-time home buyers might effectively address the issue of market access. In contrast, one of the participants considers such subsidies a kind of "pushing the ceiling" by funneling money to the sellers by raising the buyer's capacity to pay more.

The discussion highlighted that municipalities' common approaches revolve around generic principles of increasing supply, retention of existing stock, diversity of housing options, and partnership with housing providers and other levels of government. Such multi-scaler housing policies are effective if they provide contextual solutions to the municipality's local circumstances. A respondent from

Regina highlighted a need for studies to investigate housing delivery models at the municipality level. Similarly, a respondent from Calgary highlighted a gap in the current housing policies ignoring the missing middle of housing types such as row-housing and fourplexes in the low-density zoning. Whereas Fredericton stressed ensuring single-room occupancy policies are more supported. Participants agreed that there is no silver bullet, no single solution that will be able to solve the housing problem. In addition to new experiments and out of box thinking, it is advisable to incorporate market-tested methods such as incentives, inclusionary zoning, pro-active land use policies, multiple delivery options, including non-market and co-op housing, and engagement of private and nonprofit organizations. Furthermore, participants have shown interest in revenue-based models that could facilitate municipalities to localize housing. In the end, it was also emphasized that housing should be considered a fundamental human right to be delivered as part of public service.

Affordable housing will always be a multi-jurisdictional issue requiring multidimensional solutions. Participants have shown great concern for the effectiveness of the prevailing system and policy development framework. As stated, the housing crisis is a systemic problem involving multidimensional things that led to the massive problem. Further added by another participant, the municipality financing framework is entirely out of whack and needs to be significantly modernized. Similarly, the prevailing decision-making structure is complicated and challenging to navigate. Therefore, municipalities would not be very influential within the current governance and financial system. As stated, "a massive shift in the sector is required, which is not easily obtainable overnight." Therefore, it is necessary to be more adaptive and agile in response to varying housing challenges.

To summarize, housing affordability is a diverse and complex problem that requires a multi-faceted and holistic approach. Municipalities consider housing affordability a crisis that requires both short-term and long-term solutions on a priority basis. Conceptual understanding, market knowledge, and governance priorities set the course of policy development. Affordable housing policies depend on market practices, socioeconomic circumstances, political will, policy jurisdiction, capacity, and the role of the upper tiers of government. Furthermore, the difference in the conceptual understanding (for example, housing tenure, purpose, inclusion, affordability, accessibility, suitability) and socioeconomic priorities of regulators, operators, developers, and users establish housing policy direction that could be a barrier to finding a comprehensive solution for housing affordability. Similarly, general market preferences such as single-family housing, cheap farmlands, ownership, and investment returns are shaping the demand for housing.

Municipalities have unique challenges due to socioeconomic and geographical circumstances, governance structure, changing priorities, and the incapacity to act. For example, multiscalar policies, partial subsidies, segregated responsibilities (Jurisdiction), and lack of public investments impact the affordable housing supply. Similarly, circumstantial challenges such as access to land, economic activity, and dealing with urgent housing needs such as homelessness, short-term rental, and student housing influence their policy objectives in the short run. Furthermore, municipalities' limited regulatory powers, inability to access funds, and lack of operational capacity limit their capability to deal with housing affordability challenges independently.

Furthermore, pro-growth policies, economic priorities, financialization of housing, low-interest rates, excessive money supply, lenient regulations combined with the lack of profits for the developers, and insufficient proportion of government grants contributed to the crisis. Participants agreed that cities should be proactive in finding local solutions for housing affordability in coordination with the Federal and Provincial governments, which is crucial in the current governance structure. However, the relevance and effectiveness of the current policy approach, the relationship between actors, and the distribution of responsibilities in the housing domain remain a question. To achieve sustainable and affordable housing, it is therefore required to reconsider the prevailing housing delivery system by adopting the human-centered approach, devising contextual policies, empowering local governments, and increasing horizontal and vertical coordination.

4.6 Discussion

The localization of SDGs would be challenging in complex urban functions and governance structures. Whereas housing, a crucial component of urban function, is an essential driver of many SDGs and prerequisite for inclusive, resilient, equitable, and sustainable cities (Habitat, 2021). The complexity and multidimensional nature of housing makes it challenging for local governments to sustainable housing. Whereas municipalities' horizontal and vertical policy relationships, functional dependencies across geography, and resource constraints determine local capacity to influence sustainability objectives. A universal approach may offset regional disparities and local context, which wouldn't ease communication between stakeholders. In contrast, locally driven policies stand well to address local challenges (Tremblay, et al., 2021), which seems fit with the concept of the subsidiarity principle. However, the multidimensional nature of an urban governance structure requires not only

devolution of authority but also proprietary responsibility, collaboration across the board, and assistance to overcome resource challenges.

In general, cities see an organic tension or conflict of interests between tiers of government, civil society, and non-government organizations. Local services responsibility split between local and provincial governments is one factor that poses a challenge to localizing. For example, a response to poverty is shared between a city, province, and federal government. The same is the case with affordability and homelessness. Capturing that in an integrated way would be helpful but very complex, and there wouldn't be a consensus. Moreover, it may require revisiting the assignment of the responsibility jurisdictions from the concept of the subsidiarity principle discussed above.

Canadian municipalities are proactive, taking climate and sustainable development initiatives independently. Such actions at a local scale are mainly driven by an individual's interest, regulations, or financial motivation tied to national policies. Similarly, geographic and jurisdictional mandates restrict municipalities' capacity to meet their sustainability objectives and influence targets set at regional or national levels. Within their mandate, cities are taking action to respond to local challenges and their development objectives. However, Local efforts vary due to the priorities of political and administrative authorities that seem fit in their circumstances. Therefore, geographically diverse targets require more significant provincial and federal assistance.

Similarly, housing affordability is a complex problem that requires a multidimensional and holistic approach. The housing diversity and role in the delivery of urban functions makes it an important test case to evaluate effectiveness of governance structure, horizontal and vertical coordination, resources distribution, and local capacity to achieve sustainability in the housing sector. The discussion highlighted that affordable housing policies are influenced by market practices, socioeconomic circumstances, political will, policy jurisdiction, capacity, and the role of the upper tiers of government. Whereas, local governments geographical and socioeconomic circumstances, financial and resource constraints, and changing political priorities makes it challenging to achieve affordable and sustainable housing objectives.

To summarize challenges to localizing SDGs and affordable housing, the critical factors identified during the discussions can be organized concerning the distribution of authority, functional and geographic mapping, and assigning roles and responsibilities. It wouldn't be easy to achieve operational and geographic integration of functions that requires an innovative and evolving approach

incorporating local circumstances. Therefore, to overcome operational constraints, municipalities need more significant provincial and federal financial and constitutional assistance to meet capacity challenges and to guide a unified approach to meet sustainability targets.

Municipalities are facing methodological and capacity challenges to collect and process information necessary to assess local performance towards SDGs. Subsequently, cities struggle to take their local KPIs to the goal level. Although municipalities have adopted different types of indicators and reporting frameworks, an alignment with SDGs is still a missing piece. In addition to financial and resource requirements, municipalities require assistance from professional bodies and provincial and regional governments to devise a unified and consistent data collection and reporting framework to incorporate inter-and intra-municipal functional and policy relationships.

Alignment of leadership interests and commitment to the common objective would be vital. Since sustainable development benefits are enormously significant to all cities, it's more than likely that local governments would be keen to acquire standardized tools and collaborate to achieve the goals. However, the common assessment and reporting tools, such as the Cities index, would bring them a certain level of accountability, as highlighted by the participants. Therefore, the acceptance of such tools would be mainly driven by the people's confidence in the legitimacy of data, the purpose of comparison, and its helpfulness in decision-making. As one of the participants said, "it's hard to establish those targets when you're basing it on data that you're not so sure that you can." Although, participants have shown their trust in institutional data such as Statistics Canada. However, the difference in data geography might be a constraint. Similarly, some indicators may have a scale limitation. Therefore, indicators that combine multifactor may need to break down to a more localized scale.

Another challenge is the construction of indicators with local data. Municipalities can collect timely and valuable data at the local level in routine practices. However, geographic data constraints and operational jurisdictions restrict municipalities' ability to influence the indicators to progress toward targets. For example, an indicator is sometimes available for the province, but the data isn't refined or precise enough for the municipality. Another challenge may occur in the city's current structure to conduct a VLR due to resource constraints. Interdepartmental coordination and data compilation would require a diverse action that may not be accessible without a particular purpose

team. Although assigning additional resources may not be an issue for large municipalities, it would be challenging for cities with fewer resources and financial constraints.

The key constraints to operationalizing SDGs are access to regional and national data, local capacity to collect and process data, consistent reporting framework, and accountability. Additional constraints include reporting inconsistencies and methodological differences between upper and lower tiers of government, national institutions, and private organizations involved in sustainability and environment-related information management.

There is a value in localizing SDGs, and municipalities consider it a potentially helpful tool in establishing trust between local government and its citizens. Similarly, meaningful and easy-to-understand data is more important to convey a message to the public. Generic global standards may not be instrumental in the local context. However, the approach to localization also varies. Local governments have devised their reporting structure or followed an international reporting regime. For example, Edmonton localization is attempted through a fully integrated enterprise performance management system, considered extremely useful in decision-making. Similarly, Regina has adopted the balanced scorecard approach to measure and monitor the strategic objectives set with the perspective of the community, financial, internal processes, and learning and growth.

The SDG framework requires comprehensive and multidimensional data reporting involving all levels of government, social actions, academia, and public and private institutions. Despite global efforts to systematically recognize the importance of localization of SDGs and assisting in structuring voluntary local reviews, there is still a long way to duly incorporate the SDGs framework into the local assessment and decision-making structure. As mentioned above, there is no single reporting framework in place. Municipalities have chosen available reporting platforms based on their convenience, knowledge, and regulatory compliance set by authorities. However, there is a consensus among cities that a deliverable and structured approach are required to facilitate municipalities to align their current operational indicators to the SDGs framework and then adopt the same across the board for reporting and assessment methodological consistency.

The municipality's response to the SDGs' localizing and their buy-in would determine the success of standard reporting tools such as the Cities Index. Therefore, the framework's contribution mainly drives their motivation to facilitate target measurement with the local data, data processing, standardized reporting, and the level of commitment required. Additionally, the local government's

partnership and willingness to work together on SDG initiatives would be another crucial factor in determining the role of the index in facilitating SDG localization.

Our discussion concluded that municipalities are keen to understand the flexibility and adaptability of the reporting framework, clarity of data, and the opportunity to drill down to community details are essential to attract municipalities. Similarly, data should be presented to make it easy to understand. For example, large city strategic plans and numbers of intensive financial reports would be challenging for ordinary citizens to extract the required information of their interests. Therefore, the simplicity of the dashboard of the Cities Index would be a good approach. Furthermore, a detailed description of terminologies, data geography, data sources, description of methodologies, and visual tools would be necessary for general awareness.

Canadian municipalities are proactive and willing to take charge of sustainable development initiatives such as climate change, environmental protection, equity, and affordable housing. However, such actions are driven by geographical circumstances, political objectives and economic priorities which requires integrated approach across functions and stakeholders. Furthermore, policy and functional jurisdiction, authority distribution, financial access, and resource capacity limits municipality's ability to make significant contribution to sustainable development targets. Therefore, local government require more support from federal and provincial governments to provide enhanced capacity to respond to local challenges. Additionally, a generic and one-time solution may not be sufficient to address SDGs localization. Local evolving socioeconomic and environmental circumstances advocate a closed-loop data collection and analysis framework necessary to revisit policies. Similarly, multilateral policy exposure is driven by socioeconomic and development regulations, financial motivations, and individual understandings. Therefore, policy development, policy accumulation, data feedback loops, and operational capacity would determine the responsiveness and effectiveness of policies.

To summarize, the localization of SDGs and affordable housing in the Canadian context would require stakeholders' motivation, collaborative decision-making, provincial and federal government support, knowledge sharing, methodological consensus, resource allocation, and process innovation to address contextual priorities. The principle of subsidiarity determines the proper distribution of responsibility and authority among various societal entities (Golemboski, 2015). Which goes well to determine policy and functional jurisdiction, assigning responsibilities and allocation of resources to

facilitate local government to meet the challenges of localizing SDGs and addressing housing affordability. Furthermore, geographic constraints and socioeconomic objectives emphasis on place-based policy approach. Similarly complex and multidimensional challenges such as affordable housing would require innovative and multifaced approach. Therefore, a nexus of subsidiarity, place-based policy development, and innovation theory would help cut corners for an efficient implementation of sustainability policies at all levels of governance (de Vries, 2012; Plummer, 2006; Gawlowski, Nefas, & Makowski, 2020).

4.7 Conclusion

The study helped to understand the current trend of SDG localization and housing affordability in Canadian municipalities and the relevance of the subsidiarity principle, with respect to distribution of authority, assignment responsibility, and provision of resources, which is unique in its scope. The study assessed the local practices from the principle of subsidiarity (Gawlowski, Nefas, & Makowski, 2020; Kocak, 2022), innovation in public policy (Kitson, 2012; Spiller, 2022), and place-based (Diamond & McQuade, 2016; Tsenkova, 2022) approach for successful outcome. The study confirms that the localization would require an innovative approach to deal with the local circumstance in conjunction with close relationships with regional municipalities and administrative and legal support from the upper tiers of government. The case of affordable housing for local government reflected on weaknesses in governance structure, distribution responsibilities, and allocation of resource which limits municipalities capacity to act. Furthermore, the study added a dimension to cities' response to a unified framework to measure local progress and compare regional and national scales. Finally, the study provided a comprehensive review and validated municipalities' current approach towards SDGs and its level of acceptance, affordable housing, and related issues they face.

Many of the findings of this study are very much in line with the previous literature. Previous studies have identified challenges related to the measurement, localization, and governance of SDGs at multiple tiers of government. The challenges associated with SDGs localization and affordable housing mainly revolve around operational capacity, authority, political motivation, and cross-functional integration and territorial coordination between various levels of governance (Gustafsson & Krantz, 2021; Allen, et al., 2020). On the other hand, SDG indicators' measurement is constrained by their overlaps with local KPIs, data availability, measurement methodologies, and tradeoffs to address local priorities (Allen, et al., 2020; Klopp & Petretta, 2017).

Although municipalities are more comfortable with their list of indicators and targets emerging from local process groups (City of Surrey, 2016; OECD, 2016), they are keen to learn and look for a unified methodology to facilitate their transition to the SDG framework. Municipalities generally agree that there is a disconnect between development objectives, actions, and outcomes. It is one of the reasons that plans developed at a local scale were not implemented very well. Additionally, some indicators/targets are either missing or not measurable at the city scales (Valencia, et al., 2019). These operational and capacity constraints restrict them from taking local KPIs to the target level.

