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Conceptualizing the Urban Circular Economy: Understanding the formal-Informal continuum in London, Ontario, Canada

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A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in
Geography and Environment

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Abstract

This research study delves into the contribution of formal and informal practices to the local urban circular economy in London, Ontario, Canada. The circular economy (CE) aims to foster a sustainable economy by closing resource, energy, and materials loops. While there is existing research on formal large-scale industrial activities within the CE, there still is a significant gap in understanding the role of informal CE activities in driving greater CE efforts. This study examined grassroots CE initiatives undertaken by local stakeholders and assesses their significance in promoting urban sustainability. A CE inventory captured a comprehensive overview, documenting 152 actors and events over seven months. This inventory facilitated visualizing formal, informal, and formal-informal continuum networks. The analysis revealed the prominence of the informal network, which, unfortunately, suffers from limited interconnections, thereby hindering its growth.

To address the limited growth plaguing informal CE, the need for more partnerships between formal and interconnected actors to foster the development of the informal CE is required. Key stakeholders, including city staff, business owners, members of local environmental non-profits, and residents, participated in semi-structured interviews (11 informants in total). Thematic analysis was conducted to analyze the interview data and construct a narrative of the urban CE in London, Ontario. Despite the diversity of formal and informal informants, most informants (n=7) identified a top-down power structure at play, attributing the most influence and power to the municipal government in driving environmental sector changes. This research contributes to a deeper understanding of the interplay between formal and informal practices within the urban CE. It highlights the importance of informal initiatives in advancing

urban sustainability. The findings emphasized the need for collaboration, partnerships, and attention between formal and informal actors to foster a thriving informal CE network.

Keywords: urban circular economy, formal practices, informal practices, urban sustainability, top-down power structure, municipal government, local stakeholders.

Summary for Lay Audience

This research examines how formal and informal practices contribute to the local urban circular economy in London, ON, a mid-sized city in Ontario, Canada. The Circular Economy (CE) aims to transform the economy into a sustainable economy by closing resource, energy, and materials loops. Examples included buying second-hand clothing or swapping, using recycled materials in production processes, and reusing building materials in construction. However, most CE studies have focused on formal, large-scale industrial activities. Comparatively, little is known about informal CE activities and how grassroots, locally organized initiatives contributed to greater CE efforts. This project examined grassroots CE initiatives undertaken by local stakeholders and identified the significance of these activities for urban sustainability.

A CE inventory was constructed to identify events and stakeholders that offer opportunities to participate and engage with the CE. This inventory captured 152 events and stakeholders over seven months. This inventory was then used to create formal, informal, and formal-informal continuum (holistic) networks using social network analysis approaches. These networks were then analyzed, which showed that the informal network was larger than the formal network but lacks connectivity. In contrast, the formal network was well-connected. The CE sphere has limited growth. Where partnerships between formal and well-connected actors could help develop the informal CE.

This study also used semi-structured interviews featuring open-ended questions to determine key stakeholders' motivations, perceptions, and participation in the CE. A total of 11 interviews were conducted with informants, including city staff, business owners, members of local environmental non-profits, and residents. These stakeholders engaged in CE-related activities through work or their lifestyle. Informants were recruited using public-facing

information (e.g., London-area business directories, organizational websites, Facebook groups) and by approaching speakers at public CE-related events, such as London-area talks. In addition to these recruitment methods, connections within the non-profit environmental community were leveraged to recruit informants. Following the semi-structured interviews, a thematic analysis was used to code and analyze the interview data. Interview data was then analyzed to understand the urban CE in London, Ontario. Despite the diverse range of formal and informal informants, the majority (7 out of 11) identified the municipal government as having the most influence and power in driving positive environmental sector changes despite municipal government workers identifying issues with reaching residents and the importance of community groups in educating Londoners. The results of the interviews illustrate the need for increased informal partnerships to continue growing the current urban CE.

Co-Authorship Statement

The work presented in this monograph thesis was in collaboration with my supervisor, Dr. Agnieszka Leszczynski, and my advisory committee members, Dr. Bipasha Baruah and Dr. Michele Buzzelli, who helped conceive and shape the study idea. Dr. Leszczynski, who contributed to the design and provided critical feedback for:

- The implementation of the research.
- The analysis of the results.
- The writing of the manuscript.

I developed all figures and tables by myself with some guidance from my supervisor.

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This thesis is dedicated to Tigger (July 5, 2006-January 30, 2024), who showed persistent strength and perseverance, especially in his final month of life. I miss you more than words can express; thank you for everything, and until we meet again, te amo mucho.

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Chapter 1

1. Introduction

This thesis examines the Circular Economy (CE) at the municipal scale in London, ON, a mid-sized city in Canada. The CE is an interdisciplinary framework and model that strives for sustainable development while implementing climate mitigation and resource protection by "prevent[ing] the depletion of resources, closing energy and material loops, and facilitating sustainable development" (Prieto-Sandoval et al., 2018, p. 613). This research focuses on urban-scale engagement with the CE as it directly impacts the importance of municipal policy and the role of community participation in contributing to sustainability. The CE relies on accessible and viable solutions for consumers to consciously recycle or dispose of materials and low-cost technology to recycle or use recycled material in production. To create a large-scale transformation and adaptation of the CE, all participants, from consumers to manufacturers, must adapt their behaviour. This includes both 'formal' (institutional, regulated, and otherwise highly visible) and 'informal' (grassroots, not-for-profit, unregulated, and otherwise not highly visible) actors, institutions, and entities. The relationship between formal and informal sectors of the London, ON local urban CE is the subject of this research.

1.1. Research Context

As the impacts of climate change are amplified from anthropogenic sources, sustainability efforts have been increasingly important. The increased effects of climate change resulted in multi-scale approaches to tackle climate change, whether through government, policy, or grassroots/non-profit efforts at the global, national, provincial, municipal, and individual levels. These multi-scale approaches have a cascading effect in influencing lower-level policy,

frameworks, and government. At Canada's national, provincial, and municipal scale, we see climate action through large-scale movements such as decarbonization through Net-Zero, a framework aimed at reducing or eliminating greenhouse gases (GHG) manufactured (Abram et al., 2022). In addition to the growing decarbonization movement, we see municipalities tackling climate change through declarations of climate emergencies, such as the one in London, ON¹, which acknowledges the severity of climate change's current and future impacts. Climate declarations raise awareness and allow cities to prioritize climate action through related causes such as decarbonization or a transition to a Circular Economy (CE).

As visualized in **Figure 1.1**, the current linear economy follows a linear pathway from raw material extraction through production and consumption to end-of-life waste (Murray et al., 2015). The contrasting 'circularity' of a circular economy is visualized in **Figure 1.2**. Examples of CE activities include:

- Buying second-hand clothing or swapping;
- Using recycled materials in production processes;
- Re-using buildings and materials in construction.



Figure 1.1. The linear economy as a terminal resource pathway.

¹ <https://london.ca/living-london/water-environment/londons-climate-emergency-declaration>

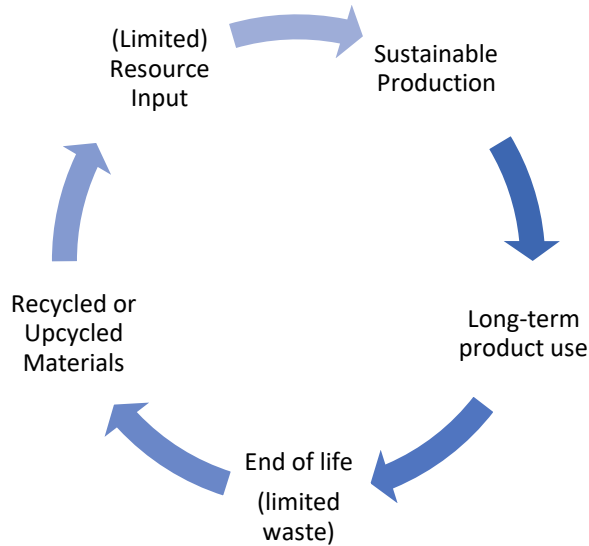


Figure 1.2. The flow of the lifecycle of products in the Circular Economy.

Sustainable production and consumption must undergo a sustainable shift, which involves transitioning to a CE (Dempsey et al., 2011; Murray et al., 2017). Sustainable consumption and production must start with transforming services and products from the manufacturers through the volume, process, materials, waste, and consumers through consumption habits (Cohen & Munoz, 2015). The issue with production and consumption is how sustainability is offered to consumers in these processes. Waste is tied to how or what products are offered to consumers, partly controlled by governments and businesses. Municipalities, such as London, ON, are working towards improving waste management, end-of-life, and second-hand markets through formal policies and programs.

1.2. Research Problem

With an estimated 72% of the global population residing in urban areas by 2030, the need for urban policy is increasingly important (Dempsey et al., 2011). Furthermore, cities are responsible for 70% of GHG emissions globally (Cohen & Munoz, 2015). Top-down CE programs rely on an

external authority figure as a regulatory body (Sauvé et al., 2015). The strain of urbanization and resulting environments draws questions around the role of local policymakers, municipalities, and community groups in the urban CE. As argued in the CE literature, cities are the ideal scale to implement the CE (Cohen & Munoz, 2015; Rutherford, 2007; Clube & Tennant, 2020; Murray et al., 2017). Cities represent an appropriate scale to observe CE-led transformations because they provide ample opportunity to detect and scale transformations (Cohen & Munoz, 2015). Urban-level policies encourage and involve citizens taking a bottom-up approach (Dempsey et al., 2011). Examples of urban-level policies include incentives, engagement opportunities, and access to resources for residents.

This study will take place in London, Ontario, Canada, a mid-sized city home to approximately 543,551 people (Statistics Canada, 2023). The City of London is an ideal place to conduct this research due to the City's commitments to climate change goals. In April of 2019, the City announced a climate emergency. The city will join many other Canadian cities in reaching net zero by 2050 (the City of London, n.d.). London has continuously implemented new programs, policies and funding to meet climate-related goals, such as the London Emergency Climate Plan², the Green in the City speaker series³, and the Million Tree Initiative⁴. The Climate Emergency Action Plan (the City of London, 2022a) identified moving towards a CE through:

Reduced emissions from consumption and waste, more efficient material use, and the creation of regenerative prosperity. Strive for at least 60% waste diversion from landfill through reduced waste generation and improved material efficiency (pp. 31-32).

² <https://getinvolved.london.ca/climate>

³ <https://www.londonenvironment.net/greencity>

⁴ <https://milliontrees.ca/>

1.3. Research Questions and Objectives

My research questions aim to explore and explain the social dimensions of the CE through the lens of informality and the role of different stakeholder groups.

1. What current formal and informal opportunities exist for citizens in London, ON, to engage with the Circular Economy (CE)?; and
2. How do stakeholders perceive and participate in the urban Circular Economy in London, ON, and what motivates them to do so?

