

# **Sustainable Community Development through the conceptual lens of productivity**

**by**

**Maria Spiliotopoulou**

M.A., University of Strasbourg, 2003

Diploma/B.A., University of Strasbourg, 2002

B.A., Panteion University of Athens, 2000

Thesis Submitted in Partial Fulfillment of the  
Requirements for the Degree of  
Doctor of Philosophy

in the

School of Resource and Environmental Management  
Faculty of Environment

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SIMON FRASER UNIVERSITY

Spring 2021

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**Name:** **Maria Spiliotopoulou**

**Degree:** **Doctor of Philosophy**

**Thesis title:** **Sustainable Community Development through the conceptual lens of productivity**

**Committee:** **Chair: Andr anne Doyon**  
Assistant Professor, Resource and Environmental Management

**Mark Roseland**  
Supervisor  
Professor Emeritus, Resource and Environmental Management

**Sean Markey**  
Committee Member  
Professor, Resource and Environmental Management

**Amelia Clarke**  
Committee Member  
Associate Professor, School of Environment, Enterprise and Development, University of Waterloo

**Maya Gislason**  
Examiner  
Assistant Professor, Health Sciences

**Timothy Beatley**  
External Examiner  
Professor, Department of Urban and Environmental Planning, School of Architecture  
University of Virginia

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## **Abstract**

Achieving global sustainability requires addressing urban systems since more than two-thirds of the world's population will live in urban areas by 2050. Fundamental changes are needed in local decision-making, urban sustainability planning, implementation, and assessment, and citizen mobilization to move from current piecemeal approaches toward long-lasting and successful implementation of local and global sustainability goals.

This research explores the potential of holistic community/urban productivity: "How can the concept, principles, and practices of community productivity help address local sustainability planning, implementation, and assessment, and contribute to the achievement of the UN Sustainable Development Goals?" In response, I engaged in critical review of the literature on sustainable community development, urban sustainability, and holistic productivity, developed a conceptual framework for holistic urban productivity, and conducted in-depth case studies with two Canadian cities.

While cities are often considered as a component of Anthropocene problems, they also offer unique opportunities and solutions: they have enormous potential not only in terms of economic and labor productivity (diverse and inclusive economy, fostering innovation), but also of social productivity (hubs of research, learning, and sharing) and ecological productivity (ecological function regeneration and efficient use of resources). Holistic urban productivity posits that transforming cities into well-functioning and sustainable systems is possible through inclusive co-production of the commons, resource circularity and regeneration, natural systems restoration, and systemic decision-making.

This dissertation contributes to sustainable community development conceptually and empirically by substantiating existing literature and by proposing a new framework with principles, goals, and metrics grounded in long-term whole-systems thinking and regeneration of urban assets and resources. The research findings helped enhance the holistic Urban Productivity Framework and the development of recommendations for municipalities in Canada and beyond and for further research. Cities need to welcome visioning, networking, learning, and connectedness tools for balanced and synergistic optimization of all community elements.

**Keywords:** sustainable community development; urban sustainability; urban productivity; sustainable cities; urban development; sustainability frameworks

*To my beloved family:*

*Aris, my husband*

*Anna, my sister*

*And my parents: my late father Nikos (who I miss a lot) and  
my mother Antonia (who patiently supported me  
through yet another university degree).*

*Σας ευχαριστώ μαμά και μπαμπά.*

## Acknowledgements

This journey started almost eight years ago with a newlywed environmental consultant passionate to explore how 21<sup>st</sup>-century urban dwellers can cocreate cities in harmony with Mother Earth. That quest brought me and my husband to the West Coast of Canada, in the unceded Traditional Coast Salish Lands including the Tsleil-Waututh (səlilwətaʔt), Kwikwetlem (kwikwəʔləm), Squamish (Skwxwú7mesh Úxwumixw) and Musqueam (xʷməθkʷəy̓əm) Nations.

I wish to wholeheartedly thank my supervisor, Dr. Mark Roseland, for believing in me since our first Skype call in 2013 and for being an amazing mentor and encouraging friend throughout this academic journey. My sincere thanks to my Committee members Dr. Amelia Clarke and Dr. Sean Markey for their invaluable support and constructive feedback that helped me become a better researcher. I would also like to thank the external examiners in my PhD defence, Dr. Maya Gislason and Dr. Tim Beatley.

I would also like to thank Dr. Patrice Ranger and Dr. Susan Brook from Simon Fraser University's Health and Counselling Services, as well as Dr. Erika Horwitz and Dr. David Wasylynko, for taking excellent care of my physical and mental health during my PhD. I am also grateful to SFU Library's Research Commons and other library staff and to faculty, staff, and the Community Planning and Development Lab in SFU's School of Resource and Environmental Management, for their patience and support.

This research would not have been possible without the collaborators in my two case studies who welcomed and hosted me with enthusiasm and interest in my research. Thank you to Laura Benson and her sustainability team in the City of Maple Ridge; and thank you to Tom Lancaster, Suzy Lunn, and the Community Planning team in the District of North Vancouver. I am also grateful to the two cities, their community foundations, Mitacs Accelerate, the Office of the Dean of Graduate Studies, and the A. G. Leventis Foundation for financially supporting my doctoral research.

Last but certainly not least I wish to express my deepest gratitude: to my family – my husband (and best friend!) Aris, my sister Anna, my mother Antonia, my mother-in-law and sisters-in-law and their families, and my late father Nikos and late father-in-law Vassilis – I couldn't have made it this far without you and your love; and to many dear friends who stood by me in difficult times and celebrated with me in joyful times – Pavlo, Elli, John, Thanos, Alexander, Marianna, Eirini, Gretchen, Krista (my patient proofreader), Mary, Vasso, Fr. Kosta, Iliana, Ellie, Jesus, Angela, Christopher, Jon, Soudeh, and George; thank you!

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# Chapter 1.

## Introduction and research methods

### 1.1. Introduction

#### 1.1.1. “Glocal” challenges

A growing number of scholars refer to the modern period as “the Anthropocene”, the geological era marked by the detrimental impact of human activity on the planet (Steffen et al., 2018). The increased frequency of extreme weather phenomena; the persistent poverty, increasing social and economic inequality, and inaccessibility to basic provisions; the decline of ecosystem services; pandemics and spread of deadly viruses; and the unprecedented species extinction are some of the signs that the Earth may soon not be able to sustain the growth of human population and economic activity while maintaining systemic planetary well-being (Daly, 2005; Steffen et al., 2011).

The scientific evidence on the Earth’s deteriorating condition – and the urgency to respond with effective action – has been mounting for decades. The necessity for limits to economic growth was established decades ago in the seminal report “The Limits To Growth” submitted to the Club of Rome (Meadows, Meadows, Randers, & Behrens, 1972). The 1987 Brundtland Commission report also noted the interconnectedness between human activity and environmental degradation: 26% of the world’s population, living in developed countries, consumed 80-86% of non-renewable resources and 34-53% of food products (WCED, 1987). We no longer live in an “empty world”, but rather in a world full of human-made products and waste, with significant implications and repercussions for current and future generations (Daly, 2005).

From the 1972 Stockholm Conference on Human Environment, the 1987 UN World Commission on Environment and Development report “Our Common Future” (Brundtland), and the 1992 UN Conference on Environment and Development in Rio, to the 2002 Johannesburg World Summit on Sustainable Development, followed by the 2012 Rio+20 Earth Summit, the 2015 Sustainable Development Goals (SDGs), the 2015 Paris Climate Accord, and finally the 2016 New Urban Agenda, the message has been

loud and clear: the world needs to be on a more sustainable pathway quickly, if we are to have any hope of a sustainable future.

In some cases the situation may not be reversible; however the argument for limits to growth is strongly supported by up-to-date research on planetary boundaries some of which have been exceeded, e.g. genetic diversity and climate change (Steffen et al., 2015; Hamstead & Quinn, 2005; Meadows, Meadows, & Randers, 1992). Current generations now have both the knowledge and the responsibility to lead humanity away from putting further pressure on the planet and toward a safer and more sustainable future (Rockström, 2009; Steffen et al., 2011).

In this spirit, in 2000, the UN Member States adopted the Millennium Development Goals (MDGs) aspiring to eradicate extreme poverty and reduce inequalities by 2015, with a particular focus on developing countries. Despite persistent problems in urban areas in sub-Saharan Africa and South Asia, several goals were achieved: decreases in extreme poverty, child and maternal mortality, and disease rates, and rising rates of primary school enrollment and life expectancy (Harcourt, 2005; Meth, 2013; United Nations, 2015c).

Building partly on the achievements of the MDGs but mainly acknowledging the continuing struggles around the world, the Sustainable Development Goals (SDGs) were unanimously approved by the UN Member States in September 2015 (United Nations, 2015b). The UN 2030 Agenda for Sustainable Development with its 17 SDGs and 169 targets is both a significant step forward and a turning point for global sustainability. The new goals offer an integrated vision and plan for the 21<sup>st</sup> century: they apply to both developed and developing nations, and they are grounded in a holistic, systemic view of sustainability (ICSU & ISSC, 2015; Woodbridge, 2015).

The acknowledgement that today's principal global challenges need to be addressed in a systemic way is also reflected in the 2015 UN Climate Change agreement (United Nations, 2015a) and in the UN New Urban Agenda (United Nations, 2017). Achieving the SDGs and other international goals and targets is a complex undertaking that requires coordinated collaboration of actors at numerous scales. Yet effective action, as well as political will for meaningful, structural change, has been elusive, perhaps because these global issues must be primarily addressed at the local

level (Connelly, Markey, & Roseland, 2013). The success of the SDGs – or other long-term sustainability goals – is conditional on creating and implementing successful, monitorable, and transferable sustainability policies and practices in local communities (Dodds, Donoghue, & Leiva Roesch, 2017; Kanuri, Revi, Espey, & Kuhle, 2016).

### **1.1.2. Research focus: urban communities**

**My research focus is sustainability at the local community level, particularly in urban areas where key components of both challenges and solutions are increasingly observed** (Roseland & Spiliotopoulou, 2016). Communities today “constitute the arena where action is concretized; they [...] are hubs of peer-to-peer learning and knowledge sharing” (United Nations, 2012). A predominantly “community-up” approach is crucial for stakeholder engagement and for ultimately turning sustainability into the new *modus operandi*, within this century, globally.

For my research purposes, a community refers to “a group of people bound by geography and with a shared destiny, such as a municipality or a town” (Roseland, 2012, p. 12), and is considered as a complex, adaptive, and interconnected system, requiring interdisciplinary study (Uphoff, 2014). An urban area is “a human settlement characterised – ecologically, economically, politically and culturally – by a significant infrastructural base; a high density of population, whether it be as denizens, working people, or transitory visitors; and what is perceived to be a large proportion of constructed surface area relative to the rest of the region”(James, 2015, p. 26).

Urban areas occupy 3-4% of the world’s land surface, use 80% of resources, discharge most global waste and will be host to two thirds of the world’s population by 2050 (Girardet, 2015; UN DESA, 2018). They are increasingly vulnerable to climate change and health challenges, and are linked to increased costs to the economy and the environment (Kanuri et al., 2016). For these and more reasons, the UN Global Agenda for 2030 includes a specific goal for “inclusive, safe, resilient, and sustainable” cities. Local communities in general are the laboratories for successful, monitorable, and transferable sustainability policies and practices, and quite possibly our best chance to deal with the environmental impact of human activity (Cairns, Clarke, Zhou, & Thivierge, 2015; Woodbridge, 2015).

**Urban communities have enormous productivity potential** not only in terms of economic and labor productivity (diverse and inclusive economy, fostering innovation), but also of social productivity (hubs of research, learning, and sharing) and ecological productivity (ecological function regeneration and efficient use of resources) (Roseland & Spiliotopoulou, 2017). **This research thus focuses on the potential of holistic, integrated urban productivity to address the phases of plan development for urban sustainability, implementation of such plans, and assessment of progress toward sustainability goals.**

### **1.1.3. Sustainable community development**

Sustainable development (SD) emerged as a field of study after the 1987 Brundtland Commission showed the correlation between human economic activity and the deteriorating situation of the natural environment (WCED, 1987). The Brundtland Report first popularized the term, stating that SD is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 41).

SD has been criticized as ambiguous and open to contradictory interpretations but most definitions present common characteristics: integration of environmental, economic, and social aspects; systems thinking; and dynamic nature (Berke & Conroy, 2000; Roseland & Spiliotopoulou, 2016). Although some scholars use the terms SD and sustainability interchangeably, for the purposes of my research SD is the process, the effort, and activities leading to the end goal which is the state of sustainability (Sartori, Da Silva, & Campos, 2014). SD represents a new way of thinking about economic development: “doing development differently” (Roseland, 2012, p. 3).

The growing awareness that achieving sustainability requires societal change through collaborative decision-making and citizen engagement locally has brought sustainable community development (SCD) to the foreground (Clarke, 2012; Hermans, Haarmann, & Dagevos, 2011). SCD is a holistic approach that integrates social, environmental, and economic considerations into the dynamic processes and actions of communities on their path toward sustainability, while providing for current and future generations (Berke & Conroy, 2000; Roseland, 2012). This view is reflected in high-level UN documents such as the 2030 agenda (United Nations, 2015b), the 2015 Paris

Climate agreement (United Nations, 2015a), and the New Urban Agenda (United Nations, 2017).

The current sustainability approach has been influenced by theories drawing on various disciplines without having necessarily or explicitly formed a scientific discipline yet – although “sustainability science” and “sustainable urban systems science” are actively under discussion (Advisory Committee for Environmental Research and Education, 2018; Weinstein & Turner, 2012). Early SD work focused mainly on economic and partly environmental issues and was based on assumptions such as that humans should dominate over nature, natural resources are super-abundant, and economic growth can continue indefinitely through resource efficiencies (Ayres, 2007; Solow, 1993; Williams & Millington, 2004). Such approaches were criticized for not incorporating important issues such as social equality, environmental justice, population trends, and inter- and intra-generational equity (Agyeman, Bullard, & Evans, 2002; Bayulken & Huisinigh, 2015).

More recently, SD and SCD have gradually embraced initiatives acknowledging the Earth’s regenerative limits and the need for socio-ecological and economic resilience “across temporal and spatial scales” (Daly, 2005; Meerow, Newell, & Stults, 2016; Rockström et al., 2009). Community Economic Development (CED), circular economy, eco-localism, and social economy initiatives, for example, emerged as a community response to the negative impacts of older approaches and they evolved rapidly, from simple forms of local economic activity reflecting social or cultural values to ventures addressing broader social needs and environmental well-being (Ferguson (Hernandez), 2015; Gismondi, Connelly, Beckie, Markey, & Roseland, 2016).

Communities today are gradually including social and ecological factors in policy-making through collaborative – and often systemic – processes. However, they often face the complexity of sustainability goal-setting and the challenge of navigating various local agendas grounded in diverse conceptual backgrounds or stakeholder interests (Roseland & Spiliotopoulou, 2017). Adopting sustainability frameworks and tools is considered an effective means of addressing such challenges; a sustainability framework can be broadly defined as “the rational and the structure for the integration of concepts, methodologies, methods, and tools” (Sala et al., 2015). Communities can then gauge success and measure progress toward their ecological, social, and economic

goals, while engaging citizens in a broad range of processes (Caprotti et al., 2017; Moreno Pires, Magee, & Holden, 2017; Roseland, 2012).

#### **1.1.4. Weaknesses in current SCD approaches**

Despite the conceptual evolution of sustainability over the last decades, policies and initiatives have not always involved a balanced approach between environmental, economic, and social concerns. The multitude of definitions and approaches, the lack of shared understanding, and the intense reliance on technological efficiency have contributed to limited and inconsistent application of sustainability principles and insufficient systemic thinking (Joss et al., 2015; Kristensen & Roseland, 2012; Roseland & Spiliotopoulou, 2017). For example, social economy and CED initiatives have sometimes been criticized for operating inside the capitalist system without trying to change the system's rules (Roseland & Spiliotopoulou, 2016). Likewise, not all efficiencies translate to reduced resource extraction and consumption since other factors, such as population growth and industry interests, are also at play (Ang & Van Passel, 2012; Kopnina, 2015).

In the pursuit of sustainability or well-being, communities are challenged with difficulties such as addressing multiple objectives, thinking strategically and holistically about high-level goals, and meaningfully engaging their citizens, while also assessing projects and policies and tracking progress consistently (Connelly et al., 2013). Numerous agendas, frameworks, and tools have influenced or informed operations of planning for sustainability, implementing these plans, and assessing progress toward goal achievement in communities worldwide. The abundance of plans, tools, and networks demonstrates acknowledgement of the need to take action and the desire to cooperate and exchange knowledge. However, not all plans and agendas promote a whole-systems approach or are followed by implementation strategies, thus leading to lost opportunities, lack of credibility, and increased public scepticism (Cairns et al., 2015; Roseland, 2012).

Successful SCD planning, monitoring, and assessment entails tackling issues such as stakeholder engagement, place-specific context, political credibility, and adoption of a shared and practical vision. Frameworks and decision-making processes should consider factors such as the systemic nature of cities, the need to integrate

human and environmental health interests, the rapidly changing production and consumption patterns in a globalizing world, and the need to emphasize social inclusion, equity, constructive societal mobilization, and security (du Plessis, 2012; Kissinger & Rees, 2009; Newman & Jennings, 2008).

Despite historical and theoretical debates as well as practical weaknesses, SCD should not be understood as a series of trade-offs between social, environmental, and economic priorities. Protecting ecosystems and promoting social inclusion at the local level need not mean job loss or economic downturn. Rather, achieving the end goal of sustainability requires fundamental changes to stop sustaining an ill-functioning socio-ecological system and business-as-usual operations, in favor of meaningful improvements to system health and well-being (Benson & Craig, 2014; Neuman, 2005; Roseland & Spiliotopoulou, 2017).

### **1.1.5. My research on urban community productivity**

Sustainability has in recent years somewhat expanded its scope to embrace advancements in resource and labor productivity (Jackson & Victor, 2011), collective action and social economy (Connelly et al., 2013), local resilience, re-organization, self-reliance (Brugmann & Mohareb, 2012; Folke, 2006; Meerow et al., 2016), and resource regeneration (Robinson & Cole, 2015), as well as policies inspired by “just” sustainability (Agyeman, 2008) and a “shared ethical framework” (The Earth Charter Initiative, 2010). Businesses have started to adopt more sustainable practices for efficiency in technology, design, and management, and to promote green jobs (Kouri & Clarke, 2012) and communities are finding that they can actively pursue SD while improving their economic indices (Portney, 2013).

Traditional economic growth policies still direct cities to maintain or increase their economic output by improving technology, accumulating capital, and enhancing labor productivity. However, urban space that is planned with whole-systems sustainability thinking can lead to increases in human, resource, and process productivity, enhanced urban assets performance and systemic interactions, ecological function regeneration, effective and inclusive decision-making processes, and co-production of community space (Brugmann, 2015; Girardet, 2015; McLaren & Agyeman, 2015).

In this context, **my research explores holistic urban productivity as an emerging SCD concept and practice that can help address challenges in urban sustainability planning, implementation, and assessment.** As the **currently limited literature on holistic urban productivity** argues, a productive city would seek to regenerate its resources by being net-positive, i.e., by producing more capital than it consumes and limiting its dependence upon external resources (du Plessis, 2012; Girardet, 2013; Robinson & Cole, 2015).

**The concept of holistic urban productivity is multi-dimensional and interdisciplinary.** It respects the dynamic nature of socio-ecological systems, and offers a holistic long-term perspective that can reveal opportunities for synergies and direct and indirect positive impact. As detailed in chapter 3 (paper 2), holistic productivity is informed by theories and approaches such as whole-systems thinking, regenerative development, ecological systems restoration and productivity, resource circularity, socio-cultural equity and inclusive co-creation (or co-production) of urban space, and regenerative sustainability.

This thesis also proposes a **holistic Urban Productivity Framework** to help cities address issues in sustainability planning and implementation (through systemic analysis, long-term goal setting, and inclusive processes) and assessment (through meaningful indicators that measure all aspects of the urban system and help uncover synergies for progress and success). The framework attempts to converge its foundational concepts and approaches so that cities optimize, co-create, and redesign their tangible and intangible assets and achieve intergenerational and intragenerational equity and well-being within the Earth's carrying capacity.

Holistic urban productivity overall proposes a shift in mindset and action: from the current demanding, resource-extracting, and individualistic model to a systemic, resource-regenerative model of a productive – and eventually sustainable – city. This transition involves shifting community development from a negative logic (reducing impact) to a positive one (Brugmann, 2015; Girardet, 2015) and has the potential to contribute to the achievement of sustainability goals so that the system we “sustain” thereafter is a well-functioning one. During the shift, community, people, and the environment would be involved in a co-evolutionary process, engaging all related systems, sub-systems, and stakeholders (Neuman, 2005).

## 1.2. Research questions and thesis roadmap

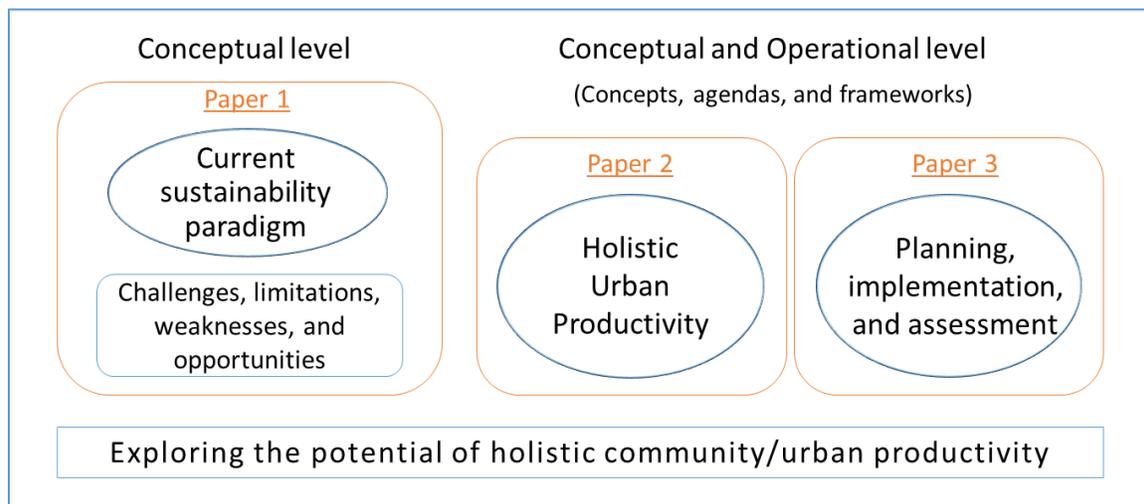
The meta-question that has guided my research is:

- How can the concept, principles, and practices of community productivity help address local sustainability planning, implementation, and assessment, and contribute to the achievement of the UN SDGs?

The two major sub-questions are:

- How can the concept of community productivity contribute to sustainable community development theory?
- How can the principles and practices of community productivity help address local sustainability planning, implementation, and assessment and contribute to the achievement of the SDGs?

This thesis is structured in five chapters: this introductory chapter, three chapters organized as full papers, and a discussion/conclusions chapter (figure 1.1. shows the main three papers). The first sub-question is investigated in chapters 2 and 3 (papers 1 and 2) and the second sub-question is tackled in chapter 4 (paper 3).



**Figure 1.1. Roadmap of the main papers.**

Original graph.

Chapter 1 begins with an overview of the significance of urban communities and local/urban action in dealing with today's global and local challenges. It then introduces the research questions and details the research methods and the integrated research framework.

Chapter 2 (**Paper 1**) presents a historical overview and a review of the literature on sustainability concepts, theories, and debates and focuses on their application in cities. It identifies gaps and shortcomings in theory and practice and concludes with a critique of how urban sustainability is understood and operationalized.

Chapter 3 (**Paper 2**) explores the concept, principles, and practices of holistic urban productivity and the theories and approaches it is grounded in. It then introduces a conceptual framework (developed through an iterative process) that seeks to help address urban sustainability planning, implementation, and assessment, and contribute to the achievement of the UN SDGs.

Chapter 4 (**Paper 3**) presents the findings of two in-depth case studies with municipalities in British Columbia, Canada, regarding perceptions and challenges in urban sustainability planning, implementation, and assessment, and opportunities for adoption of urban productivity. It then discusses implications and opportunities based on the research findings and offers recommendations for integrated and effective urban sustainability by engaging holistic urban productivity principles and practices.

Finally, chapter 5 recaps the three main chapters and includes an integrated discussion of the research findings and the potential of the concept and practice of productivity to offer a systemic and long-term perspective to local sustainability planning, implementation, and assessment.

The dissertation concludes with a series of appendices: details on the research methods (Appendix A), the data collection instruments (Appendix B), the descriptions of sustainability frameworks and tools consulted throughout this research (Appendix C), a list of proposed indicators for holistic urban productivity (Appendix D), and a list of publications and presentations that disseminated this research in the last few years (Appendix E).

My research in this interdisciplinary field is primarily informed by the philosophical orientation of pragmatism, with elements from constructivism and the transformative worldview (Bazeley, 2013; Creswell, 2014; David & Sutton, 2011; Inam, 2013; Yin, 2015). As Yin explains, a “middle ground” worldview such as that of pragmatism offers the researcher flexibility, adaptability, and opportunity to situate the research in a paradigmatic continuum as opposed to having to choose between extreme approaches

(Yin, 2015). Inam and Holden corroborate Yin's view especially with regard to applying the principles of pragmatism to urban sustainability planning (Holden, 2008; Inam, 2013).

The pluralistic and real-world-problem-centred approach of the pragmatic worldview is suitable for attempting to deal with the debates and issues identified in theory and practice of sustainability. Pragmatism focuses on the issue at hand and its historical, social, political, environmental, and other context, while acknowledging human agency. It emphasizes being open to diverse perspectives and methods when researching social phenomena: "pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis." (Creswell, 2014, p.11)

Closely related to pragmatism, constructivism also acknowledges the significance of human experience and reflection in the construction and interpretation of the world; however, constructivism favors the use of qualitative research methods (Creswell, 2014). In addition, the influence of the transformative paradigm comes from the necessity to take social and environmental justice into consideration when planning for, implementing, and assessing sustainability. This research argues that to achieve a productive – and eventually sustainable – community, policies and actions need to move beyond social sustainability, toward "just sustainability" and into understanding and forming a deeper connection among humanity and between humanity and nature.

## **1.3. Research methods**

### **1.3.1. Introduction**

Case study research was deemed as the most appropriate method for my doctoral research, given that the focus is on contemporary, real-world phenomena and the main research question seeks to answer "how" a new concept can help address current issues. I therefore engaged a mixed-methods, information-oriented approach within case study research, integrating a participatory process with qualitative and quantitative data collection and analysis techniques and tools (Creswell, 2014; Hermans et al., 2011; van Kerkhoff, 2014; Yin, 2014).

An important strength of case study research is that the researcher pays attention to the complexity of the unit of analysis as a system nested within larger

systems and formed by sub-systems (David & Sutton, 2011). The researcher selects the cases to study, focuses on the interactions of actors within the cases, and has the opportunity to proceed with in-depth documentation and analysis of dynamic systems (Maxwell, 2013; Yin, 2015). A notable weakness of case study research relates to the generalisability of results; research findings such as correlations based on a limited number of case studies may not be necessarily applicable in other cases (David & Sutton, 2011; Yin, 2015). Although case studies are not “sampling units”, the findings of in-depth case studies tend to counteract this disadvantage: they can feed back to the theoretical framework of the research to confirm, reject, modify, or advance theory (Yin, 2014).

### 1.3.2. Research methods overview

This research started with a traditional, theoretical **literature review** initially anchored in the study of two groups of academic literature: a) my senior supervisor’s book *Toward Sustainable Communities* and related papers he authored or co-authored (e.g., Connelly et al., 2013; Roseland, 2000, 2012) and; b) seminal work on SCD and urban sustainability by scholars such as Julian Agyeman, Peter Newman, Bogachan Bayulken, Philip Berke, Simon Joss, Herbert Girardet, Meredith Hamstead, Mike Hodson, and Paul James.

The next step was a thorough search for academic literature using Simon Fraser University Library’s search tool<sup>1</sup>. I first looked for peer-reviewed papers with broader search terms such as “sustainable community development”, “sustainable community development theory”, “urban sustainability”, “environmental justice”, “sustainable cities”, “local sustainability case studies”, “building sustainable communities”, “sustainability debates”, “urban systems” (and “systems theory”), “sustainability frameworks”, “urban sustainability agendas”, “local sustainability plans”, and “urban sustainability assessment”.

Then I looked for literature using search terms that were more specific to the theories and concepts I had identified in the previous steps, e.g., “weak and strong sustainability”, “community economic development”, “just sustainability”, “social

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<sup>1</sup> The current web link for the SFU library’s search tool is: <https://sfu-primo.hosted.exlibrisgroup.com/primo-explore/search?vid=SFUL&sortby=rank>

economy”, “green economy”, “circular economy in cities”, “urban metabolism”, “urban governance”, “collaborative planning”, “sustainability economics”, and “urban resilience”.

Building on the above and looking for academic literature on the concepts underpinning holistic urban productivity (traditional literature review with a component of argumentative review), I conducted a thorough search using Simon Fraser University Library’s search tool<sup>2</sup>. I first used broader search terms such as “urban productivity”, “economic productivity” (and “labor productivity”), “resource productivity”, “social productivity”, “ecological productivity”, and “urban regeneration”. Based on the results, I then expanded the search using terms such as “resource regeneration”, “regenerative sustainability”, “sharing economy”, “regenerative development”, “total factor productivity”, “urban metabolism”, and “urban resilience”.

In an iterative way and while studying prominent articles and their reference lists, I also followed the snowballing method to identify related academic literature. In addition, I explicitly looked for debates and discourses and, in some cases, I deemed useful to consult non-academic sources such as scientific reports, international organization documents, handbooks, or edited books. I evaluated the resources for credibility and soundness, in terms of author, methodology, content, and publication venue. More details on the methods followed for the literature review are in Appendix A1.

The overall **case study research design** is based on Yin’s approach for multiple-case study design with replication logic (Yin, 2014). The multiple-case design with in-depth study of each case presents advantages that can lead to high degree of robustness: collection of compelling evidence, immersion in the system and context of the case, and extensive study and understanding of interactions and other dynamics that can offer valuable insights. Disadvantages of this type of design, such as the small number of case studies or the difficulty to generalize the results, can be offset to some extent by the depth and breadth of evidence collected and the extensive analysis that follows.

In implementing exploratory and concurrent mixed methods approach, the overall research design (figure 1.2) provided a flexible comprehensive roadmap for conducting

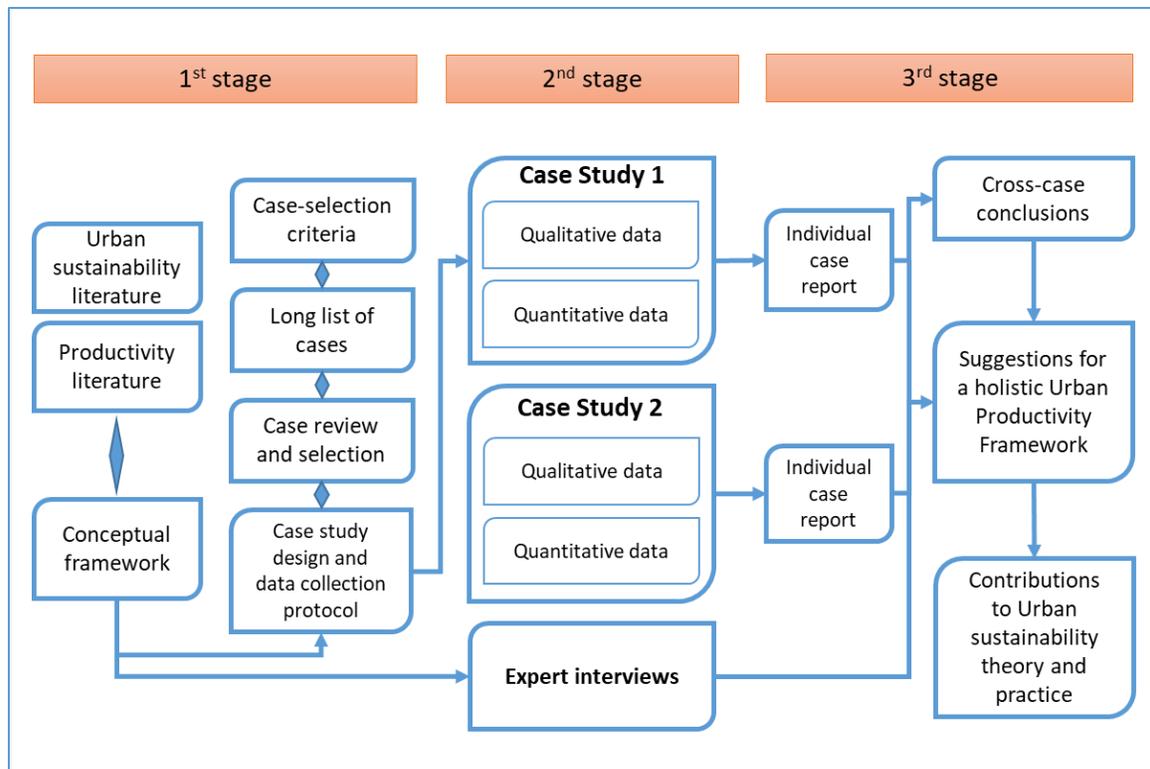
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<sup>2</sup> The current web link for the SFU library’s search tool is: <https://sfu-primo.hosted.exlibrisgroup.com/primo-explore/search?vid=SFUL&sortby=rank>

the case studies with the research questions and goals in mind (Creswell, 2014; Guest, Namey, & Mitchell, 2013). The first stage of the case study research included: defining the units of analysis as cities/municipalities, conducting an initial search for potential cases and compiling a list of cities in Canada and in British Columbia, and preparing data collection instruments and protocols.

In the second stage, restrictions in available resources (time and funding mainly) were taken into account for the selection of case studies. I therefore focused on Metro Vancouver, British Columbia, and conducted two in-depth case studies in two municipalities that expressed interest in hosting me as an intern: the City of Maple Ridge (CMR) and the District of North Vancouver (DNV). For additional validity, insights, and conceptual feedback, I also conducted a number of interviews with internationally-recognized experts in urban sustainability, productivity, and regeneration.

Shortly after finishing data collection in each case study, I submitted a case report to the municipality and other involved stakeholders, as part of stage three in the overall research design. The report included an account of the internship tasks and methods, preliminary findings, and recommendations for embedding sustainability in municipal policy documents and decision-making practices. Lastly, it is worth noting that the conceptual framework for holistic urban productivity was developed through an iterative process informed both by the literature (chapter 3 / paper 2) and the findings of the two case studies (chapter 4 / paper 3). More details are available in Appendix A2.



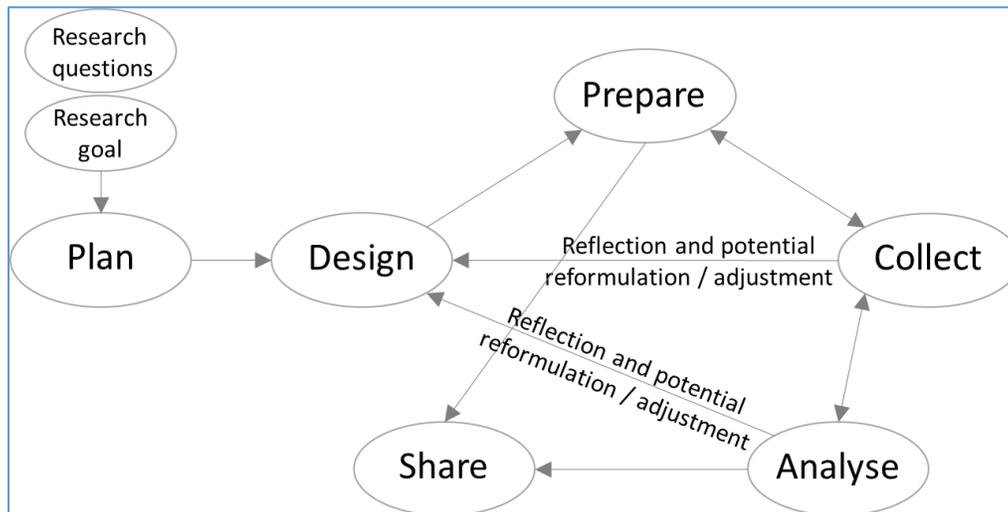
**Figure 1.2. Overall research design.**  
Original graph.

### 1.3.3. Case study design

For each case study I followed an iterative approach inspired by Yin’s model (2014) with elements from David & Sutton (2011). As shown in figure 1.3, the case study design was informed by the research questions and the overall research goals. It is embedded in an integrated framework based on Maxwell’s “interactive model of qualitative research design” as shown in section 1.6. (Maxwell, 2013).

The initial stage included the design and drafting of the case study protocol (see Appendix B), an important research instrument containing the procedures and other guidelines for the researcher to follow during data collection (Yin, 2014). The next step was taken once the case studies were identified: submission of the required documentation for the Research Ethics approval and for funding from Mitacs Accelerate. The Research Ethics application “with minimal risk” was approved by SFU on May 7, 2017 for the first case study and on November 27, 2017 for the second case study, and was renewed on May 4, 2018 to cover the last two months of data collection in case

study two. Another Research Ethics approval was obtained on November 6, 2018 for the interviews with key informants which were separate from the two case studies.



**Figure 1.3. Case study design as an iterative approach.**  
Adapted from Yin (2014).

#### 1.3.4. Data collection and analysis

In the two municipalities and within a mixed methods approach, I primarily collected qualitative data from the following sources of evidence:

- semi-structured interviews (guided by open-ended questions and a few close-ended questions);
- structured observations of City Council meetings;
- high-level policy document review and analysis, and study of local context; and
- participation in group meetings with city staff and community representatives.

More specifically, qualitative data were collected by engaging elected officials (Councillors), appointed officials (city senior management and expert staff), and community members through the local Community Foundations<sup>3</sup> or other meetings and workshops. In the District of North Vancouver, I also briefly became involved in the 2017-2018 Official Community Plan Implementation Monitoring Committee (OCP IMC)

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<sup>3</sup> Community foundations manage private endowments to provide local projects with funding for initiatives that benefit the community (Community Foundations of Canada, n.d.).

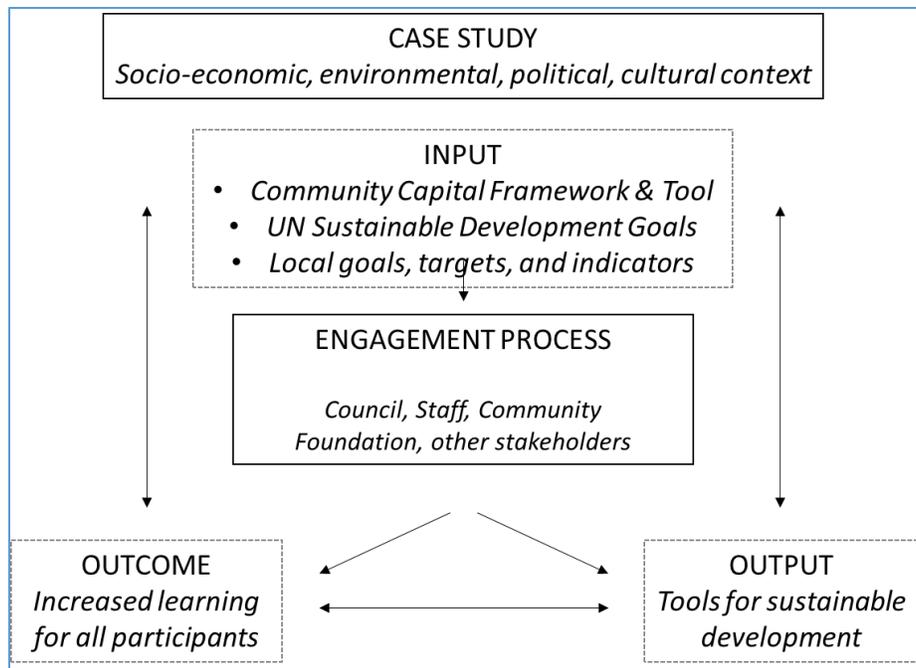
which is composed of community members and whose purpose is to provide comments on OCP implementation (consistency of vision, goals, and actions), monitoring (ensuring meaningful and appropriate indicators), and communication with the public.

In addition, a series of meetings with key staff provided me with valuable contextual information (local needs, issues, trends, politics etc.) as well as perspectives on various aspects of localizing sustainability indicators and the importance of progress assessment in relation to Council directions to staff. I met with departments such as Planning or Community Planning, Parks and Recreation, Public Works, Economic Development, Information Technology, Engineering, and Emergency Services (Fire and Police). Through these meetings, the subject-matter experts largely contributed to my understanding of indicator contextual meaningfulness, policy jurisdiction, data availability, data sources, existing targets, municipal capacity, etc.

In total, I:

- conducted 30 semi-structured interviews with Councillors and senior management (department directors and managers) – 14 in the District of North Vancouver and 16 in the City of Maple Ridge (out of the 18 and 21 people I contacted respectively),
- consulted 36 subject-matter expert staff in both municipalities in semi-structured interview meetings and in follow-up meetings mostly related to monitoring and progress assessment,
- observed 16 Council meetings (10 in CMR and 6 in DNV), several of which involved at least some citizen participation (e.g. Committee of the Whole forum), and
- engaged with more than 40 community members in workshops with the two community foundations and the DNV OCP IMC

Thanks to this inclusive participatory process, I had the opportunity to explore and identify the perceptions of stakeholders on needs and gaps in existing policies and processes, and document their preferences and ideas regarding the linkages between global and local sustainable development, assessment tools, and visions for the future; I also received their direct feedback for my research on sustainability frameworks and the development of the holistic Urban Productivity Framework. Figure 1.4 illustrates the methodological model of the participatory process used in in both case studies.



**Figure 1.4. Contextual and methodological model of participatory process.**  
Adapted from Hermans, Haarmann, & Dagevos, 2011.

For reasons of pluralism, validation, and interdisciplinarity, qualitative methods were complemented with the collection of some quantitative data in the form of a “nested arrangement” (Creswell, 2014; Maxwell, 2013; Yin, 2014). The quantitative data were obtained through a short survey component in the interviews (closed-ended questions with Likert-scale, forced-choice, or check-all-that-apply responses– seen in Appendix B1) and a study of social, economic, environmental, political, and cultural contextual information from archival sources such as Statistics Canada, BC Stats, BC Assessment, BC Hydro, local health authorities, and the cities’ own archival records. The overall goal was to establish a picture of each city’s context and sustainability situation and to evaluate their capacity to source reliable and timely sustainability data.

The concept and principles of holistic urban productivity were discussed in the case studies without explicitly mentioning the term “productivity” to ensure that participants would not immediately associate it with economic and labor resources only (as is commonly the case) and that I would receive responses on *all* aspects of urban productivity. As the framework presented in paper 2 was still in the draft stage of its development during the case studies, it was *indirectly* discussed in the interviews or in other conversations with participants: I would either use holistic productivity language

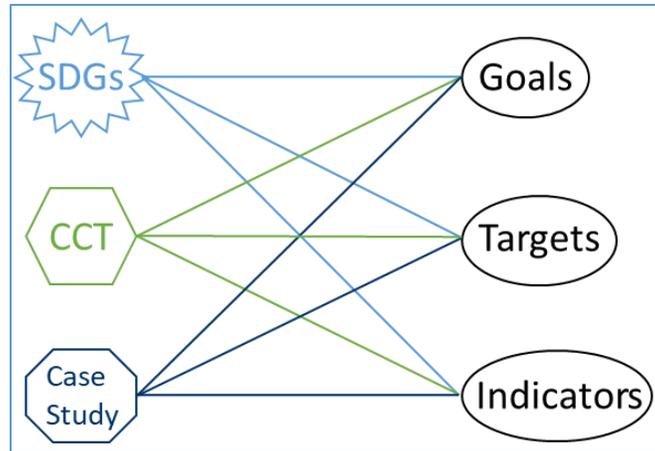
and concepts (but again, not the term “productivity” itself) or discuss and receive feedback on holistic productivity goals and metrics.