Targets developed at the local scale are vague and lack clarity and measurability (Valencia, et al., 2019). Our findings confirm that the availability of appropriate data and standardized measurement methodologies pose a significant challenge for the local expression of SDG targets. Sometimes, targets are disconnected or have geographic constraints (GTF & UN-Habitat, 2016). Similarly, selecting relevant targets addressing local objectives and priorities complicates it. That makes some SDG targets beyond capacity or sometimes fail to attain local interests. Additionally, political motivation and cooperation between provincial, regional, and local political and administrative structures influence policy direction (Edquist & Espey, 2019; Ho & Runnalls, 2018).

SDGs as a holistic way to frame objectives and understand outcomes. It helps to devise policies to achieve objectives. Canadian cities are motivated and struggling to take internal performance indicators to the goal level. However, methodological inconsistency among municipalities and all tiers of governments restricts their transition to the SDG framework (Simon, et al., 2015). A unified reporting and evaluation framework like the cities Index could fill this gap. Municipalities found the SDG index as a way forward to an integrated and comprehensive framework for reporting and monitoring that could be built on existing data streams. It can facilitate standardized reporting and data for all. Furthermore, the cities' index dashboards or indices could help communicate with the public more quickly.

A comprehensive and unified attempt would be necessary to localize SDGs. Which is also relevant to achieve affordable housing for all. In the Canadian context, the provincial role would be vital. Provinces should take the lead, facilitate to overcome resource deficits, motivate municipalities, and embed sustainable development policies through provincial legislation. It confirms that in addition to devolution, as advocated by the subsidiarity principle, the proprietary responsibility (Golemboski, 2015), enabling operational environment (Messner, 1952), and the role of upper tiers of governance

(Drew & Grant, 2017) in achieving local goals are vital for the localization of SDGs and affordable housing. Furthermore, a comprehensive move would be required to educate all stakeholders, create a unified reporting structure, and provide local administration data collection and measurement assistance. The diversity of SDG's geographic scales makes it hard to pursue only a normative approach for decision-making due to political and administrative bargaining, lack of information, and local capacity (Dasandi, Hudson, & Pegram, 2015). SDG localization requires a scientific approach and a political and administrative consensus over decisions and processes.

Housing sensitivity to economic performance, environment, human prosperity, and urban governance makes housing affordability a diverse and complex problem that requires a multi-faceted and holistic approach. Therefore, housing contributes to the most of SDGs and drives household resilience and sustainability. Urban sustainability is not possible without realizing everyone's right to safe, adequate, and affordable housing. The discussion concluded that conceptual understanding, market knowledge, and governance priorities set the course of policy development. Furthermore, affordable housing policies rely on market practices, socioeconomic circumstances, political will, policy jurisdiction, operational capacity, and the role of the upper tiers of government (Raynor & Whitzman, 2021; Turk, 2019). Canadian municipalities have their unique challenges due to socioeconomic and geographical circumstances, a complex hierarchy of decision-making, changing priorities, and the local government's incapacity to act (DesBaillets & Hamill, 2022; Guha & Chakrabarti, 2019; UCLG, 2018; UNDP-WBG, 2016). Furthermore, multiscalar policies ignoring local circumstances and segregated responsibilities without considering functional and jurisdictional constraints make it harder for local governments to respond to contextual housing needs. The outcome of this research is aligned with the principle of subsidiarity which advocates the dominance of norms and ethics in policy development, decentralization of authority and resources, clear lines of responsibility and accountability, and reliance on the competence of local authority (Dylus, 2021; Spiller, 2022). Considering the challenges of municipalities, it is essential to revitalize the urbanization process to achieve the target of inclusive, safe, resilient, and sustainable cities (UNDP-WBG, 2016). Knowledge sharing, stakeholder awareness, and voluntary local reviews to ensure accountability criteria will promote coordination between the industry actors and improve the housing delivery mechanism (UCLG, 2018). The adaptation of the subsidiarity principle (Bortel, 2012; Morphet, 2018) and innovative (Bates, 2022; Mullins et al., 2018) and place-based policy development such as revenue-based affordable housing models (Morphet & Clifford, 2017; Nizau & Trillo, 2019; Potsiou, et al.,

2022; Noring, Struthers, & Grydeho, 2022; Vasoo & Jia, 2018) would help to revolutionize the Canadian housing delivery structure.

To summarize, constraints to localizing SDGs and achieve affordable housing identified in this research can be organized concerning the distribution of authority, functional and geographic mapping, and assigning roles and responsibilities. These factors set a foundation for the subsidiarity principle, which guarantees delegation of commitment to a lower level of governance provided the federal government's role in ensuring systematic implementation of regulations and provision of necessary resources. Furthermore, the interconnectedness of SDGs requires synergies and tradeoffs to overcome potential hindrances and supplement multilateral efforts (United Nations, 2018). Similarly, complexity of housing system demands multidimensional approach, multisectoral integration, and tradeoff between socioeconomic and environmental objectives. Such complexity wouldn't be easy to address without innovative and out-of-the-box solutions to address socioeconomic and geographic differences between cities. It would further facilitate the global nature of societal problems that can be diffused on a regional scale with similar challenges through a standardized framework of policy tools (Wanzenbock & Frenken, 2020).

A theoretical accumulation and responsiveness trap of the subsidiarity principle has added to the conceptual complexity of the theory (Knill & Tosun, 2020). We believe that the subsidiarity principle was misunderstood by assessing the theory from a single lens. For instance, the subsidiarity debate revolved around the jurisdiction and application of the theory covering a variety of factors, including individualism or pluralism (Føllesdal, 1998), moral or realism (Da Silva, 2022a), local or national (Da Silva, 2022b), normative democracy or deliberate democracy (Dollery, 2009), authority or function (Follesdal & Fraticelli, 2015), generic or specific (Cahill, 2021).

We have studied the application of subsidiarity theory for the localization of SDGs involving normative and functional aspects of urban functions such as affordable housing, which is unique. Our findings broaden the range of the existing subsidiarity and localization literature. Our study confirmed that the SDG's localization is best applied using a nexus of the subsidiarity principle, place-based theory, and innovation theory. Furthermore, our findings demonstrated that local authorities' horizontal and vertical association is not limited to policy development or allocation of power. It is a complex integration of needs, willingness, competencies, functional relationships, and defining jurisdictions at all levels of governance. Which is necessary to facilitate local governments to address development

challenges such as affordable and sustainable housing. Finally, our study indicates that the subsidiarity principle may not be limited to delegating authority or subsidium. It would require the inclusion of policy ownership, contextual tradeoff, and access to and appropriate distribution of resources.

Furthermore, the study clarifies the definitional ambiguity of the subsidiarity principle facilitating its purposeful application in the context of urban sustainability. The subsidiarity principle can be best understood from a systems perspective, not a standalone normative approach. The theory provides a basis for a tradeoff between normative and functional needs across political, administrative, and operational units. From a systems perspective, the subsidiarity principle can help to understand the contextual socioeconomic and environmental circumstances, balance normative and functional constraints, and justify informed policy development. Furthermore, the subsidiarity principle is theoretically generalizable, not a contextual solution drawn out of it.

MANUSCRIPT ENDS

Chapter 5

Housing Sustainability: The Effects of Speculation and Property Taxes on House Prices within and beyond the Jurisdiction

Housing system heterogeneity and its sensitivity to human wellbeing make housing policies vulnerable to achieving their objectives without an integrated approach (Gilbertson, Grimsley, Green, & Group, 2012). The challenge is further increased due to limitations of our understanding of the housing system's dynamics and complexity, policy design relevance, and implementation that are also subject to both intended and unintended negative consequences (Shrubsole, Macmillan, Davies, & May 2014; Davies & Oreszczyn, 2012). In addition, the prevailing political structure that embroiled the conflicting interest in property, resource generation, and development has failed to address the more significant social and environmental sustainability of housing that calls for immediate attention (Godfrey, Dear, & Regier, 2019).

Many factors, attributes and relationships between housing system and stakeholders influence the delivery of affordable housing (Choi, Zhu, Goodman, Ganesh, & Strochak, 2018). The core aspects of sustainable housing are adequacy, suitability, and affordability (Okkola & Brunelle, 2018). These aspects must be achieved through balancing social, environmental and economic objectives to achieve overall sustainable housing development (Tan, Xu, & Zhang, 2016; Bratt, 2016). However, the prevailing housing system in Canada cannot meet the housing needs of all segments of society (CMHC, 2018) as well as environmental standards that address climate change (Tushar, 2019). Further to increasing housing costs in the urban core, low income families are pushed out to urban neighborhoods with lower economic opportunities and fewer urban facilities (Skaburskis & Nelson, 2014), fostering spatial segregation (Walks, 2015) and social disparities (Rozworski, 2018).

The literature suggests that migration driven by house prices creates displaced and replaced demand, which may be considered a driving factor (Hamnett, 2009). On the other hand, speculation is caused by investment interests and wealth management, channeling their investments for future returns (Rauf, 2017). Therefore, housing investment behaviors depend on spatial links between housing markets. Instead, speculations caused by premium expectations and propagation by various media actors play a crucial role in price movement (Shiller, 2000). In this sense, income variation and spatial lags are not the only factors determining house prices.

Regional housing markets are different due to behavior and structural composition. For example, income, occupation, ownership, household debts and planning constraints vary between locations. Therefore, a complete set of interdependencies needs to be analyzed to determine the heterogeneity coefficient in different housing markets (Meen, 1999). For instance, desirable locations and investment objectives will form a connection between the city core and its peripheries. Prices would reduce its strength as the location moves away from the core (Jowsey, 2011; Grigoryeva & Ley, 2019).

The complexity of housing in an urban context can be better understood by developing a framework incorporating the development pattern process and association of locations, land use, and policy interactions (Scott & Storper, 2015). Furthermore, housing policy adoption and actualization depend on the translation and assemblage of policies and ideas that move through time and space to new contexts (Baker & Evans, 2016; Clarke, Parsell, & Vorsina, 2020). Therefore, a widespread adaptation of similar policies across diverse markets will not be able to deal with contextual housing affordability issues (Cheung, Day, Wu, & Tomlinson, 2019). Furthermore, urban decision-making approaches and implementation processes require further research and knowledge development (Nilsson et al., 2014). Finally, contextual heterogeneity requires intense and multiple theoretical approaches to address the urban development process and related challenges (Scott & Storper, 2015).

Many countries have introduced housing policies to address housing adequacy, availability, and affordability. However, integration policies initiated from different levels of governance, the interaction between various policy instruments and their effectiveness are not sufficiently investigated (Aydin & Brounen, 2019; Karunathilake et al., 2020). Similarly, according to Gurran and Bramley (2017), despite knowing the significant drivers (demographics, incomes, and access to credit) of housing supply and demand, uncertainties still exist for policy design, influencing demand and supply due to speculative investment and urban regeneration.

Multilateral and dynamic factors influence the relationship between housing affordability and housing policies. These factors may include property taxes, interest rates, development charges, fiscal requirements, the value of space, local capacity and the demographic factors that are driven by socioeconomic and environmental objectives. This chapter details the case analysis of nine cities in different administrative regions in the province of Ontario. Government intervenes in housing market either by providing financial assistance to households or influencing housing holding or purchasing costs (Galster & Lee, 2020). We have focused on selected government interventions such as Non-

Residential Speculation Tax (NRST), interest rates and property taxes and their impact on intra-regional housing markets. This research first analyzed the control variables regarding housing prices in the selected municipalities, such as population and unemployment. Later, the housing market efficiency variables, such as units sold, absorption rate and units created, are tested to analyze their relationship with house prices.

The study has investigated the housing markets' response to regulatory measures in administratively different but geographically compact regions. Additionally, the research provides a different angle of analysis by evaluating the varying impacts of regulatory policies corresponding to local demographic factors and intra-regional housing market interaction (Alexiou, Chan, & Vogiazas, 2018). The research advances knowledge and theory in housing system analysis, sustainable housing, and policy-related decision-making. It provides insight into the accumulative effect of policies and demographic factors that shape local housing markets while paving the way for an integrated assessment of multiple elements based on multidisciplinary theories.

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MANUSCRIPT BEGINS

5.1 Abstract

Housing plays an essential role in sustainable governance due to its socio-economic and environmental connection. However, the relationship between governance policies, market behavior, and socio-economic outcomes varies geographically and demographically. Therefore, segregated policies developed and implemented may fail to achieve their desired objectives because of the sensitivity of housing policies for their connection to human wellbeing. The effectiveness of housing policies in geographically connected regions is one of the areas that has received little attention in the Canadian context. The study follows a multi-step empirical method using a multiple linear regression model and a difference-in-difference approach to assessing the geographical variation of speculation and property taxes on housing markets. The study confirms that speculation taxes are not an effective tool in curbing house prices. Similarly, considering the role of property taxes in providing public services, delinking property taxes from a potential contributor to house prices would provide a better lens to develop local housing policies. Furthermore, the study also confirms that the housing market can be better assessed at a local scale, considering geographical influence in conjunction with investment trends.

5.2 Introduction

The housing system's multidimensionality as well as its multi-factor influence make it complex and highly sensitive to policies (Sterman, 2000). Moreover, the sustainability challenges imposed by a rapidly changing global socioeconomic structure (such as globalization and financialization) may not be dispensed by orthodox policy instruments that cannot make housing environmentally sustainable and affordable to all (Herrle & Ley, 2016). Moreover, the housing system makes the policies sensitive to human wellbeing ranging from economic factors to health associated to living conditions. Therefore, policies developed and implemented without an integrated approach may fail to achieve their desired objectives (Gilbertson, Grimsley, Green, & Group, 2012).

The literature to date has identified several factors affecting the adoption of housing sustainability. These factors are generally based on household behavior, socio-economic conditions, geography, environment, policy, and policy instruments. The policy instruments include financial, monetary, and regulatory measures to manage consumption and public services, and to regulate market activities to meet socioeconomic and environmental objectives (Sanberg, 2018; Weber & Mathews, 2008). However, the multilateral and dynamic nature of governance objectives and instruments used

make it challenging to achieve an optimum and sustainable outcome (Cohen, 2019; Eriksen & Lang, 2018). For instance, the quality of public services, environmental ambiance, and energy efficiency play a key role in property values. These values are judged against housing cost and availability, which influences real estate market activities (Bai, Li, & Ouyang, 2014; Giertz, Ramezani, & Beron, 2021; Poterba, 1984). Thus, this poses another policy challenge in balancing local economic objectives and housing affordability. Furthermore, housing regulations are not just limited to offsetting the cost and supply of housing market interventions through market control and providing subsidies; they also affect housing rent, energy consumption, and efficiency (Eriksen & Lang, 2018; Lima, 2020).