The main objectives of this research are to:

- Inventory the nature and variety of formal and informal CE activities in London, ON;
- Document opportunities and motivations for London residents to participate in informal, grassroots CE initiatives;
- Analyze key London-area stakeholders' relationships vis-a-vis formal and informal participation, motivations, and contributions to the local CE; and

1.4. Overview of methods and data sources

To answer the research questions and satisfy the objective, this study used a mixed methods approach where quantitative (network analysis) and qualitative methods (thematic analysis, exploratory visualization) to link (the formal and informal) CE through activities and narratives in London, ON. I inventoried formal and informal CE-related activities, actors, organizations, and events over a seven-month period (September 2022 - February of 2023 and August 2023). The CE inventory was then subjected to network analysis and data visualization. Additionally, I conducted semi-structured interviews with informants over the same seven-month period. These interviews elicited local stakeholders' motivations, practices, and understandings

of the impacts of these activities on the larger urban CE. Informants were selected based on their involvement with the CE or CE-related activities through work or their personal lives. These interviews were then subjected to qualitative coding using a thematic analysis framework, yielding a narrative of the local CE.

1.5. Research contributions

The study informs an understanding of the scope and connectivity of the London, ON urban CE. By examining both the formal and informal sectors of the local CE, this research contributed to CE literatures and debates by bringing a focus on how informal economic activities contribute to the CE in developed countries. In interviewing local CE informants, this project shed light on how local stakeholders understand, are motivated to participate in, and see possibilities for improving urban circular economies. Finally, interconnections were analyzed between formal and informal CE events, actors, and organizations informed recommendations for strengthening the local CE through expanding opportunities for interaction across formal and informal spheres.

1.6. Thesis Structure

The thesis is organized into six chapters, including this chapter (**Chapter 1**). **Chapter 2** is the literature review, which explores the CE literatures and places debates into a multi-scalar context (global, national, provincial, and urban). **Chapter 3** introduces the case study city (London, ON), and identifies methods of data collection and analysis, and discusses the implications of the findings. **Chapter 4** presents the results of the CE inventory and network analysis of the London, ON CE. **Chapter 5** presents the thematic analysis of data collected

through interviews with 11 informants, and discusses the significance of the resulting narrative.

Chapter 6, the conclusion, identifies the research contributions and limitations, discusses the potential policy recommendations informed by study findings, and identifies directions for future research.

Chapter 2

2. Literature Review

This chapter reviews the current CE literature, definitions, studies, gaps, and relationship to feminist economic theory. Restructuring or revitalizing our systems of production and consumption to reduce the strain on our environment through resource extraction, pollution, and GHG emissions is necessary for societies continue to thrive amidst the detrimental effects of climate change that are set to continue to impact the globe (Prieto-Sandoval et al., 2018). One such solution to restructuring or revitalizing our systems of production and consumption is the Circular Economy (CE). The CE aims to transform the economy into a sustainable economy by closing resource, energy, and material loops (Prieto-Sandoval, 2018). Examples include buying second-hand clothing or swapping, using recycled materials in production processes, and reusing building materials in construction. The CE academic literature has only begun to expand from 2012 onwards with many studies using vague or varying definitions. First, the Circular Economy academic literature will be explored then defined and examined through its core characteristics. Second, Circular Economy studies examined through geographic scale on the global, national, regional/municipal, and formal CE studies will be examined. Finally, feminist economic theory will be explored to understand capitalism, economy, and alternative economies (informality) and informal CE studies will be reviewed.

2.1. Defining the Circular Economy

The concept of the Circular Economy (CE) is still novel. It is most often defined in direct contrast to the linear economy, which is described as the linear pathway from extraction of raw material through production and consumption to end of life (waste) (Murray et al., 2015).

However, the linear economy has many limitations such as environmental harm seen as mining and pollution that cause scientists, policy leaders, and business to look for sustainable solutions that benefit society, the economy, and our environment (Murray et al., 2015). The linear economy is a reference frame among CE scholars against which to contrast the CE, and to help nuance understandings of both linear and circular economies (Murray et al., 2015).

The CE was originally introduced as a political tool and framework in Asia (China) and the Europe Union to close energy and material loops of production (Prieto-Sandoval et al., 2018; Moraga et al., 2019). Closing energy or material loops describes the process of turning these traditionally linear systems into cyclical ones where the product is designed to reduce energy/material in its production, be in use longer/repared by the consumer, and can be repurposed or recycled at its end of life to minimize such as through eco-innovation of existing technology (ex. plastic products designed with recycled material that can be recycled at the end of its life/use) (Prieto-Sandoval, 2018).

Since its introduction on the global political stage, the CE has begun to make its way into businesses, with the most notable adoptions in China, Japan, and many European countries (Clube & Tennant, 2020). The CE has largely emerged from policy, legislation, and corporate responsibility efforts (Murray et al., 2015). Due to the interdisciplinary nature of the CE, the definition can vary depending on the stakeholder engaging with it (Kirchherr et al., 2017). A review by Kirchherr et al. (2017) found that only 77% of journal articles about the CE provided a definition of the CE. A more recent 2020 study by Niskanen et al. (2020) examined how stakeholders in Sweden view and understand the CE, which in that context is disconnected from the localized environmental issues such as logging and other resource extraction. Instead, the authors noted that all stakeholders, especially municipal services (Swedish Recycling Industries

Association) and businesses (IKEA) pushed for increased policies that favoured the CE and sustainability predominately when it aligned with market interest or economic prosperity, in part due to the nebulous definition of the CE by the various stakeholders and is uninformed of local issues (Niskanen et al., 2020). Based on the work of Kirchherr et al. (2017) and Niskanen et al. (2020), defining the CE is an important part of CE studies. This literature review traces the evolution of the definition for the CE in academic literature using five papers published between 2015 to 2021 to define the CE and its components.

Several key studies capture the evolution of the definition and understanding of the CE. The contested understandings they offer attest to how the definition of the CE varies based on stakeholders, including academics. With most significant definitions and academic journal articles featuring the CE after 2012 (Niskanen et al., 2020; Kirchherr et al., 2017), the most comprehensive definitions come from the field of sustainability. While varied, all these definitions touch on common characteristics of the concept of the CE. These five main characteristics, which will be expanded upon below, are:

1. *Transforming systems of production and consumption*, which involves sustainable overhauls of systems directly tied to production (type of good or service, resources extracted, waste/pollution directly tied to the production of goods) and consumption (volume consumed, use pattern, purchasing habits) of goods and services used by consumers (Prieto-Sandoval et al., 2018; Cohen & Munoz, 2015).
2. *Environmental quality* is defined as the maintenance, protection, or restoration of nature (biosphere and resources), which ensures the (ecological) quality is maintained or is improved through efficient solutions that decrease impacts (ex. healthy biosphere that is regenerative) (Kirchherr et al., 2017).

3. *Economic prosperity* refers to the economy's maintenance, protection, strengthening, and growth (Kirchherr et al., 2017; Velenturf & Purnell, 2021).
4. *Eco-innovation* has been defined as the production of goods or services from the production process, management (legislation), and consumption patterns using novel methods that reduce environmental harm and impact, whether intentional or non-intentional (energy or resource use and pollution production) (Prieto-Sandoval et al., 2018).
5. *Human well-being* is defined as the continued well-being of current and future generations or long-term perspective regarding society, job creation, rights of citizens, and social equality (Kirchherr et al., 2017; Velenturf & Purnell, 2021).

The early literature on the CE relied on related concepts such as production and consumption and sustainable development (Cohen & Munoz, 2015). For example, Cohen & Munoz (2015) relied on the 1992 World Summit on Sustainable Development's definition of Sustainable Production and Consumption, which highlighted "the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of further generations" (p. 88). Cohen & Munoz's (2015) definition of the CE for instance focuses on transforming systems and environmental quality. At the same time, academics have attempted to advance a thorough definition of the CE directly. A 2015 study done by Murray in the field of business ethics defined the CE as "an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed to maximise ecosystem functioning and human well-

being." (p. 377). This definition touched on transforming systems, environmental quality, economic prosperity, human well-being, and eco-innovation.

Kirchherr et al. (2017) draw on 114 definitions of the CE from various academic studies noting the assorted definitions used for the CE. They amalgamate these numerous CE definitions into one cohesive definition of the CE as "an economic system that replaces the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes." (p. 229). Kirchherr et al. (2017) focused their CE definition on transforming systems, environmental quality, and eco-innovation. Their definition acted as the basis of many future studies, such as that of Prieto-Sandoval et al. (2018), who expanded on this by reworking this definition to include resource/energy use and scale. Prieto-Sandoval et al. (2018) consequently define the CE as "an economic system that represents a change of paradigm in the way that human society is interrelated with nature and aims to prevent the depletion of resources, close energy and materials loops, and facilitate sustainable development through its implementation at the micro..., meso..., and macro... scale" (p. 613). In their definition, micro scale refers to consumer and product level; meso scale refers to the regional level; and macro refers to national, global, or industry level (Kirchherr et al., 2017). Prieto-Sandoval et al.'s (2018) definition of the CE serves as the most comprehensive as it captures the concepts of transforming systems, environmental quality, human well-being, economic prosperity, and eco-innovation.

Several newer studies have added much to the comprehensive definition provided by Prieto-Sandoval et al. (2018) but this definition and study, like many other, lacks detail on what human well-being consists of and how it can be achieved. Scholars have been criticized for ignoring or downplaying the social issues and how these are related or underly the environmental and

economic characteristics of the CE (Corvellec et al., 2019). For Morga et al. (2021, p. 453), the CE is seen as an umbrella term where it can be defined as *sensu stricto* (“slowing and closing resource loops” through transforming systems and eco-innovation) and *sensu latu* (“push[ing] the focus to sustainability and the effects CE strategies have on the economy, environment, and society” through economic prosperity, environmental quality, and human well-being). Elsewhere, other scholars have emphasized the components of the CE as “minimising the extraction of natural resources, maximising waste prevention, and optimising the environmental, social, material and economic values throughout the lifecycles of materials, components and products” (Velenturf & Purnell, 2021, p. 1438). The Velenturf & Purnell (2021) definition of the CE relies on transforming systems, economic prosperity, environmental quality, and human well-being.

Of the various definitions offered, this section clarifies how the CE is understood in this research project. This study adopts Prieto-Sandoval et al.'s (2018) definition of the CE due to its ability to capture the five key characteristics of the CE (transforming systems, environmental quality, human well-being, economic prosperity, and eco-innovation) and its scales of operation (micro, meso, macro). From the six definitions discussed, the variation in definitions and focus areas differ slightly. Therefore, a single definition is difficult to advance without over- and under-emphasizing the five characteristics of the CE. The CE can be better understood as an umbrella term (Corvellec et al., 2019) that includes the already-identified five key themes of 1) transforming systems (of production and consumption); 2) environmental quality; 3) economic prosperity; 4) human well-being; and 5) eco-innovation. Although the studies reviewed in this section represent a small sample, similar results are reported by larger studies where economic prosperity and environmental quality are frequently seen in definitions of the CE (Kirchherr et

al., 2017; Murray et al., 2015). The next sub-section explores each of these thematic components in depth.