In parallel, information was collected with regard to the local understanding and implementation of the UN Sustainable Development Goals (SDGs). The objective was to assess existing policy goals and targets, identify gaps and needs, and offer customized policy and metrics recommendations that would help align local and global goals, while providing valuable data for my research. I conducted a complex SDG-Local Goals matching and mapping exercise, modeled on the work done in San Jose, New York, and Baltimore within the USA Sustainable Cities Initiative (USA-SCI) under the guidance of the Sustainable Development Solutions Network (SDSN) (Nixon, 2016; Prakash et al., 2017). As shown in figure 1.5, the mapping extended along three levels of decision-making within three frameworks: I compared the goals, targets, and indicators of the SDGs with those of the Community Capital Tool (CCT, explained in chapter 3) and those of the two case studies<sup>4</sup>.

For this task, I followed a similar process to the one described by Ruckstuhl, Espey, & Rae (2018) and the steps in Mesa, Edquist, & Espey (2019), despite conducting this work before these two documents were made available. I first studied the official community plans and other major policy and strategy documents to locate local goals and targets and identify core values and principles. I then compared local goals and targets with the SDGs and their targets (excluding SDG 17 on global partnerships as largely not applicable) and with the CCT capitals and stocks. Finally I compiled lists of existing sustainability and other performance indicators in the two cities and compared them with the CCT and the SDG indicators. The evidence collected provided valuable insights regarding the extent to which high-level policy documents incorporated a systemic approach regarding the community and its goals for the future.

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<sup>4</sup> An SFU Master of Resource Management Planning student, Danny Ross, was also involved in this part of the DNV project (Ross, 2018).



**Figure 1.5. The extent of mapping of the two cities' goals, targets and indicators with the Sustainable Development Goals and the Community Capital Tool.**

Original graph.

Also, as mentioned above, I collected qualitative data by interviewing a number of experts in urban sustainability, productivity, and regeneration. Following a careful consideration of potential interviewees, I shortlisted seven experts based on my review of the literature and practice of urban productivity. Four responded positively:

- Julian Agyeman, Professor of Urban and Environmental Policy and Planning in Tufts University
- John Robinson, Professor and Presidential Advisor on the Environment, Climate Change and Sustainability at the University of Toronto
- Coro Strandberg, Business sustainability strategist and thought leader
- Daniel Christian Wahl, Sustainability educator and whole systems consultant

I interviewed the experts via Skype call, using a small set of questions as a guide while being open to unstructured conversation (Appendix B). These interviews were recorded, transcribed, and analysed in NVivo. They informed the conceptual discussion and offered insights on how holistic urban productivity can address urban sustainability challenges.

Quantitative data from the survey component in the interviews consisted mostly of Likert-scale responses to closed-ended questions. The analysis of quantitative data included aggregation by case study and use of descriptive statistics, first within each case study and then with all data from both case studies (please also see the last

paragraph below). Microsoft Excel and Tableau were used for quantitative data entry, cleaning, aggregation, interpretation, and visualization.

The bulk of data collected were qualitative (interviews). I transcribed interviews verbatim myself and analysed data using the software NVivo. The general strategy for analysis was inductive, as deemed suitable for exploratory case study research, although it involved an important deductive element as well. The initial exploration was deductive, i.e., coding based on theoretical propositions and literature with NVivo nodes such as “efficiency prioritization”, “weak sustainability”, “strong sustainability”, “global-national-local links”, “long-term or short-term decision-making”, “sustainability as a buzzword”, “progress assessment”, and “implementation issues”. In this context, data analysed confirmed and reinforced the existence – and helped explore the extent – of contemporary challenges and shortcomings in sustainability planning, implementation, and progress assessment.

Then I primarily employed inductive thematic analysis which was iterative to some degree; data collection was generally temporally separate from analysis, although preliminary analysis of data from case study 1 contributed to refining the data collection process for case study 2 without altering the case study design. At the inductive analysis stage, NVivo nodes included, for example, “examples”, “storytelling”, “systemic thinking signs”, “data collection suggestions”, “complex governmental processes”, “socio-cultural sustainability”, and roles of Council, staff, and citizens in sustainability decision-making and assessment. I applied analytic techniques such as: pattern exploration and pattern matching (comparison with the literature and theoretical predictions); explanation building (linking theory, patterns, and findings); and cross-case synthesis for more robust research findings.

With regard to validity threats such as researcher bias and researcher reactivity (Maxwell, 2013; Yin, 2015), biases based on my previous experience and occasional reactions during interviews (e.g. spontaneous nodding) could have affected interviewee responses and my interpretation thereof. In dealing with such biases and reactions during data collection, first of all professionalism and research ethics principles were followed at all times. Secondly, several validity tests were used during data analysis:

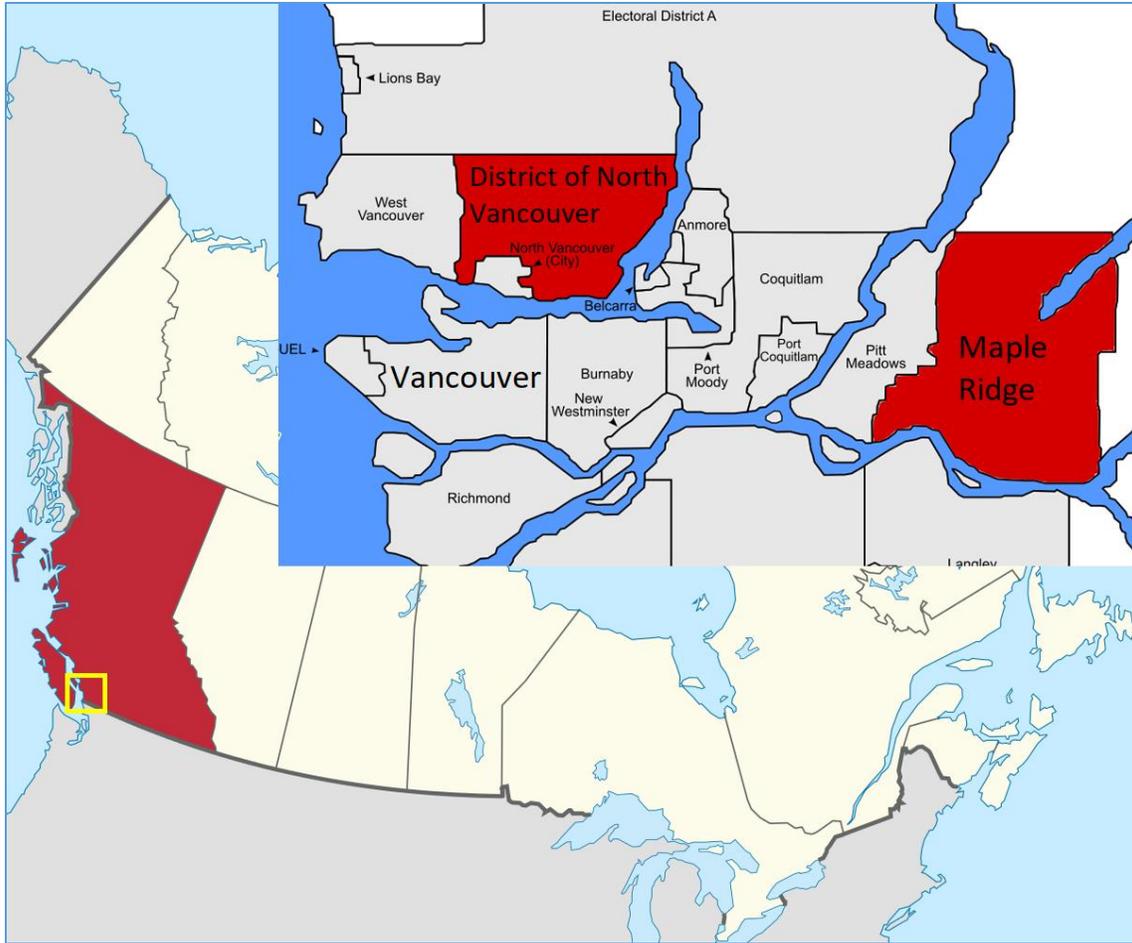
- cross-referencing qualitative data from interviews with quantitative data from interviews, contextual information, and archival records;

- examining plausible rival explanations that might be due to researcher bias or reactivity or potentially social or other trends external to the study; and
- taking advantage of my long-term involvement in each case study to triangulate data to consider multiple perspectives and if possible verify processes or facts (Marshall & Rossman, 2010; Maxwell, 2013; Yin, 2014).

Finally, it is important to note that following an initial analysis through NVivo and MS Excel, most data (quantitative and qualitative) were combined in one dataset for two reasons: *firstly*, to ensure confidentiality and anonymity, as the number of participants in each case study was limited and potential identification of elected or appointed officials with the findings should be avoided per research ethics, and; *secondly*, because the initial comparative analysis clearly showed that on most occasions the answers and opinions of participants from the two case studies completely converged (with the exception of some findings as detailed in chapter 4 / paper 3). More details are available in Appendix A2.

### **1.3.5. Case studies context**

For reasons of funding and focus, I worked with two municipalities in Metro Vancouver, British Columbia: the District of North Vancouver (DNV) and the City of Maple Ridge (CMR) (figure 1.6).



**Figure 1.6. The province of British Columbia and, in the inset, the two case study municipalities.**

Adapted from images by [TUBS / CC BY-SA 2.5](#), and by [TastyCakes / CC BY 3.0](#).

The two cities were selected following their own expression of interest for this research as well as a consideration of data demonstrating similarities and differences that would increase the potential of comparability and generation of constructive research findings. As seen in Table 1.1, these cities presented similarities in total population, surrounding natural environment, and suburban character, and differences in household income and educational level (both were higher in DNV) and in ethnic diversity.

**Table 1.1. Comparative table of the two municipalities selected as case studies.**

<b>Similarities</b>	<b>DNV</b>	<b>CMR</b>
Population (1)	85,935	82,256
Connection to the region (4)	Suburbs of the City of Vancouver where many of their residents commute every day for work	
Natural environment (hectares of parkland supply, incl. areas managed by the Province of BC) (2) (3) (4)	3,159	3,187
Main socioeconomic issues (4)	Transportation, housing, employment, and infrastructure	
<b>Differences</b>	<b>DNV</b>	<b>CMR</b>
Population change (2011-2016) (1)	-1.8%	+8.2%
Population density (people per square kilometre) (1)	534	308
Household income (median, in C\$) (1)	103,981	86,178
Educational level (Postsecondary certificate, diploma or degree; % of the population over 15 years old) (1)	67%	51.5%
Ethnic diversity (1)		
- by "Ethnic Origin":		
European	70%	77%
Asian	25.8%	13.3%
North American Aboriginal	2.5%	5.3%
Central/South American	2%	1.8%
African	1.6%	1.7%
Caribbean	0.6%	0.9%
Oceania	1.2%	0.8%
- by "Visible minority"		
Not a visible minority	74.4%	85%
Visible minority	25.6%	15%

Sources: (1) 2016 Census Profile (Statistics Canada, n.d.); (2) District of North Vancouver Parks and Open Space Strategic Plan (District of North Vancouver, 2012); (3) Maple Ridge and Pitt Meadows Parks, Recreation, and Culture Master Plan (City of Maple Ridge & City of Pitt Meadows, 2010); and (4) online search on municipal current affairs and information from my case study research.

Whereas some communities may see sustainability goals as irrelevant to or in conflict with local priorities, these two cities demonstrated interest in participating in this research to enhance their sustainability planning and performance assessment processes. They both expressed interest in receiving a report with tangible recommendations for embedding sustainability in their processes, which I submitted at the end of each internship.

Finally, the cities and their respective Community Foundations kindly provided part of the case study research funding through Mitacs Accelerate. This arrangement

allowed me to spend 1-3 days per week at their premises and engage directly and meaningfully with municipal staff and processes. In the District of North Vancouver, I worked from within the Community Planning department for approximately 6 months and in the City of Maple Ridge I was part of the team of the Manager of Sustainability and Corporate Planning for approximately 9 months.

### **The District of North Vancouver**

As one of three municipalities on the North Shore of Metro Vancouver, the District shares key infrastructure (roads and utilities) and in some cases partners in the delivery of services (recreation and emergency services). Its natural assets define the local lifestyle and values, and the industrial waterfront, a strategic national asset, provides significant business opportunities and local jobs. A growing community with two First Nations reserves, the District considers collaborative planning essential to the achievement of its long-term goals.

The District of North Vancouver (DNV) Official Community Plan (OCP), titled “Identity 2030”, presents the DNV’s vision for an “inclusive and supportive community that celebrates its rich heritage and lives in harmony with nature” and that has a “network of well designed and livable centres” and “resilient and diverse” local businesses (District of North Vancouver, 2011). My internship with the District was carried out in 2018 and aimed to help achieve this vision by adding to the monitoring and reporting work of the Community Planning Department and the Official Community Plan Implementation Monitoring Committee 2017-2018. The District was also very interested in exploring ways of localization of the SDGs, inspired by how cities like San Jose and Baltimore work with the SDGs.

### **The City of Maple Ridge**

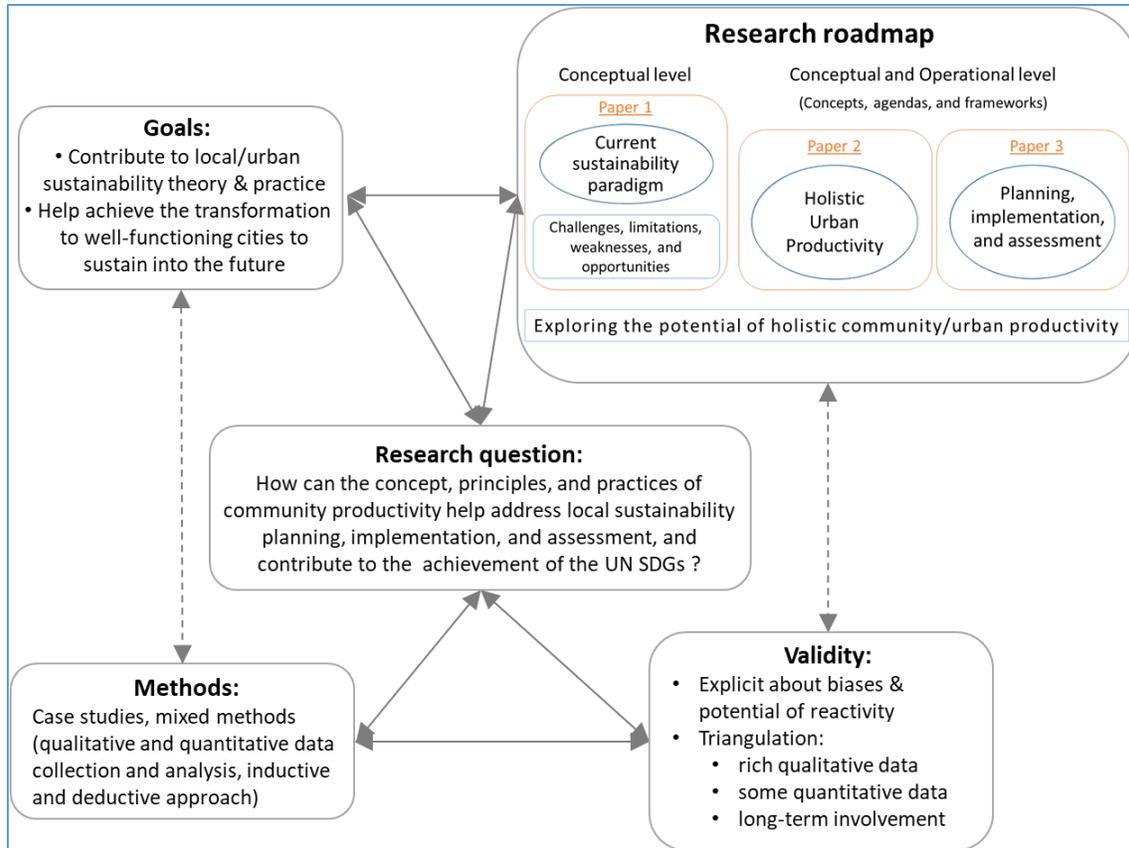
Located 45 kilometres east of Vancouver, Maple Ridge is a family-oriented community and one of the fastest growing cities in Metro Vancouver. It has a vibrant local economy and the most affordable industrial land and real estate in the region. It is committed to becoming a sustainable community by considering the environmental, social, and economic impacts of its actions for present and future generations. The City of Maple Ridge (CMR) Official Community Plan lays out the city’s long-term vision for a “vibrant and prosperous [community, with] a strong local economy, stable and special

neighborhoods, thoughtful development, a diversity of agriculture, and respect for the built and natural environment” (City of Maple Ridge, 2014).

As with the other case study, the main objective of the Maple Ridge internship carried out in 2017 was to help the City achieve this vision by assessing current sustainability and providing the City and its citizens with a customized sustainability assessment framework. Although at the time the City of Maple Ridge did not explicitly express interest in aligning their goals with the SDGs or taking advantage of the SDG framework in a specific way, I nevertheless conducted SDG-local goals mapping in this case study as well.

## **1.4. Conclusion**

To recap and wrap up this chapter, I am presenting Maxwell’s (2013) interactive model of research design which I adapted to show the major components of my research and their interactions (figure 1.7). The upper triangle, consisting of the research question, goals, and guiding roadmap, is the conceptual part of my research while the lower triangle, consisting of the research question, methods, and validity tests, is the operational part. Dotted lines demonstrate more flexible interactions and implications than solid lines. Other factors that influence the research, such as personal experience and goals, research ethics, and resources, are not core elements of this framework but interact with at least one or two of the main components as contextual elements.



**Figure 1.7. Integrated research framework.**

Adapted from Maxwell's interactive model of research design (Maxwell, 2013, p. 5).

**This thesis has used a common research design to explore a known concept in the field of economics but never before used to converge multiple theories and approaches into an umbrella term (and framework) in the interdisciplinary field of sustainable community development.** I investigated whether and how the application of holistic urban productivity principles can increase well-being for current and future generations and help restore planetary health.

**My research contributes to urban sustainability theory and practice by substantiating existing literature, providing recommendations to bridge existing gaps and shortcomings, and opening paths through the proposal of a framework grounded in long-term whole-systems thinking and holistic regeneration of urban assets and resources.** A holistically productive city can be simultaneously healthy, safe, resilient, smart, regenerative, creative, and happy. Holistic productivity can help cities achieve long-term sustainability goals, transform into well-functioning systems, and contribute to the achievement of the UN Sustainable Development Goals.

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## Chapter 2.

### [Paper 1] Urban Sustainability: From Theory Influences to Practical Agendas

#### 2.1. Introduction

A growing number of scholars refer to the modern period as “the Anthropocene”, the geological era marked by the detrimental impact of human activity on the planet. Since the 1972 Club of Rome report on the necessity for limits to economic growth, evidence of the Earth’s deteriorating condition has been mounting. The increased frequency of extreme phenomena, the persistent poverty and inequality, the decline of ecosystem services, and the unprecedented species extinction are only some of the signs that the Earth may soon not be able to sustain current economic and population growth while maintaining systemic well-being and staying within planetary ecological boundaries (Rockström et al., 2009; Steffen et al., 2015).

Sustainable development (SD) emerged as a field of study after the Brundtland Commission described the connection between human activities and increasing environmental degradation and defined the term as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 41). Despite the SD concept having received copious criticism, it is generally understood as the integration of environmental, economic, and social considerations in the development of a dynamic system (Berke & Conroy, 2000; Roseland & Spiliotopoulou, 2016). In short, it is about “doing development differently” (Roseland, 2012, p. 3).

The message of the 21<sup>st</sup> century international fora (2002 World Summit on Sustainable Development, 2012 Earth Summit, 2015 Sustainable Development Goals (SDGs), 2015 Paris Climate Accord, and 2016 New Urban Agenda) has been loud and clear: the world must get on the path to a more sustainable future now. No longer do we live in a world empty of us and our waste, but rather in a full one that presents significant implications for current and future generations (Daly, 2005). We therefore need to address current global challenges on multiple scales and in a systemic way to maintain

or improve quality of life while decreasing consumption of non-renewable materials and resources.

Achieving national and international sustainability goals is a complex undertaking that requires coordinated and multi-level collaboration. Yet effective action for meaningful, structural change, has been elusive despite its urgency, partly because global issues must be primarily addressed at the local level (Connelly et al., 2013). The success of long-term sustainability goals, such as the SDGs, is conditional on creating and implementing successful, monitorable, and transferable sustainability policies and practices in communities (Dodds et al., 2017; Kanuri et al., 2016).

### **2.1.1. Focus: Sustainable community development / Urban sustainability**

This research review focuses on sustainability at the community level, particularly urban areas, and seeks to advance the understanding and practice of sustainable community development (SCD) and sustainable urban development. A community can be defined as “a group of people bound by geography and with a shared destiny, such as a municipality or a town” (Roseland, 2012). A city or urban area is “a human settlement characterized – ecologically, economically, politically and culturally – by a significant infrastructural base; a high density of population, whether it be as denizens, working people, or transitory visitors; and what is perceived to be a large proportion of constructed surface area relative to the rest of the region” (James, 2015).

SCD is a holistic approach that integrates social, environmental, and economic considerations into the dynamic processes of complex systems, toward the achievement of community sustainability for the benefit of current and future generations (Berke & Conroy, 2000; Connelly et al., 2013; Roseland, 2012). SCD has been influenced by several theoretical traditions and movements. In the past, it emphasized the reduction of the environmental impact of economic growth but today considerations of equity and justice are increasingly included in community analysis (Connelly et al., 2013; Hermans et al., 2011). Sustainable urban development similarly calls for steering away from trade-off mentalities and toward concerted action and collaborative approaches among urban stakeholders (Bibri & Krogstie, 2017).

While the early 20<sup>th</sup> century saw only 13% of the total global population living in cities, today's estimates bring this number up to 56% (UN-Habitat, 2020) or even 70%-80% (Dijkstra et al., 2018). Urban areas occupy 3%-4% of the world's land surface, use 80% of global resources, consume more than 67% of global energy and other materials, and generate most of the global waste (Elmqvist et al., 2019; Girardet, 2015; World Economic Forum, 2018). Cities are projected to be home to more than two thirds of the world's population by mid-century, while being vulnerable to climate and health challenges resulting in high economic and environmental costs (Harlan & Ruddell, 2011; Kanuri et al., 2016; UN DESA, 2019).

The significance of urban sustainability has been expressed since the 1976 UN Conference on Human Settlements (Habitat I) when governments started perceiving the magnitude and ramifications of rapid urbanization. Following the Rio Earth Summit in 1992, ICLEI – Local Governments for Sustainability (formerly known as ICLEI – the International Council for Local Environmental Initiatives) catalyzed the adoption of Local Agenda 21 to promote local sustainability planning (Bayulken & Huisingsh, 2015a). In 2012, the Rio+20 conference also encouraged local sustainability assessment (Roseland, 2012).

International agreements such as the New Urban Agenda acknowledge that it is impossible to tackle global socio-ecological system issues without addressing the related processes at the local level (Elmqvist et al., 2018). Urban areas are the laboratories for successful sustainable development and our best chance to deal with the environmental impact of human activity (Cairns et al., 2015). As the mayor of Barcelona, Spain, eloquently explains, “municipalism” and bottom-up policies are required in order to develop “fair, inclusive and diverse” societies (Colau, 2020).

The UN Global Agenda for 2030 has recently brought the urgency for urban sustainability to the foreground by including a goal for “inclusive, safe, resilient, and sustainable” cities (SDG 11). However, the full SDG set is relevant to urban areas and therefore implementation needs to be informed by SCD principles such as long-term and whole-systems perspective and the potential for synergies and indirect positive impact among the various dimensions and goals for sustainability (Clarke, 2012; Elmqvist et al., 2018; Hermans et al., 2011; Kaika, 2017; Spiliotopoulou & Roseland, 2020).

## 2.1.2. Research methods and paper outline

The field of urban sustainability has evolved extensively in the last few decades, however conceptual debates remain vivid in the literature while in practice cities face many and complex issues. The purpose of this traditional, theoretical literature review is to seek for theoretical roots and conceptual influences, while identifying major debates, limitations, and current trends in SCD and urban sustainability.

The literature review started with the study of two groups of academic literature: a) my senior supervisor's book *Toward Sustainable Communities* and related papers he authored or co-authored (e.g., Connelly et al., 2013; Roseland, 2000, 2012) and; b) seminal work on SCD and urban sustainability by scholars such as Julian Agyeman, Peter Newman, Bogachan Bayulken, Philip Berke, Simon Joss, Herbert Girardet, Meredith Hamstead, Mike Hodson, and Paul James.

The next step was a thorough search for academic literature using Simon Fraser University Library's search tool<sup>5</sup>. I first looked for peer-reviewed papers with broader search terms such as "sustainable community development", "urban sustainability", "environmental justice", "sustainable cities", "sustainability debates", "urban sustainability agendas", etc. Then I looked for literature with more specific search terms, e.g., "weak and strong sustainability", "community economic development", "just sustainability", "social economy", "urban metabolism", etc.

In an iterative process and while studying prominent articles and their reference lists, I also followed the snowballing method to identify related academic literature and I explicitly looked for debates and discourses in the field. Finally, in some cases, I deemed useful to consult non-academic sources such as scientific reports, international organization documents, handbooks, or edited books. I evaluated the resources for credibility and soundness, in terms of author, methodology, content, and publication venue. More details on the literature review methods can be found in Appendix A.

In this paper, I seek to expand the reader's understanding of the concept of urban sustainability, starting with a historical overview tracing the intellectual progression

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<sup>5</sup> The current web link for the SFU library's search tool is: <https://sfu-primo.hosted.exlibrisgroup.com/primo-explore/search?vid=SFUL&sortby=rank>

of the field and establishing the context of current issues. The conceptual analysis is then organized by theme or concept, synthesizing the major debates and perspectives to demonstrate the interdisciplinary nature and influences by various fields. The last section inquires into ways in which community and urban sustainability is operationalized and offers a critical overview of the concept's application.

## **2.2. Urban sustainability conceptually**

### **2.2.1. Historical progression**

The origin of sustainability as a body of knowledge can be traced to environmental and social justice discourses of the 18th and 19th centuries – if not to ancient civilizations (Dernbach & Cheever, 2015). The current concept of sustainable development is thought to have emerged following conferences and influential publications of the 1970s-1980s, such as Rachel Carson's *Silent Spring*, the Club of Rome report on limits to economic growth (Carson, 1962; Meadows et al., 1972), and the 1972 UN Conference on Human Environment.

For some scholars SD is a decision-making framework (Dernbach & Cheever, 2015) and for others it is a societal thinking paradigm and a large-scale discourse on the relationship between social and natural systems (Bibri & Krogstie, 2017). It could also be described as “the emergent property of a conversation about what kind of world we collectively want to live in now and in the future” (Robinson, 2004, p. 382).

Despite an early focus on concerns over environmental and economic issues, the SD discourse has in the last three decades been including social concerns too (Drexhage & Murphy, 2010; Garren & Brinkmann, 2018; Robinson, 2004; Roseland, 2012; Williams & Millington, 2004). SD gradually took its current shape after the 1987 Brundtland Commission report, the 2000 UN Millennium Development Goals, and the 2002 Johannesburg Summit, but became more widespread since the universal agreement on the UN Sustainable Development Goals in 2015 (Garren & Brinkmann, 2018).

In its seminal report *Our Common Future*, the World Commission on Environment and Development (Brundtland Commission) revealed that: the poorest fifth of the world's population had less than 2% of the global economic product while the

richest fifth had 75%; and that 26% of the global population consumed 80%-86% of non-renewable resources and 34%-53% of food products (WCED, 1987). SD was defined as “development which meets the needs of current generations without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 41).

The report has been criticized in many ways, for instance for emphasizing inter-generational (rather than both inter- and intra-generational) equity, and for underestimating the contribution of economic growth and human activity to the expansion of poverty and environmental degradation (Garren & Brinkmann, 2018; Imran et al., 2014; Kates et al., 2005; Roseland, 2000). The Commission’s SD definition received considerable criticism too, particularly for being too broad, although recent papers postulate that the vagueness was an intentional political maneuver for the concept to gain wide acceptance (Imran et al., 2014; Williams & Millington, 2004).

For many scholars, this definition subscribes to a worldview that assimilates development to growth while attempting to link economic growth and environmental protection through an anthropocentric perspective within the dominant, colonial-era paradigm of growth (Hedlund-de Witt, 2014; Imran et al., 2014; Williams & Millington, 2004). Nevertheless, this definition is now regarded as classic and at minimum as a starting point for any sustainability discussion.

In the spirit of environmental and political awareness that flourished after the 1992 Rio Earth Summit and the Agenda 21, the UN Member States adopted the Millennium Development Goals (MDGs) in 2000, aspiring to eradicate extreme poverty and reduce inequalities by 2015. The eight MDGs included 21 targets and 60 indicators and had a particular focus on developing countries. Many goals were achieved: decreases in extreme poverty, child and maternal mortality, and disease rates, and rising rates of primary school enrollment and life expectancy (Harcourt, 2005; Meth, 2013; United Nations, 2015c). Severe issues however persisted in urban areas in sub-Saharan Africa and South Asia, and the MDGs were criticized as being disconnected from a whole-systems view, difficult to measure (in part due to data insufficiency), and potentially causing further inequality in urban areas (Harcourt, 2005; Meth, 2013).

The post-2015 UN Development Agenda was initiated at the Rio+20 Earth Summit in 2012 and built partly on the achievements of the MDGs while acknowledging

the continuing socio-ecological and economic struggles around the world. In 2015 the UN Member States unanimously approved the 2030 Agenda for Sustainable Development which, with its 17 goals (SDGs) and 169 targets, was a significant step forward and a turning point for global sustainability (Dodds et al., 2017; United Nations, 2015b). The SDGs offer an integrated vision and plan, apply to both developed and developing nations, and are grounded in a holistic view of sustainability (ICSU & ISSC, 2015; Woodbridge, 2015). The Paris Climate Agreement and the UN New Urban Agenda equally reflect the need to address this century’s principal global challenges holistically and at multiple systemic scales (United Nations, 2015a, 2017).

### 2.2.2. How is sustainable development understood?

Sustainable development is usually conceptualized as a three-legged stool, a three-pillar edifice, or a Venn diagram (figure 1) (Bayulken & Huisingh, 2015a; Garren & Brinkmann, 2018; Purvis et al., 2019). The three-dimensional framework has been influenced by the work of two eminent scholars: Barbier’s 1987 description of the sustainable economic development process as the interaction among economic, biological, and social systems, and Elkington’s Triple Bottom Line concept proposed in the mid 1990s as a management and accounting method (Kuhlman & Farrington, 2010; Purvis et al., 2019).



**Figure 2.1. The most common conceptualizations of sustainable development.**  
Adapted from these sources: Bayulken & Huisingh, 2015; Drexhage & Murphy, 2010; Garren & Brinkmann, 2018; Purvis et al., 2019.

The terms *sustainable development* and *sustainability* have been criticized as ambiguous and open to contradictory interpretations (Bibri & Krogstie, 2017; Garren & Brinkmann, 2018; Sartori et al., 2014). The main arenas of debate in the literature

discuss whether the two terms, SD and sustainability, are synonyms, and whether SD is an oxymoron if it implies the pursuit of economic growth (Benson & Craig, 2014; Dernbach & Cheever, 2015; Kuhlman & Farrington, 2010; Purvis et al., 2019; Robinson, 2004).

On the first debate, the current tendency is to use the two terms interchangeably, my literature review shows that governments and private sector generally prefer SD but academia and non-governmental circles prefer sustainability (Benson & Craig, 2014; Kates et al., 2005; M. Leach et al., 2018; Sartori et al., 2014). In the literature of the last decade though, there seems to be a preference for sustainability as a more inclusive and universal term, whereas SD historically incorporates industrialized world connotations (Hamman, 2017; Hassan & Lee, 2015a; Purvis et al., 2019; Robinson, 2004).

On the second debate, literature discusses whether SD has in practice concealed an oxymoron, i.e., the objective of unlimited economic growth (Dernbach & Cheever, 2015; Robinson, 2004). Until the 1990s, SD was understood as economic development coupled with human rights, peace, and security and did not necessarily include attention to nature, resulting in environmental degradation and further poverty and inequity (Dernbach & Cheever, 2015). Development though should not be confused with growth but challenge and replace it (Roseland, 2012). UNESCO, the United Nations Educational, Scientific and Cultural Organization, for example, recommends redefining development to include cultural, spiritual, emotional, and intellectual development and well-being (Hedlund-de Witt, 2014).

On the lack of definitional consensus, some argue that a simple and generic SD definition allows for flexible and context-specific implementation, while facilitating endorsement by various types of organizations (Blühdorn, 2016; Drexhage & Murphy, 2010; Garren & Brinkmann, 2018; Kates et al., 2005). This flexibility however can be a disadvantage if SD initiatives accommodate selective application, organizational interests, and the current economic growth paradigm (Dernbach & Cheever, 2015).

Sustainability scholars have reached a general understanding of the concept's nature and principles (Berke & Conroy, 2000; Dernbach & Cheever, 2015; Harrington,

2016; Hedlund-de Witt, 2014; Kates et al., 2005; Neuman, 2005; Williams & Millington, 2004):

- Sustainability is a normative concept – it depends on the vision we want to achieve and sustain, the goals we set, and the context we operate in.
- Values such as equity (inter- and intra-generational, interregional, and interspecies), peace, justice, inclusiveness, attention to local needs, and freedom are common in SD discourse.
- Decision-making and implementation processes require systemic thinking, i.e., integration of social, economic, and environmental objectives and consideration of their interconnections, interdependencies, and the drivers of change in a process of regeneration.
- Acknowledging the dynamic nature of systems is paramount in understanding that sustainability is not a specific target in the future: systems are ever-changing and as a result the SD process will have to embody resilience and be open to necessary adjustments to respond to challenges.
- The precautionary principle and the *polluter pays* principle need to be part of an integrated sustainability approach, given the Earth's limited ecological capacity and the thresholds already exceeded.

Sustainable Community Development has the same three core elements/pillars as SD, although it is sometimes considered as simply integrating ecological considerations into previous operationalizations of community development, such as the (more liberal) community economic development and the (more progressive) equitable local development (Hamstead & Quinn, 2005; Roseland, 2012). Overall, SD and SCD should not be conceived as a set of environmental and economic trade-offs: SD need by no means equal job loss or economic downturn (Roseland, 2012).

### **2.2.3. Theories and concepts underpinning SCD and urban sustainability**

SCD, along with SD, has been influenced by a number of theories, as presented below, and has matured over the last few decades in academic, professional, and popular discourse. A review of the related literature shows that there is not a specific and widely endorsed set of theoretical foundations for SCD, which is considered a fairly new paradigm or framework for community development. SCD has been informed by broader SD theories, such as systemic thinking, ecological modernization, environmental justice, and resilience, and by intellectual traditions of the last two centuries relating to social

ecology, self-reliance, bioregionalism, and native worldviews (Roseland, 2000; Roseland & Spiliotopoulou, 2016). These theories underpin a broad range of urban agendas as shown in Figure 2 further below which summarizes the approximate and relative positions of sustainability milestones and urban agendas in time and with regard to the weak/strong sustainability debate.

### **Weaker-to-stronger sustainability**

The position of an agenda or an initiative on the weak/strong sustainability continuum is a debate that is rooted in economics but is now central to sustainability discourse, pertaining to both research and practice. As Williams and Millington summarize it, the weaker-to-stronger sustainability debate is a spectrum between those who seek to change the supply side of resources and those who seek to change the demand side (Williams & Millington, 2004).

Weak sustainability (WS) is grounded mainly in ecological modernization (economic and resource efficiencies through technology) and environmental justice (demand for equitable resource distribution) (Dernbach & Cheever, 2015). WS follows the approach of the neoclassical economics production function: inputs (natural resources and human-made capital) are perfectly substitutable while the total capital stock remains constant (Ayres, 2007; Bartelmus, 2010; Solow, 1993). Sustainability in this case is viewed as an economics concept aiming to incorporate socio-ecological goals in economic development (Barbier, 1987). WS overall upholds an anthropocentric worldview: humans should dominate over nature, technological and scientific progress can compensate for the depletion of natural resources, and economic growth can continue indefinitely (Dernbach & Cheever, 2015; Williams & Millington, 2004).

Strong sustainability (SS) is more aligned with recent history of SD and is the subject of a gradual shift in recent literature, with ecological economists such as Herman Daly arguing that natural resources are finite and not substitutable (Daly, 2005). SS holds that production inputs should exist independently since environmental damage and resource depletion cannot always be reversed (Ayres, 2008; Williams & Millington, 2004). In the scholarly discussion, often called *sustainability economics*, SS advocates for qualitative and locally focused measurement of well-being and protection of ecosystems for their intrinsic value and biotic rights (van den Bergh, 2010; Williams & Millington, 2004).

In this continuum, some scholars favor resource efficiencies to enhance environmental protection and resource management, whereas others distinguish between natural capital and “critical natural capital” (considering this as the only non-substitutable) (Neumayer, 2012; Williams & Millington, 2004). The critical natural capital approach allows substitution either between non-critical forms of capital or when there is significant benefit from resource depletion or extremely large cost for conservation (Roseland, 2000). Such decisions however assume complete information about natural capital and its depletion impact and this is not always the case.

SD and SCD interpretation and implementation depend highly on one’s position in the spectrum between the more utilitarian approach of WS and the more holistic well-being approach of SS (Dernbach & Cheever, 2015; Robinson, 2004; Williams & Millington, 2004). Although some substitution can perhaps not be avoided, economic growth should no longer be an end in itself and the maintenance, restoration, and protection of natural capital should be paramount for current and future generations (Dernbach & Cheever, 2015). SS seems to be the right direction for SCD: preserving adequate amounts of all natural assets, avoiding terminal damage to critical ones, and consciously seeking to address key social issues through sustainable local development and self-reliance (Roseland, 2012).

### **Systems theory in urban areas**

Studying the sustainability of a human settlement requires viewing it as a complex, adaptive, and networked system that involves interdisciplinary study through the lens of fields such as sociology, economics, anthropology, ecology, engineering, planning, agronomy, and political science (Roseland, 2012; Uphoff, 2014). Elinor Ostrom pioneered the analysis of socio-ecological systems (SES) such as a city by proposing a framework that emphasizes the complex nature of SES and the need to consider all of the system’s levels, components, and external settings in sustainability decision-making (McGinnis & Ostrom, 2014; Ostrom, 2009). Informed by her work, an urban system can be conceptualized as comprising four interconnected components that interact across spatial and temporal scales: material and energy flows, urban infrastructure and form (including urban natural environment), governance networks, and socioeconomic dynamics (Meerow et al., 2016).

The study of urban systems is particularly connected to such concepts of ecological systems as stocks and flows, nestedness, feedback loops, non-linearity, interdependence and connectivity over time, complexity, regeneration, and adaptive ability and management (Ellen MacArthur Foundation, 2013; Meadows, 2008; Uphoff, 2014). Donella Meadows emphasizes the possibility to increase a stock not only by increasing the inflow but also by decreasing the outflow (Meadows, 2008). In today's resource-dependent and extractive cities, this means that an obvious solution would be to decrease resource consumption instead of increasing their extraction while potentially enhancing quality of life.

An urban system is not linear or hierarchical, rather it is nested, i.e., containing sub-systems, embedded in larger systems, and interacting across components, time, and space (Meadows, 2008; Uphoff, 2014). Fluctuations in one urban community asset, for instance through policy, can affect other assets or interconnected systems. An example would be waste management: a whole-systems approach would comprise all conceivable stages of waste management and take into account potential impact on other parts of the community (Roseland, 2012).

Urban systems are also characterized by feedback loops that occur when a persistent behavior affects the flows or trends while changing the stock; *positively* if it amplifies change and *negatively* if it preserves status quo or reduces the intensity of change (Meadows, 2008). Urban feedback loops may occur for instance when addressing chronic issues requires the development of new types of governance to adopt and implement new policies (Cumming et al., 2013). Redundancy – or diversity in assets and land-use forms – is key for a resilient urban system with minimal feedback loops that result in negative outcomes (Neuman, 2005).

A framework that sees the city as an ecosystem and studies the flows of urban energy and resources is based on the concept of urban metabolism, propagated mostly by McKinsey & Company and the World Future Council (Brugmann, 2015; Girardet, 2013, 2015; Newman & Jennings, 2008). It is “the sum total of the technical and socio-economic processes that occur in cities, resulting in growth, production of energy, and elimination of waste” (Kennedy & Hoornweg, 2012, p. 780). Urban metabolism studies demonstrating the ever-increasing demand for natural resources in cities have inspired

sustainability and resource efficiency initiatives worldwide (Moore et al., 2013; OECD, 2015).

### **Ecological modernization and resource efficiency**

A key influence for environmental or SCD strategies in the past few decades is ecological modernization (EM) which emerged in the 1980s as a response to environmental degradation. EM seeks to balance economic and ecological sustainability, i.e., address environmental problems, ensure food for all, and contribute to further economic growth, through technology and design improvements and energy and resource efficiency (Bayulken & Huisingh, 2015a; De Jong et al., 2015). EM proponents such as Von Weizsäcker et al. state that an 80% increase in resource productivity could be achieved through efficient design, technology, and management (von Weizsäcker et al., 2009).

The main EM debate relates to its scope that is restricted to ecological and economic concerns and does not incorporate for instance inter- and intra-generational equity (Bayulken & Huisingh, 2015a). Early on, EM theory subscribed to WS and was typically connected to capitalism and industrialism; it has also been called “a profitable sustainability” (Du Plessis, 2012; Williams & Millington, 2004). Derivative concepts, such as eco-efficiency and efficient design, have resulted in the development and adoption of “green” or “clean” economic and business strategies (De Jong et al., 2015; Hodson & Marvin, 2014).

Even the greatest gains in efficiency, however, may not be sufficient to halt or reverse environmental degradation or collapse; not all efficiencies translate to reduced resource extraction and consumption due to factors such as industry interests and growth of population and food demand (Ang & Van Passel, 2012; Kopnina, 2015; Robinson, 2004). The persistence on efficiency reveals the absence of integrative approaches to urban issues requiring deeper social change (Bayulken & Huisingh, 2015a; Hamman, 2017; Reed, 2007). Policy-makers still adopt “green growth” strategies but are reluctant to move transformative policies forward, even after such windows of opportunity as the 2008-2009 financial crisis, the annual UNFCCC Conference of Parties (Blühdorn, 2016; Hamman, 2017), or the 2020 pandemic.

In some developed countries, EM has manifested locally through the privatization and technological modernization of urban utility networks and the investment in innovation research and development for an enhanced lifestyle for urban dwellers (Bayulken & Huisingh, 2015a). Propitiously, 1990s urban initiatives such as eco-neighborhoods and eco-towns were evidence of a gradual shift of EM from a purely technocratic and technological approach toward an approach that combined resource efficiency with protection of environmental quality and bottom-up governance (Bayulken & Huisingh, 2015b).

### **Environmental justice and “just” sustainability**

The social dimension of sustainability was not as visible in policy-making as the economic – and partly the environmental – dimensions until about three decades ago. Social capital encompasses collective responsibility, trust, networks, shared knowledge, and social structures, as a public good that will not be depleted as long as it is being used but will diminish quickly if not used (Roseland, 2012). Eminent scholars, such as Robert Putnam, first drew attention to the importance of social capital and its linkages with other types of capital in the 1990s (Putnam, 1995).