Housing markets are exposed to exogenous and endogenous factors subject to socioeconomic policy interaction at upper and lower tiers of governance. There is considerable literature on tax competition between municipalities in response to constraints imposed by central government (Agrawal, Hoyt, & Wilson, 2020). However, most studies have contextualized outcomes due to geographic variances and the combination of variables used to assess policy outcomes. For instance, Lyytikäinen (2012) studied the impact of property tax competition between taxed and non-taxed local governments resulting from the tax reforms imposed by the central government of Finland. However, the study was focused on the federal government restricting municipalities' property tax rates. Housing policy is a provincial mandate, limiting local government influence on public services through property taxation in the Canadian context. Policy jurisdiction implies policy integration between upper and lower tiers of governance that relies on governance structure and contextual setting. Furthermore, tax implications and concurrent policies, such as a policy response to central or provincial regulations at the local scale, are essential areas of research that require more emphasis (Agrawal, Hoyt, & Wilson, 2020).

In addition to policy integrational challenges, geographic and demographic differential outcomes add to the complexity of the relationship between housing policies and the housing market. Per several researchers (Ball, 2011; Meen, 1999; Propheter, 2019; Spencer, Vinodrai, Gertler, & Wolfe, 2010), housing policy outcomes will have a spatial disparity and spillover effect due to the difference in market characteristics, homeownership status, and timing and choice of policy delivery mode. Therefore, the complexity of the housing system advocates intraregional and localized scales of assessment of housing policies (Glaeser & Gyourko, 2006; Kilian & Zhou, 2018).

Researchers (Esping-Andersen, 1990; Kemeny, 2006) have theorized on the housing system and policy configurations under liberal and social-democratic regimes. However, such theories still lack some con-temporary factors such as financialization (Stephens, 2020), market regulation, and environment, which are all considered significant factors of change in the housing system (Galster & Lee, 2020). Furthermore, the net outcome of the regulatory policies is highly contextualized in terms of local connections, policy configuration, obligations, and local capacity (Kaminski, 2019; Villalobos, 2019). The interaction between housing affordability and housing regulations at the inter-metropolitan scale is a crucial research domain that lacks emphasis (Cox & He, 2016; Gabbe, 2019).

The relationship between taxes and house prices is one of the areas of interest that is considerably investigated, but no clear consensus has been achieved (Giertz, Ramezani, & Beron, 2021). However, in the Canadian context, this is one of the areas that has gained little attention. Additionally, the behavior of multiple taxes and spatial variation have not been much emphasized by academia (Fischer, Huber, Pfarrhofer, & Staufer-Steinnocher, 2019). The objective of this paper is to assess inter-city variation in tax policies in a compact regional setting. It investigates the behavior of local property taxes and the impact of a regional speculation tax on house prices within and beyond tax jurisdictions, using the multivariable regression method to investigate spatial variation in house prices. This study confirms the distortionary behavior of regulatory policy, but such policies are ineffective in controlling house prices. In contrast to some previous studies, the regulatory approach is futile in the long run by contributing to a house price increase. Furthermore, the study confirms that the impact of regulatory policies resonates beyond policy jurisdiction.

This paper details the case analysis of nine cities that are from multiple administrative regions in the province of Ontario. It produces an interesting study in its assessment of the housing markets' response to regulatory measures in administratively different but geographically compact areas. In addition, the research provides a different angle of analysis by evaluating the varying impacts of regulatory policies corresponding to local demographic factors and intra-regional housing market interaction (Alexiou, Chan, & Vogiazas, 2018). The research contributes to advancing knowledge and theory in housing system analysis, sustainable housing, and policy-related decision making. It provides in-sight into the cumulative effect of policies and demographic factors that shape local housing markets, while further paving the way for an integrated assessment of multiple elements based on multidisciplinary theories.

The following section reviews the literature on the relationship between housing taxes and prices. The study area, variables, and methods adopted for empirical analysis are discussed in the subsequent section. The third section details the empirical outcomes and discussions. Finally, the last section concludes with the findings.

5.3 Literature Review

5.3.1 Housing Affordability and Sustainability

Housing-related global, societal, and policy issues are becoming a significant concern for policymakers and academia (Wetzstein, 2018). The core of this issue is rising housing costs surpassing household income increase (Perry, 2015). Housing affordability, particularly for starters, has become a significant concern in recent years (Choi, Zhu, Goodman, Ganesh, & Strochak, 2018; Hromada & Cermakova, 2021). According to United Nations Habitat, more than 880 million people around the globe live in slums. The situation worsens with a shortage of houses; for instance, in South Asian countries, thirty-eight mil-lion homes are required to meet the demand (UN-Habitat, 2016). Similarly, 440 households worldwide—1.6 billion people—will be struggling for suitable housing by 2025 (Woetzel, Ram, Mischke, & Sankhe, 2014). Moreover, rising urbanization, economic disparities, and environmental challenges make it hard to provide adequate, suitable, affordable, and sustainable housing for all.

In terms of housing sustainability, the housing market is influenced by how sustain-ability is defined, driving factors, policy objectives, and the way demand and supply are managed in response to housing market activities (Collinson, Ellen, & Ludwig, 2019; Pomeroy, 2017). For instance, in Canada, the core aspects of sustainable housing are adequacy, suitability, and affordability (Okkola & Brunelle, 2018). However, these objectives can only be achieved through balancing social, environmental, and economic goals to achieve overall sustainable housing development (Tan, Xu, & Zhang, 2016).

Governments around the world use various policies to address housing sustainability. Their goals are energy efficiency, reducing carbon emissions, addressing urban sprawl and the connection between housing and mobility, housing affordability, and reducing social and health inequalities (Macmillan, et al., 2016). However, some conflicts between objectives, such as the environmental standard of houses, energy consumption, and affordability, are considered a significant barrier to

progress (APPG, 2013). Additionally, economic and planning policies shape housing costs and socio-economic disparity across residential spaces and tenures (Branco & Alves, 2020).

The research acknowledges that housing is sensitive to varying institutional and policy structures influenced unevenly across scales and population geographies (Herrle & Ley, 2016). Therefore, a relationship between governing policies, the housing market, and housing affordability is crucial. For example, an interaction between housing affordability measures and planning regulations (Cox & He, 2016; Gabbe, 2019; Hulchanski, 1995) and managing energy consumption and housing cost through taxes (Sanberg, 2018; Weber & Mathews, 2008; Cohen, 2019; Slack, 2016; Raslanas, Zavadskas, & Kaklauskas, 2010; Bednář, Čečrdlová, Kadeřábková, & Řežábek, 2022). However, economic and development policies are driven under different regimes. As discussed above (Esping-Andersen, 1990; Kemeny, 2006), theories about the housing system and policy configurations lack speculative investment for the sake of profit (Stephens, 2020) and government response to regulate speculative investment impacts the housing disproportionately (Galster & Lee, 2020). Therefore, it is worth investigating the behavior of housing markets under varying regulatory measures intended to influence house prices.

5.3.2 Real Estate Taxes and House Prices

Real estate and property taxation literature contains mixed opinions about the relationship between property-related tax policies and house prices. Some researchers (Benjamin, Coulson, & Yang, 1993; Dachis, Duranton, & Turner, 2012; Fritzsche & Vandrei, 2019; Oates, 1969; Tiebout, 1956) have found taxation policies helpful in curbing house prices, whereas some have not (Best & Kleven, 2018; Hoyt, Coomes, & Biehl, 2011; Lundborg & Skedinger, 1999; Wei, Chu, Hsu, & Hou, 2019). The disparity in conclusions is mainly due to a difference in the combination of variables used, study setting, research design, and tax policies analyzed. Research suggests that the net outcome of policies would depend on a combination of taxation policies applied, their scope, and demo-graphic and geographic variation.

The real estate and property taxation literature considers tax policies from two major perspectives: policies impacting transfer of ownership and policies impacting the user's cost of housing. The former, which is applicable on the housing transaction link, implies tax payable when transferring ownership or policies restricting investing in secondary residential properties. The latter form of policies relates to the retention of houses, usually recurring and applicable to housing value, or in the

form of tax incentives such as mortgage tax credits. These taxes on the retention of housing directly impact the user's cost of housing.

Previous studies have adopted various approaches to determine the influence of taxation on house price volatility. Most studies have used policies related to transaction or retention links of housing and aggregate national-scale data to assess policy implications on housing prices (Liberati & Loberto, 2019; Oliviero, Sacchi, Scognamiglio, & Zazzaro, 2019). In addition, they have either framed the analysis in the context of market distortion (Benjamin, Coulson, & Yang, 1993; Fritzsche & Vandrei, 2019; Best & Kleven, 2018; Kopczuk & Munroe, 2015; Yu & Chen, 2018), analyzing investment behavior (Ling, 1992; Manganelli, Morano, Rosato, & De Paola, 2020), or cost–value analysis (Cebula, 2009; Rosen & Fullerton, 1977). Many empirical studies have indicated that both transaction and transfer links have significant explanatory power for price differences before and after the implementation of taxes. However, limited studies (Oliviero, Sacchi, Scognamiglio, & Zazzaro, 2019; Tsoodle & Turner, 2008) have adopted the aggregate impact of both forms of tax policies and have analyzed price variation between cities. Furthermore, national- and provincial-scale aggregate data, ignoring intercity demand and supply heterogeneity, will limit the strength of a conclusion (Hoyt, Coomes, & Biehl, 2011; Murray, 2022). Additionally, considering the importance of geographic variation, the tax policy impact beyond its administrative jurisdiction is one of the vital aspects that remains under-researched.

Studies conducted to assess the retention taxes have framed their analysis in the context of cost capitalization (Propheter, 2019; Liberati & Loberto, 2019) and impact variation (Berkovec & Fullerton, 1992; Chambers, Garriga, & Schlagenhauf, 2009; Li & Yu, 2021) due to variation in population income level, tenure status, investment choice, and service value. The aggregate outcome of these policies is not uniform. For instance, housing purchase subsidies may contribute to driving up real estate prices (Krolage, 2022). Similarly, mort-gage tax credit in the United States is meant to facilitate homeownership. However, many researchers believe that the mortgage tax credit policy is inefficient and somewhat coun-terproductive (Chatterjee & Eyigungor, 2015). The literature shows that instead of price capitalization, a mortgage tax credit limit reduction decreases house prices (Poterba, 1984; Hilber, 2017; Sommer & Sullivan, 2018). This is mainly due to the increasing cost of housing ownership, which reduces investment interest in a secondary home. In contrast, primary homeowners are more concerned with house prices than with homeownership costs (Ricks, 2021).

Furthermore, the policy measure impacts differently across population income tiers, housing tenure status, and spatial variations (Berkovec & Fullerton, 1992; Chatterjee & Eyigungor, 2015; Ricks, 2021). Mortgage tax credit facilitates the rich more than the poor. It is believed that incentivizing retention cost encourages secondary house investment, speculates house prices, and promotes inequality. Similarly, recurrent property taxes implemented by local governments to fund public services are highly dependent on the quality of services provided. The relationship between tax rate and public service expenditure determines the quality of public goods (Oates, 1969; Liberati & Loberto, 2019). However, the impact of property taxes on house prices may cause a differential outcome. Increased property taxes with low-value public value may negatively impact house prices. This may lead to population sorting, encouraging people to move to either low-taxed areas or communities with quality public goods to compensate for additional user cost of housing (Berkovec & Fullerton, 1992; Brueckner & Kim, 2003). Subsequently, neighborhoods with high-value public services increase housing demand, resulting in increased house prices (Cebula, 2009; Han, Cui, & Yu, 2021). Therefore, an aggregate impact of retention taxes and incentives is driven by a cumulative user cost, service value, and household income that varies geographically.

The literature on transfer taxes has no definitive answer to the effectiveness of trans-action policing in curbing house prices. As per some researchers (Benjamin, Coulson, & Yang, 1993; Dachis, Duranton, & Turner, 2012; Fritzsche & Vandrei, 2019), transfer taxes efficiently control house prices, whereas, for others (Best & Kleven, 2018; Hoyt, Coomes, & Biehl, 2011; Wei, Chu, Hsu, & Hou, 2019), there is a positive correlation between transfer taxes and house prices. However, there is a consensus on the stimulus behavior of taxes on the transaction link, creating market distortion in the short run (Best & Kleven, 2018; Kopczuk & Munroe, 2015; Yu & Chen, 2018). Most of these studies have used short-term or event analysis to assess the impact of transfer tax on house prices, ignoring long-term and integrated impact at the regional scale. In general, property-related taxes might be significant in the short run, but they are not driving housing demand in the long run (Lin & Hsieh, 2021). This means that investment decisions may not be affected by property-related taxes if the benefit outweighs the cost (Wei, Chu, Hsu, & Hou, 2019; Manganelli, Morano, Rosato, & De Paola, 2020; Bimonte & Stabile, 2020). In these circumstances, price speculation is the most crucial factor driving the housing market. Policies controlling drivers of housing speculation, such as taxing secondary home investments or capital gain from property flipping, are also ineffective unless restrictions are imposed on executing such investment moves (Li & Xu, 2016). Wei et al. (2019) concluded that house prices

do not react to the conventional market asymmetric volatility phenomenon. They are primarily driven by past trends and speculation about future price growth. The effectiveness of tax regimes relies on the combination of real estate and housing policies. Agrawal et al. (2020) emphasized that a singular approach to policy assessment, ignoring local response to the federal constraints, would limit its relevance to determining the effectiveness of the policy outcome. Subsequently, single-ended measures will not be adequate in achieving house price control objectives (He & Wen, 2017).

In addition to a combination of tax policies, geographical variation of tax instruments, qualification, and spillover effect will alter the aggregate outcome (Mo, 2019). Very few studies have attempted to assess the aggregate outcome of policies on retention and transfer links of housing transactions (Oliviero, Sacchi, Scognamiglio, & Zazzaro, 2019; Manganelli, Morano, Rosato, & De Paola, 2020; Mo, 2019). However, studies that have attempted cumulative assessment were limited to one city or multiple cities from geographically disconnected regions. No studies were found regarding evaluating market response to housing policies within and beyond policy jurisdiction in geographically related areas.