2.1.1. Transforming Systems of production and consumption

Transforming systems has been mentioned in various definitions of the CE and by all six studies examined. Transforming systems typically requires a closer analysis of the lifecycle associated with goods and services. The *sensu stricto* CE definition calls for shifting the product design as well as lifecycle to extend the life and use of products through redesigning, renting, and sharing items (Moraga et al., 2019). A product's lifecycle refers to the production of goods from the initial design, production, consumption, usage, and subsequent discarding, along with any additional resource (material) and energy inputs (Moraga et al., 2019). Scholars such as Prieto-Sandoval et al. (2018), Cohen & Munoz (2015), Moraga et al. (2019), Kirchherr et al. (2017), and Velenturf & Purnell (2021) all suggest production and consumption cycles need to be completely overhauled to improve the longevity and environmental impact or strain associated with them.

A multi-scaled approach (micro, meso, macro) was common when discussing transforming systems associated with production and consumption. For example, calls for changes at the three scales involve micro-systems, including product-level changes to increase circularity, meso-systems includes changes to regional-level structures to implement CE systems, macro-systems include national or global changes to industrial sectors when discussing the implementation of changes to current systems of production and consumption (Kirchherr et al., 2017). This implies that all stakeholders need to be involved in change to systems of production and consumption from individuals to larger national and global scale stakeholders. This multi-scale approach also

supports the idea that complete overhauls or changes to production and consumption cycles are necessary for the successful implementation of a CE.

The key words ‘restorative’ and ‘regenerative’ were frequently mentioned (by Kirchherr et al., 2017; Velenturf & Purnell, 2021; Murray et al., 2015) to describe the changes needed to the current production cycles. Where restorative systems prevent future damage and repairing existing damage or strain on the environment such as cradle to cradle designs that produce no waste (ex. compostable disposable cups) (Murray et al., 2015). Whereas regenerative systems refer to the regeneration or renewal of the (ecological) environment through fortification or improving value within nature (ex. improving water quality) (Velenturf & Purnell, 2021). Similarly, Prieto-Sandoval et al. (2018) also suggest regenerative and restorative solutions, substituting the word ‘restorative’ with ‘cyclical’, and suggest a shift in production and consumption cycles through regulation, policies, and supply of resources/material. These restorative (or cyclical) and regenerative approaches provide guidance on how policy, supply, and regulation must change to prioritize environmental quality through decreased resource use and increased circulation of existing material/products. To successfully transform cycles of production and consumption, we must consider or build in environmental protection, such as through cradle-to-cradle designs, which are waste-free products (Kirchherr et al., 2017).

2.1.2. Environmental Quality

Of the six studies examined, *environmental quality* typically falls into one of two categories. They vaguely mention the environment, or provide a more specific explanation of the direct impacts of production and consumption on the environment. The first group use words like ‘maintain’, ‘protect’, ‘restore’, and ‘maximize’ to describe how environmental quality may be

preserved (Kirchherr et al., 2017; Moraga et al., 2019). When referring to the environment, these studies mention environmental resources, ecosystem health, or the environment itself (Kirchherr et al., 2017; Moraga et al., 2019). An example of these vague associations is Morgia et al. (2019), who briefly mention the CE's impact on the environment and improving ecosystem health without further elaboration. These inexplicit references contribute to the contested understanding of the CE.

The second group also use terms like 'minimize', 'reduce', 'preserve', 'renew', and 'enhance' to describe environmental quality (Cohen & Munoz, 2015; Prieto-Sandoval et al., 2018, Velenturf & Purnell, 2021; Murray et al., 2015). In contrast to the first group, these studies specify what is harmful to the environment, such as resource extraction, resource use, emissions, pollution, and waste (Cohen & Munoz, 2015; Prieto-Sandoval et al., 2018; Velenturf & Purnell, 2021; Murray et al., 2015). This second group of works offers a clearer understanding of the environmental damage of current systems and human activities associated with environmental damage. However, environmental quality does not mean sacrificing our quality of life or well-being. In fact, human well-being is inextricably linked to the CE.

2.1.3. Human Well-being

The six studies examined all contain reference to human well-being with varying degrees of detail, emphasizing different aspects of well-being, from temporality and reference of future generational equity (Cohen & Munoz, 2015; Murray et al., 2015), to maximizing or improving human well-being (Moraga et al., 2019; Velenturf & Purnell, 2021), through engaging citizens (Velenturf & Purnell, 2021), and shifting perspectives of recognizing humans as a part of nature rather than owners of nature (Prieto-Sandoval et al., 2018). Despite the various characteristics of

human well-being from justice to equity (Velenturf & Purnell, 2021), it is uncommon for studies to explore in detail the relationship between people and the CE aside from mention of preserving well-being. The studies that offer details suggest citizen engagement is necessary to create inclusive solutions and empowered citizens, which is a necessary part of a successful CE transition (Velenturf & Purnell, 2021). Human activity (such as through the linear economy) has resulted had negative effects on the biosphere, from careless resource extraction to excessive consumption habits; it is up to the members of society to revitalize and transform current practices of production and consumption to be more sustainable (Velenturf & Purnell, 2021).

There have long been calls to continue exploring the human and social dimensions of the CE (Murray et al., 2015; Velenturf & Purnell, 2021). In addition, a paradigm shift at the micro scale is required to better integrate solutions that centre on humans as a part of nature, leading to increased environmental quality and eco-innovations (Prieto-Sandoval et al., 2018). Many (though not all) businesses are concerned with profits and larger economic prosperity, especially if they have responsibilities to shareholders. Profit-driven businesses include businesses with sustainability commitments, prioritizing their profit and economic prosperity above sustainability and ethical practices. For example, environmental economics focuses on how to continue profiting while sustainably managing the environment (Murray et al., 2015). However, this is not always the case such as B corporations (non-profit network focused on helping people, communities, and the Earth that certifies businesses⁵) or triple-bottom-line businesses (business model that prioritizes people, profits, and the earth⁶).

⁵ <https://www.bcorporation.net/en-us/certification/>

⁶ <https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line>

2.1.4. Economic Prosperity

The economy is tied to human well-being in regard to jobs and ethical or alternative markets (Gibson-Graham, 2006). Economic prosperity and growth was frequently mentioned but vaguely expanded on by authors. When discussing economic prosperity, the *sensu latu* definition provided by Moraga et al. (2018) refers to the impact of the CE on the economy but does not explain further. Prieto-Sandoval et al. (2018) specify that economic growth must be sustainable in its practices (regarding nature) and maintain economic growth over time. Despite previous evidence identifying economic prosperity as the most common theme of the CE (Kirchherr et al., 2017), this was not the case amongst the studies examined in the smaller sample drawn on in this review. The decreased mention of economic prosperity could be influenced by the positionality of stakeholders defining the CE and the implied nature of economic prosperity as an outcome of the CE. The formal transition to the CE is partly driven by businesses, governments, and collective consumers and citizens (Kirchherr et al., 2017). Businesses are concerned with expenses from the upfront costs of switching to new sustainable technologies for production systems. There is a low chance that a business will switch to these newer sustainable technologies without incentives or policies directly addressing eco-innovations or transformations for the production system (van Langen et al., 2021).

2.1.5. Eco-innovation

Amongst scholars (Prieto-Sandoval et al., 2018; Cohen & Munoz, 2015; Moraga et al., 2019; Kirchherr et al., 2017; and Velenturf & Purnell, 2021) there are fewer differences in their definition of eco-innovation. For example, Kirchherr et al. (2017), like many earlier CE studies, use the 'Four R's' of reduce, reuse, recycle, and recover to describe how redesigning systems

enables a low carbon transition to ‘eco’ technologies. For example, like many earlier CE studies, Kirchherr et al. (2017) use the ‘Four R’s’ of reduce, reuse, recycle, and recover to describe how redesigning systems enable a low carbon transition to ‘eco-technologies, where systems are redesigned to increase product usage (life) and reduce or forgo natural resources while preserving natural capital (Kirchherr et al., 2017).

Prieto-Sandoval et al. (2018) outline ten categories of innovation, including “business models, networks, organizational structures, processes, products, services, market, customer engagement” (p 612). To illustrate, Prieto-Sandoval et al. (2018) use an example of a tannery in China that utilizes eco0innovation amongst multiple categories (networks, process, and product) that reduces its environmental footprint of the products which offer an alternative to traditional leather products (and tanneries) (Prieto-Sandoval et al., 2018). Other studies focus on technological advancements of resource cycles through closing material and energy loops (Moraga et al., 2019; Prieto-Sandoval et al., 2018; Murray et al., 2015). Specifically, energy, emission, and materials loops should focus on recovery or recirculation, which will lead to reduced resource use while also being highly effective or reliable (Prieto-Sandoval et al., 2018).

Specifically, energy, emission, and materials loops should focus on recovery or recirculation, which will lead to reduced resource use while also being highly effective or reliable technically and financially (insofar as their ability to replace current technologies while meeting the distribution demands) (Prieto-Sandoval et al., 2018). The eco-innovations needed to transform energy and material loops depend on availability, cost, lifespan, incentives associated with the transition, and substitution of current solutions and technologies. Despite claims that technological solutions alone will not create large scale change (Bengtsson et al., 2017), having the necessary technology to transition to low carbon solutions will enable an easier transition to

the CE. The CE is one potential approach to reaching a low carbon society and is informed by larger global climate policies, solutions, and treaties.

2.2. The Circular Economy at the global scale

Although the CE can be understood as a framework and approach that aims to transform cycles of production and consumption while considering environmental quality, economic prosperity, human well-being, and eco-innovation, it is typically mobilized in parallel or in tandem with decarbonization efforts. Decarbonization can be defined as a zero carbon or net zero carbon society where minimal carbon or GHGs are produced (Abram et al., 2022). This section will explore global efforts that overlap the CE and decarbonization. Transitioning to a CE involves operationalizing at all three scales impacted by humans from the micro (local) to meso (national and global) scales, much like larger sustainability and climate action efforts.

International efforts are shaped and decided upon by decision-makers, typically at the global and national levels, where transnational issues such as climate change, sustainability, and climate action are discussed and decided. As a result, global-scale initiatives are linked and inform national, provincial, and local policies and priorities (Abram et al., 2022). Global initiatives require policymakers to actualize pledges and goals into action (i.e. policy) (Lenzi, 2021).

Specifically, three global efforts are examined: the Intergovernmental Panel on Climate Change (IPCC), Sustainable Development Goals (SDGs), and the 2016 Paris Agreement. All three of these efforts were a result of United Nations bodies or subcommittees formulated or ratified with member countries and representatives. These decarbonization efforts (Paris Agreement, SDGs, and IPCC) happen at the same scales the CE must operate at to be successful, with many initiatives overlapping or implementing CE-related or CE actions themselves. Global

efforts led by the United Nations guide and shape action through CE characteristics of eco-innovation, environmental quality, transforming production and consumption systems, and human well-being.