Some researchers consider that sustainability is an advancement of the environmental justice movement which emerged in the 1980s through the convergence of social and environmental activism (Agyeman et al., 2002; Salcido, 2016). Environmental justice can be described as the right to a clean and safe environment for all. It is the foundation of calls for a more equitable distribution of resources, services, and facilities between and within generations, but also of the sociocultural and health impacts of environmental degradation (Williams & Millington, 2004).

Under the umbrella of environmental justice, the relationship between environmental degradation and social capital has three main characteristics: 1) both aspects progress in parallel, as “human inequality is bad for environmental quality”, 2) environmental impact is disproportionately higher for the poorest, and 3) both aspects should be parts of a holistic SD approach (Agyeman et al., 2002). Environmental justice emphasizes an anthropocentric viewpoint leaning toward weak sustainability, but when it advocates for equity (not only among humans but also with nature and ecosystems) and includes Indigenous justice, it becomes *just sustainability*, i.e., “environmental quality-human equality” for present and future generations (Agyeman, 2013).

Environmental sustainability is fundamental but considerations of social equity and well-being have to be integrated with environmental and economic considerations in any sustainability discussion. Social sustainability has been gaining momentum for instance by becoming an objective for grassroots movements. By subscribing to strong sustainability and embracing justice and equity within the ecological limits to growth, *just sustainability* can help achieve community sustainability through social interaction, trust, and a sense of security and place (Agyeman, 2013; Hassan & Lee, 2015a).

Raworth's "doughnut economics" framework has recently enriched sustainability theory and practice by proposing the need to consider social boundaries (meeting everybody's basic needs) in addition to the planetary ecosystem boundaries. The goal is to ensure well-being for all humanity: this framework converges the planetary boundaries research with the just sustainability approach presented above (Raworth, 2017; Rockström et al., 2009).

### **Social economy, Community Economic Development (CED), bioregionalism, eco-localism**

Social economy (SE), CED, and eco-localism emerged as a community response to negative impacts of economic and social restructuring, free trade agreements, and privatization (Ferguson (Hernandez), 2015). SE refers to activities by democratically controlled organizations that integrate social and economic mission, exist between private and public sector, and/or use the market to pursue social objectives (Ferguson (Hernandez), 2015; Gismondi et al., 2016). SE initiatives have evolved from simple forms of economic activity reflecting sociocultural values to green social enterprise ventures (Ferguson (Hernandez), 2015).

CED is often considered as a predecessor of SE and refers to bottom-up economic initiatives with participatory processes to meet environmental well-being and social needs (Ferguson (Hernandez), 2015; Gismondi et al., 2016). SE and CED are similar but not identical: CED emphasizes local knowledge and collective, community-led action, whereas SE is not necessarily geographically focused and builds on both collective action and (voluntary) individual entrepreneurship (Ferguson (Hernandez), 2015; K. Leach, 2013).

Bioregionalism, eco-localism, and self-reliance are complementary approaches to SE and CED. Eco-localism focuses on the creation of self-reliant local economies and bioregionalism stresses the connection of communities to place (Curtis, 2003; Roseland, 2012). Such initiatives encourage local diversification, equity, and inclusion, while creating awareness on the impact of economic activities on the local and regional environment (Roseland, 2012). They typically acknowledge the limits to local community capital and that the road to self-reliance requires collective agreement, capacity building, and SCD-based decision-making (Curtis, 2003; Wahl, 2016).

As with the weaker-to-stronger sustainability continuum, the above approaches move along a spectrum between initiatives that strongly prioritize social equity and societal needs and those that barely address social issues. For instance, SE has been criticized for subscribing to WS by operating inside the capitalist system instead of pursuing to change it (Connelly et al., 2013). SE initiatives should be able “to generate their own capital, rather than relying on an ongoing subsidy from the derivatives of the mainstream economy and the politics of redistribution” (Connelly et al., 2013, p. 198). Although SE and CED seek mostly social and economic sustainability, they can contribute to overall local sustainability when converged with eco-localism and bioregionalism under the umbrella of SCD (Gismondi et al., 2016; Leach, 2013).

### **Urban resilience**

Despite being an old concept for engineering, psychology, and disaster management, the famous natural scientist C.S. Holling introduced ecological and socio-ecological resilience in the early 1970s. He synthesized social and ecological theory to study and enhance adaptive (as opposed to simply reactive) ecosystem management (Folke, 2006; Zhang & Li, 2018). Holling's notion of ecological resilience, however, may not be entirely applicable to urban social systems or appropriate to understand them and address their challenges (Benson & Craig, 2014). While ecology and engineering usually emphasize recovery and restoration of a previous stable state, social system unpredictability may make transition to a new state and transformation necessary or often desired (Childers et al., 2014; Hamman, 2017).

Ostrom's seminal work on sustainability of socio-ecological systems offers insights for their resilience as well as it illustrates the complexity of a system's components and their relationships and interactions (McGinnis & Ostrom, 2014). A

resilient SES is characterized by its dynamic nature, adaptive capacity, multiple stable states, redundancy, and persistence to exist and renew in the face of gradual or rapid change (Chelleri, 2012; Folke, 2006; Meerow et al., 2016; Roseland, 2012). Such a system can therefore absorb disturbance after a sudden shock or a continuous stress, manage change, and reorganize while still retaining “essentially the same function, structure, identity, and feedbacks” (Elmqvist et al., 2019; Walker, Holling, Carpenter, & Kinzig, 2004, p. 2).

Urban resilience draws on various disciplines and is very popular in urban planning, since 90% of urban areas are situated on coastlines meaning increased vulnerability for the majority of global population. Cities have so far been remarkably resilient systems, but today they experience more challenges that require flexible, long-term solutions addressing multiple environmental, social, and economic concerns simultaneously (Childers et al., 2014; Elmqvist et al., 2019).

Defining urban resilience is a debate in the related literature; Meerow et al. (2016) studied the literature since Holling’s 1973 paper and identified 25 different definitions from 2003 to 2013, most of which however seemed too focused or used vague language. They offer the following comprehensive definition: “urban resilience refers to the ability of an urban system – and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales – to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity” (Meerow et al., 2016, p. 39).

Urban resilience and urban sustainability have had somewhat parallel trajectories in theory and practice, sometimes used interchangeably because of their shared principles and goals, and other times with resilience understood as a requirement or component of sustainability (Chelleri, 2012; Zhang & Li, 2018). Whereas local resilience focuses more on protection against threats and crises and seeks stability and diversification, local sustainability prioritizes local/regional self-reliance, resource protection, and planning for and monitoring urban development (Zhang & Li, 2018). Other differences relate to implementation: urban resilience is considered more passive (mostly top-down monitoring, reactivity, and recovery) and urban sustainability more

active (mostly bottom-up-driven co-evolution of sub-systems toward a common goal) (Zhang & Li, 2018).

Both approaches need to be considered within a whole-systems decision-making, as the descriptive nature of resilience can be complementary to the normative nature of sustainability (Chelleri, 2012; Elmqvist et al., 2019; Meerow & Newell, 2016). Policies for sustainability may call for efficiencies that, if applied, could lead to reduced resilience due to the absence of redundancy; for instance, planning for higher densities could lead to reduced green space and impact community health (Elmqvist et al., 2019).

Similarly, without systemic thinking, efforts to increase resilience in a neighborhood could result in decreased resilience in the region; or actions to make specific infrastructure resilient could negatively impact the resilience of other societal sectors. Resilience planning is necessary not only against natural disasters, but also in case of chronic socioeconomic turbulence (NYU Marron Institute & 100 Resilient Cities, 2018), such as the current crisis due to the 2020 pandemic. In this respect, resilience supports the normativity of sustainability that a sustainable society pursues constant improvement (Roseland, 2012).

### **Circular economy**

The concept of circular economy (CE) is grounded in environmental and ecological economics, industrial ecology theory, and general systems theory (Ghisellini et al., 2014). CE origins are often attributed to ecological economists Pearce and Turner who, based on Boulding's metaphor of the Earth as a "spaceship" (a closed system), developed a theoretical framework describing the shift from an open-ended economic system to a circular one due to constraints imposed by the laws of thermodynamics (Geissdoerfer et al., 2017; Ghisellini et al., 2014). CE is a response to the need to manage the ever-increasing waste generated within the "take-make-dispose" model of the predominantly linear economy (Ghisellini et al., 2014).

CE builds upon the perception of a city as an ecosystem and can be defined as "a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling" (Geissdoerfer et al., 2017, p. 759; Girardet,

2015; Newman & Jennings, 2008). In its early iterations CE was informed by WS, seen as a new business model for sustainability associated with “greener” industrial processes, but current CE theory and practice are influenced by SS approaches such as cradle-to-cradle, regenerative design, and biomimicry (Geissdoerfer et al., 2017; McDonough & Braungart, 2013).

In Europe, China, and elsewhere, the CE is promoted as a step toward “the ultimate goal of decoupling economic growth from resource consumption” (Ghisellini et al., 2014, p. 24). In some places, a relative, localized, or temporary decoupling has been achieved through efficiencies and agendas such as eco-cities, but the true ultimate goal that prevails globally is that of economic growth. CE can contribute to a degrowth path, but not to complete decoupling since recycling and circularity are limited by thermodynamics (Ghisellini et al., 2014; Korhonen et al., 2018).

The literature views CE in three broad ways: as a condition for sustainability, a beneficial relation, or a trade-off. Like sustainability, CE advocates for interdisciplinary research, multi-stakeholder cooperation, and exploration of multiple pathways and benefits of development (Geissdoerfer et al., 2017). However, long-term approaches and integration of social concerns and well-being objectives are only sporadically encountered in CE literature and practice so far (Geissdoerfer et al., 2017). By focusing on economic, financial, and resource optimization goals and immediate results, decision-makers may be missing opportunities to funnel resources to address all three sustainability pillars and promote deeper change.

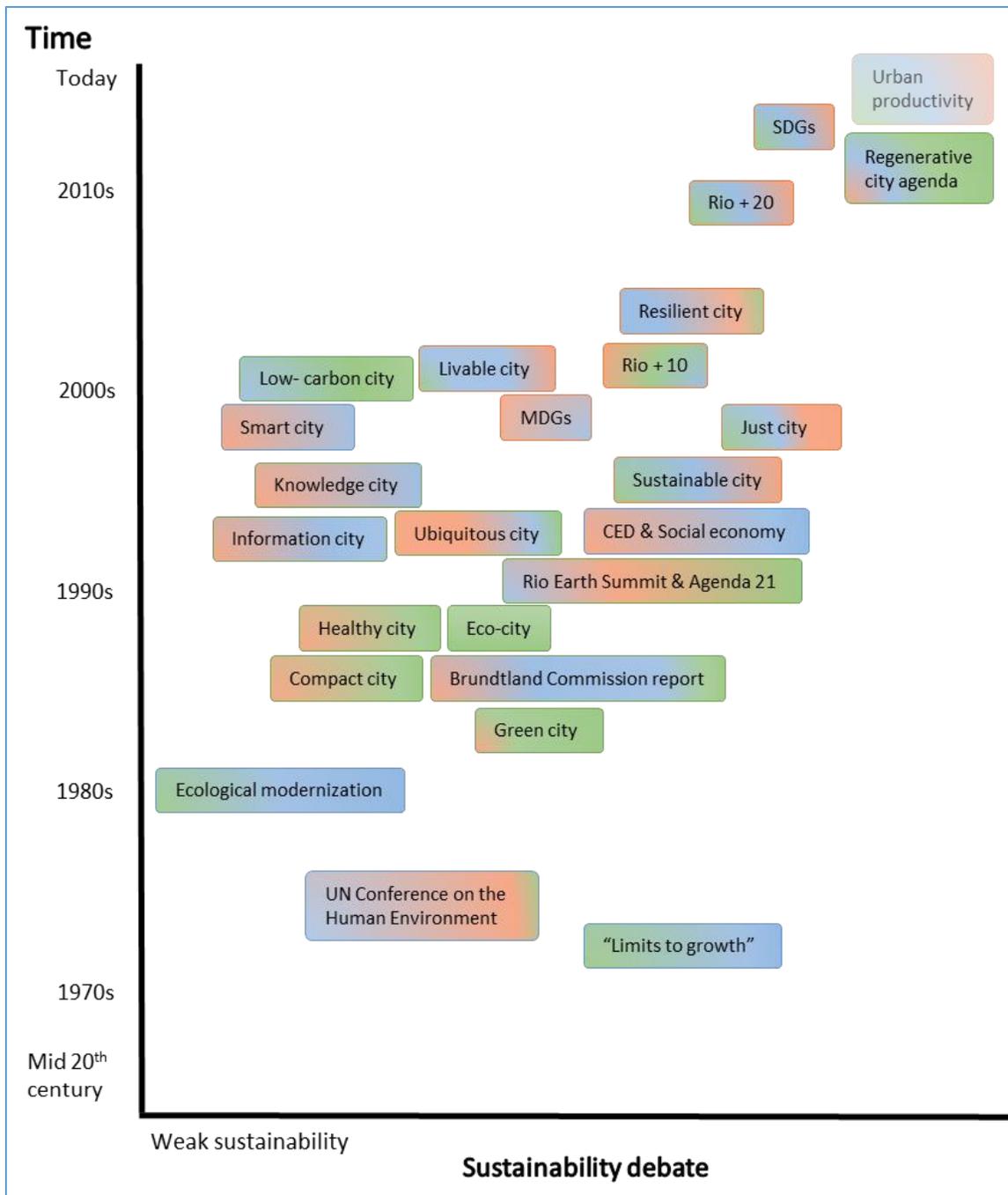
On the upside, compared to sustainability, CE is better defined and has clear directions in terms of implementation potential (Geissdoerfer et al., 2017; Ghisellini et al., 2014). It appeals to policy-makers and private actors more than the (flexible but vague) concept of sustainability (Geissdoerfer et al., 2017). Fortunately CE initiatives are already shifting this focus from quantitative growth toward qualitative and regenerative development and are well positioned to help achieve SCD (Geissdoerfer et al., 2017; Ghisellini et al., 2014).

### **2.3. Urban sustainability operationally: urban agendas**

The above theories and concepts have been in the past two decades shaping and informing a broad range of urban agendas. Figure 2 shows the approximate positions of these agendas in time and regarding the weak/strong sustainability debate and other sustainability milestones. In the literature, the sustainable city the most prominent and most frequently occurring urban agenda. Directly deriving from SD and SCD, this agenda first appeared in the 1994 Aalborg Charter and was highly influenced by the UN Agenda 21 and the 2002 Melbourne Principles on Sustainable Cities sponsored by UNEP (the United Nations Environment Programme) and ICLEI (De Jong et al., 2015).

Different authors provide different interpretations of the sustainable city: some view it as a framework for greater ecological and resource protection; for others it is a way to safeguard economic growth with greener technology while somewhat preserving ecological stability and social equity (“greener urban growth”); and others draw attention to all three pillars of sustainability (De Jong et al., 2015; Fu & Zhang, 2017; Hamman, 2017; Hassan & Lee, 2015a).

What would a sustainable city be like? Mori and Yamashita offer an integrative but simple definition: a sustainable city maximizes socio-economic net benefits while considering environmental constraints and the limits of economic and social inequity (Mori & Yamashita, 2015). For Roseland, a sustainable community (urban or rural) is dynamic and engages in activities to sustain the environment, empower citizens, and ensure the needs of current and future generations can be met (Roseland, 2012, p. 22). Other scholars highlight key form characteristics: inclusive and accessible, healthy and well-planned, adequately dense, energy efficient, resilient against climate and other risks, economically competitive and affordable, and with protected ecosystems, eco-friendly transportation infrastructure, and strong regional linkages (Jenks & Jones, 2010; Kanuri et al., 2016).



**Figure 2.2. Approximate positions of urban agendas in time and in relation to the weak/strong sustainability debate and other sustainability milestones.**

Please note that the figure includes the approximate position of the urban productivity agenda presented in the next chapter. Color coding denotes extent of subscription to each sustainability dimension: green = environmental; orange = social; and blue = economic. Original graph with information from these sources: De Jong et al., 2015; Fu & Zhang, 2017; Hassan & Lee, 2015a, 2015b; Hodson & Marvin, 2010; Joss et al., 2015.

Apart from the prevalent sustainable city agenda, at least five other popular urban agendas have been identified in the literature: ecocity, low-carbon city, resilient city, knowledge city, and smart city (De Jong et al., 2015). The green city and the livable city also briefly appear but are conceptually considered as satellites of ecocity and sustainable city respectively; similarly, healthy city and just city appear as variants of the sustainable city (De Jong et al., 2015; Hamman, 2017). Contrary to common perceptions among policy-makers, the various agendas are not all based on the same theoretical foundations and their terms should not be used interchangeably (Roseland & Spiliotopoulou, 2016).

Ecocity and green city, grounded in decades-old principles of deep ecology and the humanities, gained momentum in the late 20<sup>th</sup> century and were operationalized mainly within a broader *eco-urbanism* movement (De Jong et al., 2015; Moore et al., 2017; Sharifi, 2016). Eco-districts, Zero-carbon city, and Low Impact Urban Developments are similar approaches that seek to address sustainability within a spirit of collectiveness (Hodson & Marvin, 2010; Sharifi, 2016).

Smart and digital city agendas seem to prioritize the use of digital technology and infrastructure to increase well-being, along with an increased focus on governance (Joss et al., 2019). However, the smart city agenda in practice tends to not include holistic sustainability approaches in that related initiatives may not address social equity or ecologically responsible resource management (Cowley et al., 2018; Joss et al., 2019; Mora et al., 2017). Bibliometric and webometric analyses additionally showed that there is not a widely accepted definition or coherent understanding of the smart city agenda, thus potentially leading to tensions and disconnect in research, policy, and practice (Joss et al., 2019; Mora et al., 2017).

The resilient city agenda in practice emerged before Alberti et al. and Godschalk first defined the concept of urban resilience and before Ostrom and the Resilience Alliance introduced their SES framework (Chelleri, 2012; McGinnis & Ostrom, 2014; Meerow et al., 2016). It was for instance a key driver of the UK Transition Town movement which encourages communities to reduce carbon emissions, prepare for a post-peak oil economy, and ultimately transition to sustainable systems (Baker & Mehmood, 2015; Roseland, 2012). As of January 2020, more than 950 towns across the world participated in the movement (*Transition Network*, n.d.). The resilient city concept

has more recently been operationalized through the 100 Resilient Cities network pioneered by the Rockefeller Foundation and based on the *City Resilience Framework* (NYU Marron Institute & 100 Resilient Cities, 2018).

The ubiquitous city focuses on eco-efficient and energy-efficient technologies, and local circularity and the compact city agenda prioritizes efficient land use, lower service cost, and high productivity and social life (Hassan & Lee, 2015a; Hodson & Marvin, 2010). Critics of such eco-urbanism agendas posit that green infrastructure is developed only for wealthy inhabitants, turning such places into “ecological security” or “ecological gentrification” zones that largely fail to address social issues (Beatley, 2017; Hassan & Lee, 2015a; Hodson & Marvin, 2010).

The compact city caters to all sustainability pillars more than other agendas and cities around the world have applied its principles of compactness and high density. It presents many benefits (e.g., reduced greenhouse gas emissions and increased safety and economic productivity), but also potential challenges to be dealt with (e.g., inadequate green space, reduced housing affordability, traffic congestion if not coupled with robust public transit infrastructure, and possible difficulties in tackling health crises like the 2020 pandemic) (Ahlfeldt & Pietrostefani, 2017; Hassan & Lee, 2015a; Neuman, 2005).

Yet, how do decision-makers choose one urban agenda over another? The main decision-making driver seems to revolve around trade-offs depending on the city's needs, context, and aspirations (De Jong et al., 2015). It is impaired though due to internal issues, such as NIMBYism (“not in my back yard”), lack of sufficient resources and political will, and community fragmentation, and external threats, such as inter-city competition and climate change impact (Berke, 2002). Many local governments, particularly in cities with global outlook or narrative, turn to their national government and the private sector for partnerships in technology and innovation as the panacea for all urban challenges, hence the rapid emergence of the smart city and resilient city agendas (De Jong et al., 2015).

## 2.4. Discussion

Two decades into the 21st century, sustainability talks, negotiations, and plans at scales from local to global still may not lead to meaningful and concrete action. Climate change is often a “proxy” for SD and, while climate action can potentially help tackle multiple Anthropocene realities and challenges, the struggles in cities globally and the often meager outcomes of international talks suggest there is a long road ahead. Meanwhile sustainability policies and initiatives do not always involve a balanced approach between environmental, economic, and social concerns that are meant to be interconnected, interdependent, and mutually reinforcing (Garren & Brinkmann, 2018; Joss et al., 2015).

The debates and critiques around the concept of SD seem linked to limited and inconsistent application, as well as a variety of local agendas grounded in diverse theoretical backgrounds and frequently reflecting specific stakeholders’ interests (Joss et al., 2015; Kristensen & Roseland, 2012; Roseland & Spiliotopoulou, 2017). Some scholars and practitioners view SD as too broad and unnecessarily flexible and others as attending mostly to environmental and economic concerns by embracing technology while still pursuing economic growth (Garren & Brinkmann, 2018; Robinson, 2004).

While the relevant academic discourse includes the systemic analysis required for sustainability in socio-ecological systems, in practice SD has been interpreted with an anthropocentric focus (weak sustainability) and has become a “buzzword” for development (Benson & Craig, 2014; Dernbach & Cheever, 2015; Garren & Brinkmann, 2018). Because of the lack of definitional consensus and shared understanding, the concept may not be “sufficiently attractive” to local decision-makers and citizens, especially when climate action or action on local, short-term issues appear to be more appealing (Dernbach & Cheever, 2015).

As SD remains largely perceived as a framework to tackle environmental degradation, governmental and corporate policies do not seem willing to integrate the three pillars. Sustainability practice is still strikingly short of strong sustainability, i.e., interdisciplinary thinking, synergistic implementation, or inclusive decision-making processes (Garren & Brinkmann, 2018; Robinson, 2004). Thought leaders and activists conclude however that we should not be trying to apply sustainability in the way it is

interpreted by developed countries who seek to keep their lifestyle while developing countries strive to catch up (Dernbach & Cheever, 2015; Gambino, 2012; Robinson, 2004).

As this efficiencies-centred approach of sustainability looks to sustain an inherently dynamic system at its currently ill-functioning state, some scholars suggest considering resilience as a more realistic goal, given the dire situation of the planet. They advocate that a shift toward resilience, which acknowledges uncertainties, would help policies deal with and adapt to change while enabling human agency and enhancing social and human capital (Benson & Craig, 2014; Kaika, 2017). However, this should not simply replace the current techno-managerial practice of weak sustainability, but become a component of an integrative, strong sustainability process (Benson & Craig, 2014; Dernbach & Cheever, 2015; Kaika, 2017).

Cities worldwide face multiple short-term and long-term challenges and, while it is encouraging that many interpret SCD based on their context, local sustainability efforts are not always embracing comprehensive, systemic tools (Dernbach & Cheever, 2015). Sustainability agendas are often implemented within mainstream planning, investment, and operations or are the sole responsibility of environmental departments. At the same time not all urban agendas promote a whole-systems approach or tackle underlying causes of local problems (Drexhage & Murphy, 2010).

Obstacles to SD may also include lack of stakeholder coordination and policy coherence, short-termism and corruption in local politics, greenwashing or “cosmetic environmentalism”, and inadequate mandate and financing of local governments (De Flander, 2014; Robinson, 2004). In addition, collecting data to feed it into frameworks has become a holy grail and an end in itself, but it is not clear if or how all this monitoring and reporting improves decision-making and encourages community change (Kaika, 2017). Such issues can lead to lost opportunities, lack of credibility, and increased public skepticism (Cairns et al., 2015; Roseland, 2012).

Successful implementation of urban sustainability plans is contingent on the take-up and application of strong sustainability principles that can lead cities to systemic transformation and equitable living within planetary boundaries. If theories and approaches such as social and sharing economy, environmental justice, and local

resilience in practice challenge today's business-as-usual, "profitable sustainability" model, they can help release the full sustainability potential of urban systems. If nothing else, the current abundance of urban agendas, frameworks, and community networks demonstrates acknowledgement of the need to take action and the desire to cooperate and exchange knowledge.

## **2.5. Conclusion**

Sustainability theory, despite its conceptual and operational limitations, has more recently embraced advancements in resource and labor productivity, participatory decision-making, and green and shared economy, as well as synergies with initiatives for local resilience, self-reliance, and ethical and just cities (Agyeman, 2008; Connelly et al., 2013; Folke, 2006; Jackson & Victor, 2011; Meerow et al., 2016; Robinson & Cole, 2015). International agreements and calls for climate action offer opportunities for local sustainability; communities globally are increasingly pursuing such goals while businesses are promoting green jobs and adopting efficient technology and management practices (Kouri & Clarke, 2012; Portney, 2013).

Holistic system analyses are essential for the successful implementation of sustainability policies locally and globally. Although some trade-offs may be called for in dynamic systems such as cities, a decision-making process based on sustainability should strive for a net-positive outcome for the entire community (Barbier & Burgess, 2017; Neuman, 2005; Sachs et al., 2019). Urban sustainability analysis should therefore be conducted with a comprehensive, multi-criteria, place-oriented, and scalable framework to include both natural and anthropogenic stocks and flows (Beloin-Saint-Pierre et al., 2017; Kennedy & Hoorweg, 2012).

Future urban sustainability research should emphasize performance enhancement, impact and user benefit increase, exploration of holistic human productivity potential, effective and inclusive decision-making, co-creation (or co-production) of urban space, and efficient resource use and regeneration. Such values and outcomes are not always prioritized or successfully implemented and assessed using current urban agendas (Clarke, 2012; Du Plessis, 2012; Joss et al., 2015; Newman & Jennings, 2008; Roseland, 2012). Fundamental changes are required in local decision-making and citizen mobilization to move from current piecemeal

approaches and limited tools toward long-lasting urban sustainability and successful implementation of the SDGs.

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## Chapter 3.

### **[Paper 2] Urban Sustainability via Urban Productivity? A conceptual review and framework proposal**

#### **3.1. Introduction**

Sustainable development (SD) emerged as a field of study after the Brundtland Commission described the connection between human activities and environmental degradation (WCED, 1987). SD is generally understood as the integration of environmental, social, and economic concerns in the development of dynamic systems (Berke & Conroy, 2000). International fora such as the 2012 Earth Summit, the 2015 Sustainable Development Summit, and the 2017 UN Habitat sent a clear message: the world must get on the path to a more sustainable future now and this calls for coordinated, multi-level collaboration (Connelly et al., 2013; Kanuri et al., 2016).

**In this paper I focus on sustainability at the urban community level and seek to advance the theory and practice of sustainable community development (SCD).** SCD, influenced by many theoretical traditions and movements, integrates social, environmental, and economic considerations into the dynamic and complex community processes for the sustainable development of current and future generations (Berke & Conroy, 2000; Roseland, 2012).

Urban areas will host more than two thirds of global population by 2050 (UN DESA, 2018). Today cities occupy 3-4% of the world's land surface, use 80% of global resources, account for one third of global energy and material consumption, and generate most global waste (Elmqvist et al., 2019; Girardet, 2015; World Economic Forum, 2018). A city is "characterized – ecologically, economically, politically and culturally – by a significant infrastructural base; a high density of population, whether it be as denizens, working people, or transitory visitors; and what is perceived to be a large proportion of constructed surface area relative to the rest of the region" (James, 2015, p.26).

Cities are often considered as a component of the problem but they also offer opportunities and solutions for local and global socio-ecological systemic issues (Elmqvist et al., 2018). Their significance in achieving sustainability was expressed already in the 1970s when governments started perceiving the ramifications of rapid urbanization. The Rio+20 conference encouraged local sustainability assessment while the UN Global Agenda for 2030 brought the urgency for urban sustainability to the foreground by including a goal for inclusive, safe, resilient, and sustainable cities (Spiliotopoulou & Roseland, 2020).

**This paper offers conceptual and operational insights for more effective, collaborative, and forward-looking urban sustainability processes through urban productivity grounded in long-term whole-systems thinking and holistic regeneration of urban assets and resources.** Cities have enormous productivity potential, not only in terms of economic and labor productivity, but also of socio-cultural and ecological productivity. The main research question is: how the concept, principles, and practices of holistic urban productivity can help address local sustainability planning, implementation, and assessment, and contribute to the achievement of the UN Sustainable Development Goals (SDGs).

### **3.2. Research methods and paper outline**

To explore the research question, I studied prominent academic articles and consulted non-academic sources as well. The traditional literature review for this paper (with a component of argumentative review) built on that for paper 1 on sustainable community development and urban sustainability (see 2.1.2). Details for the literature review methods are available in Appendix A1.

Seeking for academic literature on holistic urban productivity and the concepts underpinning it, I conducted a thorough search using Simon Fraser University Library's search tool<sup>6</sup>. I first looked for academic literature with search terms such as "urban productivity", "economic productivity" (and "labor productivity"), "resource productivity", "social productivity", "ecological productivity", and "urban regeneration". Based on the

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<sup>6</sup> The current web link for the SFU library's search tool is: <https://sfu-primo.hosted.exlibrisgroup.com/primo-explore/search?vid=SFUL&sortby=rank>

results, I then expanded the search using terms such as “resource regeneration”, “regenerative sustainability”, “sharing economy”, “regenerative development”, “total factor productivity”, “urban metabolism”, and “urban resilience”.

In an iterative way while studying prominent articles and their reference lists, I also followed the snowballing method to identify related academic literature. In addition, I explicitly looked for debates and discourses in the fields of the concepts and approaches underpinning holistic urban productivity. Finally, in some cases, I deemed useful to consult non-academic sources such as scientific reports, international organization documents, handbooks, or edited books. I evaluated the resources for credibility and soundness, in terms of author, methodology, content, and publication venue.

In search for conceptual feedback and breadth of views, I also interviewed internationally recognised experts in urban sustainability, sustainable community development, productivity, and regeneration. Acclaimed scholars and practitioners provided added value to this research by offering comments on the concept and practice of urban sustainability and insights on local challenges in planning for and evaluating sustainability and on the concept of urban productivity. These were:

- Julian Agyeman, Professor of Urban and Environmental Policy and Planning in Tufts University
- John Robinson, Professor and Presidential Advisor on the Environment, Climate Change and Sustainability at the University of Toronto
- Coro Strandberg, Business sustainability strategist and thought leader
- Daniel Christian Wahl, Sustainability educator and whole systems consultant

This paper synthesises theoretical roots, conceptual influences, major debates, limitations, and opportunities in sustainability (briefly) and productivity theory and practice (extensively) and demonstrates the interdisciplinary influences. It starts with an overview of the literature and practice of SD/SCD and urban sustainability (section 3.3) and then examines the interdisciplinary conceptual foundations of holistic urban productivity and presents examples of related initiatives from cities around the world (section 3.4).

In section 3.5 I introduce a conceptual framework for holistic urban productivity; while the concept seeks to converge its foundational theories and approaches, the

framework presented here was developed through an iterative process that was also informed by the findings of two in-depth case studies with municipalities in British Columbia, Canada. Details about the case studies, the research findings, and how these connect to the Urban Productivity Framework are in chapter 4 (paper 3) below. Finally, this paper ends with a discussion of the potential of this concept to help address urban sustainability processes and outcomes.

### **3.3. Overview of urban sustainability conceptually and operationally**

#### **3.3.1. Urban sustainability conceptually**

Sustainable development can historically be traced to environmental and social justice discourses of the 18th and 19th centuries – if not to ancient civilizations (Dernbach & Cheever, 2015). It can be conceptualised as a three-legged stool, a three-pillar edifice, or a Venn diagram (Bayulken & Huisingsh, 2015; Garren & Brinkmann, 2018; Purvis et al., 2019). While the interdependent and mutually reinforcing character of the three pillars was highlighted in the UN World Summit on SD in 2002, in practice the pillars are still largely applied separately from each other (Garren & Brinkmann, 2018).

The contemporary understanding of SD emerged following milestones such as Rachel Carson's influential *Silent Spring*, the Club of Rome seminal report on the necessity for limits to economic growth, and the 1972 UN Conference on Human Environment. SD gradually took its current shape after the 1987 Brundtland Commission report, the 2000 UN Millennium Development Goals, and the 2002 Johannesburg Summit. Despite criticism about favoring economic growth over socio-ecological concerns, the Brundtland definition for SD remains the starting point for related discussions: "development which meets the needs of current generations without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 41).

The concept became more widespread after the universal agreement on global SD goals (the SDGs) in 2015; the 17 SDGs and 169 targets were a significant step forward and a turning point for global sustainability (Garren & Brinkmann, 2018). They apply to all nations and are grounded in a holistic view of sustainability that calls for

multi-scale action – an approach also reflected in the Paris Climate Agreement and the New Urban Agenda (ICSU & ISSC, 2015; United Nations, 2015, 2017; Woodbridge, 2015). The SDGs offer an integrated vision and plan through at least 2030 and the full set is also applicable at the local level.

For some scholars SD is a decision-making framework, for others a societal thinking paradigm, but most agree that the concept is normative and value-laden, encourages systemic analysis, acknowledges the dynamic nature of systems, and supports the precautionary and polluter-pays principles (Bibri & Krogstie, 2017; Dernbach & Cheever, 2015; Garren & Brinkmann, 2018; Harrington, 2016; Kates et al., 2005; Neuman, 2005; Robinson, 2004; Roseland, 2012; Williams & Millington, 2004).

**SCD and urban sustainability have been influenced both by broader SD theories and debates and by intellectual traditions of the last two centuries,** although there is not a specific and widely endorsed set of theoretical foundations for SCD in the literature (Spiliotopoulou & Roseland, 2020):

- Weaker-to-stronger sustainability: a debate between those who seek to change the supply side of resources and those who seek to change the demand side; a continuum between a utilitarian approach to resource management and a more holistic well-being approach that considers resource constraints. SCD implementation depends highly on the actors' position in this spectrum (Dernbach & Cheever, 2015; Roseland, 2012; Williams & Millington, 2004).
- Urban systems thinking: viewing a human settlement as a complex, adaptive, and networked system that involves interdisciplinary study across spatial and temporal scales. Systemic thinking entails analysis of urban stocks and flows, nestedness, feedback loops, interdependence and connection between components, and adaptive capacity (Ellen MacArthur Foundation, 2013; Girardet, 2015; Meadows, 2008; Meerow et al., 2016; Uphoff, 2014).
- Ecological modernization: it seeks to address environmental problems, ensure food availability for all, and advance economic growth through technology and design improvements and resource efficiency. It has manifested through the privatization and technological modernization of urban utility networks, but the persistence on efficiency reveals the absence of integrative approaches to urban issues requiring deeper social change (Bayulken & Huisingh, 2015; De Jong et al., 2015; Hodson & Marvin, 2014).
- Environmental justice: one of the foundations of social sustainability, seeking a more equitable distribution of resources, services, facilities, and environmental impact between and within generations. A step forward, "just" sustainability

advocates for the inclusion of social equity and indigenous justice in sustainability (Agyeman et al., 2002; Agyeman, 2013; Hassan & Lee, 2015).

- Social economy (SE), Community Economic Development (CED), bioregionalism, eco-localism: such initiatives emerged as a community response to negative impacts of socio-economic restructuring. SE builds on collective action and individual entrepreneurship; CED emphasises local knowledge and community-led action; and bioregionalism, eco-localism, and self-reliance encourage local diversification, community-place connection, and social equity (Connelly et al., 2013; Curtis, 2003; Ferguson (Hernandez), 2015; Roseland, 2012).
- Urban resilience: popular approach in urban planning, as 90% of cities are situated on coastlines meaning increased vulnerability for most of the global population (Childers et al., 2014; Elmqvist et al., 2019). A resilient urban system is able to maintain or rapidly return to desired functions after a disturbance (a sudden shock or a continuous stress), adapt to change, and quickly transform components that limit its adaptive capacity (Meerow et al., 2016; Walker et al., 2004).
- Circular economy (CE): it builds upon the perception of a city as an ecosystem and is influenced by approaches such as cradle-to-cradle, regenerative design, and biomimicry. Despite its narrow focus on resource optimization that does not necessarily integrate social concerns, CE can contribute to a degrowth path by limiting resource waste and leakage to an extent (Ellen MacArthur Foundation, 2017; Geissdoerfer et al., 2017; Ghisellini et al., 2014).

### 3.3.2. Urban sustainability operationally

**These theories and concepts are operationalised through a broad range of urban agendas, with that of the sustainable city being the most frequently occurring;** others are: ecocity, smart city, resilient city, knowledge city, low-carbon city, ubiquitous city, green city, compact city, and livable city (De Jong et al., 2015). A sustainable city can be described as a complex and dynamic community that maximises socio-economic net benefits within environmental constraints while empowering current and future citizens (Kanuri et al., 2016; Roseland, 2012).

**Most agendas do not always integrate the three pillars or may use climate action as a sustainability proxy while pursuing economic growth, leading to siloed implementation and sustained inequity** (Dernbach & Cheever, 2015; Garren & Brinkmann, 2018; Joss et al., 2015). Sustainability for many is a “buzzword” that lacks interdisciplinary thinking and inclusive processes (Garren & Brinkmann, 2018). As sustainability educator and whole systems consultant Daniel Christian Wahl says, “it’s

dangerous to put these things into silos” (D. C. Wahl, personal communication, January 21, 2019).

Academic literature notes that sustainability weaknesses result primarily from the concept’s implementation and secondarily the lack of a widely accepted definition (Joss et al., 2015). Urban agendas may not embrace whole-system tools and are often implemented within mainstream planning, investment, and operations (Dernbach & Cheever, 2015). Choosing an agenda may be also impaired by issues such as NIMBYism (“not in my back yard”), lack of sufficient resources and political will (e.g. due to short-termism), community fragmentation, inter-city competition, interests that promote innovation and technology as panacea, and climate change impact (Berke, 2002; De Jong et al., 2015).

Other obstacles to implementation include lack of stakeholder coordination, corruption in local politics, greenwashing or ‘cosmetic environmentalism’, and inadequate mandate and financing of local governments (De Flander, 2014; Robinson, 2004). In addition, collecting data has become an end in itself, but it is not clear if or how all this monitoring and reporting improves decision-making and encourages community change (Kaika, 2017). Such issues can lead to lost opportunities, lack of credibility, and increased public scepticism (Cairns et al., 2015; Roseland, 2012).

Despite the debates and weaknesses, however, SCD could represent a new way of thinking about and planning for long-term development. The SDGs, the New Urban Agenda the abundance of urban agendas and networks, and the growing calls for climate action offer a window of opportunity for new methodological tools to help communities achieve their sustainability goals (Kaika, 2017; Spiliotopoulou & Roseland, 2020). In practice, SCD has in recent years embraced advancements in green, social, and circular economy, just and collective action, local resilience, and self-reliance (Agyeman, 2008; Connelly et al., 2013; Folke, 2006; Jackson & Victor, 2011; Meerow et al., 2016; Robinson & Cole, 2015).

The sustainable community is “an illusion in many ways, but it's a journey that we have to travel, and the combination of journey and destination [...] makes it exciting” (Julian Agyeman, Professor of Urban and Environmental Policy and Planning in Tufts University, personal communication, December 17, 2018). Sustainable development and

management of the urban commons requires more bottom-up initiatives and movements, new policies (but not necessarily new technologies), and new narratives beyond the growth/degrowth discourse (Hamman, 2017; Kaika, 2017). **The concept of urban productivity can help achieve the fundamental changes needed to stop sustaining an ill-functioning system, in favor of maximized environmental and community well-being** (Neuman, 2005; Roseland & Spiliotopoulou, 2017).

### **3.4. Urban productivity conceptually and operationally**

#### **3.4.1. Urban productivity conceptually**

**Shifting community development from a negative individualistic logic (reducing impact) to a positive systemic one (regeneration within a network of systems)** is a transition that has emerged lately in the SCD literature as will be shown in this section. Urban areas may not be indefinitely sustainable if they continue to be solely extractive and not holistically productive. For long-term sustainability, a transformation is proposed, to disrupt the current path so that the system we ‘sustain’ thereafter is a well-functioning one (Brugmann, 2015; Girardet, 2015; Spiliotopoulou & Roseland, 2020; Wolfram, 2016).

**Urban or community productivity incorporates theories and practices from various disciplines and backgrounds, including traditional forms of knowledge** that have been left out of the sustainability discourse in the past. Conceptually, it is multi-dimensional, grounded in strong sustainability principles and seeks to move past the notion of balancing priorities toward optimizing and regenerating tangible and intangible urban assets and components, beyond the triple-bottom line of SCD. Although traditional economic growth advises cities to increase economic output through technology, capital, and labor, holistic urban productivity addresses all city dimensions and components, and is therefore distinguished from the typical view of urban productivity in the economic literature (Roseland, 2012; Spiliotopoulou & Roseland, 2020).

#### **Economic and labor productivity**

The concept of productivity is historically associated with economic and other resources. Economic and labor productivity have been thoroughly researched and are quite developed concepts in economics, both in general and in urban context (Behrens

et al., 2015; Jackson & Victor, 2013). A central concept in neoclassical economics, productivity can be defined as the ratio of given output per given input, the value of output obtained with one unit of input, or the rate at which goods or services are produced (Bleischwitz, 2001; Jackson & Victor, 2011). Labor productivity is a standard measure of economic productivity and in this case the input is the time workers spend in employed labor (Behrens et al., 2015; Jackson & Victor, 2013).

The neoclassical, economic understanding of productivity gradually evolved toward multi-factor or multi-capital framings of productivity. These analyses considered factors such as human capital, services, information, and infrastructure, but did not usually involve environmental or ecological concerns (Bleischwitz, 2001). Taking theory a step further, Total Factor Productivity (TFP), which emerged in the 1980s, is based on the existence of a residual, i.e., a “significant” percentage of output which could not be attributed to the neoclassical labor and capital inputs (Burkett, 2006). By the mid-1990s, TFP theory included the input of natural resources, policies, knowledge sharing, collaboration, and expertise, and informed local and regional economic development strategies, along with other concepts such as ecological modernization, circular economy, and innovation (Brugmann, 2015).

Influenced by the above, urban productivity in the literature has been typically connected to local economic development and assets such as infrastructure, labor work, trade, and financial investment (Benjamin, 1993; Brown & Rigby, 2013; Diez, 2017; Sachs, 2013). It has been well documented that cities, especially those with higher density, attract agglomeration economies and high-skilled employees and enjoy higher labor productivity, in both Global North and Global South (Abel et al., 2012; Behrens et al., 2015; Fallah et al., 2011; Glaeser & Xiong, 2017). Higher labor productivity of course need not mean ever-expanding working hours and exhaustion that reduce happiness and well-being for individuals and communities. Well-being is positively connected to time affluence and negatively connected to sprawled, unsustainable cities (Fallah et al., 2011; Knight et al., 2013).

### **Resource productivity and circularity**

Economically productive cities benefit from high labor productivity and production circularity to become as self-reliant and resilient as possible, given local and global resource constraints. Resource productivity can be defined as the net balance of

resource production relative to resource extraction or the quantity of a good or service as outcome per unit of resource use (OECD, 2015). This traditional understanding is similar to that of economic productivity (output of economic growth per unit of resource used), with efficiencies in resource allocation and management (OECD, 2015). Contemporary documents such as the New Urban Agenda's report "The City We Need 2.0" echo this by focusing on resource efficiency and regeneration and infrastructure resilience (UN-Habitat, 2016).