5.3.3 Ontario Non-Resident Speculation Tax (NRST)

Rising house prices are one of the key challenges in Canadian Cities. An influx of immigrants, a short supply of new units, and government lack of interest in public housing are considered primary reasons for increased housing costs (Kilian & Zhou, 2018; Okkola & Brunelle, 2018; Pomeroy, 2017; Rozworski, 2018) Additionally, financialization of the housing market and growing interest in foreign investment are also believed to fuel house prices in Canadian cities (Krznar, Arvai, & Ustyugova, 2017; Simone & Walks, 2019; Walks A. , 2013)). A foreign buyer is classified as a buyer who is neither a citizen nor a permanent resident of Canada. Two Canadian provinces have introduced an additional tax on foreign buyers. The objective was to limit the alleged role of foreign investors in speculating Canadian housing markets. British Columbia (BC) took the lead in imposing a 15 percent additional tax on foreign buyers in July 2016. Later, BC raised the tax rate to 20 percent in February 2018. The BC foreign buyer's tax covered five major districts, of which four are closely packed.

Ontario was the second province to introduce a tax on foreigners purchasing proper-ty (BC, 2020). The Ontario Non-Resident Speculation Tax (NRST) tax received royal assent on June 1, 2017. However, the tax came into effect on transactions that happened on or after 21 April 2017 (OMF, 2021). Following the global reaction to the impact of the COVID-19 pandemic (Kaklauskas, et al., 2021), the

tax was later suspended during the Government of Ontario's emergency declaration from January 17 to 24 July 2020 (OMF, 2021). The tax rate of 15 percent is applied to the sale price of a residential property purchased within the Greater Golden Horseshoe Area (GGH) by foreign nationals or entities. However, GGH neighboring cities are exempted from NRST. This makes the Ontario case different from BC due to a large number of neighboring densely populated cities outside of NRST jurisdiction.

Based on the literature discussed above, this study examines how effectively transfer tax policy, such as NRST implemented in the GGH region, fulfills its intended objective of controlling housing market speculation. Additionally, the study assesses how speculation tax implemented in one region influences markets beyond its administrative jurisdiction. Furthermore, it examines the contribution of local property taxes and mortgage interest rates to local house prices. In this case, the study combines assessing the role and geographical variation in retention and transfer taxes on house prices. Thus, it would help to determine the effectiveness of housing policies in an intra-regional setting against the speculative investment behavior of conventional financialized housing markets.

5.4 Method

5.4.1 Study Area and Data Description

The research was conducted in the province of Ontario. Ontario is the most populous province in Canada, holding over 36 percent of the total housing stock. Ontario contributes around 22 percent of Canada's total GHG emissions, which includes an 18 percent contribution by the residential sector (CER, 2017). Ontario is a critical region to study house price response to various housing policies in markets located in geographically adjacent but administratively different regions. The intra-regional markets comprise multiple administrative regions and CMAs (Census Metropolitan Areas) of Ontario. The city of Toronto, being the largest city, is considered a regional economic center (Joy & Vogel, 2015). For this study, secondary regions are defined on policy-based provincial subdivisions: the Greater Golden Horseshoe (GGH) and the non-GGH region. GGH is the mega metropolitan region in Southern Ontario. We selected CMA boundaries for data consistency. A CMA is defined as a territory with more than 100,000 residents, of which more than 50,000 live in its core. There are sixteen CMAs in Ontario, of which nine CMAs are in the region of GGH. The list of sample geographical areas is presented in Table 7. The sample includes five CMAs from the GGH region and four CMAs from the non-GGH region.

Table 7: Sample geographical area.

CMA	House Price—CREA Boundary	Region
Toronto	City of Toronto	GGH
Guelph	Guelph and District	GGH
Hamilton	Hamilton–Burlington	GGH
KWC	Kitchener–Waterloo and Cambridge	GGH
St. Catherine Niagara	Niagara Falls and Fort Erie	GGH
London	London and St. Thomas	Non-GGH
Windsor	Windsor-Essex	Non-GGH
Ottawa (Ontario part)	Ottawa—Ontario	Non-GGH
Kingston	Kingston	Non-GGH

We have gathered a data set to assess major drivers of house prices in their regional and contextual settings. The housing data covers the period from Jan 2011 to Dec 2021. The data for monthly average house prices and the number of units sold for all CMAs, excluding the city of Toronto, were obtained from the Canadian Real Estate Association (CREA). In contrast, average Toronto house prices were not available through CREA. Therefore, we retrieved Toronto's average house prices and the number of units sold from Toronto Regional Real Estate Board (TRREB) monthly sales reports. The real estate boards rely on the data obtained through Canada's Multiple Listing Services (MLS) platform that facilitates home sales in Canada. Real estate agents associated with CREA use this platform for property listings. Generally, most of the Canadian housing market that operates through the MLS platform captures the majority of housing activities in the region. As a result, there might be some differences in housing market boundaries assigned by CREA and the CMA boundaries. However, in this study, we have assumed this difference insignificant and have adopted the same data assignment methodology for all CMAs included in this study.

Table 8 presents a list of the variables and data descriptions. The number of units sold is the sum of detached, semi-detached, townhouses, and apartment units. Other independent variables are

categorized into housing supply, housing demand, and housing policy. The supply-side indicators include the total number of units created, the absorption rate of new housing units created, and the housing vacancy rate. The monthly data for the number of units created and the absorption rate of new housing units were obtained from Statistics Canada. The annual vacancy rate for each CMA was available from Statistics Canada. The demand side variables, such as unemployment rate and population, were controlled in this study. Monthly data for the unemployment rate and people of 15 years of age and above were obtained for each CMA from Statistics Canada. Three different levels of housing policies were used in this study. The housing mortgage rate, non-resident speculation tax (NRST), and residential property interest rate were used as proxies for national, regional, and local policies. We used a five-year variable discounted mortgage rate from ratehub.ca. It is an average rate closer to the actual mortgage rate a bank would offer. For convenience, the remainder of the paper uses the term "City", which refers to a CMA.

Table 8: Variable description, data range, frequency

Domain	Variables	Period / Frequency
National Policy	Mortgage Rate (5Y-Var.)	Jan 2011–Dec 2021 (Monthly)
Regional Policy	NRST	Yes/No (1, 0)
Local Policy	Property Tax Rate	Jan 2011–Dec 2021 (Annual)
Market Outcome	Average Price	Jan 2011–Dec 2021 (Monthly)
	Units Sold	Jan 2011–Dec 2021 (Monthly)
Supply Side	Units Created	Jan 2011–Dec 2021 (Monthly)
	Absorption Rate (New Units)	Jan 2011–Dec 2021 (Monthly)
	Vacancy Rate	Jan 2011–Dec 2021 (Annual)
Demand Side	Unemployment Rate	Jan 2011–Dec 2021 (Monthly)
	Population (15+ × 1000)	Jan 2011–Dec 2021 (Monthly)

5.4.2 Dependent Variable

We conducted two separate tests to perform multivariate regression for average house prices and the number of units sold. Testing was performed to understand how NRST relates to average house

prices and units sold. The adjusted R-square value is 0.702 and 0.763 for average house prices and units sold, respectively. This indicates that the model explains 70.2% and 76.3% of variance with house prices and units sold, respectively. Additionally, the centered fitted values are taller than the residual values for both the average house prices and the units sold. Therefore, we can conclude that the spread of fitted values is greater than the spread of residual values. The distribution of the values is also normally distributed. This means variables account for the significant variations in the model, with small residual variation.

The coefficient for NRST is significant for average house price ($p \leq 0.0001$, $t = 12.47$) and units sold ($p = 0.0398$, $t = -2.06$). This indicates that introducing the NRST tax contributes to increasing the house price, while negatively impacting the units sold. However, the relative influence of NRST on units sold is low (St. Est. –0.03814) compared to average house prices (St. Est. = 0.31012). Therefore, we continue our analysis with average house prices as the dependent variable. The test results are presented in Table 9.

Table 9: Cumulative impact of housing policies on average house prices

Variables	DF	t Value	Pr > |t|	St. Estimate	t Value	Pr > |t|	St. Estimate
Dependent Variables			Average House Price			Units Sold	
Intercept	1	20.76	<0.0001	0	6.55	<0.0001	0
Independent Variables							
Mortgage Rate	1	–18.14	<0.0001	–0.33393	–2.91	0.0037	–0.05532
NRST Tax	1	12.47	<0.0001	0.31012	–2.06	0.0398	–0.03814
Property Tax Rate	1	–5.52	<0.0001	–0.13753	–6.40	<0.0001	–0.15285
Units Sold / Average Price	1	2.33	0.0201	0.07385	2.33	0.0201	0.06196
Units Created	1	1.54	0.1241	0.06229	5.38	<0.0001	0.19727
Absorption Rate	1	1.99	0.0469	0.03637	4.14	<0.0001	0.06901
Vacancy Rate	1	–6.54	<0.0001	–0.12946	2.56	0.0104	0.04722
Unemployment Rate	1	–0.24	0.8100	–0.00481	–1.38	0.1676	–0.02531

Population	1	6.66	<0.0001	0.32153	11.78	<0.0001	0.50194
Dependent Variable			Average House Price			Units Sold	
F Value			311.38			396.28	
Pr > F			<0.0001			<0.0001	
Root MSE			105,071			443.1225	
Dependent Mean			434,023			936.18	
Coeff Var (R-MSE/D-Mean)			24.2085			47.3329	
R-Square			0.7040			0.7517	
Adj R-Sq			0.7018			0.7498	
Observation Used			1188			1188	

The total number of observations used in this model is 1188, excluding the missing values. The number of effects is 10, including the intercept. The p-values for average house price and units sold are both significant ($p < 0.0001$). However, the coefficient of the variable for house price (24.21) is stronger than for units sold (47.33). Therefore, we can conclude that the independent variables selected in the model can reliably predict house prices (dependent variable) compared to the units sold. Furthermore, the adjusted R-square value (0.7018) indicates that 70 percent of variation in the dependent variable is predictable with the independent variable selected in the model. Therefore, we can conclude that the impact of independent variables, including housing policies, can be better understood with the average house price variable compared to the unit sold variable.

Our full model (Table 9) includes key variables to assess house price response to market supply, market demand, and control measures. For this study, we have controlled the population and unemployment rate. Vacancy rate and absorption rate contribute to housing supply. The mortgage rate, NRST, and property taxes are considered controlled measures at the national, regional, and local scales. The fluctuation in the number of units sold, depicting the market response to policies, significantly correlates with house prices ($p < 0.0001$). Similarly, vacancy rate ($p < 0.0001$, $t = -6.54$) and absorption rate ($p = 0.0469$, $t = 1.99$) significantly influence house prices. However, the number of units created

($p = 0.1241$) has no significant relationship with house price. On the other hand, government control measures have a varying impact on house prices. The property taxes have a significant ($p < 0.0001$) but relatively weaker ($t = -5.52$) influence on house prices, whereas NRST tax ($p < 0.0001$, $t = 12.47$) and the mortgage rate ($p < 0.0001$, $t = -18.14$) show a strong and significant relationship with regional house prices.

5.4.3 Empirical Model

The study uses descriptive analyses and inferential statistics to analyze the variables. Multiple linear regression (MLR) is widely used to assess the response of house prices to socio-economic, environmental, and policy factors (Zhang, Jin, Xiao, & Gao, 2020; Nistor & Reianu, 2018). This study uses the ordinary least square (OLS) regression method to explain a response of a dependent variable to changes in more than one explanatory variable (Hutcheson, 2011). Our model assumes a linear relationship between variables as well as assuming no significant correlation between independent variables. Additionally, having panel data for treatment and control groups before and after an event, the difference-in-difference (DID) method is useful to assess the impact of an event (Eerola, Harjunen, Lyytikainen, & Saarimaa, 2021; Marcato & Nanda, 2022). Therefore, we use the DID method to assess the relation between tax intervention and house prices.

The study developed a multiple linear regression model to evaluate the influence of policy frameworks on intra-regional house prices. The empirical analysis follows three steps. First, multivariate regression analysis selects an appropriate dependent variable, ensuring the model's reliability to predict the response variable. The second step involves impact assessment of policy intervention at short and longer durations using the Wilcoxon rank-sum two-tailed test (Siegel & Castellan Jr., 1987). Finally, the third approach uses multiple linear regression (Granger, 1969) and DID methods (Eerola, Harjunen, Lyytikainen, & Saarimaa, 2021) to assess the geographical variation in tax policies within and beyond tax administrative jurisdictions.

The method adopted in this research is the Multiple Linear Regression (MLR) model using multiple explanatory variables. We use a regression model to measure the response variable (Y) as a linear function of the parameters (b0-p), using various predictor variables (x1-p). The MLR scalar form is presented below.

$$y_i = b_0 + \sum_{j=1}^{p} b_j x_{ij} + e_i \qquad 1)$$

y_i is the real-valued response (dependent/regressand/outcome) for the ith observation, and x_{ij} is the jth predictor for the ith observation. Additionally, b_0 and b_j are regression intercept and jth predictor's regression slope, respectively. An error term (ei) is with conditional mean zero for the given regressors. It is assumed that x_j is in a linear relationship with y, experiencing b_j increase in value for every 1 unit increase in x_j, keeping other predictor variables constant.

The coefficient of variation will be used to select an appropriate dependent variable (e.g., average house price and the number of units sold). The regressor's ability to predict the response variation will determine the reliability of the regression model. We use the standard set of predictors (policy, demand, and supply variables) to test models with available response variables. Additionally, the study uses the response variable with a more robust coefficient of variation in combination with the predictors. This step will confirm the reliability of regressors to predict the variation in the response variable (for instance, average house price) used for the statistical estimation.

To obtain robust estimates of the effects of independent variables and assess the degree of similarity, lagged values of the dependent variable are used in the regression model (Barreca, Curto, & Rolando, 2018). The use of both current and past values of the dependent variable assesses bias and the degree of autocorrelation between variables (Wilkins, 2018). This step provides a regional model and relative predictive capacity of independent variables at the regional/provincial scale.

The diagnostic test helps in confirming regression assumptions. We conducted a diagnostic test to find multicollinearity and heteroskedasticity issues (Chasco, Gallo, & Lopez, 2018). High collinearity may cause problems in estimating regression coefficients. In the case of collinearity between variables, one will be dropped. On the other hand, the independent variables' heteroskedasticity will help achieve the ideal concept of BLUE (Best Linear Unbiased Estimator). BLUE is one of the main assumptions for ordinary least squares regression (i.e., homogeneity of variance of the residuals). Additionally, the study uses a residual fit spread plot to assess the explanatory power of variables. The comparison between fit-mean and residual plots determines how well explanatory variables can explain the variation in the dependent variable.