2.2.1. The Intergovernmental Panel on Climate Change (IPCC)

The IPCC was established in 1988 because of the World Meteorological Organization and the United Nations Environment Programme (IPCC, 2023). The IPCC provides science-based reports to address the technical, social, and economic challenges of climate change and associated policies (IPCC, 2023). The IPCC reports are aimed at policy makers and government because of various working groups with contributors from the member countries (IPCC, 2023). The primary focus of the reports includes climate change impacts, adaptation, mitigation, and reporting of GHGs (Calvin et al., 2023). These AR reports do not mention the CE by name, but they do refer to circular flows aimed at industries to reduce GHG emissions (Calvin et al., 2023b). Section 4.5.2 Industry outlines disruption of supply and operations from climate change and the multiple pathways available to reduce emissions, specifically “[r]educ[ed] industry emissions will entail coordinated action throughout value chains to promote all mitigation options, including demand management, energy and materials efficiency, circular material flows, as well as abatement technologies and transformational changes in production processes...” (Calvin et al., 2023. p. 71). As the CE gains momentum and popularity, we see increased language related to or informed directly by the CE characteristics (transforming systems, eco-innovation, environmental quality, economic prosperity, and human well-being) in global, national, and local initiatives and policies. These initiatives and policies detail the overlap (and use of similar language) between the IPCC and CE, specifically through coordinated action for

energy and material efficiency and the transformation of production cycles (Calvin et al., 2023). The IPCC reports are influenced by those who contribute to the IPCC reports (ex., scientists, sociologists, strategists), as well as global policies and agreements such as the 2016 Paris Accord. The current IPCC Assessment Report outlines short-term mitigation efforts up to 2040, building on existing data; climate models depicting various scenarios (temperature increases) are presented alongside carbon adaptation and mitigation solutions (Bengtsson et al., 2017). Climate models depicting various scenarios (temperature increases) are presented alongside carbon adaptation and mitigation solutions (Bengtsson et al., 2017). The focus is less on temporality and instead on quantitative or technological targets (temperature and GHG). The issue with technologically focused solutions is they lead to a static endpoint which offers temporary solutions to reach decreased GHG levels, where longer term solutions to decarbonization and larger climate change mitigation/adaption that consider external factors are needed (Abram et al., 2022).

The two common approaches to climate change solutions include a whole-systems approach (all factors are considered regarding each other) and a reductionist view (each factor is considered independently) where the factors of economy, ecology, and culture are considered (Abram et al., 2022). Transnational solutions should not be heavily informed by, nor be intended solely for, high income countries; instead, they need to consider consequences, engagement, and global-local linkages for climate solutions (Abram et al., 2022). Climate change solutions should consider spatial, temporal (generational), and institutional dimensions (government at various levels) (Abram et al., 2022). Although the IPCC does not directly mobilize the CE as a framework, it does touch on related concepts of transforming systems of production of consumption through “circular material flows” and “transformational changes in production

processes” (Calvin et al., 2023, p. 71). The IPCC also addresses eco-innovation through “all mitigation options, including demand management, energy and materials efficiency...as well as abatement technologies” (Calvin et al., 2023, p. 71).

2.2.2. Sustainable Development Goals (SDGs)

The United Nations 2030 Agenda for Sustainable Development centred on 17 Sustainable Development Goals (SDGs) was adopted by all member countries by 2015 (United Nations, n.d.). These goals were built on the existing global calls to eradicate poverty while also addressing related issues of climate change, economic growth, health, and other inequalities (United Nations, n.d.). SDGs act as a global policy framework to address both ecological and social concerns (Bengtsson et al., 2017). Although none of the 17 SDGs refer to the CE directly, there are a few whose goals align with the CE. As presented in **Table 2.1**.

Table 2.1. Summary of SDG goals 11⁷, 12⁸, 13⁹ and targets and their relationship to the CE.

SDG Goals	Most Relevant Targets	Relationship to the CE
11- Sustainable Cities and Communities: Make cities and human settlements inclusive, safe, resilient and sustainable	<ul style="list-style-type: none"> • 11.3- By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries • 11.6- By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management • 11.b- By 2020, substantially increase the number of cities and human settlements adopting and 	SDG 11 addresses the urban CE concerning sustainable planning/management, natural heritage, waste/resource management, and local materials.

⁷ <https://sdgs.un.org/goals/goal11>

⁸ <https://sdgs.un.org/goals/goal12>

⁹ <https://sdgs.un.org/goals/goal13>

	<p>implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels</p> <ul style="list-style-type: none"> • 11.c- Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials 	
<p>12- Responsible Consumption and Production: Ensure sustainable consumption and production patterns</p>	<ul style="list-style-type: none"> • 12.1- Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries • 12.2- By 2030, achieve the sustainable management and efficient use of natural resources • 12.3- supply chains, including post-harvest losses • 12.4- By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment • 12.5- By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse 	<p>SDG 12 directly addresses the CE characteristic of transforming production and consumption systems. SDG targets rely on framework management, supply chains, improved practices/information, tools, natural resources, materials, or waste subsidies. SDG 12 is heavily focused on environmental quality and eco-innovation (Bengtsson et al., 2017). Indicators 12.1-12.8 encourage change from various stakeholders, from individuals to the private and public sectors (Bengtsson et al., 2017).</p>

	<ul style="list-style-type: none"> • 12.6- Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle • 12.7- Promote public procurement practices that are sustainable, in accordance with national policies and priorities • 12.8- By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature 	
13- Climate Action: Take urgent action to combat climate change and its impacts	<ul style="list-style-type: none"> • 13.2- Integrate climate change measures into national policies, strategies and planning • 13.3- Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning • 13.b- Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities 	SDG 13 addresses the CE characteristic of environmental quality and eco-innovation to plan, strategize, manage, and mitigate climate change or its related impacts. This SDG focuses on formal policies or frameworks for developing countries.

There are also semi-related goals that touch on individual CE characteristics (transforming systems, environmental quality, human well-being, economic prosperity, and eco-innovation), such as SDG 15- Life on land: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. SDG 15 also addresses the CE characteristic of environmental quality, focusing less on developing countries than on SDG 13. Instead, the focus

of SDG 15 is on the conservation, restoration, reduction, and sustainable management of terrestrial and inland water ecosystems touching on environmental components, which is how it is linked to the CE but does not overlap beyond one characteristic (environmental quality).

The SDGs are achieved separately or parallel to other climate policies and remain siloed, taking a reductionist approach (Abram et al., 2022). A reductionist approach is one where the respective parts are considered individually rather than together, so each issue has corresponding solutions or guidance, which tends to create uneven impacts on the economy, biosphere, and society (like many of the SDGs) (Abram et al., 2022). Despite the 2030 goal, there needs to be more consideration for temporality or timelines (Bengtsson et al., 2017). Although SDGs identify major transnational issues around sustainable development and begin to provide guidance, they fail to consider the local context and, in some cases, create uneven impacts on the economy, biosphere, and society, much like all global-level initiatives (Abram et al., 2022; Bengtsson et al., 2017). For example, SDG 12 primarily relies on technological solutions (eco-innovation) and consumer behaviour requiring voluntary execution (Bengtsson et al., 2017) at a smaller scale, where the local context has more influence on policy, private/public organizations, and individual consumers or citizens which leads to systemic or formal changes (Bengtsson et al., 2017).

2.2.3. The Paris Agreement

There have been various attempts to create international treaties aimed at reducing climate change and its impacts globally from the 1997 Kyoto Protocol to the 2016 Paris Agreement. Under the Paris Agreement, the treaty aimed to reduce global warming by 1.5 °C (compared to pre-industrial levels) by the end of this century (UNFCCC, n.d.). These numbers

were based on figures and facts from IPCC reports on planetary boundaries (UNFCCC, n.d.). Unlike the previous two efforts (IPCC and SDGs) the Paris Agreement has goals and reporting metrics based on timelines through a national climate action plans every 5 years and 43% GHG reduction by 2030 (UNFCCC, n.d.). This treaty uses a framework based on financial aid for developing countries to improve climate mitigation technology or investments and capacity building for developing countries to achieve the global targets (UNFCCC, n.d.). While developed countries must rely on technologies and relying on global scale promises (ex. the Paris Agreement) (Lenzi et al., 2021). This is one of few global policies that use an equitable approach along with quantified targets and monitoring requirements. Despite these targets and requirements, it is up to each country to determine how they will reach targets while using the suggested framework (Lenzi et al., 2021). As a result, this takes a bottom-up approach where member country is responsible for equitable solutions for its citizens (Lenzi et al., 2021).

Global or large-scale policies such as those explored in this section use goals and indicators that assume homogeneity among urban and rural spaces or developed and developing countries (Bengtsson et al., 2017). Despite these global scale policies academics suggest the inclusion of local context such as lived experiences, policies informed by needs, and take a bottom-up approach or whole system approach (Lenzi et al., 2021; Abram et al., 2022). On a global or national scale this is difficult to achieve due to the generalization required to analyze large geographic areas. For each global policy there needs to be an emphasis on social equity and engagement which consider local-global links such as social barriers (Bengtsson et al., 2017; Lenzi et al., 2021; Abram et al., 2022). Current global policies overemphasize technical solutions that leave certain populations behind. Therefore, examining policies at the global level is not the appropriate scale to examine the CE as it cannot meet the social and spatial nuances of smaller

geographic scales. Because of this, CE scholars have moved to studying the CE at finer scales, from the national through the regional and down to the municipal scale.

2.3. National Scale Studies

As established earlier in this chapter, the CE has slightly different definitions, which have led to slightly different understandings, which can result in an under or over-emphasis on technology (eco-innovation) or economy (prosperity) (Corvellec et al., 2019). This section focuses on CE- specific studies conducted at the national scale, including in the countries of Hungary (Kiss et al., 2015), China (Liu et al., 2018), Croatia (Luttenberger, 2019), and Sweden (Niskanen et al., 2020). The similarities of these various national approaches are identified, as are their strengths and weaknesses. CE literature relies on macro and micro scales or indicators used to examine and measure success of CE implementation (Alaerts et al., 2019). Like global level policy, many national-level CE studies focus on technological solutions such as waste management or recycling (Liu et al., 2018; Luttenberger, 2019), while others focused directly on sustainable production and consumption (Kiss et al., 2018) and perceptions of the CE by stakeholders (Niskanen et al., 2020).

Countries such as China, Croatia and Sweden have existing CE policies and frameworks which prioritize top-down structures to enable the CE in both production and consumption. Top-down structures or strategies rely on macro or meso-level governments or decision-makers to outline solutions that will be implemented and trickle down to influence the lower levels (Alaerts et al., 2019). Yet, many CE solutions continue to suggest these top-down solutions through policy, such as the study in China which recommends improved legislation, regulations, and national data base to track resource use (Liu et al., 2018). The solutions proposed in the Liu et al.