Urban circular economy models encourage product redesign for extended life and repair, material and resource regeneration, and overall closing of technical and biological cycles in production and consumption (Ellen MacArthur Foundation, 2017; World Economic Forum, 2018). Circular flows cannot continue indefinitely due to the second law of thermodynamics but proponents of the approach argue that it can largely contribute to a degrowth path if energy and material loops last longer than in the current business-as-usual state through material effectiveness instead of efficiency only (Ellen MacArthur Foundation, 2012; Ghisellini et al., 2014; Korhonen et al., 2018). The concept of urban metabolism is also adopted to analyse the urban ecosystem by studying resource flows and promoting effective policies for a cradle-to-cradle approach (Beloin-Saint-Pierre et al., 2017; Kennedy et al., 2015; McDonough & Braungart, 2013).

In a productive city, these approaches can help move beyond efficiency to full resource circularity by extending the productive life of urban resources for as long as this is possible while also ensuring reduced consumption of resources (Kennedy et al., 2015). The city would achieve resource extraction at a lower rate than that of resource regeneration, nature recovery and restoration, and improved community well-being (Geissdoerfer et al., 2017; McDonough & Braungart, 2013). Circular and holistically productive cities are still concepts under development but they can help cities learn from nature's low-entropy metabolic processes to gradually decrease resource input from "distant elsewhere" and optimize urban resource flows (Girardet, 2015; Thomson & Newman, 2018; Wackernagel & Rees, 1996).

Productivity, regeneration, and circularity of urban resources, combined with holistic and long-term thinking, reduced consumption, and deep decarbonization, can contribute to increased self-reliance and resilience (Wahl, 2016). While recognizing the benefits of economic globalization, Wahl highlights the importance of re-localization and

re-regionalization: “any investment in education and local capacity building, any investment in local food sovereignty, local energy sovereignty [will] bring the essentials closer to the city or closer to the regional [sic] than they are right now” (D. C. Wahl, personal communication, January 21, 2019).

### **Ecological productivity**

Sustainable ecological productivity is a key requirement for a holistically productive city as it would add nature’s intrinsic value and biodiversity’s rights to exist in the urban sustainability discourse. Ecological productivity is defined as the rate at which energy is converted to organic substances, i.e., the total amount of energy fixed by plants adjusted for energy losses during plant respiration (Lerner & Lerner, 2014). The concept of urban ecological productivity is grounded in urban ecology which sees cities as part of living ecosystems and therefore deals with ecological processes within the complex and dynamic system of a city (Childers et al., 2014; Lieber, 2018; Roseland, 2012).

Although green infrastructure initiatives, such as green roofs, living walls, urban parks, and bioswales, cannot entirely replace untouched ecosystems, restoring and enhancing urban ecological processes has great potential (Condon, 2019; Roseland, 2012). A sustainable production and flow of urban ecosystem services, planned with contextual and systemic thinking and biophilic design principles, contributes to increased resilience and a healthy relationship of urban dwellers with their natural environment (Beatley & Newman, 2013; Kabisch et al., 2018). Restoring and strengthening ecological productivity in cities adds value to their bioregions and could gradually make up for damage done in the Anthropocene (Mang & Reed, 2015; Wahl, 2016).

Regenerative design, also rooted in ecology and living systems theory, is another important concept for urban productivity, so far extensively implemented in agriculture and architecture (Robinson & Cole, 2015). It seeks to enhance and regenerate local and regional socio-ecological systems based on wisdom from ecosystems and local history. It endorses – and moves even beyond – biophilia and biomimicry and the use of organic, natural design to restore urban ecosystems and create urban spaces that offer net-positive socio-ecological value (Beatley, 2017; Condon, 2019; Mang & Reed, 2019).

The ecological worldview of regenerative design is upheld by Indigenous people but contrasted with the dominant mechanistic, anthropocentric worldview (Du Plessis & Brandon, 2015). Learning from nature means that solutions design must embrace Indigenous wisdom, such as Traditional Ecological Knowledge, and engage in co-evolutionary processes based on an “experiential understanding” of how the world works (Du Plessis & Brandon, 2015; Wahl, 2016). Wahl described this as “elegant solutions carefully adapted to the biocultural uniqueness of place” (D. C. Wahl, personal communication, January 21, 2019).

Applications of regenerative design in farming consists of closed-loop systems that help improve soil quality, increase biodiversity, and sequester carbon dioxide (LaCanne & Lundgren, 2018; Rodale Institute, 2014). In landscape architecture and urban planning, regenerative design can optimize – or even transform – the urban fabric to enhance walkability, reduce energy use, restore urban spaces of ecological significance and native biodiversity, and ultimately reduce the city’s ecological footprint (Thomson & Newman, 2018).

In built environments, regenerative design has been mostly expressed through applications of the promising approaches of net-zero and net-positive design in buildings (Mang & Reed, 2015). Net-zero design has sometimes been implemented with a technical and anthropocentric focus: maximizing human benefit as the main purpose in the design stage without necessarily considering the building’s life cycle impact on the natural environment (Mang & Reed, 2015). Net-positive design however can be truly regenerative as it emphasizes the ecological worldview of living systems that include and strive for optimization of benefits for both people and nature (Cole, 2015; Mang & Reed, 2019).

### **Socio-cultural and human productivity**

Urban and suburban communities tend to experience social capital erosion (Putnam, 1995) and current productivity approaches do not yet seem to adequately encompass socio-cultural aspects that holistic urban productivity can embrace. While 20<sup>th</sup> century economic literature sees social productivity simply as the output per person in the labor force, discourse today has begun including social and institutional trust, engagement, equity, inclusion, connection, education, happiness, and health (Burgess & Heap, 2012; Sharpe, 2002; Stiglitz et al., 2009).

Social capacity for urban sustainability transformation entails continuous and robust involvement of all stakeholders and overall development of the human, intellectual, socio-cultural, and political community assets (Macdonald et al., 2018; Wolfram, 2016). John Robinson, Professor and Presidential Advisor on the Environment, Climate Change and Sustainability at the University of Toronto, explained the need to perceive human productivity holistically and to reinforce human (professional and institutional) capacity (J. Robinson, personal communication, December 5, 2018).

In addition, the “doughnut economics” framework urges to address social boundaries (basic needs as the inner circle) along with global ecosystem boundaries (outer circle or ceiling) to ensure holistic well-being for all humanity (Raworth, 2017). The doughnut’s inner circle largely overlaps with the social determinants of human health and the space between inner and outer circle represents a safe and just space of both human and ecological health (Raworth, 2017). The growing literature on the ecological determinants of health shares this call for integrative approaches to health and well-being (Parkes et al., 2020).

Cultivating a sense of place is another fundamental component of productive cities. The significance of place-making is sometimes overlooked due to the almost exclusive focus on global processes and connecting – yet individualising – technologies (Putnam, 1995; Sassen, 2005). Indigenous communities in Canada and elsewhere, for instance, have demonstrated how the sense of belonging can enhance resilience, self-reliance, public health, and local nature (Vodden et al., 2016). Looking at a community through a lens of place promotes a sense of responsibility for and a sense of unity with the natural environment (Beatley & Newman, 2013; Mang et al., 2016; Orr, 2013).

Reclaiming, co-creating, and co-managing the urban commons is paramount. Urban researchers and practitioners “ascribe meaning to space and allocate rights to space, often unknowingly”, however more inclusive conversations about belonging to and becoming the city are needed (J. Agyeman, personal communication December 17, 2018). Ideas of co-production and just sharing of urban assets are common in contemporary literature on urban future visions; for example:

- For Elmqvist et al., achieving a resilient city is contingent on transformations that need to be collectively explored and collaboratively developed, as a requirement for the “urban century”. They advocate for co-production of

knowledge, co-management and sharing of the urban commons, and experimenting on plurality and redundancy through innovative bottom-up solutions in various spaces, scales, and sectors (Elmqvist et al., 2019).

- Landry argues that quality city-making requires creative, collaborative, and forward thinking, open-mindedness, and inventive problem-solving for social innovation and blossom of human potential (Landry, 2008). Along the same lines: Luger showed that cultural productivity should include grassroots cultural producers (Luger, 2019); Smithsimon advocates for creative planning and architecture to make open spaces intentionally inviting (Smithsimon, 2008); and Amin and Thrift's "emancipatory city" encourages creativity for freedom in the city (Amin & Thrift, 2004).
- McLaren and Agyeman explain that popular sharing economy practices that may be developed without wide societal consultation do not automatically encompass social equity and justice. Their "sharing city" vision relies on the potential of urban space to facilitate sharing of socio-cultural, economic, physical, ecological, or other assets and to fulfill the right to the city for both people and biodiversity (McLaren & Agyeman, 2017; McLaren & Agyeman, 2015). There is a need to change the (western, developed world) sustainability narrative from "less is more" and "buy local" to more inclusive place-making (J. Agyeman, personal conversation, December 17, 2018).

By seeing the city as an ever-evolving organism and by integrating built and natural commons, community stakeholders can co-produce not only knowledge, but also solutions, space, and experience – in the broad sense of the term "co-production" as is also used by the UN and UN-Habitat (UN-Habitat, 2020). Urban space can then become accessible, inclusive, creative, regenerative, and healthy (Beatley, 2017; Landry, 2008; Smithsimon, 2008; Wahl, 2016). After all, urban planning, design, and architecture can only go so far in developing urban form; the users and their socio-cultural, educational, political, and ecological processes collectively give the material form meaning and purpose (thus "co-producing" it) (Burden, 2014; Gismondi et al., 2016; McLaren & Agyeman, 2015).

### **Whole-systems approach**

Urban productivity concepts are inextricably intertwined under the umbrella of whole-systems thinking for long-term well-being (Wahl, 2016). The transformation to productivity requires viewing the city as a complex system in which urban dwellers and their natural and physical environment are involved in a co-evolutionary process in pursuit of balance and harmony in their bioregion (Condon, 2019; Neuman, 2005; Wahl, 2016). Applying urban systems theory, a city would analyse systems and networks to which it belongs and sub-systems of which it is composed, while exploring perspectives

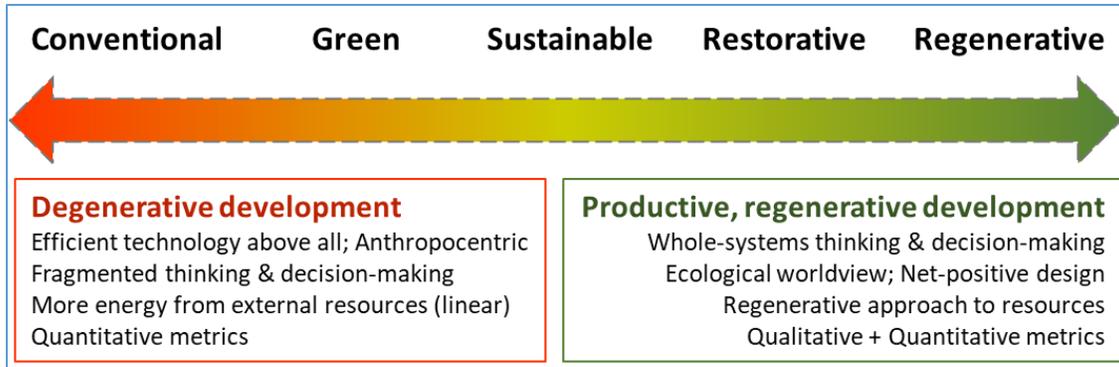
from many disciplines (Meadows, 2008; Uphoff, 2014). Such thinking is not new: Indigenous traditions have always honored the relationships and connections among all elements of the community, including the land and surrounding ecosystems (Du Plessis & Brandon, 2015; Gislason & Andersen, 2016).

Systemic thinking is at the core of regenerative design, regenerative development, and regenerative sustainability. Regenerative development seeks alignment and synergies with the natural environment for the restoration and regeneration of ecological resources (De Jong et al., 2015; Mang et al., 2016; Mang & Reed, 2012; Robinson & Cole, 2015; Woo et al., 2014). Inspired by eminent scholars such as David Orr, Fritjof Capra, and John Tillman Lyle, Mang and Reed argue that holistic regenerative development can confront and address the linear processes and fragmented approaches of the current degenerative path (Mang & Reed, 2019; Reed, 2007).

Regenerative sustainability is a more recent concept, built on constructivist social theory, emphasizing the need for collaborative planning and participatory backcasting to ensure that all perspectives are considered, *including nature's intrinsic value* (De Jong et al., 2015; Robinson & Cole, 2015). It advocates for setting goals for strong and healthy socio-ecological systems and achieving them through holistic, living-systems design (Gibbons et al., 2018).

Despite their diverse theoretical roots, regenerative sustainability, and regenerative development are in practice similar in that they all pursue meaningful engagement of citizens and a whole-systems perspective in co-creating healthy and inclusive urban space that benefits all living beings. Wahl additionally urges for the creation of “regenerative cultures” and invites us to honor transdisciplinarity and question mainstream assumptions on priorities, needs, worldviews, and values (Wahl, 2016).

**The concept of holistic urban productivity is informed by (and attempts to converge) the above theories, concepts, and approaches.** Figure 3.1. features key points of this paper and reflects the stages of a holistic urban productivity path.



**Figure 3.1. From conventional, degenerative development to productive, regenerative development.**

Adapted graph based on these sources: Mang & Reed, 2019; Reed, 2007.

### 3.4.2. Urban productivity operationally

During this research, I discovered **a range of initiatives that demonstrate how the above concepts have been put into practice worldwide and that holistic urban productivity is indeed possible** (Table 3.1, initiatives are in no particular order). More than half were identified in the academic and non-academic literature reviewed in section 3.4.1. on the concepts and approaches underpinning holistic urban productivity (see also the sources in the table’s caption). The rest were the result of online research with search words and phrases such as “sharing economy” or “sharing practices”, “regenerative practices or initiatives”, “ecological restoration or regeneration”, and “socially and/or culturally inclusive innovation”, and selection criteria such as applied at the local scale, rooted in at least one theory or approach underlying the urban productivity concept, and having proved or potential impact on multiple community sustainability dimensions.

Many of these initiatives and projects are context-specific and developed and implemented locally, whereas others are practices adopted in broader socio-economic sectors but implemented at the local community level. They are not classified by dimension of urban productivity in the table because they are not siloed; each one’s positive impact extends across multiple community dimensions and stakeholders. “A lot of the solutions require collaborating across silos and boundaries” (Coro Strandberg, Business sustainability strategist and thought leader, personal communication, December 17, 2018).

It is worth noting that: a) there is a strong representation of Global South cities that implement holistic productivity initiatives despite being lower consumers of energy and materials than most Global North cities (Kennedy et al., 2015) and; b) in this research I did not encounter a city that could be considered as *the productive city*. **If we combined practices in all aspects of urban productivity in one city, that would perhaps be the model of a productive city** (J. Agyeman, personal communication December 17, 2018).

**Table 3.1. Examples of holistic urban productivity in practice**

Place or Sector	Initiative, project, or practice
Canadian cities / globally ( <a href="http://cosacanada.com/">cosacanada.com/</a> )	Circles of Support and Accountability: a Canadian-made restorative justice program for individuals who have committed serious sexual offences.
Seoul, South Korea	Cheonggyecheon stream reclamation, restoration, and transformation to an 11-kilometre public space, biodiversity haven, and urban microclimate.
The Hague, the Netherlands	Central Innovation District, under development: green, self-sufficient, multi-layered district with housing, offices, park, public space, and public transit.
Emscher Landscape Park, Ruhr, Germany	A reclaimed and regenerated 450 sq. km regional park that links more than 20 formerly industrial towns and cities.
Vertical Forest, Milan, Italy	Two residential towers hosting hundreds of trees and thousands of plants and shrubs, to improve human-nature relationship.
Las Salinas, Viña del Mar, Chile	Regeneration of a 40-acre brownfield site: ecological restoration, extensive stakeholder collaboration, development of public space network.
Singapore	The city-state has one of the highest densities of greenery in the world and one fifth of its floor area is occupied with certified green buildings.
Vancouver BC, Canada	<i>Social innovation and sharing examples:</i> Thingery (community owned lending library of various things); TerraCycle (company upcycling typically non-recyclable waste); Woodshop (non-profit co-op upcycling reclaimed wood and offering employment and education); Vancouver Tool Library (tool lending co-op); MakerLabs (provides tools, space, and skills); and Kickstand (volunteer-run cycling resource centre). ( <a href="http://www.terracycle.com/en-CA">www.terracycle.com/en-CA</a> , <a href="http://thethingery.com">http://thethingery.com</a> , <a href="http://www.woodshop.coop">www.woodshop.coop</a> , <a href="http://vancouver.toollibrary.com">vancouver.toollibrary.com</a> , <a href="http://www.makerlabs.com">www.makerlabs.com</a> , <a href="http://www.eastvankickstand.org">www.eastvankickstand.org</a> ) <i>Vancouver's Rain City Strategy:</i> sustainable rainwater management across the city to use rainwater as a resource rather than a waste product ( <a href="https://vancouver.ca/home-property-development/green-infrastructure-documents-and-policies.aspx">https://vancouver.ca/home-property-development/green-infrastructure-documents-and-policies.aspx</a> )
Shared libraries, worldwide	Examples: Little Free Libraries (in more than 100 countries); Kimolos, Greece (old boats became open lending libraries in beaches throughout the island).
Kigali, Rwanda	Leader in knowledge-based sharing economy in Africa: Kigali Technopole (ICT centre for skilled professionals); and Knowledge Lab (open technology hub for students, entrepreneurs, and innovators).
Adelaide, Australia	Extensive organic waste composting, innovative and dynamic public consultations, and rapid shift to wind and solar energy.

Place or Sector	Initiative, project, or practice
Copenhagen, Denmark	Energy efficiency initiatives, successful public transit, cycling networks and pedestrian zone, extensive public debates, exemplary waste management.
Vancouver BC and Montreal QC, Canada	Two of the world's most bicycle-friendly cities and leaders in North America, according to the Copenhagenize Index. ( <a href="https://copenhagenizeindex.eu/">https://copenhagenizeindex.eu/</a> )
8 80 Cities, Toronto, Canada ( <a href="http://www.880cities.org/">www.880cities.org/</a> )	A non-profit dedicated to contributing to the transformation of cities into places that are inclusive and enjoyable for people of all ages. Engages in multi-stakeholder collaborations and safety and well-being projects.
Benin, Africa	Entrepreneurship training in crafts, tourism, or agriculture with a whole-systems approach combining life and business skills. Examples: Youth Employment Project and Songhai Leadership Academy.
Slow Food, worldwide ( <a href="http://www.slowfood.com">www.slowfood.com</a> )	Global movement promoting the connection between food and aspects such as culture, politics, environment, and agriculture. In 2020, local Slow Food groups worked with food producers, businesses, and consumers to build resilience amid the pandemic.
Amsterdam, the Netherlands (Europe's first "Sharing City")	Sharing and collaboration examples: ShareNL (knowledge and networking platform); repair cafés; Westergasfabriek (gas factory turned into cultural hub); Konnektid (skillsharing platform); extensive social housing, co-housing, and co-working.
Bristol, U.K.	Renewable and ethical energy initiatives, civil society partnerships and social investment programmes, climate resilience actions
Medellín, Colombia	Social urbanism: inclusive social and 'just' practices, urban revitalization through long-term participatory planning, efficient transportation system.
Philadelphia, USA	Green City, Clean Waters: an action plan to transform some of the city's paved and hard surfaces into green and natural infrastructure and to restore creeks and rivers.
Guangzhou, China	Cultural and social inclusion initiatives, large-scale urban development programs, efficient wastewater management
Portland, Oregon	City Repair Project: engages in artistic and ecologically oriented placemaking through street painting, mini libraries, urban permaculture, and self-serve cafés.
Biophilic Cities Network, worldwide	A global network of individuals, organizations and cities that pursue the vision of a natureful city within their unique and diverse environments and cultures.
Sunset Park Materials Recovery Facility, New York City	A state-of-the-art recycling and recovery facility, municipally operated since its opening in 2013. The facility separates commingled residential recyclables and creates reusable material that goes back into the economy.
Other energy or built environment initiatives	Beddington Zero Energy Development, UK; Eco-Districts, Portland, Oregon; Masdar, Abu Dhabi; Arbed scheme, Wales, UK; renewable districts in Freiburg and Hamburg, Germany; target for 100% renewable electricity by 2030 in San Francisco, California.
Other natural environment projects	Numerous regeneration projects worldwide, mapped by Spherical Studio based in Oakland, California. ( <a href="http://shorturl.at/oP789">shorturl.at/oP789</a> )
Urban farming, worldwide	Examples: programmes in Havana, Cuba; community gardens in New York City and elsewhere; food security projects in Belo Horizonte, Brazil.

Place or Sector	Initiative, project, or practice
Regenerative agriculture, worldwide	Ecologically sustainable, resource productive, and profitable. Examples: biodynamic farming; permaculture; 'Natural Systems Agriculture' projects; energy efficient and hydroponic use of farmland (e.g. Shanghai and Beijing, China).

Sources: (Beatley, 2016, 2020; Boeri Studio, n.d.; Du Plessis & Brandon, 2015; Gibbons et al., 2018; Girardet, 2015; Hunt & de Laurentis, 2015; LaCanne & Lundgren, 2018; McLaren & Agyeman, 2015; Razavi, 2018, 2017; Roseland & Spiliotopoulou, 2017; Roussopoulos, 2017; Scharmer, 2018; SIMS Municipal Recycling, n.d.; UNEP, 2018; Urban Innovation Community, 2015; WA Contents, 2018; Wahl, 2016; Woo et al., 2014).

### 3.5. Introducing a framework for Urban Productivity

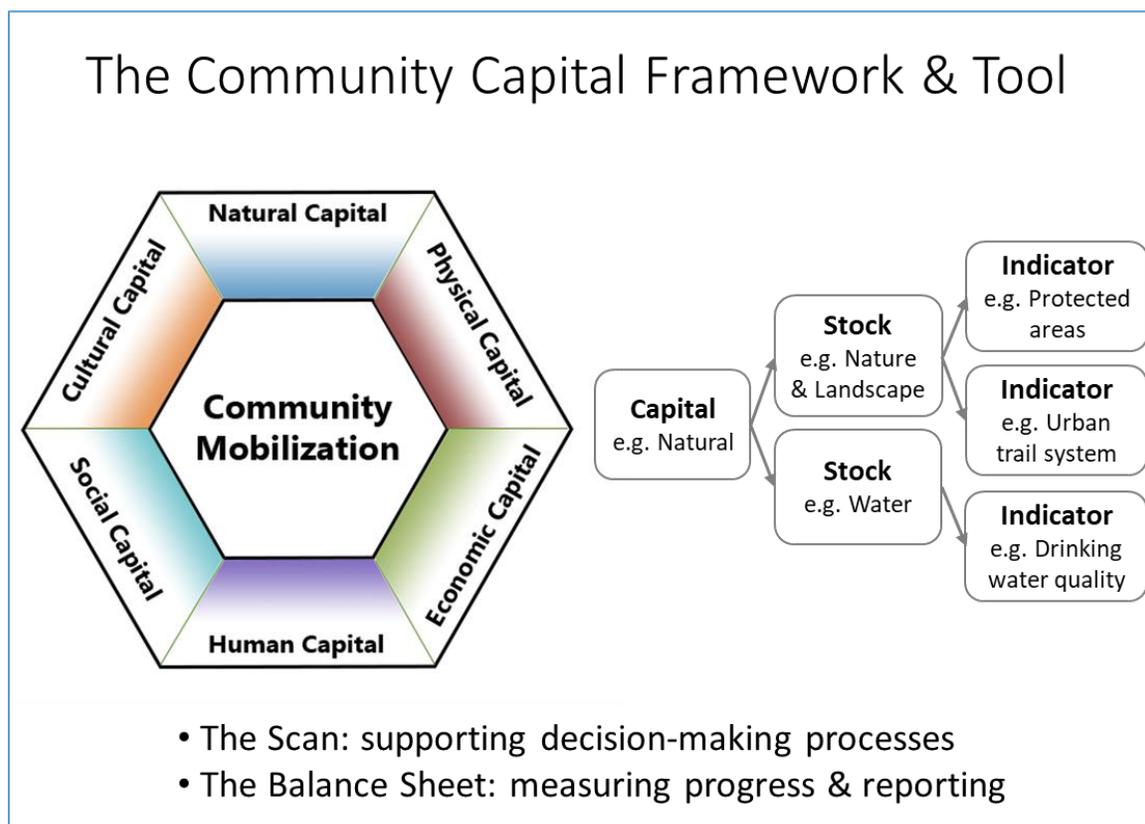
Following a brief discussion on sustainability decision-support tools, I propose a conceptual and inclusive illustration of urban productivity through a holistic framework that encompasses a set of principles and a set of urban productivity goals.

#### 3.5.1. Decision-support tools for urban sustainability

Planning for and implementing urban sustainability processes requires tackling complex goal-setting and navigating local interests, with democratic methods and holistic, long-term thinking (Caprotti et al., 2017; Clarke, 2014). Cities develop their plans often aided by one of many available frameworks or tools for local sustainability decision-making and progress assessment (De Jong et al., 2015; Joss et al., 2015; Tanguay et al., 2010). A sustainability framework can be broadly defined as “the rationale and the structure for the integration of concepts, methodologies, methods, and tools” (Sala et al., 2015). Designed by various organizations, most such frameworks and tools emerged since 2000 and usually comprise principles, goals, and metrics (Joss et al., 2015).

**One sustainability framework that provided inspiration for this research is the Community Capital Framework (CCF)**, a versatile and scalable instrument designed to support decision-making at all stages (Roseland, 2012). It recommends the balanced and concurrent improvement of six community capitals with a whole-systems perspective: each capital is a sub-system of the larger whole-community system. The six forms of community capital are natural, physical, economic, human, social, and cultural (figure 3.2) (Roseland, 2012; Roseland & Spiliotopoulou, 2017).

The **Community Capital Tool (CCT)**, which operationalises the CCF, was developed by the Centre for Sustainable Development, Simon Fraser University, Canada, and Telos, the Brabant Center for Sustainable Development, Tilburg University, Netherlands (Roseland, 2012). The CCT is composed of the Scan, a planning tool to evaluate the impact of policies and initiatives on overall community health, and the Balance Sheet, a monitoring and reporting tool that also aligns with the three-level structure of the SDGs (goals, targets, and indicators). CCT results are presented as comprehensible graphics for progress measurement with sections incorporating citizens input and priorities.



**Figure 3.2. Community Capital: A Framework and Tool for Sustainable Community Development.**

Adapted from: Roseland, 2012.

The CCT is one of many urban sustainability tools. During this research, I also consulted several other frameworks and tools that helped shape the foundations of the Urban Productivity Framework. In an iterative process before, during, and after the case studies, I studied the frameworks and tools that most

frequently appear in the sustainability assessment literature and practice (Ahvenniemi et al., 2017; Bayulken & Huisingh, 2015; De Jong et al., 2015; Joss et al., 2015; Tanguay et al., 2010). They are listed here in no particular order:

- The UN Sustainable Development Goals
- LEED v4.1 Cities and Communities (former STAR Communities and US Green Building Council's LEED for Cities program)
- Global Resilient Cities Network (former 100 Resilient Cities)
- ISO37120 Sustainable cities and communities – Indicators for city services and quality of life
- Community Well-Being Index (Canada)
- Community Foundations of Canada Vital Signs
- EU Reference Framework for Sustainable Cities
- Living Community Challenge for connected and regenerative communities
- International Eco-City Standards and framework for an ecologically-restorative human civilization
- The Natural Step's Framework for Strategic Sustainable Development
- BREEAM Communities
- One Planet Living & One Planet Cities
- The Green City Index
- The Bellagio Sustainability Assessment and Measurement Principles
- The Foundation for Sustainable Area Development tool
- Eco<sup>2</sup> Cities: Ecological Cities as Economic Cities

(more details for each one are in Appendix C).

This study was highly dependent on availability and accessibility of information. For each framework I looked for: theoretical foundations (possibly the least available or accessible information); goals, dimensions, and indicators (not all had accessible indicators while many did not have indicators at all); level of scale flexibility and systemic comprehensiveness; and applicability by process stage (e.g. planning only or monitoring and assessment too). While comparison of frameworks and tools is not strictly within the

scope of this research, it is worth noting that their study helped shape the Urban Productivity Framework because most come from various conceptual backgrounds and may in practice address different urban sustainability dimensions or emphasize different goals (Joss et al., 2015; Tanguay et al., 2010).

In addition, not all frameworks are well equipped to address complex urban challenges with a systemic approach and attention to collective action, social inclusion, and equity (Du Plessis, 2012; Joss et al., 2015; McLaren & Agyeman, 2015; Newman & Jennings, 2008). The main issues identified in the literature are: the variety of methods and sustainability interpretations; the importance of timescales beyond electoral cycles and contextual factors such as population growth and density, economics activity, etc.; and the dilemma between a reductionist (few indicators for many topics) and a holistic approach (many indicators for comprehensive understanding) (Bond et al., 2013; Cohen, 2017; Joss et al., 2015; Leach et al., 2017; Tanguay et al., 2010). The Urban Productivity Framework aspires to help address such shortcomings as siloed, fragmented, and ineffective thinking, planning, implementation, and assessment.

### **3.5.2. A framework for holistic urban productivity**

In the 30-year update of their seminal book of 1972 “Limits to Growth”, Meadows et al. explain that there are three ways to respond to current pressures on planetary boundaries and to the urgency to transition to sustainable societies: 1) denial; 2) technological efficiency or economic measures; and 3) by facing the underlying causes and restructuring the system (Meadows et al., 2004). The concept of urban productivity is clearly a response that corresponds to the third way of addressing current pressures; a way that aligns with the authors’ vision for a well-functioning and sustainable society.

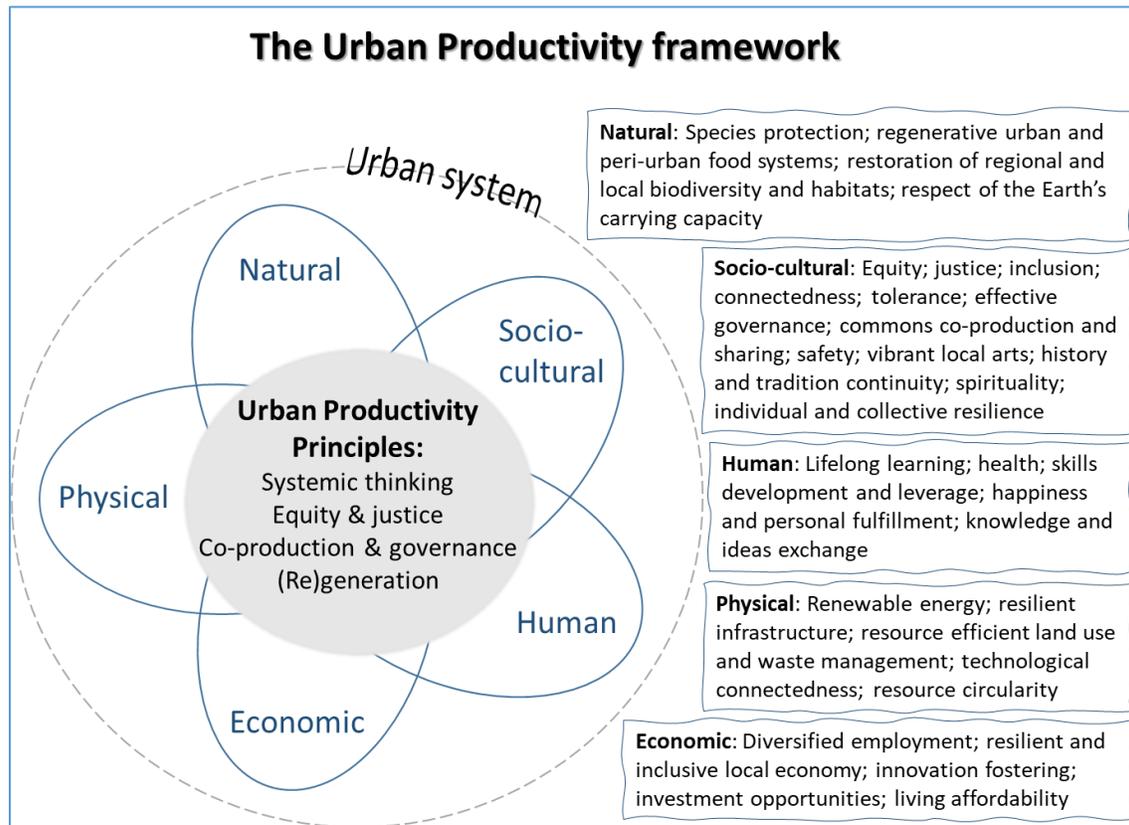
**The Urban Productivity Framework aims to help cities tackle procedural, institutional, and other challenges in a transformative and systemic manner; this is what distinguishes this framework from the typical – economic and efficiency-based – view of productivity.** While it is clear that such transformation will not be achieved in one day, cities need guidance toward sustainable, meaningful, and synergistic decision-making. To our knowledge, there are not yet comprehensive agendas or decision-support tools with integrated urban productivity principles in mind.

This holistic framework advocates for balanced optimization of all forms of productivity in a community – socio-cultural, natural, economic, physical, and human. Combining the concepts and approaches of section 3.3. under the umbrella of urban productivity can inform community visions, help shape long-term goals, and guide implementation and progress evaluation. Here I propose a set of four principles that should underpin efforts of holistic urban productivity:

- **Systemic, long-term thinking:** Through entrenched systems thinking, urban productivity can help design and implement agendas that seek regeneration of current urban systems in harmony with the socioecological systems within, above, or around them. The focus is not on the problem but on striving to achieve a desired state that can be sustained; the process of urban productivity then becomes systemic- and future-oriented.
- **Equity and justice:** Urban place-making centred on equity and justice can help achieve economic, social, and environmental transformation. The focus is on initiatives such as local solidarity economies that promote inclusiveness and affordability; sharing networks that turn products and services into social connection and well-being; food system transitions that respect global and local resources and cultural diversity; and collective climate mitigation efforts that address issues of displacement and disproportionate impact.
- **Urban co-production and governance:** Through effective and inclusive governance, urban co-creation processes embrace local and traditional forms of knowledge, and people are valued and acknowledged as change agents. Community stakeholders co-produce knowledge, solutions, space, and experience and co-manage the various urban assets, increasing their value and transformative potential in a balanced way. The focus is on the function of assets and places and how these intersect for human and ecosystem well-being.
- **(Re)generation:** The optimization of all forms of community capital requires a living systems perspective and a recognition of and respect for resource limits. The focus is on little non-renewable resource extraction and enhanced circular processes, from material and product design to production, procurement, consumption, and recovery. Tangible and intangible urban assets can then be produced and regenerated within a transformation toward well-functioning, resilient, and adaptive urban systems that can then be sustained.

As Saskia Sassen has stated, “the real city is complex and incomplete” (Guadalupe, 2013). Although whole-systems thinking is the foundational principle, all four need to be intertwined for the dynamic and complex systems of cities to achieve restoration and optimization of urban assets and resources. Agendas guiding holistically productive urban development must embrace transdisciplinary and creative solutions, collective action, and progress measurability (De Flander, 2014).

How would the four principles of the framework translate into urban productivity goals or parts of a city's vision? Enhancing and sustaining urban productivity entails investment by ideally all community actors to first build and then implement a vision that includes productivity goals such as these shown alongside the framework (figure 3.3.).



**Figure 3.3. Illustration of the Urban Productivity Framework, the underpinning principles, and the proposed generic goals for urban productivity.**  
Original graph.

Context matters when planning for and implementing urban productivity strategies and actions. Political and other priorities and goals differ, and so do the issues and the decision-making processes, while best practices may not be transferable or easily implemented in every community (Roseland & Spiliotopoulou, 2017). Trade-offs may be unavoidable to some extent, but contextual analysis and broad societal collaboration can make synergies visible, so that operationalization of urban sustainability through holistic productivity goals and action becomes specific, inclusive, and adaptive.

The urban productivity concept and framework can help citizens, local governments, and other stakeholders to integrate objective (quantitative, data-driven) and subjective (qualitative, survey-based) information throughout the various stages of the policy cycle. To measure progress and discover synergies, I propose sample indicators geared toward the productive, regenerative, and socio-cultural aspects of the community and designed to be used in addition to the more mainstream sustainability indicators.

Holistic urban productivity indicators include for example: growing space per dwelling unit, land use mix, net-positive buildings, local innovation, organic and/or regenerative farming, green public procurement, creative industry jobs, work opportunities for peoples with disabilities, lifelong learning opportunities, positive health practices, life satisfaction, mental well-being, confidence in local government, healthy and safe neighborhood development initiatives, and cultural access and participation (a longer list of proposed indicators is in Appendix D) (Spiliotopoulou & Roseland, 2020).

Focusing too much on quantifiable indicators however may result in missing part of the sustainability picture, particularly the socio-cultural and quality-of-life aspects (Stiglitz et al., 2009; J. Robinson, personal communication, December 5, 2018). The worldviews, ideas, perceptions, and storytelling are “actually the upstream influencing part that then affects how we deal with economic, social, and ecological issues” (D. C. Wahl, personal communication, January 21, 2019).

Cities need to welcome participatory but non-quantifiable tools too, such as visioning, networking, truth-telling, learning, and loving, for successful productive development within what Meadows et al. called “a third revolution” (Meadows et al., 2004). These qualitative tools reflect the spirit of urban productivity: connection and relationship building, future-oriented co-production of the city, and compassion – wholeness qualities inspired in part by scholars advocating for transformation toward regenerative and sharing communities (McLaren & Agyeman, 2015; Wahl, 2016; Webb et al., 2018). (Webb et al., 2018)

### 3.6. Discussion

Aspiring to offer conceptual and operational insights for effective and forward-looking urban sustainability processes, I examined the concept, principles, and practices of urban productivity as a way to address local sustainability planning, implementation, and assessment. In this paper, I argued that increased multi-factor productivity in an urban community can result in the transition to a sustainable city and I introduced a conceptual framework for urban productivity.

The efficiencies-focused approach adopted so far in local sustainability practice is impaired mostly by the lack of interdisciplinary thinking and inclusive processes, political short-termism, and community fragmentation. SCD operationalization through urban agendas and frameworks often fails to embrace a systemic outlook throughout the process and does not always incorporate solutions for the underlying causes of urban challenges (Benson & Craig, 2014; Dernbach & Cheever, 2015).

However, the full potential of the sustainability paradigm has not been reached yet, as it still receives extensive criticism about promoting economic growth targets, embracing ecological modernization principles, and using a traditional data-driven and reporting-centred approach. At a time when action is needed the most, the points raised offer constructive directions for SD and SCD by demonstrating the limitations of the concept without disproving it. In a gradual shift, a growing number of scholars have been offering insights not only on current limitations but above all on new approaches that can help communities transform into well-functioning systems (Childers et al., 2014; Elmqvist et al., 2019; Kaika, 2017; Wolfram, 2016).

Although the inherent vagueness of SD is partly the cause of communities (and the planet) not achieving sustainability yet, precisely this flexibility can be an advantage if combined with principles such as whole-systems thinking, equity and governance, and resource regeneration. SCD shouldn't be used as an excuse for "greenwashing" but rather as a holistic compass to address environmental, social, and economic considerations (Connelly et al., 2013; Garren & Brinkmann, 2018). There is clearly a need for decision-making that embraces systemic thinking, seeks to optimize all dimensions of community capital, and results in net gain (Dernbach & Cheever, 2015; Spiliotopoulou & Roseland, 2020).

The sustainable city agenda is suitable to help “dramatically shift the practice of local participation from dominance by narrow special interests toward a more holistic and inclusive view” (Berke, 2002, p. 34). Perhaps what is required is not to adopt a narrow-focused agenda as commonly suggested, but rather system-wide coordinated policies for the transition to a well-functioning, sustainable system. Incorporating a resilience perspective additionally urges the city to consider the system’s components, functions, and interactions, and embraces multi-level governance, flexibility, and continuous social learning (Elmqvist et al., 2019; Folke, 2006; Meerow & Newell, 2016). It is then that the challenged city can harness the co-production of knowledge and regeneration of urban assets.

**The proposed Urban Productivity Framework seeks to address many of the above issues and act as an overarching framework to help operationalize sustainability holistically and lead the process of transformation.** The emerging concept of urban productivity is grounded in theories from multiple disciplines and acknowledges the interdependence of systemic components and enablers of individual and community well-being. It can empower urban co-producers to pursue balanced and synergistic maximization of community elements (economic, physical, ecological, socio-cultural, and human) and help merge local economic development with SD goals.

In practice, the urban productivity concept has potential for great uptake by communities given its relevance to everyday life and resonance with people. The crucial first step is to “park [their] interpretation, [their] experience of this word, and then get creative” (C. Strandberg, personal communication, December 17, 2018). Operationalised through digital tools and collaborative techniques, the Urban Productivity Framework can be valuable for communities: from a systemic-thinking-focused training platform for urban designers and planning professionals to holistic productivity tools for visualization, planning, implementation, and evaluation to benefit municipal councils, citizens, professionals, and other stakeholders.

**The principles of the holistic Urban Productivity Framework can help tackle problems in SCD planning, implementation, and assessment through systemic and long-term thinking, equity and justice, urban co-production and governance, and regeneration of urban resources.** Asked how he conceives the productive city,

Agyeman replied, “I would see it as the city that releases human potential” (J. Agyeman, personal communication, December 17, 2018).

**A holistically productive city, in a nutshell**, embraces: economic resilience with shifts in employment patterns and habits; innovative, socially just, and environmentally responsible technologies; compact and nature-enhancing land use planning; strong social connections and affordable housing; and green, light, and smart infrastructure (Brugmann, 2015; Condon, 2019; Girardet, 2015; Spiliotopoulou & Roseland, 2020; Wahl, 2016).

### 3.7. Conclusion

SCD researchers and practitioners increasingly acknowledge the importance of developing – not just growing – urban assets, as cities continue to expand and extract resources from “distant elsewhere” (Wackernagel & Rees, 1996). In the face of mounting social, economic, and ecological challenges, the traditional approach of urban growth, based on weak sustainability principles, is no longer a viable option for current and future generations. The limits to growth are not only biophysical but also social, political, and institutional (Robinson, 2004). The 2020 pandemic and the natural disasters of the last few years drive the point home: it is now urgent to develop local solutions to global (or “glocal”) issues.

**Urban development must be guided by strong sustainability values and whole-systems thinking and co-produced in an equitable and regenerative way, i.e., following the principles of the Urban Productivity Framework.** This can then lead to increases in human, resource, and process productivity, improved urban assets performance and systemic interactions, ecological function regeneration, and ecologically wise use of resources (Brugmann, 2015; Girardet, 2015).

**Future research on sustainable community development and holistic urban productivity** should focus on:

- human and socio-cultural optimization and productivity;
- effective and inclusive governance models for equitable co-production and co-management of urban space; and

- the intersection of green economy (decrease of non-renewable resource use, local decarbonization, and reduction of greenhouse gas emissions) with urban resource circularity and regeneration.

Case studies to test and refine the Urban Productivity Framework would be valuable to ensure its scalability and applicability. **Wider application in various cities globally would help promote the concept’s holistic perspective with the aim of attaining the shared understanding that has been missing from the sustainability discourse.**

The urban productivity potential is considerable, not only in terms of economic and labor productivity (diverse and inclusive economy, fostering innovation), but also of social productivity (hubs of research, learning, and sharing) and ecological productivity (ecological function regeneration and efficient use of resources) (Roseland & Spiliotopoulou, 2017). Cities on this path can achieve positive results locally, contribute to the success of national and international goals (such as the SDGs), and become the new normal to be sustained. After all, “the productive city, the sustainable, resilient, smart, the sharing city, are all works in progress. They are all experiments. There is no conclusion.” (J. Agyeman, personal communication, December 17, 2018).

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## Chapter 4.