5.5 Results

5.5.1 Descriptive Statistics

We used nine regressors after performing diagnostic tests to confirm regression assumptions and achieved the best linear unbiased estimators. First, a collinearity test was conducted. The prime rate was excluded from the study due to high collinearity with the mortgage rate. Second, to check heteroscedasticity, we conducted a White test. The results obtained from the test show degree of freedom (DF) value 53 and Chi-square value 232.86, with $p < 0.0001$. The White test was significant; therefore, we could reject the null hypothesis and conclude that the variance is not homogenous. The descriptive statistics of the variables are presented in Table 10.

Table 10: Descriptive data

Variable	Mean	Std Dev	Minimum	Maximum	N
NRST-Tax	0.3787879	0.4852895	0	1.0000000	1188
Mortgage Rate (5Y)	2.0668182	0.4715543	0.8500000	2.7500000	1188
Units Sold	936.1826599	885.9169593	66.0000000	5090.00	1188
Average Price	434,023.29	192,405.68	143,149.26	1,123,076.53	1188
Total Units Created	590.9452862	1072.10	3.0000000	6796.00	1188
Absorption Rate	49.5047097	20.0489838	0	92.1428571	1188
Property Tax Rate	1.1692095	0.2384062	0.5948453	1.8200000	1188
Vacancy Rate	2.5767677	1.2305158	0.6000000	8.3000000	1188
Unemployment Rate	6.9237374	1.9343720	1.8000000	16.7000000	1188
Population	932.2348485	1500.86	119.2000000	5599.60	1188

Average growth in house prices between Jan 2011 and Dec 2021 varied between the cities; see Figure 2. In the GGH region, the city of Toronto had the lowest price growth. The average growth in the other cities from the GGH region and the city of London from the non-GGH region witnessed an over200 percent increase in house prices, whereas Niagara from the GGH region and Windsor from the non-GGH region experienced house price growth of 310 percent and 262 percent, the highest in the

sample. The lowest price growth recorded in Ottawa (89 percent) and Kingston (139 percent) are from the non-GGH region.

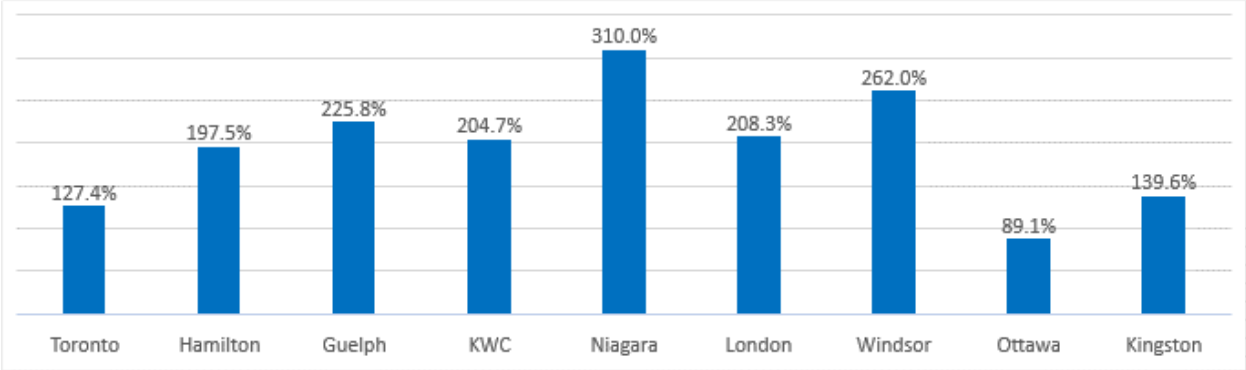

Figure 2: Change in house prices (Jan 2011–Dec 2021)

Thus, the house prices in the majority of GGH cities, close to the city of Toronto, are synchronized, whereas the non-GGH region experienced differential growth, indicating geographical alignment rather than administrative. Relatively high price growth in the cities around Toronto, and even stronger market activity in the western and southern regions of Ontario, indicate buyers' geographical priorities. For example, Windsor, London, and Guelph experienced greater price growth compared to Ottawa and Kingston in the east of Toronto (see Table 11).

Table 11: Cumulative and year-over-year house price change

Average Price Change	Toronto	Hamilton	Guelph	KWC	Niagara	London	Windsor	Ottawa	Kingston
			GGH				Non-GGH		
Cumulative 2011 to 2021	127.4%	197.5%	225.8%	204.7%	310.0%	208.3%	262.0%	89.1%	139.6%
YOY 2011 to 2021	7.92%	10.66%	11.91%	10.98%	14.34%	11.25%	12.95%	6.22%	8.60%
YOY 2018 to 2021	7.29%	13.33%	16.55%	15.34%	18.87%	19.02%	21.57%	10.89%	14.14%

Table 11 indicates a steady growth in the city of Toronto after the implementation of NRST, whereas the Year-Over-Year (YOY) growth in the GGH and non-GGH regions remained 12 percent and 10 percent, respectively, from 2011. However, following the implementation of NRST in 2017, the

YOY increased to 16 percent average in both the GGH and non-GGH regions, excluding Toronto. The rapid increase in house prices in both the GGH and non-GGH regions indicates a possible spill-over effect of tax intervention to the neighboring cities outside of the NRST jurisdiction. The significance of NRST in driving house prices is discussed in detail in the next sections.

5.5.2 Policy Intervention Impact

The data on international buyers and ownership of residential property by foreigners are very limited and come from the Statistics Canada study covering 2017–2018. Furthermore, little information is published on the number of transactions involving foreign nationals after the implementation of NRST on 21 April 2017. The information provided by the provincial government is limited to the total number of transactions involving foreign buyers and the total amount collected. The information gathered from the land registry office (LRO) scale usually does not correspond with municipality boundaries. Therefore, we cannot compare the data collected at the LRO scale to the average house prices at different scales.

The number of units sold dropped after the introduction of NRST in April 2017 (see Figure 3). However, it is not very clear to what extent taxation on foreign buyers contributed to the drop in sales because the average monthly unit sales constantly fluctuated from 2011.

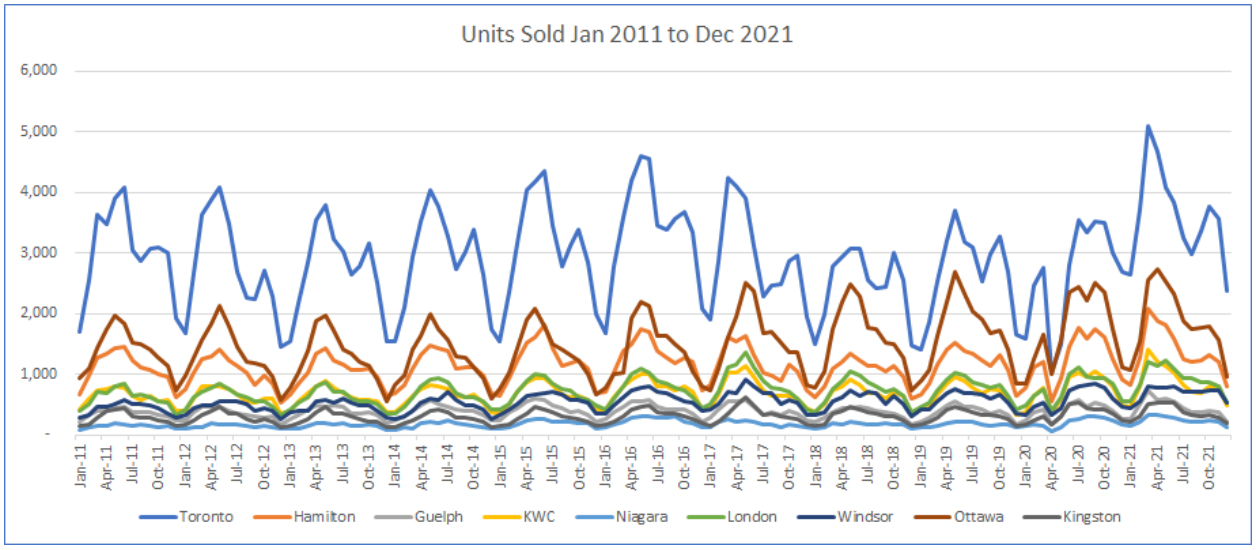

Figure 3: Monthly housing units sold from Jan 2011 to Dec 2021

We assessed the fifty-six-month average before and after the implementation of NRST. The change in the monthly average is presented in Table 12. The average monthly unit sale in Toronto was reduced by 5 percent, the highest reduction in the GGH and Non-GGH regions. However, in the surrounding areas and in the non-GGH region, market activity increased following the implementation of NRST, complementing our discussion in the previous section.

Table 12: The number of units sold before and after NRST— Fifty-six months on average.

	Toronto	Hamilton	Guelph	KWC	Niagara	London	Windsor	Ottawa	Kingston
Average Units Sold (Month)			**GGH**				**Non-GGH**		
Sept 2012 to Apr 2017	2992	1137	395	666	179	683	517	1306	283
May 2017 to Dec 2021	2841	1183	391	733	192	795	608	1722	335
Change	–5%	4%	–1%	10%	7%	16%	18%	32%	18%
Average Price									
Jan 2014 to Apr 2017	646,332	416,319	436,289	350,617	255,885	261,942	197,367	352,869	294,359
May 2017 to Dec 2021	913,780	656,046	682,109	573,252	474,333	455,463	370,390	470,924	431,095
Change	41%	58%	56%	63%	85%	74%	88%	33%	46%

To infer the descriptive analysis above, we determined the significance of the difference between the means of the GGH and non-GGH groups. Considering the sample size, we used the Shapiro–Wilk normality test to determine the distribution of data. The Shapiro–Wilk p-value of less than 0.05 rejects the null hypothesis, confirming a significant departure from normality. Therefore, we used the Wilcoxon rank-sum two-tailed test to determine the difference between the two groups. The results are presented in Table 13.

Table 13: Multi-day effects of tax implementation

	GGH Region				Non-GGH Region			
Period/Months	**–3, +3**	**–6, +6**	**–12, +12**	**–56, +56**	**–3, +3**	**–6, +6**	**–12, +12**	**–40, +40**

N (0/1)	15/20	30/35	60/65	281/284	12/16	24/28	48/52	224/228
DF	1	1	1	1	1	1	1	1
Units Sold								
Z	–0.5167	–0.3356	1.0971	–0.3608	–1.7876	–2.1661	0.1483	–3.0738
X2	0.2844	0.1171	1.2090	0.1304	3.2789	4.7316	0.0230	9.4505
Pr>X2	0.5938	0.7322	0.2715	0.7181	0.0702	0.0296	0.8794	0.0021
Avg Price								
Z	–0.5833	–1.0988	–2.115	–14.383	–1.1374	–1.6245	–3.239	–15.358
X2	0.3600	1.2218	4.4734	206.8732	1.3470	2.6688	10.5150	235.8951
Pr>X2	0.5485	0.2690	0.0344	<0.0001	0.2458	0.1023	0.0012	<0.0001

The difference between the number of units sold before and after the tax implementation is insignificant in both regions. Similarly, the difference in average price up to six months is not significant. This confirms no short-term impact on market transactions and average house prices. However, the average price p-values for twelve months and fifty-six months are significant for both regions. This indicates that the difference between the means before and after the tax implementation is significant, confirming the long-term impact on house prices. The GGH region z-values (–2.115, –14.383) and non-GGH region z-values (–3.239, –15.358) indicate that the impact on the non-GGH (non-taxed region) is greater than on GGH (taxed region). This indicates a spillover effect due to a shift in investment preferences to the non-GGH region. Although the difference in market activity (units sold) before and after the tax implementation is insignificant, the absolute numbers presented in Table 12 indicate positive growth in the non-GGH region compared to sales decline in the GGH region. Hence, we can say that there is an increase in average house prices over time and that taxes play a certain role in addition to other indicators. For further reliability, we have performed a DID panel regression in the next section.

5.5.3 Difference-in-Difference Analyses

As discussed above, NRST has shown a positive correlation with house prices. To determine tax response at the intra-regional scale, we have conducted a DID panel regression. The treatment variable is NRST because municipalities in the GGH region introduced the NRST at a certain time. The control variable is whether a municipality introduced the NRST at all. The dependent variables are average house price, units sold, units created, absorption rate, and vacancy rate.

The DID panel regression tests the difference-in-difference in the dependent variables for municipalities with and without NRST over time. Figure 4 presents the increase in the average house price over time for NRST municipalities and non-NRST municipalities. This demonstrates a stronger increase in the price for NRST municipalities.

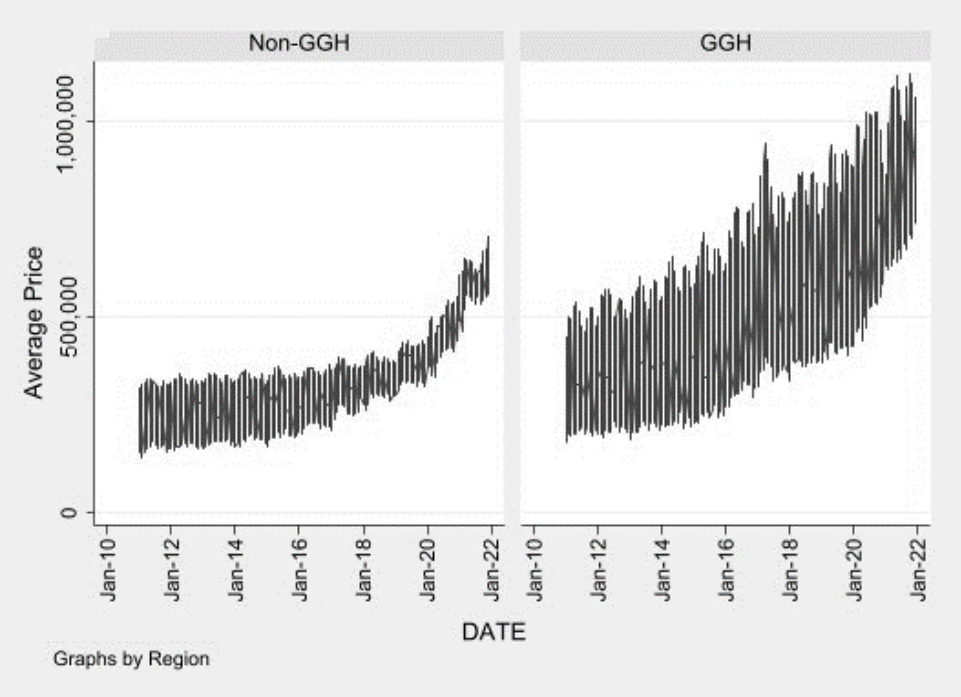

Figure 4: DID effect for Average House Price

Furthermore, we created the same graph for units sold. In contrast to the price development, we cannot identify a DID effect for units sold. See Figure 5.