(2018) study aim to reduce the GHG emissions associated with the plastic recycling industry to reduce pollution produced at the end of life for plastic products, reuse, and recover recycled plastics as well as influence decreased consumption patterns both voluntarily and through legislation. Liu et al. (2018) solutions are diversified, addressing the CE through transforming the systems of (production and consumption), utilizing eco-innovation technologies while improving human well-being and preserving environmental quality.

In the case of Croatia in 2016, the country endorsed the EU Circular Economy Package¹⁰ (CE legislative proposal directed at businesses and consumers to see waste as a resource), which promised to improve waste collection, separation, and sorting. (Luttenberger, 2019). The EU Circular Economy Package influences the countries to review current and new policies, such as the waste management plan set for 2017-2022 and Waste Prevention Programme, to comply with the EU Circular Economy Package with a recycling goal of 50% (Luttenberger, 2019). After it was passed, however, there were unannounced government modifications to keep existing practices around mixed and treated waste, resulting in a public consultation (Luttenberger, 2019). The Luttenberger (2019) study highlights the country's formal policies, which involve transforming production and consumption systems to alter waste and recycling management and eco-innovation where material can be recovered for reuse.

Social context, including the involvement of communities, community organizations, or citizen engagement, was largely ignored in these national-level CE studies. Exceptions are Kiss et al. (2015), who recruited environmentally conscious consumers to participate in their study of sustainable consumer policies as well as Luttenberger (2019), who identified the need for a whole-systems approach to waste management that incorporates municipal and national scales of

¹⁰ <https://www.edie.net/definition/circular-economy-package/>

waste management to inform larger national policies around waste management such as sorting waste and changing waste collection protocols. High support for the CE can be seen in Sweden, where discussions call for the inclusion of all stakeholders in a successful transition to a CE and specify that it cannot be left to citizens alone (Niskanen et al., 2020). In the case of corporate sustainability in Sweden, companies are onboard so long as it serves market interest, with CE implementation discussions depoliticized and happening away from environmental issues (Niskanen et al., 2020).

Despite the different focus areas, most national-level CE studies analyzed policy interventions, legislation, indicators, or targets to monitor and track progress of the CE (Kiss et al., 2015; Liu et al., 2018; Luttenberger, 2019). National level policies can be useful for identifying future needs of policies and solutions to reach an urban or national CE. However, they lack inclusion of social factors such as the needs and involvement of communities, community groups, and citizens. Instead, they emphasize technological solutions municipal waste management which are implemented through policy. The national scale needs to consider local and municipal scales where these multi-scalar interactions are examined to politicize conversations and examine social contexts relevant to the country they are being mobilized within (Kiss et al., 2015). Like CE initiatives organized at the global scale, CE efforts sited at national scales are not sufficient to serve or monitor the impacts of policies, social factors, or local contexts that need to be observed.

2.4. Regional and Municipal Scale Studies

This section focuses on three CE specific studies conducted at the regional and municipal scale highlighting studies carried out in the region of Flanders, Belgium (Alaerts et al., 2019); the

city of Londrina, Brazil (Miranda et al., 2020); and a study using a database using (from across 130 countries) (Cohen & Munoz, 2015). Cohen & Munoz, 2015 use of an existing database from cities and companies categorized in the context of an urban scale or environment (Cohen & Munoz, 2015).

Both Alaerts et al. (2019) and Miranda et al. (2020) used explored the role of government and policies to analyze the different elements of the CE. Although the study carried out in Flanders, Belgium attempted to create a framework for the region to monitor the progress towards a CE the authors note this was difficult to achieve using existing macro indicators for monitoring a CE. This required researchers to reformat indicators to include macro, meso, and micro indicators towards a CE for tentative application towards various sectors, such as mobility, housing, and nutrition (Alaerts et al., 2019). Scalar CE monitoring indicators were reformatted from literature and academic experts from related field (environment economy, resource management, and policy) (Alaerts et al., 2019). In their study, macro indicates the national scale, meso indicates the regional scale, and micro indicates the product scale (Alaerts et al., 2019). The scalar indicators (micro, meso, and macro) can then be used together to create a monitoring framework that can inform policy interventions organized through a social lens to measure progress towards a CE (Alaerts et al., 2019). The authors note macro-indicators which are top-down approach consider supranational or regional scale based on the consumption or sector perspective towards a CE result in time-lag of progress or are ignored due to the aggregated data (Alaerts et al., 2019). Alaerts et al. (2019) and Miranda et al. (2020) recommend using bottom-up approaches when monitoring the CE at a regional or municipal scale. Meso and micro indicators to monitor progress towards a CE which are best used for the city scale.

Of the three CE studies examined, only one (Miranda et al., 2020) focused on the waste and recycling cycles, doing so in the context of waste pickers and recycling cooperatives. All three studied did however touch on social factors such as societal needs, sharing activities (ex. ride sharing), and worker-driven movements (Alaerts et al., 2019; Cohen & Munoz, 2015; Miranda et al., 2020). Brazil's recycling industry must adjust its policies to incorporate issues in the regional context, be socially inclusive, take a human-centred approach, and use eco-innovations (Miranda et al., 2020). With continued calls for increased studies at the urban level and literature that explores social, environmental, and ecological benefits in conversation with one another (Cohen & Munoz, 2015).

Unlike the global and national scale studies of the CE, these regional and municipal scale studies focused more on the social and political elements of the CE with minimal discussion on the technical and economic aspects. This demonstrates that studies at the regional and municipal level are optimal for examining the CE and can better capture social dimensions. They demonstrate that regional and municipal studies are optimal for examining the CE and can better capture social dimensions. Although Alaerts et al. (2019) and Miranda et al. (2020) use governance and policy to construct monitoring frameworks, the studies differ in their data sources. Alaerts et al. (2019) leverages an existing data base from businesses and community groups. While Miranda et al. (2020) uses data from workers cooperatives of informal workers, these subjects are typically ignored by CE policies and omitted from data collection in CE studies. Instead, most studies of the CE examine formal initiatives.

2.5. Formal Studies

The examined studies based on scale and geography have been predominately formal at the global and national scale, except for the study by Miranda et al. (2020). Formality refers to the recognized portions of the economy or economic activities where they are structured, regulated, monitored, measured, and generate capital gain (Peterson, 2012; Tanaka, 2008). The formal economy regulates activities and protects workers (Chen, 2005). Formal CE studies and activities use economically recognized (structures, regulated) paths such as policies, legislation, and sectors (business and academia).

This section examines three formal CE studies conducted at the municipal scale in Botarell, Spain (Hidalgo et al., 2019); the European Union (EU) (Malinauskaite et al., 2017); and a study based on knowledge and perception of the CE from stakeholder groups (van Langen et al., 2021). The previous sections divided studies based on the geographic scale at which they were conducted. The engagement with this selection of ‘formal’ CE studies skews towards European countries and municipalities, with authors leveraging existing studies/data or user surveys.

From the three studies identified, two focused on waste management and technology (Hidalgo et al., 2019; Malinauskaite et al., 2017), while the third (van Langen et al., 2021) focused on perceptions of the CE through relevant subject matter experts. The first study aimed to revamp the current waste plants to handle multiple types of waste in Botarell, Spain, through technological advancements in waste technology, which aims to reduce the costs related to waste treatment (Hidalgo et al., 2019). The success of these technologies and management plan would eventually be scaled up to other municipalities in Spain (Hidalgo et al., 2019). This revamp to the waste treatment plan in Spain focuses on eco-innovation, environmental preservation, and economic prosperity through an existing sustainable waste management framework by the EU

(Hidalgo et al., 2019). Although Hidalgo et al.'s (2019) Spain-based study highlighted technological and economic benefits of waste treatment processes, they suggest future studies examine techno-economic assessment to verify estimated costs of waste treatment technologies and resource saving.

Conversely, Malinauskaite et al. (2017) reviewed recent changes to the legislative framework on waste management to examine the implementation of EU policies at the municipal level. The success of this municipal management plan would eventually be scaled up to other municipalities to be implemented nationally and replicated in other EU countries (Malinauskaite et al., 2017). Of the ten EU countries analysed, political barriers and multi-level governance of waste management make a streamlined management system difficult (Malinauskaite et al., 2017). The management system created by Malinauskaite et al. (2017) samples only a small number of countries in the EU so a more comprehensive plan that lays out long-term strategies and priorities are needed (Malinauskaite et al., 2017). Although the waste management system is being built for municipalities this is developed through a top-down approach starting with macro scale (national) indicators inform the plan (Malinauskaite et al., 2017). This requires plans to consider local and municipal waste management before implementation (Malinauskaite et al., 2017). While the vocabulary used in EU policies of the Malinauskaite et al. (2017) study emphasizes the concepts of re-use, recycling, and recovery to create a CE framework. The authors note the interdisciplinary perspective needed to achieve this include legal, scientific, and economic elements (Malinauskaite et al., 2017). These interdisciplinary elements differ from typical CE elements of economy, environment, and society.

The third study focuses on the perception and level of awareness for three stakeholders who have previous CE knowledge were recruited from researchers, economist, and

administrators (van Langen et al., 2021). Although the recruitment was not limited by geographic location the three stakeholder groups received higher response rates from Naples, Italy, with men making up most respondents in each stakeholder group (van Langen et al., 2021). While the van Langen et al. (2021) study took a holistic approach by understanding drivers and barriers identified by the three stakeholder groups of researchers, economist, and administrators. The results are highly varied regarding understanding, perception, identified barriers and drivers (van Langen et al., 2021). For example, the researcher stakeholders identified top-down approaches as holistic, while economists and administrators suggested bottom-up approaches guided by companies and consumers as the best approach to the CE (van Langen et al., 2021).

Despite the number of existing CE frameworks in the EU these supranational approaches prioritize eco-innovation, environmental quality, and economic prosperity leaving behind human well-being and transforming systems of production and consumption. Imposing supranational frameworks on municipalities has proved to be difficult in the Hidalgo et al. (2019) and Malinauskaite et al. (2017) studies, requiring each municipality to piece together local and municipal contexts into technology-driven frameworks for waste management systems. While van Langen et al. (2021) attempted to capture public perceptions, they excluded all stakeholders who have little formal knowledge of the CE, but who are nevertheless important to its successful implementation, such as citizens. In addition, the focus on stakeholder groups led to geographic ambiguity and overrepresentation of geographic areas (e.g., Naples, Italy). As a result, the stakeholders sampled skewed towards male respondents and age stratification amongst stakeholder groups.