### **[Paper 3] Sustainability planning, implementation, and assessment in cities: how can productivity enhance these processes?**

#### **4.1. Introduction**

The impact of human activity on the Earth in the Anthropocene ranges from extreme climate phenomena and inequality to ecosystem services decline and species extinction, and threatens human and ecological well-being locally, regionally, and globally (Rockström et al., 2009; Steffen et al., 2015). The Brundtland Commission was among the first to describe the connection between human activities and increasing environmental degradation (WCED, 1987). The Commissions also voiced the need for sustainable development (SD) which today is generally conceived as the integration of environmental, economic, and social considerations in decision-making processes for the benefit of current and future generations (Dernbach & Cheever, 2015).

In this “urban century”, planetary realities and increased environmental and social awareness have led to significant international agreements such as the United Nations Sustainable Development Goals (SDGs), the UN Habitat New Urban Agenda, and the Paris Climate Agreement (Elmqvist et al., 2019). While these are signed and ratified by national governments, local governments and their citizens play a crucial role in successfully implementing sustainability and resilience (Elmqvist et al., 2018). For example, although the SDGs contain a goal for inclusive, safe, resilient, and sustainable cities, all SDGs are locally relevant (Kanie et al., 2014; MacDonald et al., 2018). Also, Canada’s commitment to achieve the SDGs requires that Canadian cities align their sustainability efforts and reporting with this framework to some extent.

Urban areas today use more than two thirds of global resources, generate most global waste, and are projected to host more than two thirds of the global population by 2050 (Girardet, 2015; UN DESA, 2019; World Economic Forum, 2018). Yet they have huge economic, social, and ecological productivity potential and can offer innovative

opportunities and long-term solutions for socio-ecological systemic issues (Bibri & Krogstie, 2017; Elmqvist et al., 2018).

**In this research, I focus on how the concept, principles, and practices of urban productivity can help address local sustainability planning, implementation, and assessment and contribute to SDG achievement.** My goal is to advance theory and practice of sustainable community development (SCD) which integrates social, environmental, and economic considerations into community processes for current and future well-being (Roseland, 2012).

The paper begins with a brief overview of urban sustainability literature and practice, a presentation of the urban productivity concept and a brief discussion of its potential to address urban sustainability processes and outcomes. It then presents two case studies in the Lower Mainland region of British Columbia, Canada, and the research findings on perceptions and challenges in urban sustainability planning, implementation, and assessment. These findings, grouped here in five major themes, helped refine the holistic Urban Productivity Framework through an iterative process. The final section discusses implications of the research findings and offers corresponding recommendations for integrated and effective urban sustainability through application of the urban productivity principles and practices.

## **4.2. Conceptual background**

### **4.2.1. Planning and assessing urban sustainability**

Sustainability as a body of knowledge originates in 18<sup>th</sup>-19<sup>th</sup>-century discourses on environmental and social justice but contemporary SD theory and practice have been shaped by seminal works of the 1970s-1980s such as Rachel Carson's *Silent Spring*, the Club of Rome report on limits to economic growth, and the Brundtland Commission report (Dernbach & Cheever, 2015). SD is a normative concept that encourages comprehensive analysis of economic, social, and environmental dimensions of a system (Garren & Brinkmann, 2018). SD and SCD gained popularity particularly after the universal agreement on the UN SDGs that promote a holistic view and an integrated and scalable vision for sustainability.

Early applications of SD and SCD were informed by weak sustainability theory that assumes indefinite economic growth with efficiencies and innovation compensating for ecological damage (Dernbach & Cheever, 2015; Williams & Millington, 2004). Strong sustainability, on the contrary, acknowledges the limits to growth and the need for holistic, long-term approaches to achieve resilience and well-being of socio-ecological systems (SES) (Daly, 2005; Meerow et al., 2016; Rockström et al., 2009; Spiliotopoulou & Roseland, 2020a). The literature on weak and strong sustainability reflects a decades-long debate on economic growth and whether resources should be managed with technology (weak sustainability) or by limiting demand (strong sustainability) (Dernbach & Cheever, 2015).

Although the influence of eco-efficiency still exists in local sustainability policies and projects, these are nowadays gradually shifting toward stronger sustainability. SCD initiatives for community economic development, eco-localism, self-reliance, and social economy emerged as a community response to the negative impacts of weak sustainability's narrow focus on economic growth (Ferguson (Hernandez), 2015; Gismondi et al., 2016). Such local economic activities powered by sociocultural values evolved rapidly and can meaningfully embrace broader social needs and environmental well-being.

Guided by stronger sustainability approaches and global movements for equity, socio-ecological considerations are increasingly included in local decision-making through community-led action and participatory processes (Connelly et al., 2013). Nevertheless, cities still widely perceive SCD as an environmental and resource management framework; this has led to fragmented and siloed planning and implementation of goals that governments and citizens often consider conflicting (Benson & Craig, 2014; Bibri & Krogstie, 2017; Garren & Brinkmann, 2018; Spiliotopoulou & Roseland, 2020b).

While many urban agendas, e.g. sustainable city, ecocity, smart city, resilient city, low-carbon city, green city, and compact city, operationalize SCD, in practice most do not seem to adopt a systemic perspective (De Jong et al., 2015). Some prioritize emissions reduction or economic growth over social equity and others are executed within mainstream municipal operations or without adequate resources and political will (Dernbach & Cheever, 2015; Garren & Brinkmann, 2018; Joss et al., 2015). Additional

obstacles include ineffective collaborative processes, persistence of a greenwashing mentality, limited local government financing or mandate, and absence of regular and reliable data (De Flander, 2014; Robinson, 2004). Despite limitations that hinder disruption of current extractive paths, cities often adopt one or more agendas and one or more sustainability tools (Joss et al., 2015; MacDonald et al., 2018; Wolfram, 2016).

Sustainability frameworks and tools are considered as an effective way to gauge success and adjust action to achieve complex sustainability goals; they can be broadly defined as “the rationale and the structure for the integration of concepts, methodologies, methods, and tools” (Roseland, 2012; Sala et al., 2015). Designed by various organizations, most such frameworks emerged since 2000 and usually comprise principles, goals, and metrics to guide a community through some or all stages of the policy cycle: from agenda setting and policy formulation to implementation, monitoring, and evaluation or assessment (Howlett et al., 2009; Joss et al., 2015).

The related scholarly literature discusses three main issues: the multitude of methods depending on sustainability interpretations; the importance of contextual factors and timescales beyond electoral cycles; and the dilemma between a reductionist (few indicators for many topics) and a holistic approach (many indicators for comprehensive understanding) (Bond et al., 2013; Cohen, 2017; Joss et al., 2015; Leach et al., 2017; Tanguay et al., 2010). Cities sometimes develop indicator dashboards which may not be grounded in research or provide a comprehensive picture of community health or sustainability progress (Joss et al., 2015; Macdonald et al., 2012; Tanguay et al., 2010). Conversely, standardized tools may be excessively data-driven and not always scalable or locally relevant as socio-cultural and historic factors may disconnect data from reality (Kitchin, 2015).

Although a single set of indicators may not suit every city or policy, local governments could start with some basic indicators for comparability while also distinguishing between governmental performance assessment and community assessment (i.e., evaluation of policy outcomes and impact on the community). Performance metrics are useful to indicate the municipality’s level and quality of service and could help increase staff productivity but could also cause instability and decrease of trust if tied to competition with other municipalities or against external benchmarks (Tindal et al., 2016).

Overall, effective indicators should be: relevant, meaningful, measurable, timely, consistent, scale appropriate, participatory, flexible, and systemic (Bond et al., 2013; Henderson, 2006; Holden, 2013; Joss et al., 2015; Meadows, 1998; UN SDSN, 2014). Local sustainability tools can also learn from initiatives that measure progress and intangible goals with metrics considered as alternatives to GDP (Gross Domestic Product). Such initiatives include the Canadian Index of Well-being, the Human Development Index, the European Social Survey, and the Thriving Places Index (previously, Happy City Index) (Costanza, 2014; Helliwell et al., 2020; Musikanski et al., 2017).

Comprehensive urban sustainability tools are thus needed to guide the city toward balanced goal achievement and to increase stakeholder involvement in transparent processes throughout the entire policy cycle. One such tool is the Community Capital Framework (CCF), developed by the Centre for Sustainable Development, Simon Fraser University, Canada, and Telos, the Brabant Center for Sustainable Development, Tilburg University, Netherlands (Roseland, 2012). The six community capitals are natural, physical, economic, human, social, and cultural; each capital is divided into stocks and each stock contains several indicators (Roseland, 2012).

The CCF and the Community Capital Tool (CCT) that operationalizes it are versatile, scalable, and designed to support holistic decision-making at all stages with comprehensive graphics and citizen input (Roseland, 2012). The CCT, a valuable tool in my two case studies and inspiration for the Urban Productivity Framework below, is composed of the Scan (evaluating impact of municipal policies) and the Balance Sheet (monitoring and reporting progress) (Spiliotopoulou & Roseland, 2021).

Apart from the CCT, I consulted sustainability frameworks such as the SDGs, LEED v4.1 Cities and Communities, Global Resilient Cities Network (City Resilience Index), ISO37120 Sustainable cities and communities, EU Reference Framework for Sustainable Cities, International Eco-City Standards, Community Foundations of Canada Vital Signs, One Planet Communities, Eco2Cities, and The Natural Step (details in Appendix C). Many tools and frameworks, however, do not analyze urban sustainability with a whole-systems, full-process, equitable, and future-oriented approach to ensure

success in achieving sustainability goals (Joss et al., 2015; McLaren & Agyeman, 2017; Tanguay et al., 2010).

#### **4.2.2. Urban Productivity: a concept and a framework**

Urban sustainability requires integrated decision-making to support a transformation from the currently dominant individualistic approach of impact reduction to the systemic logic of urban systems restoration and inclusive co-production (Spiliotopoulou & Roseland, 2020a). The emerging SCD concept of holistic urban productivity can help cities address constraints and create fundamental changes in urban processes to achieve optimization and regeneration of tangible and intangible assets.

**Although productivity is historically associated with economic and labor resources, holistic urban productivity is interdisciplinary, multi-dimensional, and grounded in strong sustainability principles. Conceptually,** it has been informed by numerous theoretical traditions and approaches:

- The neoclassical definition of economic and labor productivity as the ratio of given output per given input and the Total Factor Productivity theory that added natural resources, knowledge, and policies to this ratio;
- Resource productivity and circularity that starts with urban metabolism (flows) analysis and encourages product redesign, resource regeneration, resilient infrastructure, and overall closing of technical and biological cycles in production and consumption;
- Ecological productivity that pursues the restoration of urban ecological processes and a healthy relationship between humans and the natural environment through biophilic design principles;
- Regenerative design which is rooted in living systems theory and indigenous ecological wisdom and promotes urban fabric optimization, ecological spaces restoration, and reduced energy and materials consumption and ecological footprint;
- Regenerative development that seeks alignment and synergies with the natural environment and regenerative sustainability that advocates for strong and healthy socio-ecological systems through holistic design and collaborative planning;
- Socio-cultural and human productivity that encompasses equity, inclusion, institutional and social trust, justice, connection, education, happiness, health,

and well-being, and aims to increase collective and individual resilience and capacity for sustainability transformations;

- Future visions that entail reclaiming, co-producing, and co-managing the urban commons through inclusive processes and partnerships with all stakeholders, sharing of assets and spaces, creativity, plurality, and redundancy;
- Doughnut economics that urges to not only stay within planetary ecosystem boundaries but also ensure that everybody meets their basic needs (referred to as social boundaries);
- Whole systems thinking that converges the above concepts and approaches into a foundational requirement for urban productivity to create healthy communities and long-term well-being across all community components

(Barry & Agyeman, 2020; Beatley, 2017; Behrens et al., 2015; Clarke, 2014; Diez, 2017; Ellen MacArthur Foundation, 2017; Elmqvist et al., 2019; Girardet, 2015; Gismondi et al., 2016; Landry, 2008; A. Macdonald et al., 2018; Mang & Reed, 2019; McLaren & Agyeman, 2017; Moore & Rees, 2013; Pintér et al., 2012; Raworth, 2017; Robinson & Cole, 2015; Thomson & Newman, 2018; Wahl, 2016; Wolfram, 2016; Woo et al., 2014).

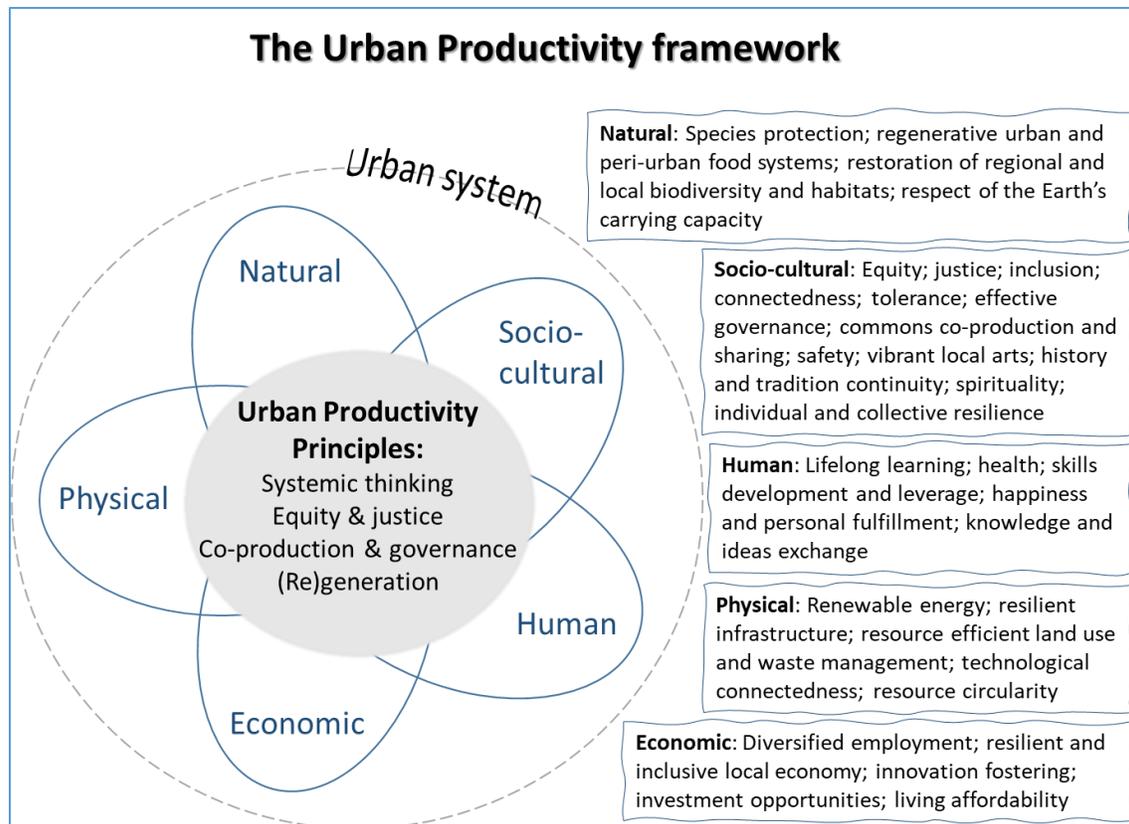
**Operationally**, urban productivity has manifested in the form of context-specific or sector-specific projects. Initiatives such as restorative justice programs, reclaimed and regenerated spaces, free community-run libraries, innovation districts with green space and transit hubs, social innovation and sharing economy, and inclusive training for young entrepreneurs, can be found worldwide, from Vancouver, Canada, and Kigali, Rwanda, to Copenhagen, Denmark, and Medellín, Colombia (see examples in table 3.1).

Informed by the above, the holistic Urban Productivity Framework aspires to help improve currently ineffective sustainability practices such as siloed, inequitable, or fragmented planning, implementation, and assessment. Unlike other frameworks, it is not meant to solely measure municipal service performance or climate action progress. Rather, it is designed to holistically evaluate policy impact while identifying systemic synergies to support transformative action toward cities that decouple well-being from economic growth and live within planetary boundaries.

The niche of this holistic framework lies at the intersection of its **four principles**:

- **Systemic and long-term thinking** (strategic, synergistic, integrating social productivity approaches, and future-oriented through backcasting i.e., following sustainability paths toward pre-determined long-term goals);
- **Equity and justice** (solidarity, food security, sharing, equitable resilience, social connection, equitable opportunities, and well-being);
- **Urban co-production and governance** (inclusive and value-driven decision-making, citizens co-produce and co-manage the urban commons as important change agents);
- **(Re)generation** (living systems perspective, circular flows of tangible and intangible urban assets, adaptive processes, living within the Earth's carrying capacity) (for details, see section 3.5.2).

Figure 4.1. is a visual representation of the framework with its four principles and a set of generic goals I propose for each component of urban productivity: natural, socio-cultural, human, physical, and economic. Context-specific analyses and inclusive planning processes are paramount to reveal synergies among these goals in an urban system. In the words of Julian Agyeman, Professor of Urban and Environmental Policy and Planning in Tufts University, “it's more of a nudge tool than a stick tool. A stick tool says ‘you're not doing this, you better start doing it’; a nudge tool says ‘why wouldn't you do this?’” (J. Agyeman, personal communication, December 17, 2018).



**Figure 4.1. A framework for holistic urban productivity, its four principles, and proposed urban productivity goals.**

Original graph.

**The urban productivity concept and framework can help guide a city throughout the various stages of the policy cycle, including progress assessment.** To this end, I accompany the framework with sample indicators based on both quantitative and qualitative data methods. The indicators have been primarily informed by the theory and practice of the concepts and approaches the framework converges and builds upon. They have also been further shaped and refined following discussions with subject matter expert staff in the two case studies who offered valuable feedback on the definitions and units of measurement of each indicator.

Overall these indicators are geared toward the productive, regenerative, and socio-cultural aspects of the community and are designed to be used additionally to the more mainstream sustainability indicators. Holistic urban productivity indicators include for example: growing space per dwelling unit, land use mix, net-positive buildings, local innovation, positive health practices, life satisfaction, confidence in local government,

and cultural access and participation (a longer list of proposed indicators is in Appendix D) (Spiliotopoulou & Roseland, 2020a). Data can be collected both from common data sources, such as archival provincial, regional, and federal records, and through surveys and engagement methods that the city can conduct in collaboration with community stakeholders.

### **4.3. Research methods**

Following a review of the literature on sustainable community development and urban productivity (as explained in 2.1.2 and 3.2, and detailed in Appendix A), I engaged the case study method with focus on contemporary communities and seeking to answer “how” a new concept can help address current issues. I therefore employed a mixed-methods, information-oriented approach, integrating a participatory process with qualitative and quantitative data collection and analysis (Creswell, 2014; Hermans et al., 2011; van Kerkhoff, 2014; Yin, 2014).

The research design was a flexible and comprehensive roadmap for conducting the case studies in three stages (Creswell, 2014; Guest et al., 2013). In the first stage, I identified two municipalities as the units of analysis and prepared the data collection instruments and protocols. In selecting these cities I considered factors of funding and local focus, as well as archival data demonstrating similarities and differences that increased the potential of comparability and generation of constructive research findings. Both cities had also expressed interest in this research and in receiving tangible recommendations for enhancing their sustainability planning and evaluation processes.

In the second stage, I collected data on each case study from the following sources: socio-economic, environmental, political, and cultural context; strategic policy documents; semi-structured interviews with elected and appointed officials; structured observations of City Council meetings; semi-structured consultation meetings with municipal expert staff; and workshops with community members. Data collection protocols are in Appendix B.

The majority of data stemmed from: 30 interviews, 36 expert staff consultations, 16 City Council meeting observations, and engagement with more than 40 community members through the local community foundations or other established groups. Some

quantitative data were also obtained through a short survey component in the interviews and an overview of contextual information retrieved from archival sources such as Statistics Canada and municipal records.

The concept and principles of holistic urban productivity were discussed in the case studies without explicitly mentioning the term “productivity” to ensure that participants would not immediately associate it with economic and labor resources only (as is commonly the case) and that I would receive responses on *all* aspects of urban productivity. During the case studies, the framework presented in 4.2.2. was still in the draft stage of its development, so it was indirectly explored in the interviews or in other conversations with participants: I would either use holistic productivity language and concepts (but again, not the term “productivity” itself) or discuss and receive feedback on holistic productivity goals and metrics.

Additionally, to explore potential local implementation of the SDGs, I conducted a complex SDG-local goals matching and mapping exercise, modeled on the work done within the USA Sustainable Cities Initiative under the guidance of the Sustainable Development Solutions Network (Prakash et al., 2017). The comparison extended along three levels of decision-making within three frameworks: goals, targets and indicators of the SDGs, the two case studies, and the Community Capital Tool. The inventory and analysis were conducted in Excel spreadsheets with data that were collected by scanning each municipality’s Official Community Plan and major policy documents; for example, documents labeled as strategies, master plans per sector, or action plans. After inventorying the indicators used in each city, I discussed measurement and data collection with subject matter expert staff and provided the two municipalities with recommendations for targets and metrics.

The third research stage consisted of data analysis and further conceptual discussion. Microsoft Excel and Tableau were used for quantitative data entry, cleaning, aggregation, interpretation, and visualization, while QSR NVivo was used for a combined inductive and deductive analysis of qualitative information which formed the bulk of research data collected. Concurrently I interviewed internationally acclaimed scholars and practitioners in the fields of urban sustainability, productivity, and regeneration. They offered valuable insights on local sustainability challenges and feedback on how the concept of urban productivity can address them.

The two cities and their respective Community Foundations kindly provided part of the case study research funding through Mitacs Accelerate. This arrangement allowed me to spend 1-3 days per week at their premises and engage directly and meaningfully with municipal staff and processes. In the District of North Vancouver, I worked from within the Community Planning department for approximately 6 months and in the City of Maple Ridge I was part of the team of the Manager of Sustainability and Corporate Planning for approximately 9 months.

Finally, it is important to note that most of the findings stem from data that have been aggregated in one dataset for two reasons: *firstly*, to ensure confidentiality and anonymity, as the number of participants in each case study was limited and potential identification of elected or appointed officials with the findings should be avoided per research ethics, and; *secondly*, because initial comparative analysis clearly showed that on most occasions the answers and opinions of participants from the two case studies completely converged (unless mentioned otherwise in section 4.5. below).

## **4.4. Case study context**

### **4.4.1. The legislative context for local governments in British Columbia, Canada**

How much power and influence do Canadian local governments have? What is within and what is beyond their mandate, and what resources do they have available to fulfill it? Ultimately, how broad and deep can the impact of municipal policy be? Here I attempt to succinctly address these questions with an overview of the context of local government in the province of British Columbia (B.C.) and in the federal state of Canada that consists of ten provinces and three territories.

While federal and provincial governments share powers and responsibilities under the Constitution Act of 1982, local governments do not have any formal link to the Constitution or the federal government nor are they given a constitutional right to exist (Roseland & Spiliotopoulou, 2018; Tindal et al., 2016). Provinces are responsible for local matters and delegate powers to local authorities which are often referred to as “creatures of the provinces” because their functions, structure, and financing depend on provincial authorization (Meligrana, 2004). Regional districts like Metro Vancouver are

an intermediate level of government comprised of mayors and councillors that develop comprehensive regional plans.

In B.C., the Community Charter and the Local Government Act form the legislative framework that guides local governmental processes (Province of British Columbia, n.d.). The Community Charter regulates municipal-provincial relations and provides a statutory framework for all B.C. municipalities except the City of Vancouver which is served by the Vancouver Charter. Municipal jurisdiction includes: delivery of services such as waste management, utilities, economic development services, culture, parks, and recreation; property taxation; financial management; and bylaw procedures and enforcement (Province of British Columbia, n.d.; Union of BC Municipalities, 2018).

The Local Government Act legislates regional districts and includes provisions for municipal matters not covered in the Community Charter such as incorporation, boundary changes, statutory requirements for elections, and planning and land use powers (Province of British Columbia, n.d.; Union of BC Municipalities, 2018). Municipalities and regional districts can regulate land use with bylaws and plans such as a Regional Growth Strategy, an Official Community Plan (OCP), zoning bylaws, and development procedures. The OCP contains strategic statements, directions on social and environmental issues, and broad objectives that guide land use planning within the area covered (usually the entire municipality) (Union of BC Municipalities, 2018).

Municipal policy-making and service delivery deal with complex and interconnected local and regional issues, and their effectiveness typically depends on available resources, internal capacity for policy analysis, stakeholder involvement, and other local or regional authorities (Tindal et al., 2016). Because of the absence of constitutional status and the adoption of market-oriented policies, federal and provincial governments in Canada influence local matters directly through direct funding, taxation policy, immigration policy, infrastructure, climate, health, and housing and transportation strategies (Ryser et al., 2019).

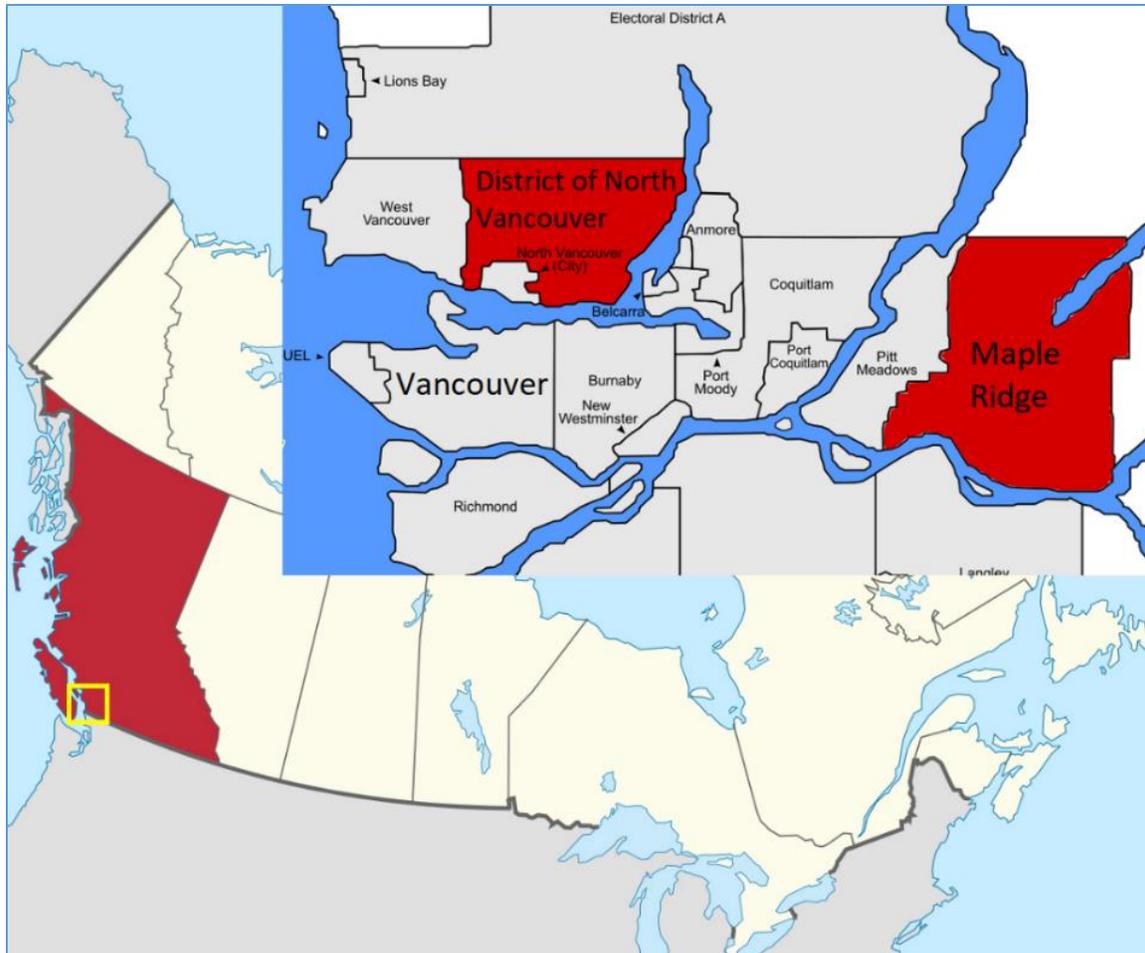
Due to the 20<sup>th</sup>-century recessions, wars, and post-war periods, municipalities saw their powers remain limited or reduced, with provinces using techniques such as downloading or uploading responsibilities to reduce jurisdiction overlap and to potentially cut costs (Tindal et al., 2016). The local-provincial government relationship is crucial: if a

power is not specifically delegated in an enabling act, the final decision lies with the province. Nevertheless, Supreme Court decisions of the last two decades have somewhat broadened the powers of Canadian municipalities to help increase local community well-being (Tindal et al., 2016).

#### **4.4.2. The case studies**

The units of analysis are two municipalities in Metro Vancouver, British Columbia: the District of North Vancouver (DNV) and the City of Maple Ridge (CMR) (figure 4.2). As one of three municipalities on Metro Vancouver's North Shore, the District of North Vancouver shares key infrastructure and partners in the delivery of some services. A growing community with two First Nations reserves, DNV envisions to be an "inclusive and supportive community that celebrates its rich heritage and lives in harmony with nature" (District of North Vancouver, 2011). As part of this research, I provided DNV's Community Planning Department and the 2017-2018 Official Community Plan Implementation Monitoring Committee with recommendations for sustainability planning and evaluation.

The City of Maple Ridge is a family-oriented community east of Vancouver and one of the fastest growing cities in the region. It has a vibrant local economy and the most affordable industrial land and real estate in the region (City of Maple Ridge, 2014). The CMR OCP lays out the city's long-term vision for a "vibrant and prosperous [community, with] a strong local economy, stable and special neighborhoods, thoughtful development, a diversity of agriculture, and respect for the built and natural environment" (City of Maple Ridge, 2014). Similarly to the DNV case study, I provided CMR with customized sustainability recommendations.



**Figure 4.2. The province of British Columbia and, in the inset, the two case study municipalities.**

Adapted from images by [TUBS / CC BY-SA 2.5](#), and by [TastyCakes / CC BY 3.0](#).

As Table 4.1. shows, these two cities present similarities in total population, surrounding natural environment, and suburban character, and differences primarily in household income and educational level (both are higher in DNV) and secondarily in ethnic composition of their populations.

**Table 4.1. Comparative table of the two municipalities selected as case studies.**

<b>Similarities</b>	<b>DNV</b>	<b>CMR</b>
Population (1)	85,935	82,256
Connection to the region (4)	Suburbs of the City of Vancouver where many of their residents commute every day for work	
Natural environment (hectares of parkland supply, incl. areas managed by the Province of BC) (2) (3) (4)	3,159	3,187
Main socioeconomic issues (4)	Transportation, housing, employment, and infrastructure	
<b>Differences</b>	<b>DNV</b>	<b>CMR</b>
Population change (2011-2016) (1)	-1.8%	+8.2%
Population density (people per square kilometre) (1)	534	308
Household income (median, in C\$) (1)	103,981	86,178
Educational level (Postsecondary certificate, diploma or degree; % of the population over 15 years old) (1)	67%	51.5%
Ethnic diversity (1)		
- by "Ethnic Origin":		
European	70%	77%
Asian	25.8%	13.3%
North American Aboriginal	2.5%	5.3%
Central/South American	2%	1.8%
African	1.6%	1.7%
Caribbean	0.6%	0.9%
Oceania	1.2%	0.8%
- by "Visible minority"		
Not a visible minority	74.4%	85%
Visible minority	25.6%	15%

Sources: (1) 2016 Census Profile (Statistics Canada, n.d.); (2) District of North Vancouver Parks and Open Space Strategic Plan (District of North Vancouver, 2012); (3) Maple Ridge and Pitt Meadows Parks, Recreation, and Culture Master Plan (City of Maple Ridge & City of Pitt Meadows, 2010); and (4) online search on municipal current affairs and information from my case study research.

The two cities and their respective Community Foundations kindly provided part of the case study research funding through Mitacs Accelerate, an arrangement that allowed me to regularly work at the City Hall and engage frequently with municipal staff and processes. I held interviews and had many discussions in person, while also observing Council meetings and participating in staff meetings.

Undoubtedly, my regular presence in municipal buildings contributed to the high percentage of positive responses to my request for interviews and to my active participation in more than two dozen staff meetings and workshops. Even though in some cases the interviews were short (less than 40-45 minutes) due to the participants'

busy schedules, 29 out of 30 agreed to be audio recorded which was clearly beneficial for this research. These in-depth case studies provided me with valuable insights and experiential knowledge while allowing me to collect as much information as possible.

**Contextual research before and during the case studies revealed three categories of pressing issues that were common in both cities: social, infrastructural, and economic.** Social issues were discussed in most interviews and meetings as “social crisis in the city” with focus on the interconnected topics of homelessness and housing stock inadequacy and unaffordability. Five interviewees also alluded to healthcare-related social challenges in their cities but chose not to expand because healthcare is not under municipal jurisdiction.

The housing market problem is common across B.C.’s Lower Mainland and has a significant impact on other community life aspects. Some 38 out of 45 occurrences of affordability in the data focused on the inadequacy of housing stock and its links to unaffordability of services such as childcare, public transit, and education. Many interviewees provided examples through storytelling: some described how their families were forced out of their original homes or were not able to buy a new home nearby, and others talked extensively about people employed within the city but commuting from neighboring and more affordable municipalities. In 2021, housing diversity and affordability remain a priority for both Councils.

On the second category of issues, wastewater was repeatedly mentioned as an increasingly costly form of infrastructure, as local water and sewage systems struggle due to population increase, sprawl, and aging facilities. Transportation is another infrastructural issue the two cities share: more than half of the interviewees discussed transit inadequacy and talked about road congestion and other challenges for residents because of the long commutes to/from other cities for work.

The third category of issues is closely associated with the first two: shortage of work opportunities while local economic activity does not keep pace with population increase. For example, 40% of interviewees expressed concern or even frustration about the insufficiency of incentives for economic activity in their city, the lack of diverse and well-paid employment positions, and the gradual loss of industrial or agricultural activity

to other sectors. Many participants in fact described both cities as “bedroom communities” for Vancouver.

## **4.5. Research Findings**

Case study data analysis revealed topics or challenges that can be grouped into **five major sustainability-related themes** (and some miscellaneous findings): perceptions on sustainability and urban sustainability; issues and perceptions related to systemic and long-term thinking; barriers linked to local government powers and responsibilities; issues in progress measurement and sustainability evaluation; and findings on localizing the SDGs. As a reminder, unless mentioned otherwise, the data collected from the two case studies were combined in the presentation of most findings in this section (details about this are in section 4.3).

### **4.5.1. Sustainability perceptions**

When asked how they perceive sustainable development, sustainability, and sustainable community, one third of all 30 interviewees viewed SD as a commitment to future generations and the continuation of current plans into the future. About 25% considered it as directly related to infrastructure whereas, interestingly, a different 25% linked SD to the need to reduce impact on the environment or at least consider environmental impact in decision-making. Lastly, about 20% of interviewees directly or indirectly referred to social and/or cultural aspects of sustainability.

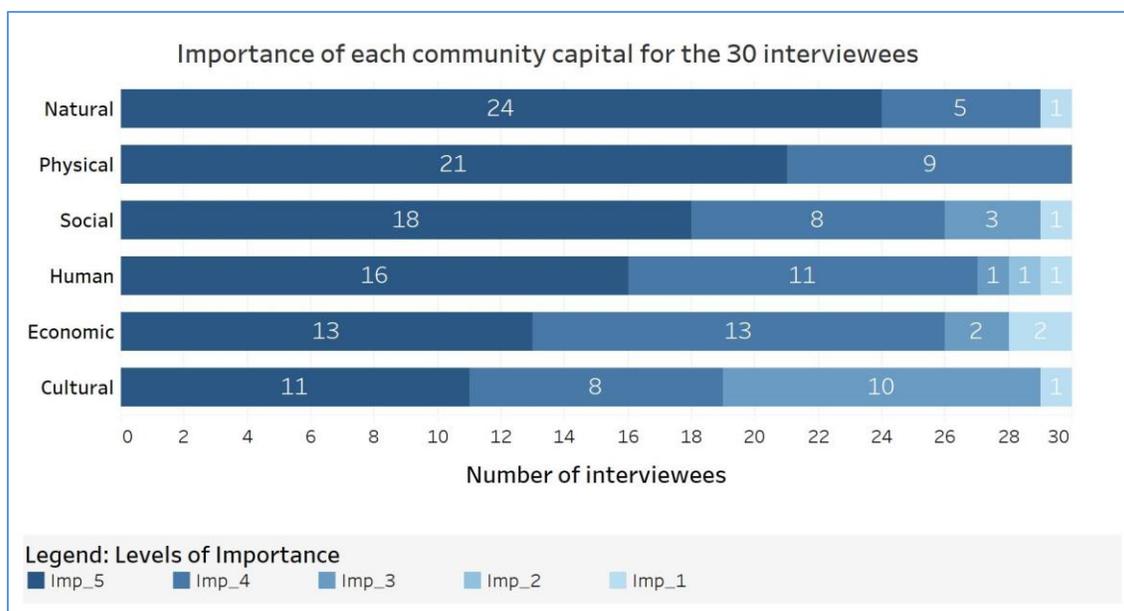
Similar perceptions of weak, one-dimensional sustainability were also noticeable in Council and staff meetings I attended. Sustainability was referred to as the ability to financially maintain municipal assets that included only humanmade infrastructure which was sometimes discussed as an acceptable way to replace natural processes interrupted by urban sprawl. It is worth noting that, at the time of my research, DNV participated in the provincial initiative Asset Management for Sustainable Service Delivery, while CMR was considering participating in the national Municipal Natural Assets Initiative to integrate natural assets into the city’s core asset management processes (Asset Management BC, 2019; MNAI, n.d.).

Following my request to describe a sustainable community, about one third of interviewees responded with examples in lieu of a definition and another third equaled a sustainable community with good land use planning and reduced environmental impact. The most frequently used keywords here were: balanced, complete, infrastructure, environment, energy, future, employment, people, and education. Words such as social, green, and management were also frequently used in examples about housing, smart growth, asset management, and environmental mapping and management.

Also, one participant incidentally alluded to the regeneration principle and goals of the Urban Productivity Framework: “If the sustainable city existed... I might have difficulty wrapping my head around how that would actually look like, but the concept of probably [be] mostly a net-zero cycle where your energy inputs and outputs are almost balanced.”

Regarding their city, most interviewees acknowledged that it could not objectively be considered a sustainable city. While many viewed their city as advanced or leading in environmental preservation and heritage protection, they believed that economic and infrastructure issues still kept the community far from their acceptable level of resilience or sustainability. Finally, a few explicitly associated their city's low level of sustainability with high levels of material consumption and waste and GHG generation.

For the last question on sustainability perceptions I showed participants the CCF's six capitals and asked them to rate each capital by importance for their city's decision-making on a scale from 1 (least important) to 5 (most important). The overwhelming majority agreed that the most important capitals were the physical and natural, closely followed by the human, social, and economic capitals (figure 4.3). While these five capitals were rated almost identically in both cities, there was a difference in the cultural capital which was rated as highly important (=5) by 50% of CMR participants but only by 21% of DNV participants; although the population in DNV is slightly more ethnically diverse than in CMR (see table 4.1), this rating could be related to potential uncertainties due to the partnership with the City of North Vancouver in cultural programming and culture venues.



**Figure 4.3. Importance of each of the six capitals of the Community Capital Framework for the case studies’ 30 interviewees.**

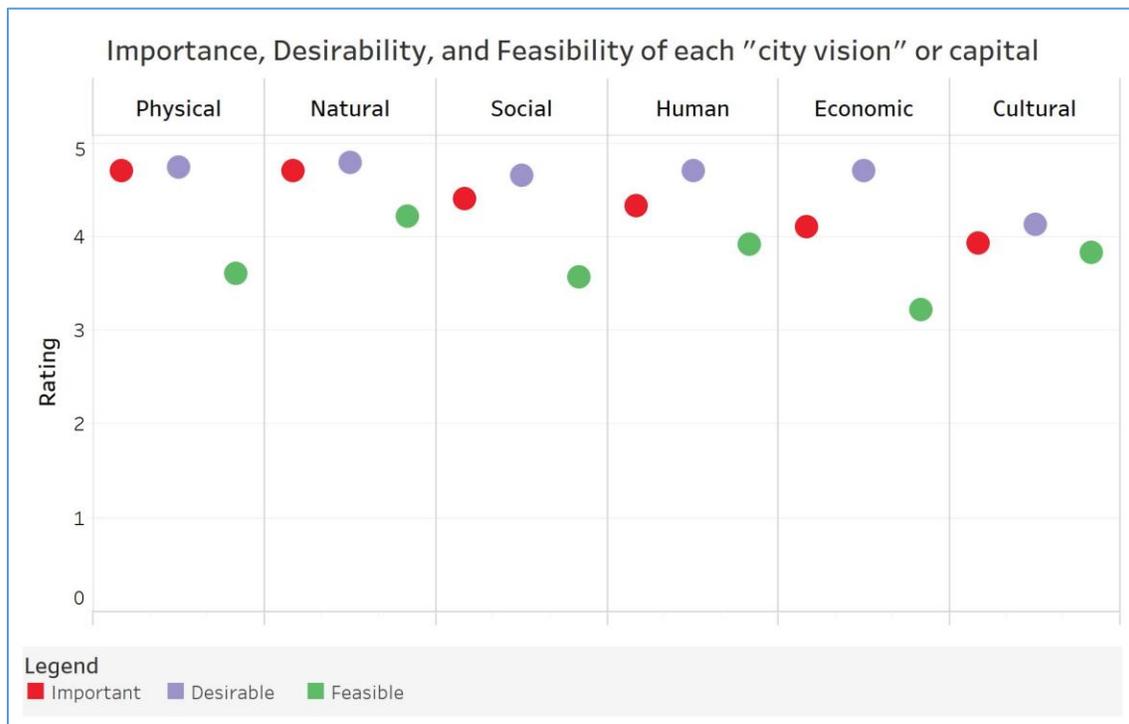
Note that the scale is from 1 (least important – light blue) to 5 (most important – darkest blue). Original graph generated in Tableau 2020.2.

Seeking to gauge the potential of urban productivity, I asked a question that included productivity principles and goals in disguise, with language such as diversified employment, restored natural environment, circular economy, and healthy and connected community. Interviewees rated six “city vision” elements for desirability and feasibility (from 1=not feasible/desirable at all, to 5=fully feasible/desirable); the six elements correspond to the CCF’s six capitals for comparability (figure 4.4).

All interviewees considered most elements as important and highly desirable but not necessarily feasible (figure 4.4). They rated the physical and natural capitals as the most important now and most desirable into the future. They linked the physical capital to their city’s effort to maintain infrastructure and achieve energy efficiency goals, and the natural capital to their city’s positive record of protecting surrounding nature. The economic aspect was also considered highly desirable which perhaps reflects municipal priorities for increased local economic development. Also, while both cities gave all capitals very similar ratings for importance and desirability, DNV interviewees rated each capital for feasibility slightly higher than CMR interviewees did. This may be related to median income levels and annual municipal revenue; as mentioned above the main revenue source is property taxes which are higher in DNV due to higher market values.

Comments on employment and housing in particular hid some pessimism that interviewees linked to the absence of related municipal power and the reality of being “bedroom communities”. Some participants also repeatedly spoke about the lack of available land for industry and manufacturing in their city which for them constitutes a major economic drawback and reduces municipal revenue that could be used for improved infrastructure and other services.

In commenting on social, human and cultural capital ratings, many interviewees again alluded to the lack of municipal mandate for education and cultural protection. Some pointed to the changing demographics as both a shortcoming and an asset: the city may struggle to engage with and integrate a highly diverse community but socio-cultural opportunities may also increase thanks to citizen-led groups. Despite the above, participants eventually expressed a rather optimistic perspective for the future because they believed that their city’s OCP already included objectives for all “city visions”.



**Figure 4.4. Interviewees’ ratings for importance, desirability, and feasibility of six “city vision” elements (or CCF capitals).**  
Original graph generated in Tableau 2020.2.