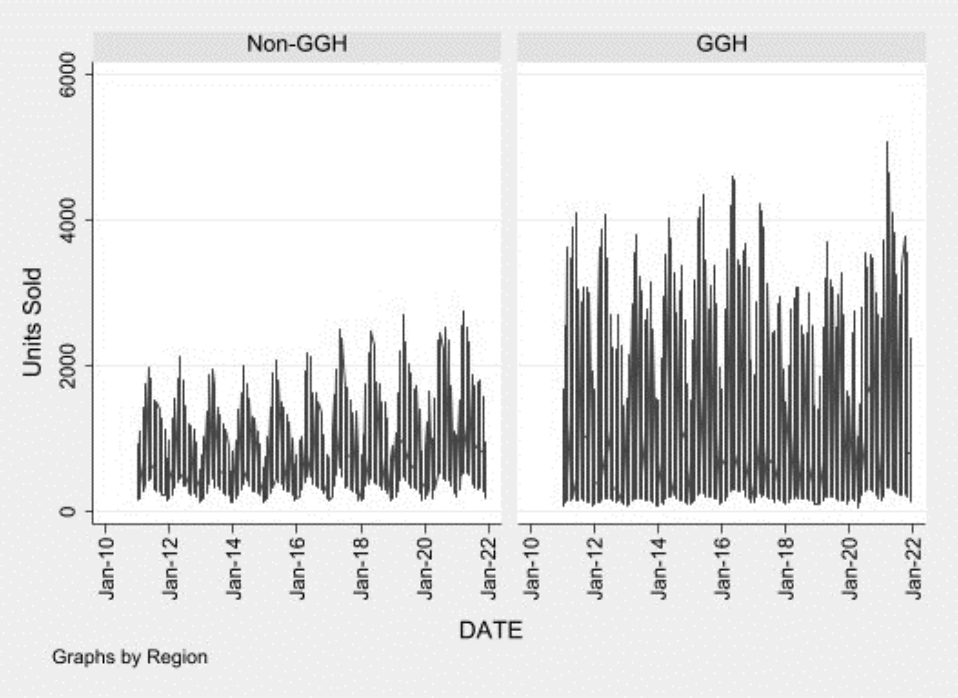

Figure 5: DID effect for Units Sold

The following table presents the DID panel regressions for the variables mentioned above, including average price and units sold.

The results in Table 14 demonstrate a significant DID for the average price. The price difference over time is significantly bigger for GGH municipalities that have implemented NRST compared to non-GGH municipalities. All other variables do not show significant DIDs. The results validate our discussion above that NRST has driven the house prices in both the GGH and non-GGH regions.

Table 14: DID panel regression for the selected variables

Dependent Variable	Coefficient	Std. err.	t	P > t	95% conf.	Interval]
Average price	91,853.120	19,422.480	4.730	0.001	47,064.810	136,641.400
Units sold	−131.038	73.151	−1.790	0.111	−299.724	37.648
Units created	40.510	101.641	0.400	0.701	−193.875	274.896

Absorption rate	−12.307	9.551	−1.290	0.234	−34.331	9.716
Vacancy rate	0.987	0.474	2.080	0.071	−0.107	2.081

5.5.4 Geographical Variation of Housing Policies—Mortgage and Property Tax

To assess the influence of mortgage rates and property taxes on house prices across cities, we conducted a linear regression analysis, presented in Table 15. The mortgage rate and property taxes relationships with house prices vary across cities. The Toronto housing market shows no sensitivity to mortgage rates ($p = 0.2533$) and property taxes ($p = 0.1695$). Hamilton house prices show strong sensitivity to mortgage rates ($p < 0.0001$, $t = -9.90$).

Table 15: Geographic impact of variables on house prices

CMAs		**Toronto**	**Hamilton**	**Guelph**	**KWC**	**Niagara**	**London**	**Windsor**	**Ottawa**	**Kingston**
Region		GGH Region					Non-GGH Region			
Mortgage	p	0.2533	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0008	<0.0001	<0.0001
	t	−1.15	−9.90	−12.44	−8.94	−10.16	−7.88	−3.43	−6.32	−9.06
Property Tax	p	0.1695	0.0770	0.0356	0.0029	0.0109	0.0007	<0.0001	<0.0001	<0.0001
	t	−1.38	1.78	2.12	3.04	2.59	3.46	5.28	5.47	4.32
Units Sold	p	<0.0001	<0.0001	0.0001	0.0073	0.2379	0.3203	<0.0001	0.0002	0.0728
	t	10.33	4.36	3.99	2.73	1.19	1.00	4.08	3.86	1.81
Units Created	p	0.2611	0.7281	0.0548	0.2295	0.5833	0.7831	0.9843	0.6795	0.4844
	t	−1.13	0.35	−1.94	−1.21	−0.55	−0.28	0.02	−0.41	0.70
Absorption Rate	p	0.2571	0.0031	0.0001	0.0897	0.1410	0.5674	<0.0001	0.0058	0.3506
	t	1.14	3.02	4.01	1.71	1.48	0.57	5.68	2.81	−0.94
Vacancy Rate	p	0.7740	0.0470	<0.0001	0.2146	0.0036	0.1314	0.0014	<0.0001	0.4039
	t	−0.29	−2.01	6.65	1.25	2.97	1.52	3.26	6.73	0.84
	p	0.7362	0.4212	0.0027	0.6242	0.0014	0.0667	<0.0001	0.4316	0.1829

Unemployment Rate	t	−0.34	0.81	−3.06	−0.49	3.27	1.85	−4.58	−0.79	−1.34
	p	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Population	t	10.78	14.47	17.42	22.03	16.87	21.54	9.12	10.57	20.10

However, property tax has no significant influence on the Hamilton housing market. In contrast, mortgage rates and property tax significantly influenced house prices in all other cities analyzed in the sample. However, a negative, and relatively higher, t-value for mortgage rate indicates the contribution to price suppression matching with the general perception of the inverse relationship between mortgage rate and house prices. Property tax has a positive but relatively smaller t-value, indicating some contribution to the price increase. This relationship is a behavior not conforming to the general perception of the inverse response of house prices to property taxes, but less distortionary, as suggested by the literature (Mirrlees, 2011). This situation can be better understood by considering significant ($p < 0.0001$) and relatively more robust population demand factors. Furthermore, the geographical placement of the city of Hamilton closer to the regional economic centers further illuminates the nonconforming behavior of the market.

The analysis above shows that national, regional, and local sale policies are distinctly and inconsistently influencing housing markets. Moreover, it is evident that other factors may become stronger to override a generic policy influence on the housing markets. A further detailed study is required to assess how neighboring market policy interventions override local variables to influence house prices in the local market.

5.6 Conclusion

In this study, we have studied housing market behavior in nine major cities from different administrative regions in Ontario. We have used housing market data from Jan 2011 to Dec 2021 to assess the impact of the provincial government intervention introduced in 2017 to control speculative investment. The study examines how effectively the transfer tax policy implemented in the GGH region fulfills its intended objective of controlling housing market speculation. Additionally, the investigation assesses how geographical variation impacts the effects of real estate taxes and mortgage interest rates on house prices. Finally, it adds to the literature through its evaluation of the effectiveness of housing

policies, in an intra-regional setting, against the speculative investment behavior of conventional financialized housing markets.

The study analyzed the varying impact of national, regional, and local policies in relationship with local demand and supply. For example, national mortgage rates determine access to finance, driving home investment decisions (Mian & Sufi, 2022). Similarly, the NRST is a regional initiative to influence foreign investment in the local housing markets, a policy influencing property transfer (Lundborg & Skedinger, 1999). Considering a possible housing market spillover effect (Meen, 1999), the NRST impact was studied within and beyond its jurisdiction. Subsequently, local property taxes not only influence the cost of housing, but they are one of the significant sources of funding for local services and the provision of amenities (Rosen & Fullerton, 1977).

Similarly, unemployment and population cover housing demand, whereas the number of units created and the vacancy rate represent the local supply of the houses (Murray, 2022). All these variables are significant in assessing local housing market response in terms of housing market activity (units sold) and changes in house prices across multiple cities (Fischer, Huber, Pfarrhofer, & Staufer-Steinnocher, 2019). The combination of variables helped assess the net outcome of multi-level policies applied, their scope, and demographic and geographic variation. However, the scope of the study, data, and geographic limitations, and the possible impact of other demographic and economic factors, limit the generalizability of the research.

Housing plays an essential role in sustainable governance due to its socio-economic and environmental connection. Housing contributes to a significant part of household spending (Čermáková & Hromada, 2022), playing a vital role in economic growth (Mach, Bedrunka, Kuczuk, & Szewczuk-Stępień, 2021). Historically, the housing market has remained a crucial medium for the transmission of socio-economic objectives. Additionally, this sector is attractive to investors for secured wealth generation and provides a stable source of revenue for public expenditures. Therefore, it makes efficient housing and real estate management significant for sustainable development. However, the relationship between governance policies, market response, and socio-economic outcomes varies geographically and demographically.

The literature has assessed the role of speculation tax distortionary in its administrative jurisdiction (Kopczuk & Munroe, 2015; Yu & Chen, 2018) and across economic sectors (Akbari & Krystyniak, 2021). Our study determines that speculation taxes, such as NRST, play a role in increasing

house prices within and beyond tax administrative jurisdiction. This indicates a spillover effect due to a shift in investment preferences to non-taxed regions. Furthermore, our research finds that the regional market leader with strong local demand is not responsive to housing market policy intervention. This confirms that investment interests are irrespective of transfer taxes, considering the benefit outweighing the cost (Manganelli, Morano, Rosato, & De Paola, 2020).

Our results also indicate a geographical variation of local and regional scale tax policies. Investors' geographical interest in the western non-GGH regions could be one of the reasons for increasing house prices, further complemented by the high buying cost in the GGH region. However, the tax policy spillover effect has a geographic limitation. The study finds that the distant markets remained independent of local policy interventions, whereas housing markets are more sensitive to neighboring markets' policy changes conforming to a spatial clustering behavior (Moralı & Yılmaz, 2022).

The mortgage rate and property taxes have shown geographically inconsistent behavior. Most of the cities have shown a significant and negative correlation with mortgage rates. This phenomenon does not match a general perception of an inverse relationship between mortgage rates and house prices. In contrast, the economic hub, such as the city of Toronto housing market has no influence from the mortgage rate. On the other hand, property tax seems to be ineffective in suppressing housing prices in the presence of strong market demand. On the other hand, property taxes are found non-distortionary in most cities, according to the literature (Mirrlees, 2011). The study confirms that, irrespective of mortgage and property tax rates, local demand factors, and geographical closeness to the major economic centers contribute to speculative investment that is driving house prices (Bimonte & Stabile, 2020; Zhang, Sun, & Stengos, 2019).

The analysis above shows that national, regional, and local policies are distinctly and inconsistently influencing housing markets. Market factors may become stronger to override a generic policy influence on the housing market. Although the study does not confirm any pattern in local market behavior responding to local market conditions, it does, however, demonstrate that housing market interventions such as speculation tax is ineffective in controlling house prices both in the short and long run (Best & Kleven, 2018; Lundborg & Skedinger, 1999; Bimonte & Stabile, 2020; Mirrlees, 2011). Additionally, the study confirms that such policies influence beyond their administrative jurisdiction. In this case, speculation taxes may not be considered an effective tool in curbing house prices. Similarly,

assuming the role of property taxes in providing public services, delinking property taxes from a potential contributor to house prices would provide a better lens to develop local housing policies. Furthermore, the study also confirms that the housing market can be better assessed at a local scale, considering the neighboring market's influence in conjunction with investment trends.

The analyses help determine the relationship between policy objectives, policy instruments, and their counteracting effects in an intra-regional setting. This will further help develop a framework for coordinative measures required between the institutions to enhance the effectiveness of housing sustainability policies.

MANUSCRIPT ENDS

Chapter 6
Conclusion

The research contributed to the literature on sustainability by devising a conceptual, operational, and governance approach to pursue sustainability and sustainable housing. The study sets a foundation to adopt a normative and functional approach to address contextual challenges while pursuing sustainability at a local scale. Furthermore, dissecting between realism and methodological bias can facilitate addressing conceptual fuzziness in qualitative research vital for the normative base of sustainability. The empirical contribution of the study demonstrated the effectiveness of policies related to intra-regional subjects such as housing. Additionally, interviews with city administration and literature review helped determine a pathway to localization of SDGs and affordable housing.

The dissertation explores the evolution of sustainability and sustainable development, conceptual and methodological challenges, and operational constraints in achieving a cohesive approach to pursuing sustainability on a local scale. The field of sustainability is facing challenges of conceptual and methodological ambiguities and operational complexities (Karoly, 2011; Verma & Raghubanshi, 2018; Hansen et al., 2018). A lack of consensus on these fronts is dividing intellect and resource bases, and it is failing to counter the sustainability challenges we face today and tomorrow. The complex linkages between objectives, drivers, and responses are subject to contextual definition, conceptual framework, relevant thresholds, and data availability. For instance, in the developing world, where poverty and scarcity are significant, it would not be easy to justify and manage an equitable trade-off between environmental protection and meeting basic needs. We argue that sustainability management can be simultaneously approached through normative, functional, and operational perspectives.

Sustainability always brings multidisciplinary aspects to address development challenges. For example, the management perspective focusing on functional requirements may not be understood without a relevant theoretical base and operational constraints. Similarly, ethics, fairness, and justice towards nature and society provide a normative base for sustainability. However, the concept's heterogeneity makes sustainability's normative objective challenging to operationalize. Further to the normative heterogeneity, amalgamated remedial measures require engaging diverse stakeholders, perspectives,

technology advancement, governance, and scale that render sustainable development even more complex and harder to operationalize. This dissertation aims to redefine the conceptual approach to sustainability, complementing several efforts made by researchers to define sustainability and relevant theories (Costanza, 1989; Odum & Odum, 1959; Daly, 1990; Rockstrom et al., 2009; WCED, 1987; Kates, Parris, & Leiserowitz, 2005; Hawken, 1993; Tol 2016; Bernstein and Cashore 2007; Nilsson et al. 2016; Walker et al. 2004; Sen 1999; Ivan 1997; Droz 2019)

I argue that the conceptual definition of sustainability will remain fuzzy without categorically addressing contextual normative and functional objectives. The socioeconomic and environmental diversity make sustainability challenging to attain a standard methodology. We suggest that moral relativism integrates normative and functional constraints. Environment, society, and economy are nested functions and cannot be separated. The assertion of facts will determine priorities and consequent trade-offs. A sustainable trade-off requires not only functional input values but the process, the path it takes, and the valuation of consequent outputs are equally important. Therefore, sustainable and relevant development would require the recalibration of global knowledge to accommodate local normative and functional realities, which is inevitable.