Studies of 'formal' CE initiatives such as policy interventions, legislation, regulations, and management practices are subject to similar barriers to realizing the CE seen at the global

climate policy scale and national CE studies, where generalized findings assume homogenous spaces of implementation and uniform results. Studies of formal CE initiatives heavily features developed country contexts, where these kinds of initiatives are prioritized. Contributions of ‘informal’ activities to realizing the CE are largely absent from the CE literatures, and tend to come from developing countries where the informal economy is more prominent, as discussed in the section below. However, discussions of intersections between informality and the CE should also occur in developed country contexts because this provides a more accurate understanding of the economy, specifically the CE (Peterson, 2012). Recognizing the informal sector captures all economic activity and their linkages (or lack of linkages) to inform the larger urban sphere (urban CE) (Lutzoni, 2016; Chen, 2005). To understand what comprises informality, what informality has to do with the economy, and how informal activities may be contributing to CE efforts, I draw on feminist and critical scholarship on the economy, alternative economies, informality, and highlight studies of informality and the CE.

2.6. The informal dimension

Scholars have identified three distinct periods contributing to informality's overall understanding. The term "informality" first appeared in United Nations International Labour Organization (ILO) released reports based out of Ghana and Kenya surrounding the workforce and larger places of employment in the economy (Lutzoni, 2016). Historically the informal sector has been larger in developing countries where this sector is highly feminized yet spanned the socioeconomic status/class spectrum (Chen, 2005; Tanaka, 2008). This first phase of scholarly engagement with informality, which spans from the 1970s to the 1980s, referred to as the "dualist" school, understood the informal economy as a marginal sphere that occurred outside

the formal sphere (Lutzoni, 2016; Chen, 2005). This conception of dualism is often still used to define the formal and informal spheres, holding them as separate.

The second phase occurred between the 1980s and 1990s, when two dominant schools of thought appeared, including "structuralism" (informal and formal economies exist within the same system) and "legalism" (informality occurs because of problems in capitalist governance) approach (Lutzoni, 2016). During this time frame, prominent scholars of the legalist school, including economist Hernando De Soto (1989), who initially speculated that the informal economy had arisen either as an alternative economy to those who could not meet the high barriers of entry (e.g., cost) into the formal economy, or a rebellion to those who did not want to participate in the formal economy (Lutzoni, 2016; Chen, 2005). Scholars Gaughan & Ferman, (1987) challenged De Soto's theory; instead they theorized that the informal economy was not only an alternative to capitalistic markets, but also a social nature of exchanges and interactions. Gaughan & Ferman (1987) observed that informal economies differ based on socioeconomic status and between developed and developing nations. The informal economy's vague conception has been difficult to monitor based on its heterogenous nature and array of activities that are similar to or intersect with the formal economy (Gaughan & Ferman, 1987).

The third phase of defining informality is the present 21st century, where feminist and critical scholars have renewed interest in the topic, including in urban planning and place-making literatures such as Gibson-Graham (2006) and Dyck (2005). This renewed interest builds on the previously established schools of thought (dualist, legalist, structuralist). Brown & McGranahan (2016) have proposed a new school named the "inclusionist" school that builds on the interconnected nature of the formal and informal parts of the economy (like the structuralist school) but focuses on the role of grassroots and citizen organizations to reconfigure power at the

urban level. The "inclusionist" school builds on the idea that local-level actors (grassroots organizations and citizens) should have a right to contribute and voice opinions on governance at the urban level, including preserving environmental quality, outside of top-down structures (Brown & McGranahan, 2016). Despite the informal sector's ontological separation from formality, Brown & McGranahan (2016) suggest incorporation into the formal economy is not always the only option; instead, policy-driven actions such as mobilizing to protect urban citizens and holding governments accountable for damage/strain on social, cultural, and environmental systems are important. The theories and scholars contributing to the clear evolution of informality's theoretical underpinnings mutually constitute informality. Like the contested nature of the CE, informality has also relied on a relational comparison of formal and informal sectors to define each other.

2.6.1. Defining Informality

The most common definition of the informal economy is its opposition to the formal (i.e., protected, regulated) economy, in which informality is seen as unprotected and unregulated (Lutzoni, 2016; Chen, 2005). Chen (2005) defines *informal economies* as employment without formal contracts, worker benefits, or social protection. Three characteristics commonly observed in informal economies include their importance and role in a capitalist economy; a formal-informal continuum; and a segmented workforce (i.e., self-employed and wage workers) (Chen, 2005). Those employed in the informal economy, such as wage workers or self-employed workers in developed nations, are not protected and lack formal contracts, benefits, stability, and protection given to formal workers (ex., fair wages, safety protocols, labour laws, short-term, and medical insurance; Chen, 2005). Chen (2005) defines self-employed workers as employees or

employers of "small unregistered or unincorporated enterprises, including... unpaid family workers" (p. 7). Meanwhile, informal enterprises within the informal sector lack government regulations and are untaxed, distinguishing them from their formal enterprise counterparts (Chen, 2005). Informal employees and enterprises still contribute to economic growth (Chen, 2005).

This definition of informality has mostly stayed the same over time due to its heterogeneous nature. Observation of informal economic sectors and activities can be difficult, especially as its presence depends on various factors, including developed vs developing country status and socioeconomic status (Gaughan & Ferman, 1987). Observation of informal economic sectors and activities can be difficult for government and policies, especially as its presence depends on various factors, including developed vs developing country status, urban or rural settings, and socioeconomic status (Gaughan & Ferman, 1987), which means that the visibility of the informal economy is contingent on the context of the economy and one of the defining factors of the informal sector. Socioeconomic status can alter the motivations and use of informal activities where low-income populations rely on the informal economy for survival or can only access these services/employment (Gaughan & Ferman, 1987). Lower-income homes who engage with the informal economy do so out of necessity for survival and lack connections to the formal economy (Chen, 2005). Middle and upper-class populations use them for other reasons, such as saving money (Gaughan & Ferman, 1987). Chen (2005) has created a hierarchy of visibility for informal enterprises and jobs (self-employment and wage positions). Activity in the informal economy can include cash exchanges, labour-intensive, non-union, and contract positions like formal employment such as repair work or kinship-based, with no capital exchange typically taking place within the household (Gaughan & Ferman, 1987). Newer studies and those outside

the field of economics have increasingly featured informality, primarily through feminist scholars who have shifted from questions around the economy to gendered work and issues.

2.6.2. The Feminist Lens

As the third phase of engagement with informality continuously emerges from academia, prominent scholars, including those from feminist disciplines, explore and critique the current capitalist economy. Historically economic literature has largely ignored informality due to its association with feminized labour and developing countries (Peterson, 2012). Feminist scholars first contributed to informal literatures by recognizing the importance of women's often unremunerated labour (e.g., housework) and at other times undercompensated work in economics and development as early as the 1970s, but this has expanded in recent years, with a focus on recognizing or identifying the role of gender in economic and political work (Peterson, 2012).

Key work by Gibson-Graham (2006) does not mention informality by name, but does recognize that alternatives to formal and capital markers exist through what they call "noncapitalism," which describes all activity outside the dominant capitalist spheres, such as the domestic and voluntary spheres (Gibson-Graham, 2006). Noncapitalism describes the alternative transactions, labour, and enterprises (Gibson-Graham, 2006). These alternatives consist of "market and nonmarket economic activities that are unregulated or even unrecognized by the state" – that is, informal activities (Gibson-Graham, 2006, p. xi). Alternatives to capitalist enterprises or firms are categorized by their difference in "production process, their product, or their appropriated surplus is oriented toward environs environmentally friendly or socially responsible behaviour" (Gibson-Graham, 2003, p. xiv). This applies to the case of NGOs, who

attribute their surplus profit to social or environmental causes but cannot retain profits like other formal (capitalist) enterprises (Gibson-Graham, 2003). Alternative markets can destabilize the formal sphere, create social transformations, and provide a better picture of the whole economy (Cameron & Gibson-Graham, 2006). The informal or alternative economy includes the gift economy and economies of care, with activities typically occurring in the social spheres of the home and community (Cameron & Gibson-Graham, 2003; Dyck, 2005). For feminist scholar Peterson (2012), informality is a feature of capitalism that captures unpaid or unregulated labour and its role in furthering inequalities along axes of race and gender. Informality is heterogeneous and can be shaped by a country's industrialization and urban vs rural settings, impacting relevant sectors' regulations (Peterson, 2012). The growing informal sector in developing countries has led to an increased interest by scholars in informality (Peterson, 2012).

Although the definition of informality seen in feminist literature does not differ much from other informality scholars, the approach of feminist scholars builds on previously established schools of thought, such as structuralist and legalist schools; the focus is on the power structures, inequalities, and social aspects of the informal sector. Peterson (2012) recognizes that the fixed omnipresence of the informal and formal spheres, contribution to inequalities, and capture of unregulated or unpaid activities provides more insight than previously established definitions by focusing on the critical analysis of the intersection between structural hierarchies and woman. Peterson (2012) uses a critical lens to study traditionally “feminized”/informal labour to explore the global historical past of informal labour through an intersectional lens that critiques the dominant capital society and systems.

2.6.3. The Informal CE

In some cases, the unprotected and unregulated characteristics of informality lack reporting of revenues, resources, and incentives, resulting in its exclusion in economic literature and, subsequently, CE literature. Informality appeared sparingly within the CE literature, and when it is featured, it is focused on developing countries. As we know, informality varies depending on its existence in developed vs developing countries, socioeconomic status, and recognition of its fixed importance in a capitalist economy, formal-informal continuum, and the varied workforce (Gaughan & Ferman, 1987; Chen, 2005). The heterogeneous composition of informality makes it difficult to generalize from findings and data because it depends on various factors at the local (micro) and national levels (macro). The current CE narrative fails to problematize the CE transition in the context of critiques of capitalist economics and policies from the perspectives of growth and consumerism (Niskanen et al., 2020).

For this study, visibility differentiates formality (visibility) and informality (invisibility). Examples of informal exchange that could fall within the remit of CE activities include local trading, volunteering, and community networks, where relationships become the most influential governing source of economic exchange (Gaughan & Ferman, 1987; Tanaka, 2008). There is an overlap between relationships and community-based resources of the informal economy and the proposed pathway to a CE where non-monetary exchanges and the informal sector underlie CE-related activities. Like traditional economic studies, CE studies must engage with the formal and informal continuum underlying the larger urban CE to get a complete and more nuanced picture.

2.6.4. Informal CE Studies

Despite the growing literature on informality, CE literature in developed countries has largely ignored informal economies. Most of the CE literature that includes informal dimensions comes from developing countries attempting to formalize industries, using top-down structures, or having a technological focus. The studies examined in this section include three at the transnational scale (global and Europe) and one at the municipal scale in a developing country.

Murthy & Ramakrishna (2021) called for increased transparency, accountability and traceability in the e-waste recycling chain using a global legal framework identifying stakeholder responsibilities, opportunities to increase formalization, regulations, and technologies. A three-pronged approach of raising stakeholder awareness, modifying consumer behaviour, and tackling global challenges to a low-carbon CE was employed for the study (Murthy & Ramakrishna, 2021). The current sector needs the proper infrastructure, technology, and skills to recycle E-waste in developing countries (Murthy & Ramakrishna, 2021). Actions outlined in the Murthy & Ramakrishna (2021) study point to different actions based on developing or developed countries but rely primarily on creating legislation, regulation, and policies which rely heavily on the formal economy to regulate the informal space.