#### 4.5.2. Systemic and long-term thinking

Systemic, long-term thinking is fundamental for sustainability in highly complex systems like cities. “Running a city is a massive job, it’s like running 25 businesses really” (participant). Systemic thinking was not explicitly mentioned but sparsely implied in my data: several interviewees alluded to the interactions among policies, the potential consequences from heavily focusing on one aspect, and the need to adopt policies that promote balanced community development. A few interviewees connected these concerns to complexities inherent in local policy-making and community systems.

Many interviewees noted that decision-makers usually do not connect the dots among issues nor with the larger picture, i.e., the Official Community Plan or national and international goals. One person for instance wondered: “But how do things connect? And how good are we in connecting all these elements together?”. Such responses revealed discrepancies between policy and practice; for example while DNV’s Transportation Plan prioritized place-making “for people, not cars” with low-impact choices such as walking or cycling, my research data showed that in practice the city prioritized investment in additional road network.

Several interviewees discussed the need for long-term planning and informed decision-making through more or comprehensive information. They explained that in reality this did not occur often and provided examples such as one-off rezoning decisions or piecemeal OCP amendments. Similarly, Council meeting observations contained only a few occasions of systemic thinking when a Councillor inquired about the broader impact of a policy. Perhaps unavoidably though, any agenda topic would eventually be connected to other issues or the municipality’s concerns at that time, e.g. economy or housing debates would at some point be linked to infrastructure, transit, or education.

Systemic thinking was also sporadically present in responses about the roles of Council and staff in municipal operations and sustainability decision-making. More than half of the interviewees agreed that Council’s role was “higher up” and to provide direction, while city staff were viewed as subject-matter experts, knowledgeable about best practices, and required to provide relevant and professional information and implement the OCP based on Council directions. Overall, most interviewees implicitly

acknowledged the systemic interconnections among City Council, municipal staff, and vision development and implementation.

A recurrent theme was about municipal departments often operating in silos, guided by their own specific priorities and path dependencies, without necessarily considering the impact of their work on other policies or coordinating with other departments. Only a few participants discussed this explicitly; for example: “there’s a lot of different things I need to do that are going to compete with my sustainability goals. [...] I don't see everything through the lens of sustainability, [...] I have it really compartmentalized right now” (participant). This is supported by my review of documents such as CMR’s Environmental Management Strategy and Strategic Transportation Plan: both briefly mention sustainability but propose policies of smart growth and additional infrastructure. Also during the DNV case study I did not encounter the cross-departmental sustainability team reported to have been established in 2007 for a partnership with The Natural Step (Miller et al., 2011).

Another common thread was the perception of citizens as customers which has resulted in a separation of the city into two components: local government and community. This disconnect emerged repeatedly as participants affirmed the role of local government as simply delivering service to citizens. One interviewee explained that for Council the three-legged stool consisted of performance in sustainability, fiscal, and customer service, but in most cases “customer service and fiscal won over the sustainability”. The example of waste management came up several times in the interviews: if citizens want weekly garbage pick-up and are willing to pay more, the city must deliver accordingly – even if this means increased volumes of garbage and CO<sub>2</sub> emissions.

Systemic thinking for sustainability also requires long-term planning, although this may be overlooked in practice: “our planning tends to be short term or catches up” (participant). Many interviewees believed that, without long-term goals, decision-making and prioritizing were reactive and fragmented, resulting in insufficient citizen involvement and decisions detached from set strategies. They acknowledged short-termism, i.e., what people want at a given moment and in the near future, as a multi-faceted barrier: politicians may not be re-elected if they aim for longer term goals and citizens may perceive their impact during one election cycle as negligible and thus focus on shorter-

term benefits. Some interviewees also noted that the community is constantly in election mode and that only citizens opposing or directly interested in a policy are vocal. More than one third stated that Council should think in horizons that are much wider than electoral cycles and “plan for the future” (participant) by helping develop the community's long-term shared vision and working with staff to ensure implementation.

### **4.5.3. Local government power**

A significant obstacle to successful sustainability planning and implementation is related to the perceived inability to influence decision-making. Several interviewees expressed concerns that they couldn't make a difference or resolve issues in aspects such as the energy mix or socio-economic opportunities and equality. Their influence was perceived as low or not meaningful, leading to fragmented action or even inaction. Land use was the most frequently mentioned policy area that local governments have absolute control over; a few interviewees also stated that any development (such as sustainable development) starts with planning land uses.

Energy is another example reiterated in half of the interviews and during several Council meetings, either in the context of waste (waste management or waste-to-energy) or regarding building and transportation energy efficiency and greenhouse gas (GHG) emissions. Energy decisions, particularly those seeking to reduce energy consumption and building emissions, are not entirely within the local government's purview. Although both cities have GHG emission reduction targets, they can control such policies for municipal facilities only. However, as many participants observed (some with concern), the city can always lobby to higher levels of government to influence other energy-related policies.

This perception of low ability to influence policy-making also came up about intangible community aspects related to social, cultural, human capitals. Several interviewees explained that, in combination with the anticipated lack of influence, they would not pursue a policy if tangible, measurable, or immediate results could not be expected: what matters in city management is what can be measured.

What is measured however is directly influenced by local government power and capacity. In my case studies, I repeatedly heard that sustainability processes can be

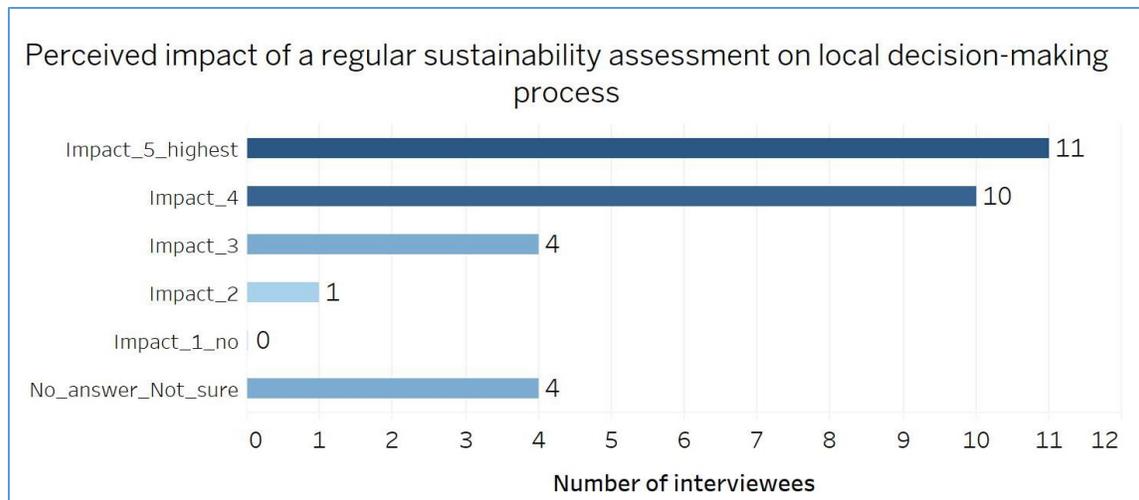
hindered by a limited service delivery mandate which regulates municipal resources and capacity levels accordingly. Some interviewees compared their cities to European cities whose sustainability action benefits from broader powers and support from national governments, the European Union, and active citizens.

The most prevalent obstacle mentioned as directly linked to the complicated governmental system is the availability and allocation of funds. Municipalities in B.C. expect provincial or federal funding to act on issues that they do not have mandate for. The provincial and federal governments were frequently mentioned in both case studies regarding the need to advocate or apply for funding or when discussing sectors over which the provincial government has clear authority. Interviewees mentioned repercussions such as policy-making inflexibility and a slow-moving governmental system.

#### **4.5.4. Assessing urban sustainability**

When asked whether a sustainability assessment tool would be useful in their city, most interviewees responded that it would provide value if used to evaluate strategic documents such as the OCP and area plans, as it might become onerous if applied, for instance, to every development application. They attached however some conditions: the tool should be accurate, populated with timely and valid data, well structured, clear enough to prevent contradictory interpretations, and adaptive to align with forward-looking goals so that citizens contribute to, accept, and support it.

Most respondents also believed that a regular sustainability assessment would greatly affect decision-making (figure 4.5), by revealing broader impacts of a policy, supporting policy continuity, helping decision-makers prioritize, and enabling comparisons over time and adjustments. Finally, while most interviewees would welcome a full city-wide sustainability evaluation annually or biannually, some would also like to see sustainability impact assessment entrenched in daily operations, perhaps as a regular section in reports to Council.

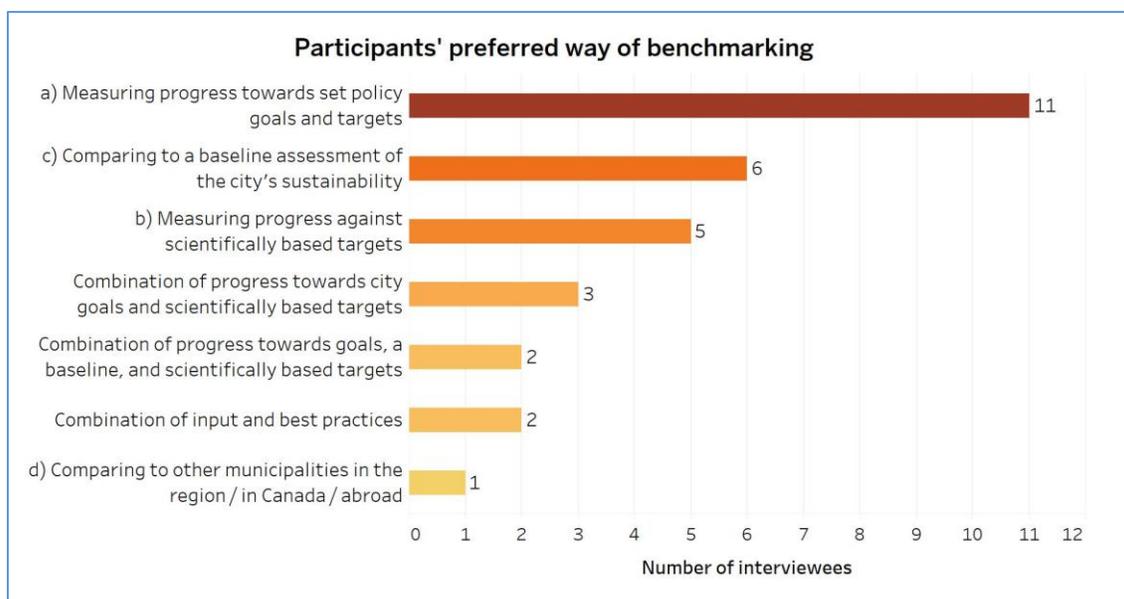


**Figure 4.5. Responses to the forced-choice question: “On a scale from 1=no impact to 5=highest impact, how would you rate the impact of a regular sustainability assessment on a city’s decision-making processes?”.**

Original graph generated in Tableau 2020.2.

I then asked participants to choose their preferred way of benchmarking among these options that stood out as the most common ways of benchmarking in my review of sustainability assessment literature and sustainability frameworks or indicators systems: (a) measuring progress toward set policy goals and targets, (b) measuring progress against scientifically based sustainability targets, (c) comparing to a baseline assessment of the city's sustainability, or (d) comparing to other municipalities in the region, in Canada, or abroad. Almost all interviewees expressed difficulty in choosing only one option. Most favored a combination of options (a), (b), and (c), but eventually more than one third chose (a) and one fifth chose (c) (figure 4.6).

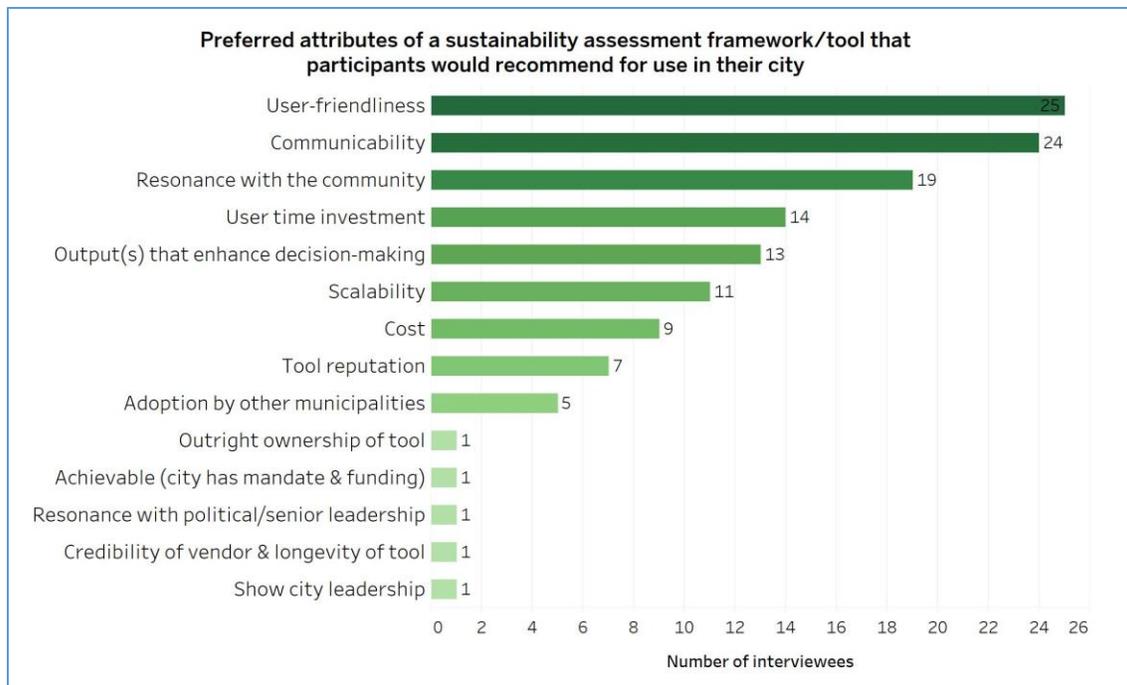
Several interviewees explained their choices as context-dependent, reiterating that each community is different and that transparency and accountability about assessment is more important than adopting standards for the sake of comparability (per the assumption behind option d). Overall, most agreed that a baseline assessment and science-informed goals and targets would make data collection meaningful and would help identify progress or barriers; a few also noted that local governments have to measure and report on progress anyway.



**Figure 4.6. Responses to the forced-choice question: “What would you say is the best way of benchmarking for your city?”.**

Original graph generated in Tableau 2020.2.

Building on the previous questions, participants selected their preferred attributes of a sustainability assessment framework they would recommend for use in their city. I offered some options but encouraged additions. The most preferred attributes were user-friendliness, communicability, and resonance with the community (figure 4.7). Other important factors were user time investment, outputs that enhance decision-making, scalability, and cost, with the latter deemed as less important if the tool provided high value and long-term benefit. Participants reiterated that they wanted an intuitive tool, easy to embed in municipal operations, and independent from electoral cycles. They described an ideal tool as self-explanatory, visual and interactive, transparent, in lay language, consistent with community values, and flexible enough to “grow with the community” (participant).



**Figure 4.7. Responses to the select-all-that-apply question: “What characteristics would you want a sustainability assessment framework to have in order for you to recommend it for use in your city?”**

Original graph generated in Tableau 2020.2.

**Collection and management of data for sustainability assessment and progress evaluation** was not only discussed in interviews but was also the main topic of many meetings with staff in both cities. I extensively consulted with subject-matter expert staff about the potential use of several holistic urban productivity indicators in their city; we discussed relevance of indicators, suggested target/direction/units, data availability and sources, etc. As AppendixDC shows, I particularly proposed indicators related to socio-cultural and human productivity and some indicators on natural, physical, and economic aspects to be measured in addition to mainstream sustainability indicators. These suggestions were initially informed by the academic and practitioner literature on concepts and approaches that the holistic Urban Productivity Framework converges and builds on (details in chapter 3 / paper 2 and in section 4.4.2.).

The initial reactions to the proposed indicators were generally positive as staff supported the expansion of the city’s metrics database to measure more dimensions and in more depth so as to have better picture of the city’s sustainability state and progress. These reactions may in part be attributed to the limited pool of mainstream ecological,

economic, and social indicators that both cities used, as demonstrated through the mapping and comparison work detailed in the next section (4.5.5.).

Also, discussions with staff in charge of data in the city halls, the fire halls, and the local police departments showed that many indicators were used because of convenience or simplicity in data collection (e.g. another governmental or non-governmental body is responsible); even if they only assessed staff performance or plan completion (not plan implementation) or measured a negative side or impact. Examples include: numbers of crimes or offences, percentage of Council meeting agendas posted to the municipal website by a specific time, number of plans completed (e.g. for stormwater or asset management), timely adoption of plans, etc.

Many of the holistic productivity indicators suggested fell into the socio-cultural and human productivity categories (Appendix D) but in most cases staff raised objections to adopting such indicators in practice. They attributed this to the lack of: timely and reliable data; adequate human resources for data collection; and/or financial resources for new databases and portals. Specifically the difficulty to obtain reliable, adequate, frequent, and locally useful data and the extensive reliance on data from external sources (e.g. national census, regional surveys, etc.) stood out in most discussions with staff and interviewees. Additionally, whole-community surveys were conducted infrequently and would lead to unreliable data due to the low number of responses; project-based consultations with citizens were more frequent but limited in scope. In any case, expert staff offered valuable feedback on the definitions and units of measurement of each indicator, thus helping me refine the list of indicators even further.

After recognizing the significance of abundant and good quality data for decision-making, senior staff in particular appeared reluctant to assign their teams additional, data-related work, emphasizing that staff had reached capacity for the mandated service delivery. They generally advised against assigning data tasks to one person per department and suggested instead to have one data coordinator for the entire municipality. On a similar note, some interviewees implied that their city would need to reconnect data collection and reporting with strategic goals such as those in the OCP.

Finally, some participants added that all local government work must be justified in terms of value created for the community and therefore the cost-effectiveness of data

collection must be visible to citizens. This is another reason why most of the socio-cultural and human productivity indicators I suggested were not embraced in the two cities; they would measure intangible and subjective urban assets and, according to staff, this would not align with Council's (and constituents') priorities at the time. Perhaps the above also partly explains why one of the case municipalities had established a citizen group tasked, inter alia, to review the OCP monitoring processes.

In a nutshell, as several participants mentioned, **limited mandate, short-termism, and overall municipal capacity are the main constraints that can obstruct sustainability data collection and management.** Almost all participants agreed that this process should require minimal effort, with streamlined and efficient measurement processes, and a few in fact favored municipal investment in technology for connected databases and related training. In any case, the need for more data (in volume but above all in comprehensiveness) to better inform decision-making was repeatedly expressed both in meetings with staff and in the interviews as analysis showed (see section 4.5.2. above).

#### **4.5.5. Localizing the SDGs**

During the case study research, I conducted a complex task of mapping the SDGs goals, targets and indicators with those of the two municipalities and those of the Community Capital Tool. This matching and comparison task was conducted in Excel spreadsheets with data collected from each municipality's Official Community Plan and major policy documents such as those labeled as strategies, master plans per sector, or action plans.

**The multi-level comparison and the inventory of indicators in each city had important benefits.** *Firstly*, it helped identify gaps that I discussed with subject matter expert staff, particularly regarding target setting, progress measurement, and data collection (see 4.5.4). *Secondly*, following this task and in combination with the discussions on urban productivity indicators, my reports to the two municipalities included recommendations for targets and metrics.

At the goal level, Table 4.1 shows the level of alignment between the SDGs and the higher-level goals of the two cities. "Direct match" or "full alignment" means that the

municipal document used the same or very similar wording as an SDG goal, target, or indicator; “indirect match” or “partial alignment” means that there existed a related municipal goal, target, or indicator but it did not fully match the language or cover the intention or direction of the SDG equivalent; and “no match” or “no alignment” means that no similar or comparable goal, target or indicator was found in municipal documents.

The OCP and other major policy documents aligned fully or quite extensively with seven SDGs and all CCT capitals in DNV, whereas they aligned fully or quite extensively with four SDGs and all CCT capitals in CMR. Strategic documents in DNV highlighted topics of economic growth, community well-being, environmental protection, affordability, food security, and education infrastructure investment. In CMR they focused mostly on food security, education infrastructure investment, climate impact resilience (Spiliotopoulou & Roseland, 2021). It is important to note that full or extensive alignment of goals in municipal plans with the SDGs does not imply (or necessarily translate to) full implementation or monitoring of planned municipal goals.

**Table 4.2. Alignment of goals of the two case studies with the SDGs.**

<b>SDG</b>	<b>DNV Goal alignment</b>	<b>CMR Goal alignment</b>
1: No Poverty	Indirect match / Partial alignment	No match / No alignment
2: Zero Hunger	Indirect match / Partial alignment	Direct match / Full alignment
3: Good Health and Well-being	Direct match / Full alignment	Indirect match / Partial alignment
4: Quality Education	Indirect match / Partial alignment	Indirect match / Partial alignment
5: Gender Equality	No match / No alignment	No match / No alignment
6: Clean Water and Sanitation	Indirect match / Partial alignment	Indirect match / Partial alignment
7: Affordable and Clean Energy	No match / No alignment	No match / No alignment
8: Decent Work and Economic Growth	Direct match / Full alignment	Direct match / Full alignment
9: Industry, Innovation and Infrastructure	Direct match / Full alignment	No match / No alignment
10: Reduced Inequality	Direct match / Full alignment	No match / No alignment
11: Sustainable Cities and Communities	Direct match / Full alignment	Direct match / Full alignment
12: Responsible Consumption & Production	No match / No alignment	No match / No alignment
13: Climate Action	Indirect match / Partial alignment	Indirect match / Partial alignment
14: Life Below Water	Direct match / Full alignment	No match / No alignment
15: Life on Land	Direct match / Full alignment	Direct match / Full alignment
16: Peace and Justice Strong Institutions	No match / No alignment	Indirect match / Partial alignment
17: Partnerships to achieve the Goals	Not applicable	Not applicable

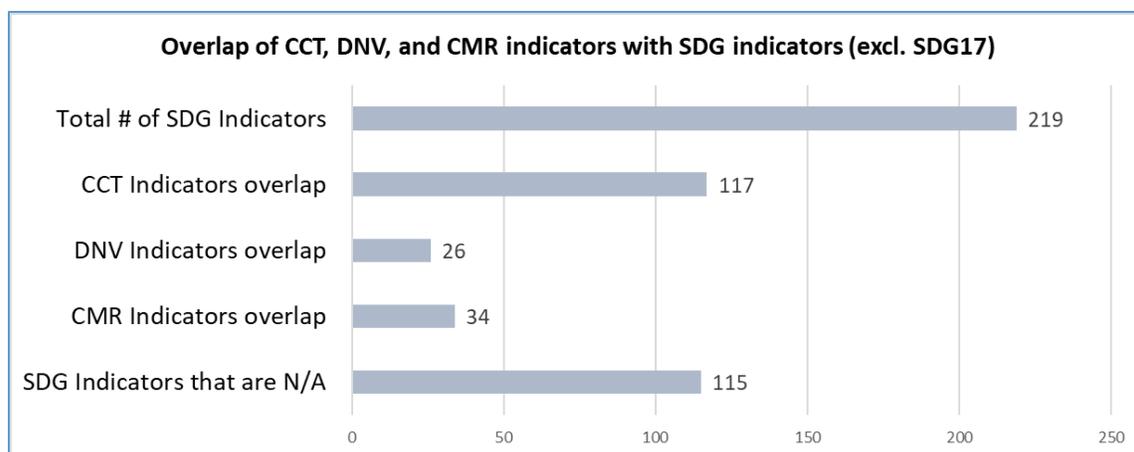
Adapted from: Ross, 2018; Spiliotopoulou & Roseland, 2021.

At the target level, the analysis gave similar results for both cities: while strategic policy documents contained many goals and recommendations, very few seemed to

correspond to actionable and measurable targets. In DNV documents such as the Transportation Plan, and the Parks and Open Spaces Strategic Plan, I identified 20 targets that corresponded to 18 (out of 169) SDG targets (Spiliotopoulou & Roseland, 2021). Likewise, in CMR policy documents such as the Parks, Recreation and Culture Plan, and the Environmental Management Strategy, I identified 10 targets that corresponded to only five SDG targets (Spiliotopoulou & Roseland, 2021).

Lastly, at the indicator level, figure 4.8 shows the extent to which existing indicators in the two cities and the CCT overlap with or address SDG indicators. At the time the case studies were conducted I decided to exclude SDG 17 on global partnerships and 115 SDG indicators as not directly applicable to cities. “Community partnerships” were only mentioned as a policy direction or goal in some strategic documents (more in CMR than DNV) without corresponding targets or indicators. However intracity and intercity partnerships can be beneficial for all stakeholders (A. Macdonald et al., 2018). DNV indicators covered about a quarter of the applicable SDG indicators while CMR indicators covered about one third. The CCT covered most SDG indicators but not topics such as gender equality, accessibility, competitiveness, investment in research and development, and equity legislation.

I also discovered **significant gaps in indicators used** in the two municipalities. Perhaps unsurprisingly, given the few targets I identified in municipal policy documents, most indicators did not correspond to sustainability-related goals or policies. Instead, they were performance metrics, such as number of people served by the city hall front desk, or contextual information, such as population demographics. Although such data enhances understanding of the community and contributes to informed decision-making, I noticed a lack of community assessment indicators that would measure various resource flows within the community and the impact of policies on all aspects and assets. Both cities seemed to focus on measuring assets or aspects that could easily or readily be quantified but had barely any indicators for intangible community assets.



**Figure 4.8. The extent to which existing indicators in the District of North Vancouver, the City of Maple Ridge, and the Community Capital Tool overlap with and address SDG indicators.**

Note: this excludes SDG 17 on global partnerships but shows 115 SDGs even though they were considered as not applicable. Source: Spiliotopoulou & Roseland, 2021.

Three main themes emerged from the analysis regarding the potential local impact of the SDGs and other international commitments. First, there is low awareness of non-local matters. When asked if they were aware of the UN SDGs, half of the interviewees responded that were not aware while another 30% could vaguely recall having heard of them (Spiliotopoulou & Roseland, 2021). Some interviewees commented that international agreements are mostly seen as aspirational or simply as an opportunity to receive funding from higher levels of government.

Second, several participants linked this lack of awareness and education with the complex, multi-level decision-making processes and the municipalities' lack of a constitutional right to exist. The third theme that emerged was a sense of non-accountability regarding international agreements (that are usually not binding anyway); local governments then tend to distance themselves from such global events and federal commitments.

Despite this apparent disconnect from the country's global commitments and the significant gaps I identified in local goals, targets, and metrics, interview participants also voiced a variety of promising perspectives. Some expressed a desire for their city to embrace national and global goals in the future, while others alluded to the increasing recognition of the importance of frameworks and tools to help cities achieve

sustainability. Finally, a few conveyed hope that widespread SDG practice in cities can promote global knowledge exchange and collaborations.

#### **4.5.6. Miscellaneous findings**

On a more optimistic note, the data analysis revealed some positive signs for the future of urban sustainability planning and implementation. When shown the six-capital CCF, some interviewees noted that elements such as connectivity, responsibility, accountability, and ownership should also be included in a sustainability framework. Another interesting observation from the interviews and the Council meetings is that Council expected or frequently requested advice from staff on best practices from around the world and particularly from other Canadian cities.

Also, many interviewees were in favor of more inclusive and broader citizen engagement to develop some sort of higher-level, well articulated, flexible, and adaptable vision that would serve as guidance for the entire community in all stages of decision-making. In addition, I noticed that even if formal participation processes may not yet be as inclusive and effective as some interviewees would want, Councillors in both cities engaged with citizens on a daily basis by attending events and meeting with citizen groups, businesses, etc. Shared vision requires broad community agreement; as some participants commented, deeply involving citizens in developing a higher-level vision would increase the sense of community and respect of diversity while providing the OCP and the city Council and staff with citizen support to implement the vision.

### **4.6. Discussion**

Working closely with municipalities provided me with valuable insights regarding urban sustainability application and the factors that determine or at least influence both action and lack thereof. Below I discuss the factors that seem to hinder and those that seem to help local sustainability planning, implementation, and assessment; either way, these findings helped shape the Urban Productivity Framework and recommendations for future research and practice.

#### 4.6.1. Obstacles

**Throughout the interviews and Council meetings, I identified weak sustainability perspectives** indicating that local governments may tend toward a rather utilitarian (eco-efficiency) approach of resource and community management, with municipal assets signifying humanmade infrastructure only. Responses on defining sustainability and on the importance of the physical and natural capitals were anthropocentric in focus, consistent with my observations of Council meetings: issues pertaining to local infrastructure, protection of the surrounding environment, and economic development dominated Council discussions in both cities.

Participants' descriptions of urban sustainability as mostly linked to land use, infrastructure, and impact reduction align with the literature on understandings and applications of urban sustainability (Bibri & Krogstie, 2017; Dernbach & Cheever, 2015; Garren & Brinkmann, 2018). For example, the constant concern about funding to develop housing and maintain infrastructure for these still sprawling suburban municipalities explains to some extent the increasing uptake of urban agendas such as smart cities and compact cities (Bibri & Krogstie, 2017; Joss et al., 2019).

Interestingly, while many interviewees defined a sustainable community as a "complete community", borrowing language from Metro Vancouver's Regional Growth Strategy, their descriptions typically included only one sustainability dimension (Metro Vancouver, 2015). Sassen has however explained that "a real city is complex and incomplete" because it is more than buildings, technology, and smart networks; it includes those who live in and visit it, its natural assets, its diversity and human innovation (Guadalupe, 2013). Metro Vancouver's current process of updating its Strategy is a promising sign in this regard, as it seeks to clarify that "complete" communities promote walkability, transit-oriented and mixed uses, inclusiveness, holistic health, and economic and socio-cultural equality (Metro Vancouver, 2019).

The generally limited number of references to social sustainability in my data was noticeable: for instance, although Council and interviewees frequently discussed housing and education, these were commonly connected to the physical and economic capitals (stock/infrastructure and municipal finances). In both municipalities, trade-offs and conflicting interests often led to prioritizing shorter-term economic – and to some extent

ecological – sustainability policies over social topics such as gender equality, governance, safety and well-being, institutional trust, culture and heritage, etc. Such findings are congruent with related literature about SD still viewed as a framework mainly for environmental management (Benson & Craig, 2014; Garren & Brinkmann, 2018).

Urban issues though are interconnected and cannot be tackled without systemic (broad and deep) analyses and iterative policy-making (Tindal et al., 2016). Several interviewees, for instance, hesitated to discuss local policies on health and education because of lack of jurisdiction, but almost all policy areas can impact the social and ecological determinants of healthy communities and ecosystems (Parkes et al., 2020; Roseland, 2012). Systemic analysis for effective decision-making also requires comprehensive and reliable data but issues in data availability, collection, and management and related municipal capacity are a reality.

The strong focus on efficiencies and the traces of path dependency I noticed may constitute another indication of insufficient systemic and forward thinking. Some participants for instance expressed concern about their municipality's continuing devotion to an OCP they considered outdated. Others firmly defended the current clearly distinguished roles of Council, staff, and citizens in decision-making processes and the potentially detached departmental operations. Such dichotomy between policy-makers and administration can be problematic though; urban systems are complex and require procedural and institutional flexibility (Childers et al., 2014; Tindal et al., 2016).

This ostensible resistance to systemic thinking could be attributed to other limiting factors I identified such as short-termism and the view of citizens as customers. Despite their separate responsibilities, both staff and Council appear to be influenced by the short electoral cycle. Similarly the singular focus on service delivery promotes a perception of disconnect between local government and citizens. Local government effectiveness appears contingent on resident willingness to pay and municipal performance assessment outweighs the holistic assessment of a policy's impact (Tindal et al., 2016).

To achieve long-term sustainability thinking in local government, as an interviewee said, they “would need a department, people to drive the messaging, the

mandate, and innovate and create ideas for the city” (participant). In growing cities like the case municipalities, the range of backgrounds, values, and needs of the constantly changing demographics cannot be easily reflected in one vision statement. If consultation processes do not meaningfully or adequately involve all citizens in vision development and implementation, this may lead to top-down place-making and the decreased sense of community that some participants alluded to. Such processes can undermine systemic analyses and, by extent, inclusive decision-making and governance (James, 2015; Webb et al., 2018).

Lastly, the above obstacles need to be considered within the structural context in which Canadian local governments operate; municipalities are “creatures of the province” and receive “delegated authority” by the provinces (Tindal et al., 2016). Not only are local governments endowed with limited mandate but their revenue sources are limited to property taxes and economic activity fees (both can be quite low in “bedroom communities”). Municipal operations’ dependence on federal and provincial funding can reduce local resilience and capacity to analyze urban and other connected systems and identify synergies for large-scale, transformative change (Elmqvist et al., 2019).

Participant perceptions reflect the reality and complexity of urban sustainability decision-making processes in Canada and elsewhere, as described in the literature (Childers et al., 2014; Spiliotopoulou & Roseland, 2020b; Tindal et al., 2016). The disparities in interviewee responses about municipal capacity, sustainability interpretation, and progress assessment suggest that **integrated decisions on principles, vision, and priorities need to precede decisions on implementation and assessment**. Perhaps now is the time to secure municipalities’ place in the constitutional order by legally recognizing them and by clearly articulating their powers in the federal or provincial acts while respecting provincial autonomy (Good, 2019).

#### **4.6.2. Opportunities and recommendations**

**While the above limiting perceptions and obstacles overall support existing literature, the case studies also provided insights that enhanced the Urban Productivity Framework and the recommendations for municipalities in Canada and beyond.** Some findings encouragingly point to participants’ openness to embrace well articulated, long-term goals developed with inclusive citizen engagement and

supporting both the local vision and the international agreements. Aligning local goals with the national context and the country's international commitments is an important opportunity for urban sustainability. Policy coherence among various levels of government and with global goals can help boost municipal influence over sustainability aspects that cities now do not have direct control over (in Canada at least) (Tindal et al., 2016).

The intent of global outlook, of course, is far from local policies simply copying best practices from around the world. Several interviewees for example expressed the need to attend to local context during several stages of the policy cycle, including assessment through locally relevant tools and indicators. Unlike urban developments branded as “eco”, “sustainable”, or “smart” but in practice offering luxury housing and becoming resource-consuming and socio-culturally disconnected, embracing holistic urban productivity will enable cities to connect past, present, and future (Angelidou, 2017; Schwanen & van Kempen, 2019; Swilling et al., 2018). Cities are thus urged to identify sustainability practices and metrics that fit their community values and can be adapted to their context: local nature, history, needs, culture, nature, ways of being, the thousands-of-years relationship of Indigenous people with the land, key patterns of success, core identity, etc. (Mang et al., 2016).

**Cities also need to redesign current decision-making that perceives citizens as customers, through application of urban productivity principles of co-production, governance, equity, and justice.** The holistic Urban Productivity Framework can help local governments to move beyond participation models and New Public Management approaches (i.e., seeing the city as a corporation that delivers service) toward inclusive, cross-sector, and multi-level partnerships (Clarke, 2014; A. Macdonald et al., 2018; Tindal et al., 2016). The development of a shared vision requires broad community involvement and agreement. Manifesting shared values and priorities through visioning and storytelling can strengthen socio-cultural aspects and policy evaluation (Meadows et al., 2004; Roseland, 2012; also, D. C. Wahl, personal communication, January 21, 2019).

By employing, for instance, the future-oriented backcasting method in their sustainability planning, cities could not only motivate citizens to engage but they will also be able to collectively identify the necessary steps toward their goals (Robinson & Cole,

2015). Complementarily, community-based initiatives can empower citizens through direct involvement in urban place-making, progress indicator selection, and data collection (particularly subjective, qualitative data) while benefiting from local, traditional, and cultural knowledge (Gismondi et al., 2016; Musikanski et al., 2017).

Business sustainability strategist and thought leader Coro Strandberg also recommends whole-systems training for planners, engineers, and other city professionals to overcome short-termism and siloed thinking (Coro Strandberg, personal communication, December 17, 2018). Recent research on the roles and competences of sustainability managers in cities corroborates this statement: strategic and systemic thinking, change management, and multi-disciplinary collaboration are some of the most important skills and qualities for senior staff in such positions (MacDonald et al., 2020).

Local governments need to embrace holistic thinking in sustainability planning and implementation by focusing more on systemic evaluation of policy impact, finding synergies among policies and stakeholders in all sectors, and incorporating ecosystems in their asset management policies (Dernbach & Cheever, 2015; MNAI, n.d.). Acting toward long-term goals and upon priorities that have potential for greater impact in most community aspects can also help combat obstacles of limited power and short cycles while transforming institutional structures and social practice (De Flander, 2014; also John Robinson, personal communication, December 5, 2018).

**Local governments could use the Urban Productivity Framework as a compass to help pursue balanced and synergistic optimization of community elements (economic, physical, ecological, socio-cultural, and human) (figure 4.9).** Holistic urban productivity principles such as systemic analysis and regeneration can help cities set goals beyond impact reduction and environmental protection. Integrated resource regeneration and circularity, species and habitat restoration, and regenerative and inclusive urban food systems would then become entrenched in urban processes, while also building up individual and collective skills, fulfillment, and resilience.

Urban sustainability – Research findings	Case studies: major themes in findings	Holistic urban productivity – A systemic lens
<ul style="list-style-type: none"> <li>• Environmental impact reduction</li> <li>• Financially maintain infrastructure</li> <li>• Good land use planning</li> <li>• Energy efficiency</li> </ul>	Sustainability perceptions	<ul style="list-style-type: none"> <li>• Ecological restoration</li> <li>• Resource regeneration and circularity</li> <li>• Energy and material consumption reduction</li> <li>• Net-zero built environment</li> </ul>
<ul style="list-style-type: none"> <li>• Dependence on electoral cycle</li> <li>• Reactive action</li> <li>• Siloed operations</li> <li>• Disconnect between local government and citizens</li> </ul>	Systemic and long-term thinking	<ul style="list-style-type: none"> <li>• Whole-system, synergistic, and long-term planning and impact evaluation</li> <li>• Inclusive, multi-level, cross-sector partnerships throughout the policy process; equity</li> </ul>
<ul style="list-style-type: none"> <li>• Inability to influence decision-making</li> <li>• Limited power and mandate</li> <li>• Municipal resource constraints</li> <li>• “Bedroom communities”</li> </ul>	Local government power	<ul style="list-style-type: none"> <li>• Truly complete communities with local opportunities</li> <li>• Community-based initiatives; Indigenous, traditional knowledge</li> <li>• Formal Constitutional status for Canadian local governments</li> </ul>
<ul style="list-style-type: none"> <li>• Data: not adequate, timely, and reliable</li> <li>• Insufficient human resources</li> <li>• Disconnected monitoring programs from goals/vision</li> <li>• Reluctance to assign data-related work to staff</li> </ul>	Assessing urban sustainability	<ul style="list-style-type: none"> <li>• Long-term outlook for goal setting linked to progress assessment</li> <li>• Regular, inclusive, community-wide assessments</li> <li>• Holistic urban productivity indicators (in addition to mainstream indicators)</li> </ul>
<ul style="list-style-type: none"> <li>• Low awareness of non-local matters</li> <li>• Focus on short-term, local ones</li> </ul>	Localising the SDGs	<ul style="list-style-type: none"> <li>• Long-term, multi-level outlook</li> <li>• Education and awareness for all stakeholders and decision-makers</li> </ul>

**Figure 4.9. How a holistic urban productivity lens can help address the research findings.**

Original graph.

**My overarching recommendation is that cities should build on the signs of systemic thinking I spotted in the data, through continuing education and adoption of tools such as the Urban Productivity Framework that fosters whole-systems processes.** Sustainability assessments are a snapshot of a dynamic system in time and must be connected to local and global goals set through long-term outlook. I would recommend regular assessments (annually if possible) that could be gradually streamlined and embedded as iterative processes that highlight synergies and potentially necessary adjustments.

In my reports to the case study municipalities, I advocated for frequent citizen surveys to help measure intangible aspects of the community (particularly socio-cultural and human). I also proposed a set of indicators influenced and informed by the urban productivity literature, language, and framework. They would be used in addition to more mainstream sustainability indicators but, while some were immediately embraced, most were listed for future consideration depending on available resources.

**Future research** in collaboration with more cities worldwide will further refine the Urban Productivity Framework and its suggested generic goals while enhancing its applicability at different scales and local contexts. It will also allow researchers and practitioners to test and adjust the proposed urban productivity indicators. This framework's suggested goals and metrics can be transformed into questionnaires and other specific tools to help uncover community values and needs and develop a shared vision through multi-stakeholder engagement and collaboration.

The particularity of conducting only two, albeit in depth, case studies and in a Global North country limits drawing definitive generalized conclusions. Therefore further research in Global South cities is required so as to explore the flexibility and adjustability of the concept and framework of holistic urban productivity. Expansion with case studies globally can help promote the concept's systemic viewpoint and establish the transition toward urban space co-production and co-management with effective and inclusive decision-making processes that can help cities live within the Earth's carrying capacity.

## 4.7. Conclusion

Current global calls for climate action coupled with social justice and equity offer a window of opportunity in the journey toward the productive and sustainable city. Youth activist leaders such as Autumn Peltier and Greta Thunberg and equity movements led by Black, Indigenous, and People of Color, and LGBTQIA2S+ create change by increasing awareness and mobilizing citizens while ultimately bringing these issues into the political agendas worldwide.

**This research identified a range of challenges and obstacles to urban sustainability that the concept and framework of holistic urban productivity can help address**, as figure 4.9 shows. Holistic productivity principles and practices can help

cities operationalize SCD with systemic and adaptive objectives and metrics to transform ineffective processes and tackle issues of fragmented thinking and implementation and short-termism. Politicians and professionals will also benefit from training on design thinking, resilience and adaptive socio-ecological systems, systems thinking, and long-term planning. These, combined with recognition and reconciliation, can help release human potential for sustainable development (C. Strandberg and J. Agyeman, personal communication, December 17, 2018).

As shown in the discussion about opportunities and recommendations, holistic urban productivity components such as whole-systems thinking, co-production, and regeneration have the potential to respond to current issues, enhance local sustainability processes, and optimise stocks and flows of tangible and intangible assets. By reaching holistic urban productivity goals, cities can become not only well-functioning systems but also sustainable, both in a literal sense and in terms of intergenerational and intragenerational well-being within the Earth's carrying capacity.

At the same time, Canada's commitment to achieve the SDGs provides Canadian cities with the opportunity to benefit from a global exchange of SD knowledge and tools as well as established international deadlines and networks. Canadian local governments are democratic systems with powers and responsibilities which make them in essence constitutional; if this was formally acknowledged, they would enjoy broader mandate and greater influence over resources required to address local matters (Good, 2019). Addressing 21<sup>st</sup> century issues that transcend municipal borders requires new configurations, non-hierarchical decision-making processes, and using local knowledge as a key guiding tool (Tindal et al., 2016).

Cities can achieve sustainable urbanization by promoting the right to the city and the design of nature-based urban environment without compromising collective and individual health and well-being (Spiliotopoulou & Roseland, 2020a; UN-Habitat, 2020). As Sassen and others posit, a city should embrace diversity, transdisciplinarity, and uncertainty and thrive by being flexible, creative, and inclusive (De Flander, 2014; Guadalupe, 2013). "The sustainability revolution is nothing less than a rethinking and remaking of our role in the natural world" (David Orr, in Edwards, 2005).

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# Chapter 5.

## Conclusions

### 5.1. Introduction

#### 5.1.1. Background and research questions

Sustainable development (SD) is a broad field whose theoretical underpinnings span several disciplines and decades. It emerged as a field of study after the Brundtland Commission described the connection between human activities and environmental degradation (WCED, 1987). Despite the copious criticism received, the SD concept is generally understood to be the integration of environmental, economic, and social objectives in the decision-making processes for the benefit of current and future generations (Dernbach & Cheever, 2015).