The first part of the study provides a foundation to develop sustainability management literature further to address contextual challenges across geographies. I argue that the overarching objectives, such as ethics and justice, can be adopted as a common approach, whereas a functional approach should incorporate ecological, geographical, and prevailing socioeconomic conditions. In this context, sustainable development can be defined as development valued with freedom of choice and resilience (Local) without compromising the ability of the natural ecosystem to flourish (Global).

Further to the conceptual fuzziness discussed above and interdisciplinary nature of sustainability is facing methodological challenges (Cocklin, 1989; Salas-Zapata, Ríos-Osorio, & Cardona-Arias, 2017; Burchinal & Broekhuizen, 2018). Sustainability from a socioeconomic perspective fall under regional and spatial studies requiring multidisciplinary concepts, varied lenses, and differentiating approaches and models to address the conflict between contextual sensitivity and universal applicability. I have reviewed the relevant literature and academic debates on qualitative methodological approaches to assess their relevance to sustainability research. Academia has utilized cross-disciplinary information and departmentalizing outcomes, resulting in a patchwork of empirical investigation (Whitehead, 1938). However, the role of the conceptual evolution of complex subjects is

well recognized, but the research methodologies were compromised due to the researcher's bias (Markusen, 2003).

Our review concluded that most of the methodological weaknesses in qualitative research persist in interdisciplinary qualitative research. Despite efforts to address the relevance, reliability, validity, and replicability that the qualitative research field still faces today, challenges from conceptual bias, methodological and operational constraints, empirical weakness, and prejudiced interpretation remain. Adding to the literature, we suggested differentiating between inherited and bequeathed fuzziness. Inherited fuzziness can come from the non-deterministic states of the case under investigation, whereas methodological weaknesses and researcher bias create bequeathed fuzziness. The former has significantly evolved theoretically and methodologically, such as fuzzy concept theories (Zadeh, 1965; Pawlak, 1982; Smarandache, 1998) and qualitative comparative studies (Schneider & Wagemann, 2010). However, standardization methodologies to address methodological vagueness and ethical concerns still need integrated efforts to overcome bequeathed fuzziness.

Our discussion to this point indicates that it would be challenging to have a simple and straight path to pursue sustainable development. Sustainable development requires a consistent methodology, process, and policy innovations (UNCTAD, 2017). At the same time, innovation is a non-linear path that requires continuous improvement through a multidimensional and multilateral interactive feedback process vital for achieving sustainability objectives (Schiederig, Tietze, & Herstatt, 2012; Forestier & Kim, 2020).

Third, addressing the heterogeneity and dysconnectivity in localizing SDGs literature (Taajamaa et al., 2022), the dissertation analyzed feedback received from the interviews with city managers across Canada. The focus was to ascertain challenges and opportunities for municipalities adopting the SDG framework for performance monitoring and reporting and challenges they are facing in providing affordable housing. Summarizing the outcome, the investigation identified several constraints to localizing SDGs, such as challenges concerning the distribution of authority, functional and geographic mapping, resource allocation, and assigning roles and responsibilities. The conclusion also aligned with the delivery of affordable housing by local governments. These factors prodded to assessing localizing of SDGs and affordable housing from the perspective of the subsidiarity principle.

The study theoretically assessed how applicable the subsidiarity principle would be in localizing SDGs with a specific focus on a delivery of affordable housing, which provided a unique

context. The study confirms that the localization of SDGs is not just about devolution. It is about subsidium for lesser associations, proprietorship at a lower level, accountability, and support from upper levels of government to overcome jurisdiction and capacity challenges. The discussion on affordable housing, validates the challenges local governments are facing to perform their functional responsibilities. The study concludes that the principle of subsidiarity could provide a foundation to reframe existing policy and governance structure of housing. It confirms that the dominance of norms and ethics in policy development, decentralization of authority and resources, clear lines of responsibility and accountability, and reliance on the competence of local authority will improve the delivery of housing at the local scale (Dylus, 2021; Spiller, 2022). Additionally, socio-spatial dynamics, knowledge sharing, and interaction of actors would create an opportunity to develop policies relevant to local needs and constraints (Healy & Morgan, 2012). Local capability and capacity building will create enabling conditions that foster innovation and knowledge across functions and governance structures to facilitate synergies and trade-offs between local, national, and global priorities. Therefore, it is essential to revitalize the urbanization process to achieve the target of inclusive, safe, resilient, and sustainable cities (UNDP-WBG, 2016). So long as we create the conditions for synergy, sustainable development will happen. Furthermore, we suggest that the localization of SDGs and affordable housing would require a nexus of the subsidiarity principle, place-based policy, and innovation theory. The dissertation's theoretical contribution clarifies the definitional ambiguity of the subsidiarity principle, facilitating its purposeful application in the context of urban sustainability. In conclusion, the dissertation identified and addressed critical gaps in operational challenges in sustainable development by providing a comprehensive assessment of the conceptual and methodological vagueness, practice implications of policy initiations, and governance.

Forth, the dissertation tried to ascertain how policies may not be able to achieve their intended purpose. It is also true that the complexity of socioeconomic structures driven by globalization and financialization imposing sustainability challenges may not be dispensed by conventional policy instruments (Herrle & Ley, 2016). For instance, the housing system is crucial for economic growth and highly sensitive to human wellbeing (Gilbertson, Grimsley, Green, & Group, 2012). Addressing the gap in the literature (Tsoodle & Turner, 2008; Fischer, Huber, Pfarrhofer, & Staufer-Steinnocher, 2019; Murray, 2022), the dissertation assessed the aggregate impact of multiple tax instruments and their spatial variations in a regional setting. Furthermore, there is a gap in assessing the aggregate impact of multiple tax instruments and their spatial variation in a regional setting.

Further to the discussion above, my analysis has shown how housing policies distinctly and inconsistently influence housing markets. The results also confirm that local market factors may get stronger to override a generic policy influence in a regional setting. However, the study could not confirm any pattern in local market behavior responding to market conditions. However, we concluded that housing market intervention such as speculation tax is ineffective in controlling house prices both in the short and long run. Furthermore, the study confirms that such policies drive house prices within and beyond its administrative jurisdiction. In this case, speculation taxes may not be considered effective in curbing house prices. Our results suggest that delinking property taxes from a potential contributor to house prices would provide a better lens to develop local housing policies. Furthermore, the study confirms that the housing market can be better assessed locally, considering the neighboring market's influence in conjunction with investment trends.

6.1 Contribution to Knowledge

The dissertation has considerable contribution throughout the published manuscripts summarized in Table 16. First, the dissertation has provided a different lens to the conceptual definition of sustainability, addressing methodological and practical implications. Second, the dissertation provides a foundation to integrate normative and functional approaches facilitating contextual trade-offs in adopting sustainability. Third, it contributes to the sustainability management literature addressing contextual challenges across geographies. Fourth, the dissertation provides a novel approach to conceptualizing sustainability addressing local challenges and operationalizing at the local scale. The research contributes to some of the sustainability challenges, such as conceptual openness, functional complexity, and operational ambiguity. The dissertation categorized major sustainability themes from normative and functional approaches to fill the ingenuity gap to fully understand the complex dynamics of problems, intervention, and adaptive compensation (Tol, 2016). In addition to cross-sectional policy development (Nilsson et al., 2016), the research identified a functional-normative directional perspective to determine the appropriate decision-making.

Table 16: Summary of Research Contributions

Summary of Research Contribution	
1 Normative-Functional Directional Approach. Setting a foundation to integrate normative and functional approaches to facilitate contextual trade-offs in adopting sustainability. *Definition:* Sustainable development can be defined as development valued with freedom of choice and resilience (Local) without compromising the ability of the natural ecosystem to flourish (Global).	3 Barriers to localizing SDGs and affordable housing. SDG framework is suitable for municipalities' performance reporting. Devolution is not the only option to facilitate localizing SDGs. Proprietorship at the local scale and subsidium for lesser associations to overcome jurisdiction and capacity challenges. A nexus of the subsidiarity principle, place-based policy, and innovation theory. Clarifying the concept of the subsidiarity principle in the context of urban sustainability.
2 Fuzziness in Qualitative Research Methodological vagueness due to the researcher's bias requires an integrated effort. Inherited and bequeathed fuzziness to distinguish between non-deterministic states and the researcher's bias.	4 A relationship between policy objectives, policy instruments, and their counteracting effects in an intra-regional setting. Regionally segregated policies may fail to achieve their intended objectives of curbing house prices. Investment interests are irrespective of transfer taxes, considering the benefit outweighing the cost. Delinking property taxes from a potential contributor to house price. The housing market can be better assessed with local facts and regional connections. local market factors may get stronger to override a generic policy influence in a regional setting. Integrated and Coordinated policy development.

Second, our literature review on fuzziness in qualitative research in regional studies identified that the challenges of conceptual fuzziness continue to exist due to ideological bias, choice of inclusion and exclusion, operational constraints, data quality, and prejudice interpretation (Silva et. Al., 2015; Pike et. Al., 2011; Markusen, 2003; Schneider and Wagemann 2010). We coined the terms inherited and bequeathed fuzziness to distinguish between non-deterministic states and the researcher's bias. The research identified that inherited fuzziness is well researched and utilized in social sciences. However, methodological vagueness due to the researcher's bias requires an integrated effort.

Third, the research highlighted critical barriers to localizing SDGs and affordable housing. It further analyzed how the SDG framework can facilitate municipalities' monitoring and reporting of local performance. Furthermore, the study assessed the relevance of the subsidiarity principle to operationalizing SDGs and affordable housing at the local scale. The study confirms that devolution is not the only option to facilitate localizing SDGs. It would require proprietorship at the local scale and subsidium for lesser associations to overcome jurisdiction and capacity challenges (Gustafsson & Krantz, 2021; Allen, et al., 2020).

Furthermore, the study suggests that the localization of SDGs and affordable housing would require an innovative approach to dealing with local circumstances and horizontal and vertical relationships (Kanuri, Revi, Espey, & Kuhle, 2016; Parnell, 2016). It is also suggested that the localization of SDGs would require a nexus of the subsidiarity principle, place-based policy, and innovation theory. In result of the interview with local administration and the literature review on localizing and subsidiarity principle (Allen et al.; 2019; Fox & & Macleod, 2021; Kanuri et al., 2016; Leavesley, Trundle, & Oke, 2022; Parnell, 2016; Gawlowski et. At., 2020; Hollenbach, 1979; de Vries, 2012; Giest, 2014; Marshall, 2007; Schiederig et al., 2012; Forestier & Kim, 2020; Wanzenbock & Frenken, 2020), the research clarifies the definitional ambiguity of the subsidiarity principle facilitating its purposeful application in the context of urban sustainability. Furthermore, it demonstrated policy and governance constraints for municipalities to meet their sustainable development objectives such as affordable housing.

Forth, the dissertation provides empirical evidence on the behavior and effectiveness of policies related to interregional subjects, such as housing and acting beyond policy jurisdiction (different functional boundaries) (Akbari & Krystyniak, 2021). The research demonstrates how segregated policies may fail to achieve their intended objectives, such as curbing house prices (Kopczuk & Munroe, 2015; Yu & Chen, 2018). The study confirms that geographically selective market interventions such as speculation taxes are ineffective in curbing house prices, especially in physically connected regions (Best & Kleven, 2018; Lundborg & Skedinger, 1999; Bimonte & Stabile, 2020; Mirrlees, 2011; Moralı & Yılmaz, 2022). This confirms that investment interests are irrespective of transfer taxes, considering the benefit outweighing the cost (Manganelli, Morano, Rosato, & De Paola, 2020). Furthermore, our investigation suggests that delinking property taxes from a potential contributor to house prices would provide a better lens to develop local housing policies (Mirrlees, 2011). Contributing to the literature, the dissertation confirms that the housing market can be better

assessed locally, considering the geographical influence and investment trends. The analyses help determine the relationship between policy objectives, policy instruments, and their counteracting effects in an intra-regional setting (Herrle & Ley, 2016; Tsoodle & Turner, 2008; Fischer, Huber, Pfarrhofer, & Staufer-Steinnocher, 2019; Murray, 2022),). It will further help develop a framework for coordinative measures required between the institutions to enhance the effectiveness of housing sustainability policies.

6.2 Contribution to Academic Theories

Further to the discussion on contribution to the knowledge, the dissertation provides a unique contribution to the theory of sustainability and subsidiarity by identifying a different conceptual and operationalizing approach facilitating contextual complexity and governance challenges in pursuing sustainability objectives, summarized in the Figure 6. Our analysis evaluated the conceptual ambiguities in setting sustainability goals addressing tradeoffs and balancing contextual challenges. Our analysis proposed two significant components of sustainability. First, ethics and justice can be adopted as a standard approach irrespective of function or geography. At the same time, the functional approach should be contextual, incorporating ecological, geographical, and prevailing socio-economic conditions. In this context, we came up with a definition for sustainable development: sustainable development can be defined as development valued with freedom of choice and resilience (Local) without compromising the ability of the natural ecosystem to flourish (Global).

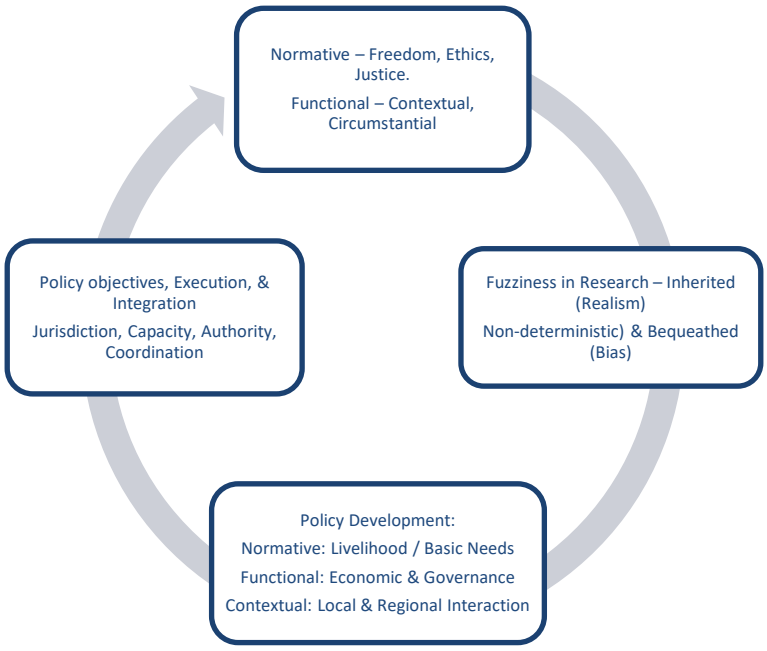

Figure 6: Conceptual and Theoretical Framework

Further, the research advances knowledge and theory in housing system analysis, sustainable housing, and policy-related decision-making. It provides insight into the accumulative effect of policies and demographic factors that shape local housing markets while paving the way for an integrated assessment of multiple elements based on multidisciplinary theories.