Boulanger & Massari (2021) examined grassroots movements from institutions and non-institution-based action for climate action in European (and at the global scale) and their impacts. The difference in each approach is that institutional network action takes a top-down approach through transnational policies or city networks, and institutional network action takes a top-down approach through activist movements such as Fridays for Future (Boulanger & Massari, 2021). Boulanger & Massari, 2021 explore how non-institutional (grassroots or citizen) organizations

and movements throughout Europe should organize, mobilize, and interact with the formal sphere (policy and government) to seek change.

According to Horodnic et al. (2023), there needs to be more discussion regarding the link between the informal economy and the platform economy using data from various European countries (ex. Romania). The study argues that it is important to understand how the informal economy operates through digital platforms (Horodnic et al., 2023). The two main rationales for those who purchase from the informal economy include lower prices or availability and improving social relationships (Horodnic et al., 2023). Horodnic et al. (2023) suggest a gap in data due to those who do not self-identify as someone participating in the informal economy or use alternative terms such as "undeclared work." The informal and platform economy have been explored through similar concepts of the sharing economy, peer-to-peer, and collaborative economy. However, the rapid growth and newness make it difficult to observe (Horodnic et al., 2023).

Miranda et al. (2020) analyzed the integration of recycling cooperatives in formal municipal solid waste management with the recyclable potential of a medium-sized municipality (Londrina) in Brazil. The Miranda et al. (2020) study prioritized creating best practices, policies, and formalization for workers in the recycling sector (Miranda et al., 2020). Waste and recycling management needs more technologies and relies on unskilled workers to perform most of the work, where workers face social barriers such as low education, a large family, unsafe working conditions, and gendered professions (Miranda et al., 2020). In this city (Londrina), the waste pickers had an existing responsibility for municipal waste collection, which provided legal and contractual components most informal workers do not have, contributing to the ease of

formalization of this sector. In this case, formalization and recognition have led to mutual benefits for the municipality and the workers.

Like the formal studies section, the studies examined in this section varied on their geographic scale, sectors, and geographic location. Although the transnational and global studies (Murthy & Ramakrishna, 2021; Boulanger & Massari, 2021; Horodnic et al., 2023) highlighted the growing academic literature of informality and the CE, the large-scale studies and various solutions presented display the need for place-specific solutions and the increased need to study the informal economy. While the municipal study (Miranda et al., 2020) showed a case where formalization benefitted the regulators and workers. Previous scholars (Gaughan & Ferman, 1987; Peterson, 2012) have noted that geographic location, industrialization, urban vs rural, and socioeconomic differences impact the informal economy; therefore, it is difficult to compare examined to my study location (London, ON). For example, the Miranda et al. (2020) study takes place in a developing country, in a low-tech job sector, and different socioeconomic status to residents in Canada's informal economy due to the opposite geographical location, industrialization, regulations, and socioeconomic status. Unlike formal studies, all informal studies engaged with the formal spheres of government and policy as well as various geographic scales (local, municipal, national). The studies in this section represent the small body of available literature on the intersection of CE and informality, drawing on the gap this study aims to fill.

This study will use the definitions of “CE” and “informality,” as discussed in this section, to underlie how the study will be carried out through data collection and analysis. This next chapter outlines the qualitative methods used to carry out the study by first introducing the political landscape of the study location (London, ON) before explaining and justifying the two-

prong approach of the CE inventory (analyzed through information visualization) and interviews (analyzed through thematic coding) to construct the urban CE in London, ON.

Chapter 3

3. Methodology

3.1. Study location

This study was conducted in London, Ontario, Canada, a mid-sized city home to approximately 543,551 people in its metro region (Statistics Canada, 2023). The City of London is an ideal location for this study because of the municipal policies, programs, and partnerships with grassroots organizations that directly address and seek to foster the local Circular Economy (CE) and respond to larger urban sustainability issues. The municipal programming and partnerships are partly due to provincial and municipal policies and plans fostering programs and partnerships.

3.2. Provincial policies

The Waste-Free Ontario Act¹¹, also known as An Act to enact the Resource Recovery and Circular Economy Act, 2016 and the Waste Diversion Transition Act, 2016 and to repeal the Waste Diversion Act, 2002 (Bill 151), were introduced to focus on resource recovery and move to a CE. This bill was successfully implemented, leading to a CE strategy that fosters the growth and implementation of a CE, protecting environmental and human health, and minimizing packaging waste. This bill touched on some of the core tenants of a CE, as explored in Chapter 2, such as environmental quality, human well-being, and transforming production and consumption systems. The Strategy for a Waste-Free Ontario: Building the Circular Economy was promptly implemented in 2017, outlining the long-term goal of zero waste and zero emissions from the provincial waste sector, with diversion targets of 30% by 2020, 50% by 2030, and 80% by 2050.

¹¹ <https://www.ontario.ca/laws/statute/s16012>

This provincial bill has informed municipal policies in London and across Ontario to meet the goals of this bill. To achieve this goal, the provincial and municipal government and stakeholders must work together to achieve waste diversion goals and create a CE.

3.3. Municipal programs and partnerships

The City of London has been working towards sustainable environmental management through municipal planning since 1997 with the release of the Continuous Improvement System and Sustainable Waste Management, followed by the 2007 A Road Map to Maximize Waste Diversion in London, then the 2014 Road Map 2.0 – The Road to Increased Resource Recovery and Zero Waste, followed by the 2018 60% Waste Diversion Action Plan, and finally the 2022 Climate Emergency Action Plan (CEAP) (The City of London, 2022a). The two main plans underly the municipal programs and partnerships, which include the 60% Waste Diversion Action Plan¹² (Strategy to reduce waste, encourage recycling and reuse of household waste) and the London Climate Emergency Action Plan¹³ (the document outlines the status of climate change in London while highlighting key actions and responsibilities required to reduce Greenhouse gases (GHG) by all citizens, city staff, businesses). These roadmaps and guiding documents are short-term plans informed by the same framework of continuous improvement and sustainable waste management (The City of London, 2018). The frameworks focus on waste reduction through recovery, environmentally responsible handling of waste, protecting human health, and ensuring environmental health (The City of London, 2018).

¹² <https://getinvolved.london.ca/whywasteresource/widgets/50491/documents>

¹³ <https://getinvolved.london.ca/climate>

In addition to programs and partnerships aimed at sustainable education or programs such as Green in the City Speaker series¹⁴ (Annual speaker series organized to highlight sustainability topics and leaders from various businesses, non-profits, grassroots groups, governments, and institutions), Green Economy London¹⁵ (One of 10 national green economy hubs that supports businesses through a network to help create a sustainable economy), Million Tree Initiative¹⁶ (Community-based initiative to plant and care for one million new trees in London, ON), TreeMe Program¹⁷ (Tree planting matching fund to help cover costs for planting on private properties or neighbourhoods in London), Urban Forest Strategy¹⁸ (Plan to guide the protection, improvement, and monitoring of urban forests over the next 20 years), Veteran Tree Incentive Program¹⁹ (Incentive-based pilot program from 2021-2022 to maintain health and protect veteran trees from invasive species of European Gypsy Moths), and London Invasive Plant Management Strategy²⁰ (Strategic framework to manage invasive species that threaten the local ecosystems). These initiatives vary in relationship to the CE, with the two most relevant programs/partnerships including Green in the City and Green Economy London. These two initiatives have directly addressed the CE alongside various stakeholders (residents, city staff, businesses, non-profits, and academia).

¹⁴ <https://www.londonenvironment.net/greencity>

¹⁵ <https://greeneconomylondon.ca/>

¹⁶ <https://www.reforestlondon.ca/programs/million-tree-challenge-placeholder/>

¹⁷ <https://staging.london.ca/living-london/water-environment/trees/treeme>

¹⁸ https://d3n8a8pro7vhmx.cloudfront.net/londonenvironmentalnetwork/pages/1361/attachments/original/1611171940/London_Urban_Forestry_Strategy_Final-compressed.pdf?1611171940

¹⁹ <https://london.ca/newsroom/city-london-debuts-veteran-tree-incentive-program>

²⁰ https://london.ca/sites/default/files/2020-11/Invasive_Plant_Management_Strategy.pdf

3.3.1. 60% Waste Diversion Action Plan

The 60% Waste Diversion Action Plan outlines a roadmap to achieve 60% waste diversion in London households by 2022, with a current 45% residential waste diversion rate as of 2018 (The City of London, 2018). The overarching goal of the 60% Waste Diversion Action Plan was to increase waste diversion, specifically through waste reduction, recycling, reuse, and resource recovery by 2022 (The City of London, 2018). This action plan will be achieved by identifying useful technologies for waste diversion, maintaining, or cutting the costs of specific city programming, local job creation, and methods that support the Waste Free Ontario Act (The City of London, 2018). This Diversion Action Plan builds directly off the previous roadmaps developed by the City of London to divert waste, A Road Map to Maximize Waste Diversion in London (2007) and Road Map 2.0 The Road to Increased Resource Recovery and Zero Waste (2013). Both previous roadmaps incorporated public feedback through various citizen and stakeholder engagement opportunities. These previous plans targeted diversion by modifying existing programs such as the Blue Box program (increasing materials accepted by residential curbside recycling), Envirodepot (expanded to include yard waste), introducing a garbage container limit, and composting pilot projects (The City of London, 2018). Although the report only mentions the CE directly in reference to the Strategy for a Waste-Free Ontario: Building the Circular Economy for the Waste-Free Ontario Act, the report is focused on related CE characteristics, mainly waste diversion, reuse, recycling, and resource recovery. Many concepts and characteristics between the report and the CE can be drawn specifically related to textiles and household waste.

The 60% Waste Diversion Action Plan is structured in six sections introduction (provincial legislation, previous municipal waste diversion plans, guiding principles), community

engagement (feedback activities and results), residential garbage composition (current analysis of garbage and plans), analysis and proposed actions (blue box program, new recycling programs, organics management programs, reduction and reuse initiatives, environmental, social and cost details), resource recovery strategy (timeline and direction of strategy), and the summary of key implementation requirements (15 requirements and actions have been suggested by the report involving politicians, Londoners, city staff, the transportation sector, and the local community) (The City of London, 2018). The following sections will explore and discuss only relevant information directly or indirectly related to the CE.

The three guiding principles that had the most public support include prioritizing waste reduction (ex. reduce total material being generated, avoiding food waste), including social responsibility (ex., fair solutions that benefit multiple stakeholders enable participation), and ensuring financial stability or sustainability (ex. affordable solutions for the present and future generations, economic prosperity) (The City of London, 2018). Like those in the past, the waste diversion action plan leveraged community engagement in determining key issues or themes and feedback on existing services and programs. The community engagement for the 2018 waste diversion plan primarily embraced traditional media, social media, the City of London website, the Get Involved London website²¹, and open houses (The City of London, 2018). This feedback was used to guide the creation of the report alongside provincial legislation and research into waste diversion, such as a comparative analysis, compiling actions and programs from other municipalities, and various partnerships with industry and academia (The City of London, 2018). Here the guiding principles that receive the most support relate to the CE components of eco-

²¹ <https://getinvolved.london.ca/>

innovation, human well-being, and economic prosperity. The discussion is balanced and not techno-centric (eco-innovation) based on public engagement.