My doctoral research has focused on sustainable community development (SCD), i.e., the application of SD principles and practices to local communities. My interest is particularly in cities; they occupy 3%-4% of the world's land surface, use 80% of global resources, consume more than 67% of global energy and other materials, and generate most of global waste (Elmqvist et al., 2019; Girardet, 2015; World Economic Forum, 2018). Cities are projected to host more than two thirds of the world's population by 2050, while being vulnerable to climate and health challenges resulting in high economic and environmental costs (Harlan & Ruddell, 2011; Kanuri et al., 2016; UN DESA, 2019).

In this “urban century”, planetary realities and increased environmental and social awareness have led to significant international agreements such as the United Nations Sustainable Development Goals (SDGs), the UN Habitat New Urban Agenda, and the Paris Climate Agreement (Elmqvist et al., 2019). Such agreements recognize that it is impossible to tackle global socio-ecological system issues without addressing the related processes at the local level; municipalities and citizens are therefore instrumental in successfully implementing and achieving sustainability and resilience (Elmqvist et al., 2018).

Current urban sustainability approaches have been influenced by various theories and disciplines without having explicitly formed a scientific discipline yet – although “sustainable urban systems science” is actively under discussion (Advisory Committee for Environmental Research and Education, 2018). Numerous agendas, frameworks, and tools have informed local sustainability planning, implementation, and assessment in communities worldwide. As explained in chapter 2 (paper 1), urban sustainability theory and practice are still today challenged by debates and issues mostly connected to insufficient systemic thinking and fragmented understanding, application, and measurement.

My research looked into the potential of holistic urban productivity to address such issues and tackled the meta-question “How can the concept, principles, and practices of urban community productivity help address local sustainability planning, implementation, and assessment, and contribute to the achievement of the UN SDGs?” Cities have enormous productivity potential not only in terms of economic and labor productivity (diverse and inclusive economy, fostering innovation), but also of social productivity (hubs of research, learning, and sharing) and ecological productivity (ecological function regeneration and efficient use of resources) (Roseland & Spiliotopoulou, 2017).

In exploring how holistic, integrated urban productivity can address the phases of plan development for urban sustainability, implementation of such plans, and assessment of progress toward sustainability goals, the research was guided by two sub-questions:

- How can the concept of community productivity contribute to sustainable community development theory?
- How can the principles and practices of community productivity help address local sustainability planning, implementation, and assessment and contribute to the achievement of the SDGs?

In response to the first sub-question, I first identified and discussed debates, challenges, and limitations in urban sustainability theory and practice (paper 1/ Chapter 2). I then studied and integrated contemporary concepts and approaches under the umbrella of a holistic Urban Productivity Framework to explore its potential to address urban sustainability conceptually and operationally (paper 2 / Chapter 3). In response to

the second sub-question, I conducted two in-depth case studies with municipalities in Canada, established opportunities to embed holistic urban productivity in sustainability processes, and formed recommendations for research and practice (paper 3).

This chapter begins with an overview of the research background and methods and continues with synopses of the three papers, an integrated discussion of the findings and their implications, and recommendations for further research and practice. **Overall this research contributes to urban sustainability knowledge and practice by substantiating existing literature and by opening new paths through the proposal of a framework grounded in long-term whole-systems thinking and holistic regeneration of urban assets and resources.**

### **5.1.2. Research methods overview**

To answer the above questions, I started with a review of the literature on sustainable community development and urban sustainability, looking for theoretical roots, conceptual influences, major debates, and current trends. I studied prominent academic articles as well as consulted non-academic sources; all references were evaluated for credibility and soundness, in terms of author, publication venue, content, and methodology. The next step involved a review of the interdisciplinary literature on holistic urban productivity and related concepts and initiatives.

I engaged a mixed-methods, information-oriented case study approach, integrating a participatory process with qualitative and quantitative data collection and analysis (Creswell, 2014; Hermans et al., 2011; Yin, 2014). The research design was a flexible and comprehensive roadmap for conducting the case studies in three stages. In the first stage, I identified the two municipalities as my in-depth case studies and prepared research protocols. In the second stage, I collected data on each case study from numerous archival sources, 30 semi-structured interviews, observations of 16 City Council meetings, and more than 40 consultations with municipal staff and community members. I also conducted a multi-level exercise mapping municipal goals against the SDGs to explore the potential of localizing the SDGs. Finally, the third research stage consisted of data analysis, further conceptual discussion with urban sustainability and regenerative sustainability experts, and dissertation writing.

## **The case studies**

The units of analysis in my research were two municipalities in Metro Vancouver, British Columbia: the District of North Vancouver (DNV) and the City of Maple Ridge (CMR). The two cities present similarities in population, surrounding natural environment, and suburban character, and differences in household income and educational level (both are higher in DNV). The CMR is a family-oriented community east of Vancouver and has a vibrant local economy and affordable industrial land and real estate. The DNV is one of three municipalities on Metro Vancouver's North Shore; it shares key infrastructure and partners in the delivery of some services. Both are fast growing communities (DNV also has First Nations reserves) and work toward becoming prosperous, inclusive, supportive, and respectful of their diverse populations and natural environment (City of Maple Ridge, 2014; District of North Vancouver, 2011).

The two cities and their respective Community Foundations kindly provided part of the case study research funding through Mitacs Accelerate, an arrangement that allowed me to regularly work at each City Hall and engage frequently with municipal staff and processes. I was able to hold interviews and have many discussions in person, while also observing Council meetings and participating in staff meetings. These in-depth case studies provided me with valuable insights and experiential knowledge while allowing the collection of as much information as possible. To fulfill my commitments to the municipalities, I provided customized recommendations for sustainability planning and assessment.

## **5.2. Overview of the three main papers**

### **5.2.1. Paper 1 (chapter 2)**

This paper contains an overview of literature and practice of sustainable community development (SCD) and urban sustainability; it identifies, discusses, and critiques weaknesses and limitations. It partly responds to the first research sub-question ("How can the concept of community productivity contribute to sustainable community development theory?") by establishing the gaps in SCD theory and practice. It was published in the journal *Sustainability* in September 2020 (Spiliotopoulou & Roseland, 2020b).

## **Overview of paper 1 (chapter 2)**

The origins of the concept of sustainable development can be traced to social and environmental justice discourses of the 18th and 19th centuries, while contemporary views are thought to have emerged following conferences and influential publications of the 1970s-1980s. SD gradually took its current shape after the 1987 Brundtland Commission report, the 2000 UN Millennium Development Goals, and the 2002 Johannesburg Summit, but became more widespread since the universal agreement on the UN SDGs in 2015. The SDGs offer an integrated vision and plan through at least 2030 and the full set is also applicable at the local level.

This research focuses on sustainability in cities which are often considered as a component of the problem and offer opportunities and solutions for both local and global system issues (Elmqvist et al., 2018). Similarly to SD, urban sustainability seeks to integrate environmental, social, and economic considerations in complex urban development processes (Roseland, 2012). It has been influenced by broader SD theories, such as ecological modernization, environmental justice, systemic thinking, and resilience, and locally relevant intellectual traditions and movements of the last two centuries, such as eco-localism, social ecology, self-reliance, bioregionalism, and native worldviews (Robinson, 2004; Roseland, 2000; Williams & Millington, 2004).

One of the major conceptual debates in SCD literature is the weaker-to-stronger sustainability spectrum between those who seek to change the supply side of resources and those who seek to change the demand side (Williams & Millington, 2004). Weak sustainability favors an anthropocentric worldview that dictates economic and resource efficiencies through technology and innovation to minimize environmental impact and enhance resource management. Strong sustainability argues that natural resources are finite and not always substitutable and therefore economic growth should not be an end in itself (Dernbach & Cheever, 2015). SCD leans toward strong sustainability perspectives: preserving adequate amounts of natural assets, avoiding terminal damage to critical ones, and consciously seeking to address social issues through sustainable local development and self-reliance (Roseland, 2012).

These theories and concepts are operationalized through a broad range of urban agendas, with that of the sustainable city being the most frequently occurring; others are: ecocity, smart city, resilient city, knowledge city, low-carbon city, ubiquitous city, green

city, compact city, and livable city (De Jong et al., 2015). A sustainable city can be broadly described as a complex and dynamic community that strives for intergenerational and intragenerational equity and optimized socio-economic benefits within ecosystem constraints (De Jong et al., 2015; Roseland, 2012).

As scholarly literature observes, weaknesses in urban sustainability result mostly from its application rather than from its meaning or definition. Many agendas lack interdisciplinary thinking or use climate action as a sustainability proxy while pursuing economic growth, leading to siloed implementation and sustained inequity (Dernbach & Cheever, 2015; Garren & Brinkmann, 2018; Joss et al., 2015). Urban sustainability plans are also often implemented within mainstream planning, investment, and operations and may be impaired by issues such as NIMBYism (“not in my back yard”), lack of sufficient resources and political will, community fragmentation, inter-city competition, technological efficiency interests, and climate change vulnerability (De Jong et al., 2015; Dernbach & Cheever, 2015).

Other obstacles to implementation include lack of stakeholder coordination, corruption in local politics, greenwashing or ‘cosmetic environmentalism’, and inadequate mandate and financing of local governments (De Flander, 2014; Robinson, 2004). In addition, collecting data has become an end in itself, but it is not clear if or how all this monitoring and reporting improves decision-making and encourages community change (Kaika, 2017). Such issues can lead to lost opportunities, lack of credibility, and increased public scepticism (Cairns et al., 2015; Roseland, 2012).

Despite the debates and weaknesses, SCD could represent a new way of thinking about and planning for long-term development. The SDGs, the New Urban Agenda, the abundance of other urban agendas and networks, and the growing calls for climate action offer a window of opportunity for new methodological tools to help communities achieve their sustainability goals (Kaika, 2017; Spiliotopoulou & Roseland, 2020a). In practice, SCD has in recent years started embracing initiatives in social, green, and circular economy, just and collective action, local resilience, and self-reliance (Agyeman, 2008; Connelly et al., 2013; Folke, 2006; Jackson & Victor, 2011; Robinson & Cole, 2015).

### **5.2.2. Paper 2 (chapter 3)**

This paper explores the concept, principles, and practices of holistic urban productivity as an emerging theory in SCD. It also introduces a conceptual framework for urban productivity and completes the response to the first sub-question (“How can the concept of community productivity contribute to sustainable community development theory?”) by proposing ways to address the weaknesses identified in urban sustainability. It was submitted to the journal *Local Environment: The International Journal of Justice and Sustainability* in September 2020 and is currently under review.

#### **Overview of paper 2 (chapter 3)**

Managing the urban commons sustainably requires more bottom-up initiatives and movements, new policies (but not necessarily new technologies), and new narratives beyond the growth/degrowth discourse (Hamman, 2017; Kaika, 2017). Integrated and forward-looking decision-making can support a transformation from the currently dominant individualistic approach of impact reduction and resource extraction to the systemic approach of urban systems restoration and co-production (Spiliotopoulou & Roseland, 2020a). While it is clear that such transformation will not be achieved in one day, cities need guidance toward sustainable, meaningful, and synergistic and resource-constrained decision-making.

The emerging SCD concept of holistic urban productivity can help cities address constraints and create fundamental changes in urban processes to achieve optimization and regeneration of tangible and intangible assets. Although productivity is historically associated with economic and other resources, urban productivity is interdisciplinary, multi-dimensional, and grounded in strong sustainability principles.

Conceptually, holistic urban productivity is informed by numerous theories and approaches, including traditional forms of knowledge that have been left out of the sustainability discourse in the past. These include: Total Factor Productivity; urban metabolism, resource regeneration, and circularity; urban ecosystem restoration and biophilia; urban fabric optimization through regenerative design and low ecological footprint; regenerative sustainability through holistic and collaborative planning; socio-cultural equity, justice, and connection; inclusive decision-making and commons co-managing processes; and above all whole systems thinking to converge all the above

and help identify synergies for urban transformations (Beatley, 2017; Diez, 2017; Ellen MacArthur Foundation, 2017; Elmqvist et al., 2019; Girardet, 2015; Mang & Reed, 2019; McLaren & Agyeman, 2017; Moore & Rees, 2013; Raworth, 2017; Robinson & Cole, 2015; Thomson & Newman, 2018; Wahl, 2016; Wolfram, 2016; Woo et al., 2014).

Operationally, urban productivity has manifested in the form of context-specific or sector-specific projects that are not siloed; each one's positive impact extends across multiple community dimensions and stakeholders. Initiatives such as restorative justice programs, reclaimed and regenerated spaces, free community-run libraries, innovation districts with green space and transit hubs, social innovation and sharing economy, and inclusive training for young entrepreneurs, can be found worldwide, from Vancouver, Canada, and Kigali, Rwanda, to Copenhagen, Denmark, and Medellín, Colombia.

In practice, cities develop sustainability plans often aided by one of many available frameworks and tools that support local sustainability decision-making (Joss et al., 2015). For this research, I consulted many tools for local sustainability planning, implementation, and assessment; I particularly drew inspiration from the Community Capital Framework and Tool, a versatile and scalable instrument designed to support decision-making at all stages (Roseland, 2012). Other tools included the UN SDGs, the Global Resilient Cities Network, ISO37120 Sustainable cities and communities, LEED v4.1 Cities and Communities, the International Eco-City Standards, the EU Reference Framework for Sustainable Cities, and the Canadian Community Well-Being Index. Not all tools however address urban challenges with a systemic approach and attention to collective action, social inclusion, and equity (Du Plessis, 2012; Joss et al., 2015; McLaren & Agyeman, 2015).

In this paper I introduced the concept of holistic urban productivity that can help cities identify the underlying causes of current unsustainable paths and tackle procedural, institutional, and other challenges in a transformative and systemic manner to restructure their systems. I also proposed a holistic framework that supports restoration and balanced optimization of all urban assets and resources: socio-cultural, natural, economic, physical, and human.

The Urban Productivity Framework includes a set of four interconnected principles: whole-systems, future-oriented, and long-term thinking; equity and justice

through solidarity, sharing networks, and collective efforts that respect diversity; urban co-production and inclusive governance that embraces local and traditional forms of knowledge; and (re)generation of tangible and intangible urban assets. The foundational principle, systemic thinking, is what distinguishes this framework from the typical – economic and efficiency-based – view of productivity.

Enhancing and sustaining holistic urban productivity entails investment by ideally all community actors to build and implement a vision that includes productivity goals. Examples of such goals include: local biodiversity restoration; regenerative urban food systems; equity, justice, and safety; individual and collective resilience; lifelong learning and skills development; happiness and personal fulfillment; renewable energy; technological connectedness; material resource circularity; diversified employment; inclusive local economy, and living affordability. To measure progress and identify synergies for transformative action, I also propose indicators for the productive, regenerative, and socio-cultural aspects of the community, to be used in addition to the more mainstream sustainability indicators.

On a final note, context matters when planning for and implementing urban productivity strategies and actions. Political and other priorities and goals differ, as do issues and decision-making processes, so best practices may not be transferable or easily implemented in every community (Roseland & Spiliotopoulou, 2017). While trade-offs may be unavoidable to some extent, contextual analysis and broad societal collaboration can make synergies visible, so that operationalization of urban sustainability through holistic productivity goals and action becomes inclusive and adaptive.

### **5.2.3. Paper 3 (chapter 4)**

In this paper, following an overview of literature and practice of urban sustainability and holistic urban productivity, I briefly discussed the potential of the Urban Productivity Framework to address sustainability processes and outcomes. I then presented empirical research findings that shed light on perceptions and challenges in urban sustainability planning, implementation, and assessment, and discussed implications, opportunities, and recommendations. By offering conceptual and operational insights for effective and forward-looking decision-making through

application of the holistic urban productivity principles, the paper responds to the second sub-question (“How can the principles and practices of community productivity help address local sustainability planning, implementation, and assessment and contribute to the achievement of the SDGs?”). It is currently being prepared for submission to the journal *Cities: The International Journal of Urban Policy and Planning*, without the text on localizing the SDGs which is being published separately as a chapter in an edited book (Spiliotopoulou & Roseland, 2021).

### **Overview of key concepts**

SCD implementation has been widely informed by weak sustainability theory that assumes indefinite economic growth with efficiencies and innovation compensating for ecological damage (Dernbach & Cheever, 2015; Williams & Millington, 2004). Local sustainability policies and projects are still influenced by eco-efficiency and cities still widely perceive SCD as an environmental and resource management framework; this has led to fragmented and siloed planning and implementation of goals that citizens and their governments often consider conflicting (Benson & Craig, 2014; Garren & Brinkmann, 2018; Spiliotopoulou & Roseland, 2020b).

Despite signs of a gradual shift toward approaches inclusive of socio-ecological considerations, comprehensive tools are needed to guide cities toward balanced goal achievement and to increase stakeholder involvement in transparent processes throughout the entire policy cycle. Many of the existing tools, however, do not analyze urban sustainability with a whole-systems, full-process, equitable, and future-oriented approach to ensure success in achieving sustainability goals (Joss et al., 2015; McLaren & Agyeman, 2017; Tanguay et al., 2010).

Analysis of the literature reveals three main issues: the multitude of available methods depending on sustainability interpretations; the importance of contextual factors and timescales beyond electoral cycles; and the dilemma between a reductionist (few indicators for many topics) and a holistic approach (many indicators for comprehensive understanding) (Bond et al., 2013; Cohen, 2017; Joss et al., 2015; Leach et al., 2017; Tanguay et al., 2010). There is a consensus, though, that effective indicators should be: relevant, meaningful, measurable, timely, consistent, scale appropriate, participatory, flexible, and systemic, while also striving to measure intangible goals and assets (Bond

et al., 2013; Costanza, 2014; Helliwell et al., 2020; Holden, 2013; Joss et al., 2015; Meadows, 1998; UN SDSN, 2014).

After studying the theoretical foundations of holistic urban productivity and consulting numerous sustainability frameworks and tools, I designed the Urban Productivity Framework whose niche lies at the intersection of its four principles discussed in paper 2 (systemic, long-term thinking; equity and justice; urban co-production and governance; and (re)generation). The holistic urban productivity concept and framework can help a city at various stages of the policy cycle by planning ahead holistically and assessing outcomes and policy impact.

### **Overview of the empirical findings**

Contextual research before and during the case studies revealed three types of shared challenges: social, infrastructural, and economic. Social issues focused on the interconnected topics of housing stock inadequacy and unaffordability and homelessness. The housing market problem is common across B.C.'s Lower Mainland and is often a driver of unaffordability in other community aspects of life such as childcare, public transit, and education. In 2021, housing diversity and affordability remain a priority for both City Councils.

Infrastructural issues focused on local water and sewage systems (increasing costs of maintaining and replacing them) and transportation challenges (public transit inadequacy, road congestion, and other issues due to long commutes to other cities for work). Finally, economic issues revolved around the shortage of work opportunities as local economic activity cannot keep pace with population increase. Interviewees mentioned the insufficiency of incentives for local economic activity, the lack of diverse and well-paid employment positions, and the gradual loss of industrial or agricultural activity to other sectors.

Many participants described their city as a “bedroom community” for Vancouver and a “creature of the province”. The latter statement is directly connected to the legislative context of local government in Canada. While federal and provincial governments share powers and responsibilities under the Constitution Act of 1982, local governments do not have constitutional status (Tindal et al., 2016). Provinces delegate powers to local authorities and, along with the federal government, they influence local

matters directly through funding and strategies for immigration policy, infrastructure, housing, and transportation.

Five major sustainability-related themes and some miscellaneous findings emerged from the case study data analysis:

a. Perceptions on sustainability and urban sustainability

About half of the interviewees linked sustainability either to infrastructure or environmental impact reduction and one third viewed it as a commitment to future generations and the continuation of current plans into the future. The overwhelming majority agreed that the most important urban capitals were the physical and natural, closely followed by the human, social, and economic. Similar perceptions of weak, one-dimensional urban sustainability were also noticeable in Council and staff meetings; sustainability was referred to as the ability to financially maintain municipal humanmade infrastructure. Finally, I asked participants a question in which I used holistic urban productivity language to describe a future city vision without naming the concept or the framework. They considered all vision aspects highly desirable but not necessarily feasible; comments on urban economic, physical, social, human, and cultural aspects hid some pessimism explained through the dependence on provincial and federal authorities for mandate and funding.

b. Perceptions related to systemic and long-term thinking

Systemic thinking was not mentioned in the case study data explicitly but was sparsely implied, for instance, in comments about interactions among policies, potential consequences from heavily focusing on one city aspect, and the need to adopt policies that promote balanced community development. Many interviewees noted that decision-makers usually do not connect the dots among issues nor with the larger picture, i.e., the Official Community Plan or national and international goals. A recurrent theme was about municipal departments often operating in silos, guided by their own specific priorities and path dependencies, without necessarily considering the impact of their work on other policies or coordinating with other departments. Another common thread was the perception of citizens as customers which has contributed to a separation of the city into two components: local government (the city corporate) and the wider community. Finally, many interviewees spoke about short-termism in their city with

results such as reactive and fragmented priorities and insufficient citizen involvement. Several interviewees added that Council should think in horizons that are much longer than electoral cycles.

c. Barriers linked to local government powers and responsibilities

Related to both previous themes, several interviewees expressed their perceived inability to influence decision-making, particularly regarding policies about intangible or not easily measurable aspects or in sectors that are not entirely within the local government's purview. A common view was that sustainability processes can be hindered by a limited, service delivery mandate which regulates municipal resources and capacity levels accordingly; the obstacle most frequently mentioned was the availability and allocation of funds. Interviewees mentioned repercussions such as policy-making inflexibility and a slow-moving governmental system.

d. Progress assessment

Most interviewees agreed that a regular sustainability assessment would greatly affect decision-making and that such a tool would provide value if used to evaluate strategic documents such as the Official Community Plan and area plans, but it could become onerous if applied to every development application. More than half of the interviewees preferred to measure sustainability progress toward set policy goals and targets and to compare to a baseline assessment of their own city. Also, their most preferred attributes of a sustainability tool were user-friendliness, communicability, and resonance with the community. Overall, they wanted an intuitive, transparent, flexible, visual, and interactive tool, easy to embed in municipal operations, independent from electoral cycles, and consistent with community values. Also, in discussions about the potential use of holistic urban productivity indicators in the two cities, despite the initially positive reactions most participants raised objections to adopting such indicators in practice due to obstacles related to data timeliness and availability, and human and financial resources. Expert staff however offered valuable feedback on the definitions and units of measurement of the holistic productivity indicators discussed, thus helping me further refine them. Finally, participants generally agreed that data collection and management should require minimal effort, with streamlined and efficient measurement processes to overcome problems of limited mandate, short-termism, and other constraints on municipal capacity.

e. Findings on localizing the Sustainable Development Goals

The complex SDG mapping exercise extended along three levels of decision-making (goals, targets, and indicators) within three frameworks: the SDGs, the Community Capital Tool, and those in the two municipalities. Major DNV and CMR policy goals aligned fully or quite extensively with less than half of the SDGs, with similar results at the target level where very few of the many recommendations in municipal strategic documents seemed to correspond to actionable and measurable targets like those in the SDGs. Regarding the potential local impact of the SDGs and other international commitments, the main finding was low awareness of non-local matters, linked in part to the complex, multi-level decision-making processes and the municipalities' lack of constitutional status. A recurrent theme was a sense of disconnect from and unaccountability about international agreements seen as aspirational or only as an opportunity to receive funding from higher levels of government.

f. Miscellaneous findings

Positive signs for the future of urban sustainability processes emerged from data analysis as well: some interviewees wanted a sustainability framework to include elements such as connectivity, responsibility, accountability, and ownership; Council in both cities frequently expected or requested staff to search for urban best practices; interviewees were generally in favor of more inclusive and broader citizen engagement to develop some sort of higher-level, well-articulated, flexible, and adaptable vision that would serve as guidance for the entire community in all stages of decision-making. Also, despite the detachment and gaps identified in the SDG mapping work, some participants voiced promising perspectives such as the desire for their city to embrace national and global goals in the future and to use frameworks and tools to achieve sustainability.

### 5.3. Discussion

Two decades into the 21st century, sustainability talks, negotiations, and plans at scales from local to global still do not always lead to meaningful and concrete action.

**The review of urban sustainability literature and practice and the findings from the two case studies helped, firstly, to identify challenges, limitations, and needs and, secondly, to shape the proposed framework and recommendations for cities**

seeking to decouple well-being from economic growth to live within planetary boundaries but needing to overcome structural, legal, political, and perception-related hurdles.

Despite the conceptual evolution, the lack of definitional consensus and shared understanding of sustainability seem to have made the concept less attractive. The struggles in cities globally suggest there is a long road ahead. Scholars argue that SD has been interpreted with an anthropocentric focus and in reality promotes the growth paradigm instead of helping deal with the systemic inequities and natural capital depletion that infinite economic growth causes (Benson & Craig, 2014; Dernbach & Cheever, 2015).

The literature also showed that urban sustainability agendas are often implemented within mainstream municipal planning, investment, and operations, and that policies for climate action or resilience are sometimes employed as a proxy for sustainability (Benson & Craig, 2014; Dernbach & Cheever, 2015; Garren & Brinkmann, 2018; Joss et al., 2015). Also, collecting data to feed it into frameworks has become an end in itself without necessarily helping tackle underlying causes of urban problems, while related processes do not necessarily involve all stakeholders or consider all dimensions in a balanced, inclusive, and future-looking way. Other obstacles include lack of stakeholder coordination and policy coherence, short-termism, greenwashing, and inadequate mandate and financing of local governments (Dernbach & Cheever, 2015; Joss et al., 2015).

The findings from the two in-depth case studies in British Columbia, Canada, demonstrated the profound implications of the lack of a whole-systems approach in practice. Cities are effectively challenged by the difficulties of strategically addressing multiple objectives, meaningfully engaging their citizens, and tracking progress consistently. Data analysis indicated both the existence of factors that hinder sustainability planning, implementation, and assessment, and of those that offer some optimism.

Perhaps the most significant barrier identified in the research data related to weak sustainability perspectives indicating a tendency toward a rather utilitarian (eco-efficiency) approach of resource and community management. Municipal assets usually signified humanmade infrastructure and sustainability perceptions mostly connected to

land use, impact reduction, and infrastructure. Both cities prioritized economic – and to a lesser extent environmental – policies whereas social sustainability concerns (equity, inclusion, safety, etc.) would be discussed almost exclusively in the context of the housing crisis. Such findings are congruent with related literature about SD still viewed as a framework mainly for environmental management (Benson & Craig, 2014; Garren & Brinkmann, 2018).

The other major barrier, directly linked to the above, is insufficient interdisciplinary, systemic, and forward thinking. This could be attributed partly to structural and political factors, such as short electoral cycles (or short-termism), path dependencies, and the Canadian local governments' limited mandate and power; and partly to awareness and interpretation factors, such as the varying and unidimensional understandings of sustainability and the perception of citizens as customers. Systemic analyses may also be undermined by inadequately inclusive consultation processes that can contribute to top-down place-making and the decreased sense of community that research participants mentioned (James, 2015; Webb et al., 2018).

**The case study data analysis has reflected the reality and complexity of urban sustainability decision-making processes in Canada and elsewhere** as described in the literature too (Childers et al., 2014; Spiliotopoulou & Roseland, 2020b; Tindal et al., 2016). Interviewee responses about municipal capacity, sustainability interpretation, and progress assessment suggest that decisions on principles, vision, and priorities need, firstly, to be inclusive of all stakeholders and comprehensive of all community elements and, secondly, to precede and inform decisions on implementation and assessment. Community ownership of vision, goals, and indicators through broad involvement can help increase community support for sustainability plans and action.

The full potential of the sustainability paradigm has perhaps not been reached yet. The points raised offer constructive directions by demonstrating the limitations of sustainability without disproving it. In a gradual shift, a growing number of scholars propose new approaches that can help communities transform into and then sustain well-functioning systems (Childers et al., 2014; Elmqvist et al., 2019; Kaika, 2017; Wolfram, 2016). Perhaps what is required is system-wide coordination, incorporating multi-level and multi-sector governance, flexibility, continuous social learning, and resilience policies to integrate the system's components, functions, and interactions to

achieve a transformation to sustainability (Elmqvist et al., 2019; Macdonald et al., 2018; Meerow & Newell, 2016).

**The emerging concept and the principles and practices of holistic urban productivity offer a multi-disciplinary approach that acknowledges the interdependence of systemic components and enables individual and community well-being.** It can empower urban co-producers to pursue balanced and synergistic optimization of community elements (economic, physical, ecological, socio-cultural, and human) with multiple co-benefits. The proposed Urban Productivity Framework seeks to address many of the issues and act as an overarching framework to help operationalize sustainability systemically and lead the process of transformation. It can inform inclusive and collaborative decision-making processes, whole-systems training for city professionals, and holistic visualization, planning, implementation, and assessment tools for municipalities, citizens, professionals, and other stakeholders.

**A holistically productive city, in a nutshell,** embraces: economic resilience with shifts in employment patterns and habits; socially just, environmentally responsible, and innovative technologies; compact and nature-enhancing land use planning; strong social connections and affordable housing; lifelong learning and co-production of knowledge; and green, light, and smart infrastructure (Brugmann, 2015; Condon, 2019; Girardet, 2015; Spiliotopoulou & Roseland, 2020a; Wahl, 2016). As Tufts University professor Julian Agyeman told me, he “would see [the productive city] as the city that releases human potential” (J. Agyeman, personal communication, December 17, 2018).

The attempt to directly connect the concept and framework of holistic urban productivity with the case studies proved somewhat challenging because of the obstacles discussed in the previous chapter and in this section. However, some findings encouragingly pointed to participants’ openness to embrace well-articulated, long-term goals developed with inclusive citizen engagement and broad support for both a local, shared vision and international agreements. Thus **figure 4.9 links the principles and generic goals of the holistic urban productivity concept and the proposed framework with the research findings to suggest a direction for the future development of cities.**

Cities need to redesign current decision-making that perceives citizens as customers, through application of urban productivity principles of co-production, governance, equity, and justice in urban place-making. To ensure local support and successful implementation, cities are also urged to identify sustainability practices and metrics that can be adapted to their context: local nature, history, values, needs, culture, nature, ways of being, the thousands-of-years relationship of Indigenous people with the land, key patterns of success, core identity, etc. (Mang et al., 2016). In addition, policy coherence among various levels of government and alignment with the country's international commitments can help boost municipal influence over sustainability aspects that Canadian cities now do not necessarily have direct or full control over (Tindal et al., 2016).

The **overarching recommendation** based on my research is that cities should embrace holistic thinking in sustainability planning, implementation, and assessment by:

- focusing more on systemic evaluation of outcomes and policy impact;
- finding synergies among policies and stakeholders in all sectors;
- incorporating ecosystems in their asset management policies;
- ensuring continuing education for city elected and appointed officials;
- actively and frequently involving all stakeholders in decision-making processes within a whole-systems approach; and
- adopting tools and frameworks such as the holistic Urban Productivity Framework that foster systemic and long-term thinking.

These, combined with recognition and reconciliation, can help release human potential to achieve a well-functioning, sustainable city (C. Strandberg and J. Agyeman, personal communication, December 17, 2018).

## 5.4. Conclusion

No longer do we live in a world empty of us and our waste, but rather in a full one that presents significant implications for current and future generations (Daly, 2005). We must address challenges with a multi-level systems approach that promotes the right to the city, nature-based urban environments, and decreased consumption of non-renewable resources – all without compromising collective and individual health and

well-being. Thanks to contemporary calls for social and environmental equity globally, socio-ecological goals are increasingly included in local decision-making through community-led action and participatory processes (Connelly et al., 2013). Fundamental changes are still required in urban processes to move from current piecemeal approaches and tools limited in scope toward long-lasting urban sustainability and successful implementation of the SDGs.

Through a conventional research design (literature review and case studies), this research aimed to explore the potential endorsement and application of the urban productivity concept, a concept known but never before used as an umbrella term in the field of sustainable community/urban development. The particularity of conducting only two, albeit in depth, case studies and in a Global North country limits drawing definitive generalized conclusions; further research in emerging economies and Global South cities is required. Certainly though, there are lessons that can be applied in communities worldwide, with attention to their local context. Overall, participant responses indicated that an integrated, forward-thinking framework is desirable despite tools, laws, politics, and perceptions that make holistic urban productivity goals less feasible.

**This dissertation contributes to urban sustainability conceptually and empirically by substantiating existing literature and by opening new paths through the proposal of a framework grounded in long-term whole-systems thinking and holistic regeneration of urban assets and resources.** While research findings on limiting perceptions and obstacles overall support the literature, data analysis also provided insights that helped enhance the Urban Productivity Framework and develop recommendations for municipalities in Canada and beyond and for further research. Contribution is also made to the discourse on integrated sustainability assessment through goals and metrics for socio-cultural and human urban assets that cannot be easily measured. Cities would make more robust decisions if they welcomed visioning, networking, learning, connection and relationship building, and compassion tools that reflect the non-quantifiable part of the sustainability picture.

**Further research is required in order to establish inclusive, equitable, user-friendly, transparent, and consistent methods for holistic system analyses** of urban stocks and flows, including not only energy and materials but also social and

human capital and population. Future urban sustainability and holistic productivity research needs to emphasize outcomes such as:

- urban asset optimization (especially human and socio-cultural);
- systemic assessment of policy impact;
- ecological function restoration in cities; and
- ecologically wise use and regeneration of local resources in conjunction with local deep decarbonization and decrease of non-renewable resource use.

Additional studies in collaboration with more cities worldwide can further refine the Urban Productivity Framework, test its components, goals, and metrics, and ensure its scalability and broad applicability. This framework's suggested goals could be converted into questions and specific tools to help reveal community values and needs as well as synergies to increase capacity for sustainability transformation. **Expansion with case studies globally can help promote the systemic viewpoint of holistic urban productivity – and by extension strong sustainability principles – to help establish a transition toward urban space co-production and co-management with effective and inclusive decision-making processes.**

Cities have enormous productivity potential not only in terms of economic and labor productivity (diverse and inclusive economy, fostering innovation), but also of social productivity (hubs of research, learning, and sharing) and ecological productivity (ecological function regeneration and efficient use of resources) (Roseland & Spiliotopoulou, 2017). The “productive city, the sustainable, resilient, smart, the sharing city, are all works in progress. They are all experiments. There is no conclusion.” (J. Agyeman, personal communication, December 17, 2018). **The urban productivity path can help achieve local and global goals toward well-functioning systems that humanity can then sustain while living within the Earth's carrying capacity.**

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# Appendix A.

## Research methods details

### A1. Literature review methods

The traditional, theoretical literature review presented in Chapter 2 (Paper 1) started with the study of two groups of academic literature: a) my senior supervisor's book *Toward Sustainable Communities* and related papers he authored or co-authored (e.g., Connelly et al., 2013; Roseland, 2000, 2012) and; b) seminal work on SCD and urban sustainability by scholars such as Julian Agyeman, Peter Newman, Bogachan Bayulken, Philip Berke, Simon Joss, Herbert Girardet, Meredith Hamstead, Mike Hodson, and Paul James.

The next step was a thorough search for academic literature using Simon Fraser University Library's search tool<sup>7</sup>. I first looked for peer-reviewed papers with broader search terms such as "sustainable community development", "sustainable community development theory", "urban sustainability", "environmental justice", "sustainable cities", "local sustainability case studies", "building sustainable communities", "sustainability debates", "urban systems" (and "systems theory"), "sustainability frameworks", "urban sustainability agendas", "local sustainability plans", and "urban sustainability assessment" (and indicators).

Then I looked for literature using search terms that were more specific to the theories and concepts I had identified in the previous steps, e.g., "weak and strong sustainability", "community economic development", "just sustainability", "social economy", "green economy", "circular economy in cities", "urban metabolism", "urban governance", "collaborative planning", "sustainability economics", "sustainability transitions" (also "sustainability transformations" and "urban transformations"), and "urban resilience".

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<sup>7</sup> The current web link for the SFU library's search tool is: <https://sfu-primo.hosted.exlibrisgroup.com/primo-explore/search?vid=SFUL&sortby=rank>

In an iterative way and while studying prominent articles and their reference lists, I also followed the snowballing method to identify related academic literature. In addition, I explicitly looked for debates and discourses in the local and/or urban sustainable development literature, but also on broader debates regarding sustainable development. In some cases, I deemed useful to consult non-academic sources such as scientific reports, international organization documents, handbooks, or edited books. I evaluated the resources for credibility and soundness, in terms of author, methodology, content, and publication venue.

The traditional, theoretical literature review for Chapter 3 (Paper 2) built on the review for Paper 1, as explained right above, with an additional component of argumentative review. Seeking for academic literature on holistic urban productivity and the concepts underpinning it, I conducted a thorough search using Simon Fraser University Library's search tool<sup>8</sup>. I first looked for academic literature with search terms such as "urban productivity", "economic productivity" (and "labor productivity"), "resource productivity", "social productivity", "ecological productivity", and "urban regeneration".

Based on the results, I then expanded the search using terms such as "resource regeneration", "regenerative sustainability", "sharing economy", "regenerative development", "total factor productivity", "urban metabolism", and "urban resilience". Similarly to the previous paper, I followed the snowballing method to some extent in this paper as well. In addition, I explicitly looked for debates and discourses in the fields of the concepts and approaches underpinning holistic urban productivity and consulted several non-academic sources.

In search for conceptual feedback and breadth of views, I also interviewed internationally recognised experts in urban sustainability, sustainable community development, productivity, and regeneration. Acclaimed scholars and practitioners provided added value to this research by offering comments on the concept and practice of urban sustainability and insights on local challenges in planning for and evaluating sustainability and on the concept of urban productivity. These were:

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<sup>8</sup> The current web link for the SFU library's search tool is: <https://sfu-primo.hosted.exlibrisgroup.com/primo-explore/search?vid=SFUL&sortby=rank>

- Julian Agyeman, Professor of Urban and Environmental Policy and Planning in Tufts University
- John Robinson, Professor and Presidential Advisor on the Environment, Climate Change and Sustainability at the University of Toronto
- Coro Strandberg, Business sustainability strategist and thought leader
- Daniel Christian Wahl, Sustainability educator and whole systems consultant

## **A2. Case study research methods**

The overall **case study research design** is based on Yin's approach for multiple-case study design with replication logic (Yin, 2014). The multiple-case design with in-depth study of each case presents advantages that can lead to high degree of robustness: collection of compelling evidence, immersion in the system and context of the case, and extensive study and understanding of interactions and other dynamics that can offer valuable insights. Disadvantages of this type of design, such as the small number of case studies or the difficulty to generalize the results, can be offset to some extent by the depth and breadth of evidence collected and the extensive analysis that follows.

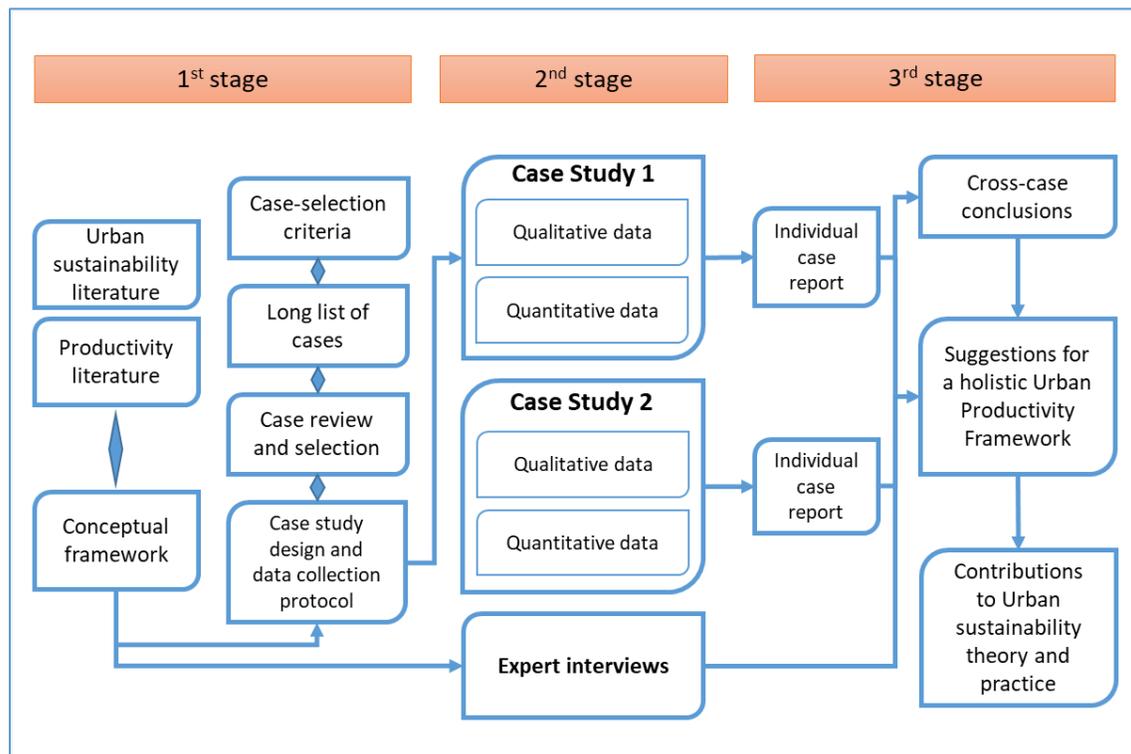
In implementing exploratory and concurrent mixed methods approach, the overall research design (figure A1) provided a flexible comprehensive roadmap for conducting the case studies with the research questions and goals in mind (Creswell, 2014; Guest, Namey, & Mitchell, 2013). The first stage of the case study research included: defining the units of analysis as cities/municipalities, conducting an initial search for potential cases and compiling a list of cities in Canada and in British Columbia, and preparing data collection instruments and protocols.

In the second stage, restrictions in available resources (time and funding mainly) were taken into account for the selection of case studies. I therefore focused on Metro Vancouver, British Columbia, and conducted two in-depth case studies in two municipalities that expressed interest in hosting me as an intern: the City of Maple Ridge (CMR) and the District of North Vancouver (DNV).

The two cities and their respective Community Foundations kindly provided part of the case study research funding through Mitacs Accelerate. This arrangement allowed

me to spend 1-3 days per week at their premises and engage directly and meaningfully with municipal staff and processes. In the District of North Vancouver, I worked from within the Community Planning department for approximately 6 months (January – June 2018) and in the City of Maple Ridge I was part of the team of the Manager of Sustainability and Corporate Planning for approximately 9 months (January – September 2017).

Shortly after finishing data collection in each case study, I submitted a case report to the municipality and other involved stakeholders, as part of stage three in the overall research design. The report included an account of the internship tasks and methods, preliminary findings, and recommendations for embedding sustainability in municipal policy documents and decision-making practices. Lastly, it is worth noting that the conceptual framework for holistic urban productivity was developed through an iterative process informed both by the literature (chapter 3 / paper 2) and the findings of the two case studies (chapter 4 / paper 3).

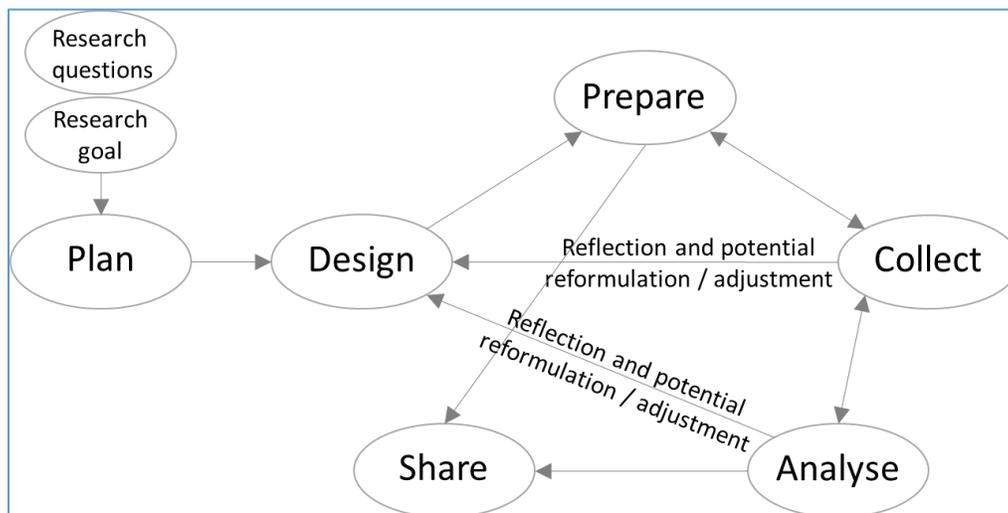


**Figure A1. Overall research design.**  
Original graph.

## Case study design

For each case study I followed an iterative approach inspired by Yin's model (2014) with elements from David & Sutton (2011). As shown in figure A2, the case study design was informed by the research questions and the overall research goals. It is embedded in an integrated framework based on Maxwell's "interactive model of qualitative research design" as shown in section 1.6. (Maxwell, 2013).