Constraints to localizing SDGs identified in this research can be organized concerning the distribution of authority, functional and geographic mapping, and assigning roles and responsibilities. These factors set a foundation for the subsidiarity principle, which guarantees delegation of commitment to a lower level of governance provided the federal government's role in ensuring systematic implementation of regulations and provision of necessary resources. Furthermore, the interconnectedness of SDGs requires synergies and tradeoffs to overcome potential hindrances and supplement multilateral efforts (United Nations, 2018) that would require an innovative approach to facilitate local and regional policy challenges (Wanzenbock & Frenken, 2020). The argument paves a path for a theoretical extension to the subsidiarity theory to facilitate SDGs localizing. It would further help to generalize the conceptual approach for the subsidiarity principle in governing SDGs at a local scale.

Our findings confirmed that the SDG's localizing is best applied using a nexus of the subsidiarity principle, place-based theory, and innovation theory. Furthermore, our findings demonstrated that local authorities' horizontal and vertical association is not limited to policy development or allocation of power. Instead, it is a complex integration of needs, willingness, competencies, functional relationships, and defining jurisdictions at all levels of governance. Finally, our study indicates that the subsidiarity principle may not be limited to delegating authority or subsidium. It would require the inclusion of policy ownership, contextual tradeoff, and access to and appropriate distribution of resources.

While clarifying definitional ambiguities (Føllesdal, 1998; Dollery, 2009; Follesdal & Fraticelli, 2015; Cahill, 2021; Da Silva, 2022a), we propose that the subsidiarity principle can be best understood from a systems perspective, not a standalone normative approach. This approach can facilitate tradeoffs between normative and functional needs across political, administrative, and operational landscapes to justify informed policy development. Furthermore, our research added that the subsidiarity principle is theoretically generalizable, not a contextual solution.

6.3 Discussion, Practical Implications and Limitations

The dissertation highlights several factors that can affect urban governance and policy development. First, we have discussed the operational constraints in the transition to sustainable development, given the complexity of urban functions and contextual challenges. Given the core theme of the dissertation, we have discussed in detail how conceptual clarity and addressing realism can help to incorporate normative and functional factors. Theoretically and methodological clarity would help to understand and operationalize the local functional challenges from the normative lens to accommodate what is needed today and tomorrow. Furthermore, the research highlighted how standalone policies, ignoring interdisciplinary and spatial integration, may fail to achieve the desired objectives.

Another important implication is local governance defining vertical and horizontal relationships between functional and administrative units. The implications are significant to localizing sustainability and sustainable development goals at the municipality scale. The analysis would help develop a relevant, generally acceptable, and integrated framework to facilitate municipalities to pursue local objectives in conjunction with national and global agendas. It would further assist in defining

governance and working relationship, a delegation of authority, and accountability across administrative units.

It would be necessary to highlight some of the limitations of this dissertation that would be helpful to pay the way to set the future course of research. In chapter 2, the core limitation was the novelty of the theoretical approach that requires triangulation to operationalize the concept in a real case study. Chapter 3 reviewed the current debate on fuzziness and methodological ambiguities in interdisciplinary social studies. The review contributed to the literature by further dissecting the subject in more detail, emphasizing the key components that require further investigation.

Chapter 4 is based on twelve semi-structured interviews involving sixteen representatives from municipalities across Canada. The results draw on the discussions with city managers and their representatives to understand the benefits of localizing SDGs (SDG 11) in local performance measurement and decision-making and the challenges they face to overcome governance and resource constraints. The study identified vital variables connecting inter and intragovernmental relationships, key challenges to pursue sustainability objectives at a local scale, and the utility of a unified reporting framework in knowledge sharing and decision making. However, the scope of the study, sample size, and geographic limitations may constrain the generalizability of the results. Furthermore, Covid 19 restrained us from conducting face-to-face interviews as planned initially.

In chapter 5, we used metropolitan scale housing data to discuss how national, regional, and local sale policies distinctly and inconsistently influence housing markets. The combination of variables used helped assess the net outcome of multi-level policies. However, it was difficult to assess the impact of housing transactions made by foreign investors due to limited access to the data and differences in data boundaries. and data. Therefore, the scope of the study, data, scale of the study area, and the possible impact of other demographic and economic factors limit the generalizability of the research.

6.4 Future Research Direction

This dissertation provides several contributions to sustainability, sustainable development, and sustainable governance literature and practice. Still, further research on the role of the normative-functional conceptual base for policy trade-offs is vital to achieving a methodological consensus on pursuing sustainable development objectives. Throughout the manuscripts, our discussion pointed toward future research avenues within sustainable policy development.

First, we have provided a comprehensive literature review on sustainability literature to analyze a conceptual approach to sustainability commonly applicable irrespective of contextual variances. Furthermore, we have discussed theoretical examples from African governance and policy experiences to support our arguments. Future research agendas should apply the same principle to assess other developing and developed countries' policy bases influencing contextual constraints. Similarly, we need future research to evaluate trade-offs between SDG targets and indicators on the same grounds.

Second, the importance of qualitative interdisciplinary research is crucial due to the extensive role of ethics and justice in sustainable development. Our research indicated the importance of fuzziness in generating new ideas and their theoretical evaluation necessary to understand complex social matters. Therefore, we suggest more investigation on the relevance of qualitative research in the sustainability domain to develop methodological consensus.

Third, our future SDG localization research suggests mapping SDG indicators with local performance indicators and aligning existing reporting platforms to the SDG framework. It would facilitate the municipality's transformation to a reporting structure with a common language and methodology of collection and reporting data. Finally, the role of subsidiarity theory in facilitating SDG localizing is one area that needs further investigation.

Forth, an interesting avenue would be to triangulate by conducting a qualitative investigation to understand individual and corporate real estate investment trends and their basis of decisions to change policies. Subject to availability, including data on the geographic distribution of real estate investments by individual Canadians, foreign individuals, and corporations would help better understand the impact of policies on geographically connected housing markets. Additionally, further study is required to assess how policy interventions override local specific variables to influence house prices.

The future research suggestions presented in the dissertation can facilitate local and provincial policymakers to govern sustainable development agendas better. The results are also helpful for administrative and functional units to devise better strategies for horizontal and vertical integration, design relevant indicators, identify data sources, and coordinate resource allocation for efficient and informed decision-making.

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Appendix A

Information Letter

City Administrator

Subject: SDGs City Index Consultation - Interview Request

Greetings!

My name is Adil Rauf. I am a PhD Candidate in the School of Environment, Enterprise and Development (SEED) at the University of Waterloo. I am contacting you on behalf of Dr. Bruce Frayne, the Director of SEED and the Principal Investigator on an investigation into urban sustainable development in Canada. This research project is focused on defining the extent to which Canadian cities are achieving the United Nations' 17 Sustainable Development Goals (SDGs) and investigating the factors influencing or hindering SDG activity in Canadian cities. The Co-Investigators on this research project include Dr. Cameron McCordic (Assistant Professor in SEED at the University of Waterloo) and Dr. Jeffrey Wilson (Assistant Professor in SEED at the University of Waterloo).

As a City Administrator for a Canadian city, I would like to invite you to a 30-60-minute interview that will help us develop an index of SDG achievement in Canadian cities. These interviews will be focused on understanding the sustainable development goals, priorities and activities that Canadian city staff engage in. This discussion will help us (myself and my Co-Investigators) to understand how an index of SDG achievement could be best designed to assist city staff in Canadian cities in the design and implementation of sustainable development policies. The interview will also touch on topics around the voluntary review of SDG achievement in Canadian cities.

Each interview will be less than one hour in length and will be carried out either via remote video conferencing or via teleconference. The interviews will be facilitated by myself and either Dr. Frayne, Dr. Cameron McCordic, or Dr. Wilson. The exact date for the interview will be determined based on your availability in July 2021. I am including calendar link to schedule as per your convenience (https://calendly.com/adilrauf/60min).

If you are interested in attending these interviews, please feel free to contact me by email (adil.rauf@uwaterloo.ca) to discuss your availability and any questions or comments you may have regarding these interviews. I will provide detailed information about the study including the informed consent, interview questions, and SDGs City Index dashboard URL link before the meeting. This study

has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE #41777).

All the best!

Muhammad Adil Rauf
Ph.D. Candidate-SUSM

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Appendix B

Informed Consent

SDG Cities Index Consultation
Interview Informed Consent Form
City Managers and Chief Administrative Officers
Greetings!

You have been asked to participate in assessment of Sustainable Development Goal (SDG) achievement among Canadian cities. This research project will develop an index of SDG achievement among Canadian municipalities and provide an online visualization portal to make this index publicly available. This index will support efforts to gauge municipal progress on sustainable development across Canada. This study is being conducted by Dr. Bruce Frayne (the Principal Investigator) at the University of Waterloo. This research project is being funded by the Social Sciences and Humanities Research Council of Canada and Employment and Social Development Canada. The purpose of this evaluation is to answer the following questions:

1. Using SDG 11 Sustainable Cities and Communities indicators, develop a Canadian SDG cities index as a measure of sustainable development in Canadian cities (and receive feedback on this index).
2. Investigate how the SDGs have been implemented in Canadian cities.

In this interview (which will last between 30 to 60 minutes either by teleconference or remote video conferencing), we would like to hear your feedback on the SDG Cities Index that is being developed in this project. We are interested in how the SDG Cities Index can be aligned with the goals, priorities and activities that direct the efforts of city staff in your municipality around sustainable development. To learn more about this study, please contact Dr. Bruce Frayne at the University of Waterloo (bfrayne@uwaterloo.ca).

Please note that you will not be remunerated for your participation in this study and your participation in this interview is voluntary. Any questions you choose not to answer in this interview can be skipped. You may also stop the interview at any time and/or withdraw from the entire study. If you decide to withdraw from the study, all notes, transcripts and recordings of your interview will be permanently deleted. Please note that you may only withdraw from the study before the publication of the final report (to be published between September and December, 2021). A voice recorder will be used during this

interview and the interview recording will be summarized in notes or transcribed. All notes and transcriptions from this interview will be shared with you within one week of your participation for you to review and modify/clarify. Unless you choose to be identified by direct quotation or anonymous quotation in this interview, your contributions to this study will only be noted in aggregate form in any reports derived from this interview (no information will be directly associated with your name in any report or paper derived from this study). That said, the report or paper may note that you were consulted in the process of the study. All completed interviews will be stored on a secure, password-protected, and encrypted hard drive. All data will be retained for at least six years. Your decision to participate will not, in any way, affect your current or future participation in activities with the University of Waterloo.

There are only minimal risks associated with your participation in this interview, however, you will have the chance to shape the Canadian SDG Cities Index and the opportunity to contribute to sustainable development efforts in Canada. Given that this interview is being completed by remote videoconference or teleconference, please note that when information is transmitted over the internet privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). University of Waterloo researchers will not collect or use internet protocol (IP) addresses or other information which could link your participation to your computer or electronic device without first informing you.

This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE #41777). If you have questions for the Committee contact the Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ore-ceo@uwaterloo.ca.

I acknowledge that I have read and understood the information and consent form and have received a copy to keep for future use.

Agree Disagree

I understand the purpose of this survey and I agree to participate.

Agree Disagree

I agree to the use of direct quotations based on the information collected in this interview.

Agree Disagree

I agree to the use of anonymous quotations based on the information collected in this interview.

Agree Disagree

By signing this consent form, you are not waiving your legal rights or releasing the investigator(s) or involved institution(s) from their legal and professional responsibilities.

Name (please print): _____ Signature: _____ Date: _____

Appendix C

Questionnaire

1. How have sustainable development related policies been designed and implemented historically in Canadian municipalities?
    a. Who initiated the process? Who implemented the policy?
        i. Was the process top-down or bottom-up (e.g. Province to City or vice versa)?
        ii. Which tier of government has been the most influential in designing these polices?
    b. What information, if any, motivated the design and implementation of the policy?
    c. How was progress monitored and evaluated?
        i. Who sets the targets and indicators (e.g. the City, the Region, or the Province)?
        ii. Were there any conflicts of interests? Were there any conflicting objectives?
        iii. Who determines the type of data and reporting pattern (e.g. the City, the Region, or the Province)?
        iv. How was departmental and third-party data coordinated for any shared indicators?
        v. Did you use a dedicated team or departmental staff for monitoring and evaluation?
2. Which structure will be more appropriate for SDGs implementation?
    a. Existing departments can manage VLR (Voluntary Local Reviews) process.
    b. Special purpose team is required to develop and align policies
    c. For implementation and control, a dedicated team is required at City, Regional, or Provincial level.
3. How helpful or unhelpful do you believe an SDG Cities Index would be to Canadian municipalities?
    a. What do you think is helpful about the SDG Cities Index?
    b. What do you think is unhelpful about the SDG Cities Index?
4. Are there any modifications that you would recommend for the next iteration of the SDG Cities Index?

a. Is there anything that is missing? If so, what?
b. Is there anything that needs to be removed from the index?

5. What do you think are the opportunities and challenges of localizing the SDGs in Canadian municipalities?
    a. What are the opportunities in localizing the SDGs?
    b. What are the challenges in localizing the SDGs?
6. Localized housing and affordability challenges
    a. What are the major barriers to affordable housing? Motivation, financial capacity, local capability, or marketized policies.
    b. How effective are multi-scalar housing policies? Which tier of governance are more effective in providing affordable housing?
    c. Which policy aspect is more effective to solve affordability? Rental/ownership, Demand/Supply subsides or public/non-market housing.
    d. Policy focus is on partial subsides not a general affordability across the board. Do you think marketized policy solutions can solve the problem of access to housing and affordability for low-income households?
    e. How motivated are municipalities to provide affordable housing? Do you see any value in municipality provided public or non-market housing as a potential source of municipality revenue?