The initial stage included the design and drafting of the case study protocol (see Appendix B), an important research instrument containing the procedures and other guidelines for the researcher to follow during data collection (Yin, 2014). The next step was taken once the case studies were identified: submission of the required documentation for the Research Ethics approval and for funding from Mitacs Accelerate. The Research Ethics application "with minimal risk" was approved by SFU on May 7, 2017 for the first case study and on November 27, 2017 for the second case study, and was renewed on May 4, 2018 to cover the last two months of data collection in case study two. Another Research Ethics approval was obtained on November 6, 2018 for the interviews with key informants which were separate from the two case studies.



**Figure A2. Case study design as an iterative approach.**  
Adapted from Yin (2014).

## Data collection and analysis

In the two municipalities and within a mixed methods approach, I primarily collected qualitative data by engaging elected and appointed officials, expert staff, and community members, through the following sources of evidence:

- semi-structured interviews (guided by open-ended questions and a few close-ended questions);
- structured observations of City Council meetings;
- high-level policy document review and analysis, and study of local context; and
- participation in group meetings with city staff and community representatives.

A series of meetings with key staff provided me with valuable contextual information (local needs, issues, trends, politics etc.) as well as perspectives on various aspects of localizing sustainability indicators and the importance of progress assessment in relation to Council directions to staff. I met with departments such as Planning or Community Planning, Parks and Recreation, Public Works, Economic Development, Information Technology, Engineering, and Emergency Services (Fire and Police). Through these meetings, the subject-matter experts largely contributed to my understanding of indicator contextual meaningfulness, policy jurisdiction, data availability, data sources, existing targets, municipal capacity, etc.

In addition, in the District of North Vancouver, I also briefly became involved in the 2017-2018 Official Community Plan Implementation Monitoring Committee (OCP IMC) which is composed of community members and whose purpose is to provide comments on OCP implementation (consistency of vision, goals, and actions), monitoring (ensuring meaningful and appropriate indicators), and communication with the public.

In total, I:

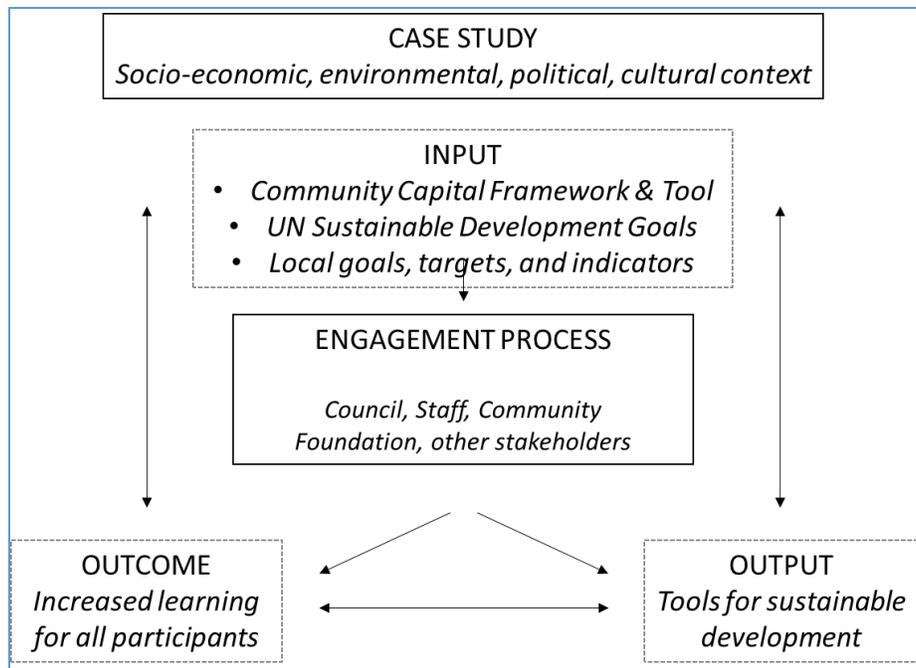
- conducted 30 semi-structured interviews with elected officials (Councillors) and appointed officials (city senior management, i.e., department directors and managers) – 14 in the District of North Vancouver and 16 in the City of Maple Ridge (out of the 18 and 21 people I contacted respectively);

- consulted 36 subject-matter expert staff in both municipalities in semi-structured interview meetings and in follow-up meetings mostly related to monitoring and progress assessment;
- observed 16 Council meetings (10 in CMR and 6 in DNV), several of which involved at least some citizen participation (e.g., Committee of the Whole forum) or some staff participation through presentations to Council and discussions of current issues (e.g., Council Workshops);
- engaged with more than 40 community members through the local Community Foundations<sup>9</sup> or other meetings and workshops and the DNV OCP IMC; and
- reviewed the Official Community Plans of the two cities and other strategic or major policy documents such as the Corporate Strategic Plan, the Sustainability Action Plan (CMR), the Transportation Plan, Parks and Open Space Plan (DNV), Environmental Management Strategy (CMR), Affordable Housing Strategy (DNV), Housing Action Plan (CMR), etc.

Thanks to this inclusive participatory process, I had the opportunity to explore and identify the perceptions of stakeholders on needs and gaps in existing policies and processes, and document their preferences and ideas regarding the linkages between global and local sustainable development, assessment tools, and visions for the future; I also received their direct feedback for my research on sustainability frameworks and the development of the holistic Urban Productivity Framework. Figure A3 illustrates the methodological model of the participatory process used in in both case studies.

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<sup>9</sup> Community foundations manage private endowments to provide local projects with funding for initiatives that benefit the community (Community Foundations of Canada, n.d.).



**Figure A3. Contextual and methodological model of participatory process.**  
Adapted from Hermans, Haarmann, & Dagevos, 2011.

For reasons of pluralism, validation, and interdisciplinarity, qualitative methods were complemented with the collection of some quantitative data in the form of a “nested arrangement” (Creswell, 2014; Maxwell, 2013; Yin, 2014). The quantitative data were obtained through a short survey component in the interviews (closed-ended questions with Likert-scale, forced-choice, or check-all-that-apply responses – seen in Appendix B1) and a study of social, economic, environmental, political, and cultural contextual information from archival sources such as Statistics Canada, BC Stats, BC Assessment, BC Hydro, local health authorities, and the cities’ own archival records. The overall goal was to establish a picture of each city’s context and sustainability situation and to evaluate their capacity to source reliable and timely sustainability data.

The concept and principles of holistic urban productivity were discussed in the case studies without explicitly mentioning the term “productivity” to ensure that participants would not immediately associate it with economic and labor resources only (as is commonly the case) and that I would receive responses on *all* aspects of urban productivity. As the framework presented in paper 2 was still in the draft stage of its development during the case studies, it was *indirectly* discussed in the interviews or in other conversations with participants: I would either use holistic productivity language

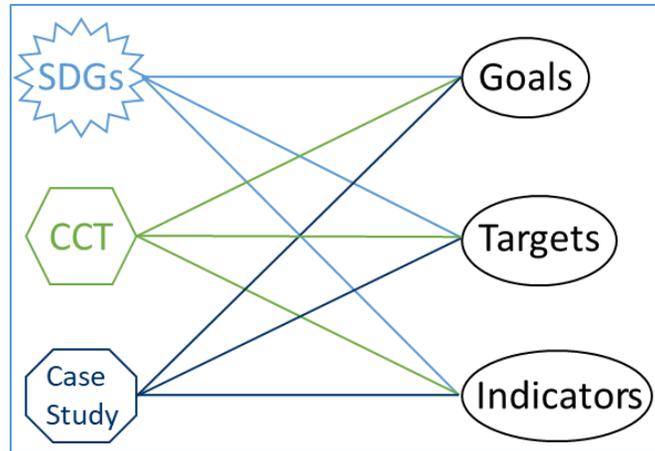
and concepts (but again, not the term “productivity” itself) or discuss and receive feedback on holistic productivity goals and metrics.

In parallel, information was collected with regard to the local understanding and implementation of the UN Sustainable Development Goals (SDGs). The objective was to assess existing policy goals and targets, identify gaps and needs, and offer customized policy and metrics recommendations that would help align local and global goals, while providing valuable data for my research. I conducted a complex SDG-Local Goals matching and mapping exercise, modeled on the work done in San Jose, New York, and Baltimore within the USA Sustainable Cities Initiative (USA-SCI) under the guidance of the Sustainable Development Solutions Network (SDSN) (Nixon, 2016; Prakash et al., 2017). As shown in figure A4, the mapping extended along three levels of decision-making within three frameworks: I compared the goals, targets, and indicators of the SDGs with those of the Community Capital Tool (CCT, explained in chapter 3) and those of the two case studies<sup>10</sup>.

For this task, I followed a similar process to the one described by Ruckstuhl, Espey, & Rae (2018) and the steps in Mesa, Edquist, & Espey (2019), despite conducting this work before these two documents were made available. I first studied the official community plans and other major policy and strategy documents to locate local goals and targets and identify core values and principles. I then compared local goals and targets with the SDGs and their targets (excluding SDG 17 on global partnerships as largely not applicable) and with the CCT capitals and stocks. Finally I compiled lists of existing sustainability and other performance indicators in the two cities and compared them with the CCT and the SDG indicators. The evidence collected provided valuable insights regarding the extent to which high-level policy documents incorporated a systemic approach regarding the community and its goals for the future.

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<sup>10</sup> An SFU Master of Resource Management Planning student, Danny Ross, was also involved in this part of the DNV project (Ross, 2018).



**Figure A4. The extent of mapping of the two cities' goals, targets and indicators with the Sustainable Development Goals and the Community Capital Tool.**

Original graph.

For additional validity, insights, and conceptual feedback, I also conducted a number of **interviews with internationally-recognized experts** in urban sustainability, productivity, and regeneration. Following a careful consideration of potential interviewees, I shortlisted seven experts based on my review of the literature and practice of urban productivity. Four responded positively:

- Julian Agyeman, Professor of Urban and Environmental Policy and Planning in Tufts University
- John Robinson, Professor and Presidential Advisor on the Environment, Climate Change and Sustainability at the University of Toronto
- Coro Strandberg, Business sustainability strategist and thought leader
- Daniel Christian Wahl, Sustainability educator and whole systems consultant

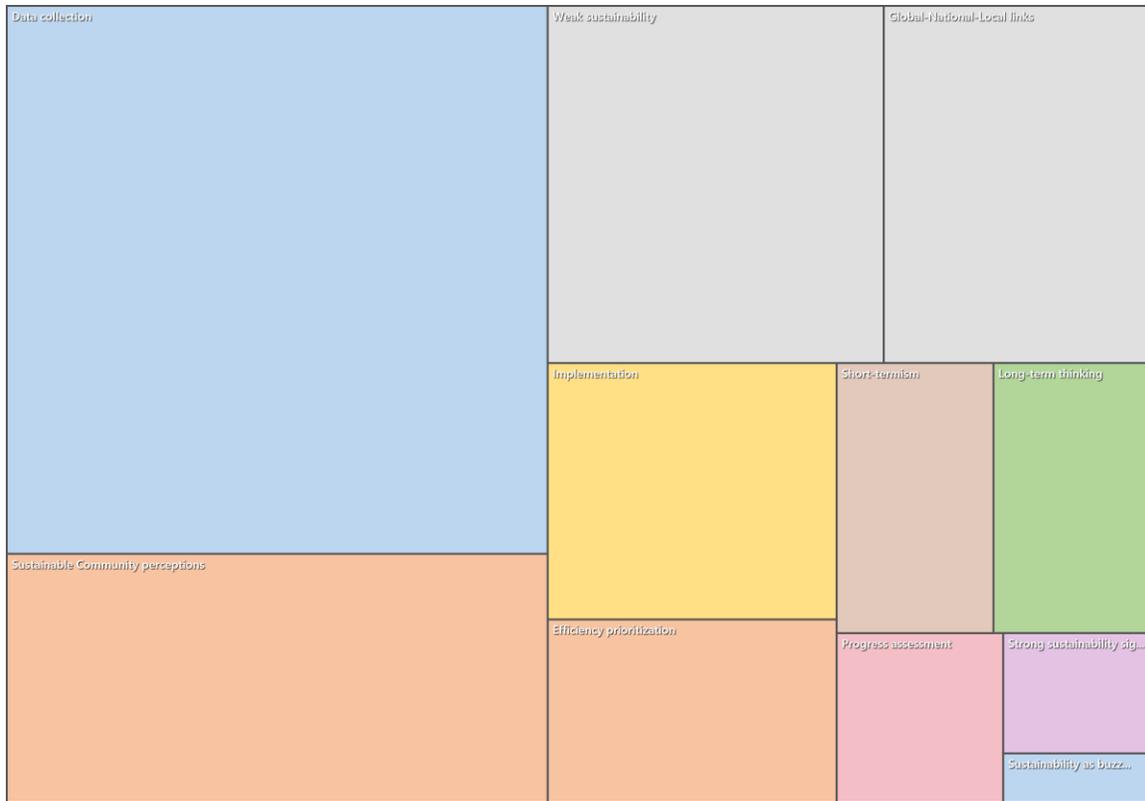
I interviewed the experts via Skype call, using a small set of questions as a guide while being open to unstructured conversation (Appendix B). I recorded these interviews and I transcribed (verbatim) and analysed them in NVivo. Expert interview data were analysed initially deductively but primarily inductively: deductive nodes included “views on governance”, “systemic thinking”, “sustainability assessment”, “social productivity”, and “views on decision-making processes”, while inductive nodes included “examples – best practices”, “silos – barriers”, “urban transformation”, “net-positive approach”, “importance of localization”, and “quotes”. These interviews informed the conceptual

discussion and offered insights on how holistic urban productivity can address urban sustainability challenges.

**Quantitative data** from the survey component in the interviews consisted mostly of Likert-scale responses to closed-ended questions (see Appendix B1). The analysis of quantitative data started with data entry and continued with aggregation by case study and use of descriptive statistics, first within each case study and then with all data from both case studies (please also see the last paragraph below). Microsoft Excel was used for quantitative data entry, cleaning, and aggregation and Tableau was used for data exploration, interpretation, and visualization.

The bulk of data collected were qualitative (interviews). I transcribed interviews verbatim myself and analysed data using the software NVivo. As a preliminary exploration of data (as also suggested by the university librarian I consulted), I attempted NVivo's "autocoding" which however had poor (i.e., not so useful) results: automatically-generated nodes included "sustainable", "development", "government", and "planning".

The general strategy for **qualitative data analysis** was inductive, as deemed suitable for exploratory case study research, although it involved an important deductive element as well. Firstly, I manually conducted a *deductive* data analysis by coding based on theoretical propositions and literature. As seen in the tree map below (figure A5), NVivo nodes included "efficiency prioritization", "weak sustainability", "strong sustainability", "global-national-local links", "long-term thinking" and "short-termism", "sustainability as a buzzword", "progress assessment", and "implementation issues". In this context, data analysed confirmed and reinforced the existence – and helped explore the extent – of contemporary challenges and shortcomings in sustainability planning, implementation, and progress assessment.



**Figure A5. Hierarchy chart of the deductive analysis coding.**

The size of each rectangle indicates the number of coding references. Generated in NVivo (unfortunately the small font size is due to NVivo 12 not supporting changing font size in charts).

Then I employed *inductive* thematic analysis which was iterative to some degree; data collection was generally temporally separate from analysis, although preliminary analysis of data from case study 1 contributed to refining the data collection process for case study 2 without altering the case study design. While I started the inductive analysis with coding that corresponded to each interview question, I soon realised that this would not be a fruitful strategy; several findings and issues seemed to appear across questions. I therefore went on to new inductive coding with NVivo nodes that included “examples”, “storytelling”, “systemic thinking signs”, “data collection”, “multi-level decision-making processes”, “social sustainability”, “cultural sustainability”, and roles of Council, staff, and citizens in sustainability decision-making and assessment (see also tree map below). I applied analytic techniques such as: pattern exploration and pattern matching (comparison with the literature and theoretical predictions); explanation building (linking theory, patterns, and findings); and cross-case synthesis for more robust research findings.



**Figure A6. Hierarchy chart of the inductive analysis coding.**

The size of each rectangle indicates the number of coding references. Generated in NVivo (unfortunately the small font size is due to NVivo 12 not supporting changing font size in charts).

With regard to **validity threats** such as researcher bias and researcher reactivity (Maxwell, 2013; Yin, 2015), biases based on my previous experience and occasional reactions during interviews (e.g. spontaneous nodding) could have affected interviewee responses and my interpretation thereof. In dealing with such biases and reactions during data collection, first of all professionalism and research ethics principles were followed at all times. Secondly, several validity tests were used during data analysis:

- cross-referencing qualitative data from interviews with quantitative data from interviews, contextual information, and archival records;
- examining plausible rival explanations that might be due to researcher bias or reactivity or potentially social or other trends external to the study; and
- taking advantage of my long-term involvement in each case study to triangulate data to consider multiple perspectives and if possible verify processes or facts (Marshall & Rossman, 2010; Maxwell, 2013; Yin, 2014).

Finally, it is important to note that following an initial analysis through NVivo and MS Excel, most data (quantitative and qualitative) were combined in one dataset for two reasons: *firstly*, to ensure confidentiality and anonymity, as the number of participants in each case study was limited and potential identification of elected or appointed officials with the findings should be avoided per research ethics, and; *secondly*, because the initial comparative analysis clearly showed that on most occasions the answers and opinions of participants from the two case studies completely converged (with the exception of some findings as detailed in chapter 4 / paper 3).

# Appendix B.

## Data collection instruments

### B1. Case study interview protocol

**PI: Maria Spiliotopoulou, PhD Candidate**

**Study # 2017s0174**

#### **Introduction – about the project**

This project is called **Studying sustainability planning and performance assessment in Canadian communities** and it is part of my doctoral research at Simon Fraser University's School of Resource and Environmental Management. My faculty supervisor is Dr. Mark Roseland, professor in REM and director of the Centre for Sustainable Development. The project is being funded by Mitacs Accelerate and the North Shore Community Foundation.

Through this research, we want to enhance theory and practice for local community sustainability and we seek input from local government officials such as yourself. Your participation is voluntary – you have the right to refuse to participate or withdraw at any time. Your confidentiality will be respected and no identifying information will be disclosed to anyone but me and the faculty supervisor. For research quality purposes, this interview will be audio-recorded unless you wish otherwise.

#### **Instructions and information**

I will ask you a series of questions regarding the concept of sustainability and how it may or may not apply in your city when it comes to planning for it as well as monitoring and assessing progress towards the city's sustainability-related goals.

Do you have any questions for me at this stage?

I will now start recording.

## Questions

1. How would you define sustainable development or sustainability?
  - a. What is your take on the UN Sustainable Development Goals?
  - b. Do they influence your thinking regarding the future of local communities? If so, how?

2. What is a sustainable community for you?

3. In the process of developing a sustainable community, how would you prioritize these aspects? *Please rate (not rank) each aspect on a scale from 1 to 5 (1 being not important and 5 being of utmost importance):*

1	Environment / nature, food systems, resources, biodiversity	
2	Social aspect / citizenship, governance, community character, safety	
3	Human capital / education, health and well-being	
4	Culture / heritage, arts & culture, identity & diversity	
5	Economic aspect / labour, competitiveness, government fiscal health	
6	Physical assets / infrastructure, transportation, energy, housing, waste management	
7	Other aspects ....?	

4. Again on the same scale (1 being not important and 5 being of utmost importance), how you rate the importance of a community having a shared vision and goals for its sustainability? \_\_\_\_\_
5. Keeping the above aspects in mind, how sustainable do you believe your city is right now?

6. For you, what is the role of ..... in setting sustainability goals, measuring progress and achieving these goals:
  - a. ... Council and Councillors
  - b. ... Staff (senior and other staff)
  
7. How would you rate (on a scale from 1=very easy to 5=very difficult) the effort for a city to collect data to measure progress towards sustainability goals? \_\_\_\_\_
  
8. Do you believe your city has the required capacity to conduct sustainability assessment at a regular basis? (human resources, technology, funds, etc.)  
  
If yes, please explain:  
  
If no, what would it take to reach the required capacity?
  
9. Would you want to see a sustainability assessment tool used at various levels and for various documents and initiatives in your city? (e.g. for every development application, major development applications, programs, policies, annual plans, master plans, the OCP?)
  - a. If yes, how would you want to see it used?
  - b. How do you think such a tool could be used effectively?
  
10. [On a similar scale, from 1=no impact to 5=highest impact] how would you rate the impact of a regular sustainability assessment on a city's decision-making processes?

11. What would you say is the best way of benchmarking for your city? [*choose one option*]

- a. Measuring progress towards set policy goals and targets? (relative)
- b. Measuring progress against scientifically-based sustainability targets? (absolute)
- c. Comparing to a baseline assessment of the city's sustainability? (relative)
- d. Comparing to other municipalities in the region / in Canada / abroad? (relative)
- e. Other way?

12. What characteristics would you want a sustainability assessment framework to have in order for you to recommend it for use in your city? E.g. in terms of:

- a. user-friendliness
- b. cost (to acquire and/or use)
- c. time required to use it
- d. type of output(s) (graphical, text, format, etc.)
- e. scalability (applicable in a variety of levels)
- f. communicability (internal and external)
- g. tool reputation/credibility
- h. adoption by other municipalities in Canada or internationally
- i. resonance with the community
- j. other \_\_\_\_\_

13. Keeping your city in mind, how would you rate the following “city visions” in terms of feasibility and desirability (1=not feasible/desirable at all – 5=fully feasible/desirable):

Vision for the city	Desirable	Feasible	Comments
Diversified employment; commercial and investment opportunities.			
Energy largely/mostly through renewable resources; economical infrastructure; green/passive buildings; waste as a resource.			
Healthy community; encourages lifelong learning, from pre-school through to seniors' programs.			
Neighbours know each other; people are connected through strong community organizations and networks.			
Natural resources the city depends upon (e.g. forests, water) are well-maintained and restored/enhanced.			
Vibrant local arts, history and traditions.			

**I would like to sincerely thank you for your time and your valuable input.**

**I will now end the recording.**

**I remain at your disposal for any clarification.**

## B2. Council observation form

Date:	
Time:	
Place:	
Event:	
Duration:	
Docs/Links/Other info:	

Sitting chart:


Appearance, behavior, gestures, personal space, interactions etc.

Mayor	
Councilor 1	
Councilor 2	
Councilor 3	
Councilor 4	
Councilor 5	
Councilor 6	

VOTING F (in Favour) or O (Opposed)

Item # (agenda):																				
Mayor																				
Councilor 1																				
Councilor 2																				
Councilor 3																				
Councilor 4																				
Councilor 5																				
Councilor 6																				

Traffic		
People who stand out & why		
Agreements, disagreements, debates, group dynamics		

Alignment with the big picture?

Do they mention OCP, vision, master plans, strategies, objectives, targets?	Do they mention any measurements for the objectives, targets, etc. (e.g. are things improving in terms of this/that...)?
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Discussing short-term (this year), medium-term (1-3 yrs), or long-term (5-10 yrs)?


Capitals/Stocks-related comments & positive/negative/neutral

	<b>Capital OR Stock</b>	+	-	0	Notes		<b>Capital OR Stock</b>	+	-	0	Notes
1	<b>Natural Capital</b>					14	<b>Economic Capital</b>				
2	Land					15	Labour				
3	Soil					16	Financial resources				
4	Groundwater					17	Economic structure				
5	Surface water					18	<b>Human capital</b>				
6	Air					19	Education				
7	Minerals & Non-Renewables					20	Health & Well-being				
8	<b>Physical Capital</b>					21	<b>Social capital</b>				
9	Infrastructure					22	Citizenship				

10	Land					23	Safety				
11	Transportation					24	<b>Cultural capital</b>				
12	Housing & living conditions					25	Cultural Heritage				
13	Public Facilities					26	Identity and Diversity				

Descriptive notes (topics discussed, etc.)


Reflective notes (speculations, feelings, pbs, ideas, hunches, impressions)


Miscellaneous notes, e.g. respect of formal decision-making processes?

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## **B3. Expert interview protocol**

### **Introduction – about the project**

This project is called **Studying productivity planning and performance assessment in communities** and it is part of my doctoral research at Simon Fraser University's School of Resource and Environmental Management (REM). My faculty supervisor is Dr. Mark Roseland, Director and Professor, School of Community Resources and Development at Arizona State University, and Professor Emeritus in REM. Through this research, we want to enhance theory and practice for local community sustainability by studying the concept of community productivity and we seek input from experts in the field of sustainable community development. Your participation is voluntary – you have the right to refuse to participate or withdraw at any time. If you opt for non-disclosure of your identity, your confidentiality will be respected and no identifying information will be disclosed to anyone but me and the faculty supervisor. For research quality purposes, this interview will be audio-recorded unless you wish otherwise.

### **Instructions and information**

I will ask you a series of questions regarding the concept of productivity and how it may or may not apply at the city level, particularly when it comes to planning for it as well as monitoring and assessing progress towards a city's sustainability-related goals.

Do you have any questions for me at this stage?

I will now start recording.

### **Questions**

1. The terms “productive city”, “regenerative city”, “net-positive city”, and “circular urban metabolism” are sometimes used interchangeably in the context of urban sustainable development theory and practice.

1a. What is your understanding of these terms - do they have similar or different meanings?

1b. Do you think the "productivity" approach can resonate with local governments and their citizens?

2. In the literature and in practice, social and human productivity are not as widely-used or as well-defined as economic, ecological and resource productivity. Do you think it's possible for a city to be socially productive? How would you characterize social productivity at a city scale?
3. How can communities embrace and move toward a long-term sustainability or productivity approach in the context of short-term financial and political costs? (e.g. dealing with waste within city boundaries, using waste as a resource instead of shipping it elsewhere)
4. An issue that came up a lot in my case studies with local governments is related to multi-level decision-making: very often decisions on important local issues lie - partly or fully - with a higher level of government (regional, provincial/state or federal). Do you think urban productivity reasoning and systems thinking can be integrated in decision-making processes that involve multiple levels of actors with complementary responsibilities?
5. Most cities conduct some kind of regular assessment which is not necessarily linked to sustainability or productivity principles or goals. If a city conducted a holistic, multi-criteria sustainability or productivity assessment regularly, what do you think its impact would be on the city's decision-making?

- None
- Limited
- Moderate
- Significant
- Transformative

Why?

6. What attributes should an urban productivity assessment tool have in order to be used effectively by local governments and their citizens? (please select all that apply)

- user-friendliness
- low cost (to acquire and/or use)
- little time required to use it
- accessible type of output(s) (graphical, interactive, etc.)
- high scalability (applicable in a variety of levels)
- high communicability (internal and external)
- tool reputation/credibility
- adoption by other municipalities in Canada or internationally
- resonance with the community
- quick and easy data collection process
- alignment with current political priorities
- other \_\_\_\_\_

6a. [Julian Agyeman] In your book "Sharing Cities" you talk about managing community assets as "shared commons". How can this approach help cities become socially productive?

**Final Thank-You statement:** I would like to sincerely thank you for your time and your valuable input! I will now end the recording. I remain at your disposal for any clarification.

## Appendix C.

### Frameworks and tools consulted

The main sustainability frameworks and tools consulted for this research are (in no particular order):

- **The Community Capital Framework and Tool:** It was designed by the Centre for Sustainable Development, Simon Fraser University, Canada, and Telos, the Brabant Center for Sustainable Development, Tilburg University, Netherlands, to support whole-systems decision-making. It recommends the balanced improvement of six community capitals: natural, physical, economic, human, social, and cultural. It comprises the Scan that evaluates policy impact on community health and the Balance Sheet for monitoring and reporting. (<https://cct.susdev.sfu.ca/>)
- **The UN Sustainable Development Goals:** As the global development agenda for 2030, the SDGs are a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity. Countries, communities, and other actors can use the 17-goal framework, with its 169 targets and numerous indicators, to align their sustainability priorities and vision with the global agenda. It includes SDG 11 for “inclusive, safe, resilient, and sustainable cities and human settlements”. (<https://sdgs.un.org/>)
- **LEED v4.1 Cities and Communities:** STAR Communities merged with the US Green Building Council’s LEED for Cities program to create a new rating system for communities of all sizes. Core categories of measurement range from natural systems and water efficiency to energy and quality of life. LEED v4.1 helps plan and design new communities or implement best practices in existing cities and communities. (<https://www.usgbc.org/leed/rating-systems/leed-for-cities>)
- **Global Resilient Cities Network:** Formerly “100 Resilient Cities”, pioneered by the Rockefeller Foundation, this is a city-led, impact-focused, regionally-driven, and partnership-based network. The network focuses on helping cities become more resilient to physical, social, and economic challenges, including acute shocks and chronic stresses, and uses the City Resilience Framework, originally developed by ARUP, which describes urban systems in four dimensions: Health & Wellbeing; Economy & Society; Infrastructure & Environment; and Leadership & Strategy. (<http://www.100resilientcities.org/resources/>)
- **ISO37120 Sustainable cities and communities – Indicators for city services and quality of life:** Developed by the International Organization for Standardization, it comprises indicators to measure the performance of city services and quality of life. Applicable to any city, irrespective of size and location, it can be used along with ISO37101 Management system for

sustainable development in communities, ISO37104 Transforming our cities, and ISO37105 Descriptive framework for sustainable cities and communities. (<https://www.iso.org/standard/68498.html>)

- **Community Well-Being Index (Canada):** A method of assessing socio-economic well-being in Canadian communities. Various indicators of socio-economic well-being, including education, labour force activity, income and housing, are derived from Statistics Canada's Census of Population and combined to give each community a well-being score. These scores are used to compare well-being across First Nations and Inuit communities with well-being in other Canadian communities. (<https://www.sac-isc.gc.ca/eng/1100100016579/1557319653695>)
- **Community Foundations of Canada Vital Signs:** Community Foundations of Canada (CFC) is the national network for Canada's 191 community foundations that work together to help build strong and resilient communities. CFC's Vital Signs program leverages local knowledge to measure the vitality of Canadian communities annually and support action toward improving collective quality of life. Communities can choose the indicators that respond to their own needs and interests. (<https://www.communityfoundations.ca/initiatives/vital-signs/>)
- **EU Reference Framework for Sustainable Cities:** RFSC supports the delivery of the Leipzig Charter and the European vision for tomorrow's cities and helps develop and implement integrated urban sustainability plans and strategies. The framework comprises 30 objectives divided under five dimensions: spatial, governance, social, economical, and environmental. (<http://rfsc.eu/>)
- **Living Community Challenge:** A framework for master planning, design, and construction, LCC is a call to action to governments, campuses, planners, developers, and neighbourhood groups to create connected and regenerative communities. It was developed by the International Living Future Institute and is organized into seven performance areas: place, water, energy, health and happiness, materials, equity, and beauty. (<https://living-future.org/lcc/>)
- **International Eco-City Standards:** An initiative of Ecocity Builders and the International Ecocity Advisory Committee, the framework offers an innovative vision for an ecologically-restorative human civilization and a practical methodology for assessing and guiding progress. It has been designed as a diagnostic tool for both cities and citizens and is composed of 18 standards under four pillars: urban design, bio-geophysical conditions, socio-cultural features and ecological imperatives. (<https://ecocitystandards.org/>)
- **The Natural Step's Framework for Strategic Sustainable Development:** The international network of non-governmental organizations that compose The Natural Step International use this framework as a comprehensive model for planning in complex systems. It is based on a whole-systems approach to assess sustainability using a four-step method: Awareness and visioning, Baseline mapping, Creative solutions, and Decide on priorities, with tools such

as gap analysis, principles development, and backcasting.  
(<https://www.naturalstep.ca/sustainability>)

- **BREEAM Communities:** BREEAM Communities seeks to improve and measure the social, environmental, and economic sustainability of large scale development plans by integrating sustainable design into the masterplanning process. It also provides certification based on scores in eight categories and compared to predefined sustainability objectives and planning policy requirements. (<https://www.breeam.com/discover/technical-standards/communities/>)
- **One Planet Living & One Planet Cities:** Based on ten principles, this framework is designed to support the creation of a “one planet action plan” as a route map toward a more sustainable future for an organisation. It uses two headline indicators: Ecological Footprint and Carbon Footprint. Other factors are also important, such as access to clean water, education, economic activity, and pollution. (<https://www.bioregional.com/projects-and-services/influencing-wider-change/one-planet-cities>)
- **The Green City Index:** A research project conducted by the Economist Intelligence Unit and sponsored by Siemens. It sought to focus attention on the critical issue of urban environmental sustainability by creating a unique tool that would help cities benchmark their performance and share best practices. (no longer active)
- **The Bellagio Sustainability Assessment and Measurement Principles:** BellagioSTAMP was developed in 2008 by a group of international experts meeting in Bellagio, Italy, led by IISD and the OECD's Measuring the Progress of Societies initiative. It included a set of high-level principles used to guide the measurement and strategic assessment of progress toward sustainability. (no longer active)
- **The Foundation for Sustainable Area Development tool:** The Foundation for Sustainable Area development developed a compact tool to quickly, yet thoroughly, assess an area with a set of sustainability indicators. The tool was primarily based on BREEAM and influenced by LEED and Estidama. It covered the following comprehensive issues: Synergy, Resources, Spatial development, Socio-economics and Climate. (no longer active)
- **Eco<sup>2</sup> Cities: Ecological Cities as Economic Cities:** This was a sustainable urban development initiative launched by the World Bank as an integral part of its Urban and Local Government Strategy. Its objective was to help cities in developing countries achieve greater ecological and economic sustainability in synergy. It worked through application of an analytical and operational framework that could be customised for a given context/city. (no longer active)

## Appendix D.

### Proposed indicators to measure holistic urban productivity

This list contains sample progress assessment indicators based on the holistic Urban Productivity Framework introduced in chapter 3. Each indicator is accompanied by a proposed definition and unit of measurement. Please note that this list is flexible and not exhaustive and that, while some indicators were proposed for use in the case study municipalities, most indicators were not tested in practice due to data, resource, and other constraints mentioned in chapter 4.

Urban Productivity Aspect	Indicator	Suggested definition	Suggested unit
Natural	Biodiversity	The average score of local ecosystems based on BC's Sensitive Ecosystem Inventory	score
Natural	Species total	Total number of species counted	#
Natural	Red list species	Red list species	#
Natural	Urban community gardens	Community gardens: number of plots per 1,000 residents in the urban containment boundary	
Natural	Growing space per dwelling unit (or apartment / condo)	Area of dedicated growing space per dwelling unit (or apartment / condo)	m <sup>2</sup>
Natural	Municipal water loss	The total estimated amount of municipal water volume that is unaccounted for by the end of the pipe	%
Natural	Tree canopy cover / Urban forest	Percentage of the municipal area that is covered with trees	%
Physical	Energy-efficient homes	Energy labels	score
Physical	Solar capacity	Percentage of energy generated in the city from solar panels	%
Physical	Mix of use	Measured by Walk Score, a publicly available, third party walkability index	index
Physical	Compact development	Compact development is measured using for example LEED ND calculation points for density per acre, for a total score out of 6	score
Physical	Rate of urban development	Ratio of dwelling unit growth within the urban containment boundary compared to the dwelling unit growth outside the urban containment boundary	%

<b>Urban Productivity Aspect</b>	<b>Indicator</b>	<b>Suggested definition</b>	<b>Suggested unit</b>
Physical	Rental Supply	CMHC purpose built rental completions (including non-profit housing) less apartment demolitions, plus estimated rented condos plus rented secondary suites plus newly rented single detached/duplex/row houses. These were allocated to income categories (low income, low to moderate, moderate to high). [based on Metro Vancouver indicators for the Regional Affordable Housing Strategy 2016]	
Socio-cultural	Volunteering	Percentage of population who are volunteers	%
Socio-cultural	Confidence in government	Percentage of residents who state their confidence in the local government and political institutions	%
Socio-cultural	Public accountability	Percentage of residents who believe there is transparency in the municipality	%
Socio-cultural	Citizen satisfaction with municipal services	Percentage of citizens satisfied with Municipal Services/Perceived Value of Services	%
Socio-cultural	CERP demographics	Participation demographics/distribution in the Community Engagement Research Panel	
Socio-cultural	Social support	Average of people that each resident can count on in case of need or emergency (citizen survey)	#
Socio-cultural	Social cohesion	Percentage of people who respond positively in questions about sense of belonging, sense of trust, and community involvement	%
Socio-cultural	Healthy neighborhood development grants	Number of Neighborhood Seed Grants for programs and tools that assist in strengthening neighborhoods	#
Socio-cultural	EOC & ESS exercise frequency	Training & plans exercises every 3-5 years (based on best practices) (loosely worded @ BC Province level) [EOC = Emergency Operations Centre, ESS = Emergency Support Services]	#
Socio-cultural	Safe urban environment	Percentage of residents who report feeling safe walking alone at night in the area where they live	%
Socio-cultural	Cultural access / participation	Estimated attendance at the largest public cultural event/festival in the city	#
Socio-cultural	Cultural programming	Participation rate in cultural programming	%
Socio-cultural	Libraries	Percentage of citizens having an active library card	%
Socio-cultural	Museum visits	Number of visitors in museums in the last year	#

<b>Urban Productivity Aspect</b>	<b>Indicator</b>	<b>Suggested definition</b>	<b>Suggested unit</b>
Socio-cultural	Public art	Annual investment in public art (as posted in the budget) OR Investment in public art: \$/sq.m. of buildable area	\$
Socio-cultural	Discrimination in justice	Perceived level of discrimination in criminal justice system felt by minority residents	#/100000 residents
Economic	Innovation	Number of patent applications	#
Economic	Organic farming	Percentage of produce that is organic	%
Economic	Creative Industry	Share of jobs in the so-called creative industry	%
Economic	Work opportunities for people with developmental disabilities	Number of hours of work and training	#
Economic	Average commute-to-work time	Average amount of time spent on commuting to work, measured in median commuting duration	minutes
Economic	Green procurement (municipality)	Percentage of city's budget dedicated to procurement of environmentally friendly goods and services	%
Human	Lifelong learning	Training apprentices as percentage of the workforce as defined by StatsCan	score
Human	Availability of doctors	Number of doctors practicing in the city, per 1,000 residents	#
Human	Children who Regularly Meet Daily Physical Activity Guidelines	Percentage of children who regularly meet daily physical activity guidelines	%
Human	Perceptions of physical health	Percentage of 19 years and over that describe their own health as 'good' or 'very good'	%
Human	Perceptions of environment	Percentage of residents who feel they have access to nature, and are satisfied with the city's pollution, conservation, and preservation efforts	%
Human	Time balance	Percentage of residents who feel they have sufficient time to complete tasks, enjoy leisure time and activities	%
Human	Life satisfaction	Percentage of people who state that are satisfied or very satisfied with their life	%
Human	Positive/negative experience	Balance of responses to "During the past four weeks, how often have you felt the following moods/emotions?" (see GNH Index calculation)	%
Human	Access to recreation facilities	Participation in recreation and leisure programming (based on citizen survey)	%
Human	Material well-being	Percentage of residents who feel they have personal financial security, and that their basic needs are met	%

<b>Urban Productivity Aspect</b>	<b>Indicator</b>	<b>Suggested definition</b>	<b>Suggested unit</b>
Human	Mental well-being	Percentage of residents who feel optimistic, positive, purposeful, and have a sense of accomplishment OR Number of poor mental health days for the average resident in past 30 days	%
Human	Satisfaction with neighborhood	Percentage 'satisfied' or 'very satisfied' with the neighborhood	%

## Appendix E.

### Research dissemination

This research has been disseminated in the following publications and conferences:

- Spiliotopoulou, M., & Roseland, M. (forthcoming, 2021). Making the SDGs Relevant for Cities: Using the Community Capital Tool in British Columbia. In King, L. O., & Iyer, S. (Eds), [\*Promoting the Sustainable Development Goals in North American Cities: Case Studies and Best Practices in the Science of Sustainability Indicators\*](#), Springer Nature.
- Spiliotopoulou, M., & Roseland, M. (forthcoming, 2021). Achieving community happiness and well-being through community productivity. In Cloutier, S. (Ed), *Linking Sustainability and Happiness: Theoretical and Applied Perspectives*, Springer Nature.
- Spiliotopoulou, M., & Roseland, M. (2021). Urban Sustainability via Urban Productivity? A conceptual review and framework proposal. *Manuscript submitted to a peer-reviewed journal*.
- Spiliotopoulou, M. (2020, November). *Making the SDGs Relevant for Cities: Using the Community Capital Tool in British Columbia*. Presented at the Virtual [Conference](#) of the Association of Collegiate Schools of Planning.
- Spiliotopoulou, M., & Roseland, M. (2020). [Urban Sustainability: From Theory Influences to Practical Agendas](#). *Sustainability*, 12(18), 7245.
- Spiliotopoulou, M., & Roseland, M. (2020). [Theories and concepts influencing sustainable community development: introducing the concept of community productivity](#). In Phillips, R. (Ed), [The Research Handbook on Community Development](#), Edward Elgar Publishing.
- Spiliotopoulou, M. (2019, June). *Sustainable Community Development through the conceptual lens of productivity*. Presented at the 4<sup>th</sup> International [Conference](#) on Public Policy (ICPP) (International Public Policy Association), Concordia University, Montreal QC, Canada.
- Spiliotopoulou, M. (2019, June). *Sustainable Community Development through the conceptual lens of productivity*. Presented at [Congress 2019](#), Vancouver B.C., Canada.

- Roseland, M., & Spiliotopoulou, M. (2018). Sustainability in North America: the Canadian experience. In Brinkmann, R., & Garren, S. (Eds), [\*The Palgrave Handbook of Sustainability: Case studies and practical solutions\*](#) (pages 635-652). Cham, Switzerland: Palgrave Macmillan.
- Roseland, M., & Spiliotopoulou, M. (2017). [\*Sustainable Community Planning and Development\*](#). In Abraham, M. (Ed.), *Encyclopedia of Sustainable Technologies*. Amsterdam, Oxford, Cambridge: Elsevier.
- Spiliotopoulou, M. (2017, June). *Sustainability planning and performance assessment in the City of Maple Ridge, BC*. Presented at the [Community Indicators Consortium](#), Winnipeg, Canada.
- Spiliotopoulou, M. (2017, May). *Studying sustainability planning and performance assessment in Canadian communities*. Presented at the [C2UExpo](#), Vancouver, Canada.
- Roseland, M., & Spiliotopoulou, M. (2016). [\*Converging urban agendas: Toward healthy and sustainable communities\*](#). *Social Sciences*, 5(3), 28.
- Spiliotopoulou, M. (2016, June). *Sustainable Community Development through the lens of urban productivity*. Presented at the 6th Urban Studies & Planning International [Conference](#), Athens, Greece.
- Roseland, M., & Spiliotopoulou, M. (2015, October). *Sustainable Community Development through the lens of urban productivity*. Presented at the Biennial Conference of the Canadian Society for Ecological Economics & United States Society for Ecological Economics, Vancouver B.C, Canada.