This analysis and proposed actions focus on both existing (blue box program, organics management) and new (actions based on material types) areas within the municipality (The City of London, 2018). The report highlights eight categories of material, their status, and the estimated quantity sent to landfill annually (The City of London, 2018). Clothing and textiles are of particular interest because this category is responsible for an estimated 2,500-3,000 tonnes of clothing/textiles, and it is estimated that half of the discarded material can be reused (The City of London, 2018). London has developed a community around clothing and textile reuse and recycling programs, including drop-off bins, drop-off depots or locations, door-to-door collection, and other programs that divert ~3,300 tonnes of material annually or a 70% diversion rate (The City of London, 2018). This plan aims to close the gap through an awareness plan and pilot programs for clothing collection from multi-residential buildings by 2019 which will require additional funding between \$5,0000-\$30,000 annually (The City of London, 2018). Here the proposed actions focus on transforming systems and human well-being with solutions focused on education and available alternative end-of-life solutions.

The resource recovery strategy outlines provincial waste management in Ontario, which aimed to decrease or minimize waste, reuse, or repurpose, and separate organics (yard waste, leaves, food) (The City of London, 2018). It also highlights three other projects taken on by the city of London, the Resource Recovery Plan (plan to increase reduction, reuse, recycling, and resource recovery through environmentally and economically responsible paths), the Residual Waste Disposal Strategy (long-term waste management plan), and the 60% Waste Diversion Action Plan (The City of London, 2018). The Resource Recovery Plan relies heavily on new

technology or advancements, in which case external research and companies have been consulted to understand needs and potential areas of implementation. The report emphasized the need to mobilize these new technologies as the diversion rate has been 45% since 2014; this report focused on short-term implementation from 2018 to 2022 (The City of London, 2018). The projects under the resource recovery strategy section rely on eco-innovations and new or non-existing technologies.

The report concluded with an overview of the 15 requirements of various stakeholders in London, noting that Londoners must make changes and embrace societal shifts to achieve long-term environmental payoff (The City of London, 2018). Relevant key actions include (The City of London, 2018):

- delivering relevant information, education, and promotions;
- willingness to embrace change;
- incentives and rewards;
- by-laws on recycling and waste;
- collaborations with stakeholders;
- capacity building;
- tracking and measurement systems;
- feedback from and to the various stakeholders.

These key actions focus on human well-being and transforming systems primarily through political interventions such as by-laws, legislations, and reward programs. This report highlights the voluntary nature of participation required to meet the waste diversion goals (ex., household reduction of consumption and waste), and some programs are not only costly to implement with little revenue/reward offered (The City of London, 2018). To combat this, the

report suggests incentives and rewards increase the potential participation of residents, the public, or community groups. Targeting businesses, legislations, by-laws, and other political interventions is more useful.

3.3.2. Climate Emergency Action Plan (CEAP)

The response to the climate emergency resulted in a municipal goal to reach net zero by 2050, with intermediate milestones in 2030, 2035, and 2040 (The City of London, 2022a). This plan builds on existing policies and programs, with municipal staff taking the lead on transportation and waste (The City of London, 2022a). The declaration of a climate emergency officially took place after a unanimous City of London council vote in April 2019. As part of this action, the City adopted the Climate Emergency Action Plan (CEAP), which explicitly identifies ten focus areas (The City of London, 2022a, p. 47):

1. Engaging, Inspiring and Learning from People
2. Taking Action Now (Household Actions)
3. Transforming Buildings and Development
4. Transforming Transportation and Mobility
5. Transforming Consumption and Waste as Part of the Circular Economy
6. Implementing Natural and Engineered Climate Solutions and Carbon Capture
7. Demonstrating Leadership in Municipal Processes and Collaborations
8. Adapting and Making London More Resilient
9. Advancing Knowledge, Research, and Innovation
10. Measuring, Monitoring and Providing Feedback

This report was prepared to help direct collaborations, discussions, and actions and determine how progress will be measured (The City of London, 2022a). To prepare the report, the City of London compiled information from community involvement and actions from municipalities, committees, organizations, and city staff (The City of London, 2022a). In addition to public engagement tools through four main consultation initiatives, including the Get Involved London website²² (which provided feedback forms and space to provide comments), a discussion primer (allows organizations and individuals to provide feedback on their current sustainability practices and how they can contribute to key areas), eDemocracy's Climate Action Plan Simulator²³ (the website provided an interactive simulation on municipal wide GHG production and a survey), community-led and supported engagements (a list of current significant sustainable organizations and programs) (The City of London, 2022b).

In the Climate Change Expected Results section, ten goals are highlighted. The Move Towards a Circular Economy is defined as "reduced emissions from consumption and waste, more efficient material use, and the creation of regenerative prosperity" (The City of London, 2022a, p. 31). The CEAP goes on to highlight 2030 Milestones associated with each goal, where the milestone for a Move Towards a Circular Economy will be achieved through "[s]triv[ing] for at least 60% waste diversion from landfill through reduced waste generation and improved material efficiency" (The City of London, 2022a, p. 32). The CEAP provided work plans for city staff, actions for households, and business recommendations. The London City Council focuses its commitments on services directly managed, such as recycling and landfills (The City of London, 2022a). The report highlighted key stakeholders as residents, businesses, community groups, and to a lesser extent non-profits, and educational institutions, for the successful

²² <https://getinvolved.london.ca/climate/widgets/49288/documents>

²³ <https://londonclimate.ethelo.net/page/welcome-survey>

implementation of the CEAP (The City of London, 2022a). Additional resources available for businesses and community groups were provided, such as the Overview of Businesses and Employers Climate Action to Address London's Top Employers and Overview of Community Climate Action. Each of the 10-focus areas addresses the following categories:

- Purpose of this work plan
- Climate Change Expected Results
- Why does it matter?
- Background
- What are some recent actions?
- Responsible City Service Area(s)
- Key Actions and Milestones
- Examples of Measuring Progress
- Resources

Moving towards a CE is an indirect expected result with many focus areas aside from Focus Area 5- Transforming Consumption and Waste as Part of the Circular Economy, which works to actively build the local CE. The Focus Area 5 Workplan is the most relevant to this study as it provides an initial direction for discussion, action, and progress monitoring. This work plan acknowledges the existing used marketplace, specifically textiles, toys, furniture and building supplies in London (The City of London, 2022a). The work plan highlights that to move towards a local urban CE, and the incorporation of the 3 R's: reduce, reuse, and recycle materials (The City of London, 2022a). The background section for this work plan acknowledges the previous 25 years of waste management that underlie the CEAP, including the 60% Waste Diversion Action Plan (The City of London, 2022a). The 60% Waste Diversion Action Plan is also listed as

one of five recent actions working towards this focus area; the other four include London Waste to Resources Innovation Centre (continue exploring projects and products that can divert waste and create value for a value chain or CE), Environmental Assessment for the W12A Landfill Site Expansion (environmental assessment of the proposed vertical expansion of the W12A landfill), Green Economy London (network to support sustainable outcomes and stewardship for businesses), and Long-term Resource Recovery Plan (residential waste plan to maximize reduction reuse, recycling, and recovery in a sustainable and economically feasible way) (The City of London, 2022a). The temporality of these actions varies from short-term to long-term but also includes undetermined time scales. For example, Green Economy London and the Long-term Resource recovery plan are ongoing projects meant to be implemented over several years or decades. The 60% Waste Diversion Action Plan is meant to cover a short three-year timespan (The City of London, 2018). From the five recent actions presented, four (all but Green Economy London) focus on eco-innovation, relying on technological solutions to help transform consumption and waste. While this is helpful, the strategies should focus more on human well-being and environmental quality.

Two of these recent action overlap with the four key actions and milestones highlighted, including Implementing the 60% Waste Diversion Action Plan (ongoing) (food waste avoidance, Green Bin program, textiles and other reusables material plan), Long-term Resource Recovery Plan (2022-2023) (use new technologies for waste diversion and local job creation), Growing the Circular Economy in London and Area (2022-2025) (current landscape, develop CE framework, bring actions to city council), Active and Closed Landfill Management - Renewable Energy and Emissions (2022-2025) (identify current and future areas for renewable gas production from landfills) (The City of London, 2022a). Unlike the recent actions section, these key actions had a

temporal element highlighting the expected completion of these actions. The four key actions and milestones predominately rely on eco-innovation, except for the development of a CE framework which focuses on human well-being. To measure the progress of the CE in this focus area, the following quantitative metrics have been suggested:

- Number of reuse, recycle, compost, digest, and recover facilities
- Percentage of business waste diverted from landfill
- Percentage of residential waste diverted from landfill
- Percentage reduction in per capita waste generation
- Household participation rate in Recycling Program
- Household participation rate in Green Bin Program

The City of London will measure, track, and compile these metrics at the respective landfill and recycling sites. Despite the focus of monitoring and actions on city staff, other stakeholders are expected to help engage in projects. The work plan specifically outlines key stakeholders as the provincial government, federal government, City of London advisory committees, businesses/business associations, energy/utility companies, community groups, and Indigenous communities (The City of London, 2022a). As the CEAP is focused on municipal-led actions and initiatives, as presented in the workplace, many stakeholders outside city staff and government need to be presented with more calls to action. The CEAP is a great primer for understanding what has been done in the past and the need for a shift to a sustainable society such as a CE but beyond that falls short. The initiatives discussed focus on collecting information and identifying barriers, gaps, and key stakeholders within food systems, recycling, and textiles. As the CEAP is a culmination of previous waste management plans (i.e., 60% Waste Diversion Action Plan),

much work is needed to move beyond the initial collection phase and engage stakeholders outside city staff. The City staff acknowledge the existing gaps within the outreach done prior to the release of the CEAP, specifically the need for increased participation from youth, Indigenous communities, and municipal governments outside London, those limited by technology and not engaged in climate policy (The City of London, 2022b). Despite the various citizen engagement efforts carried out, many groups were excluded. Future citizen engagement efforts should work to close these gaps by diversifying engagement methods and targeting minority groups previously not engaged.

While municipal CE-centric policies and objectives are important for increasing sustainability and meeting climate goals, they rarely account for or acknowledge how both formal and informal local actors - including businesses, grassroots organizations, and civic groups and collectives - may be responding to CE policy imperatives, engaging in extant activities that predate yet intersect with city government CE actions, or pursuing informal initiatives and practices that contribute to the local CE yet which are rarely included within formal urban channels (such as municipal administration). To determine the nature and extent of formal and informal aspects of the local urban CE in London, ON, this study inventoried local CE events, actors, and community groups using visual analysis.

3.4. Data collection

This research investigated how formal and informal practices contribute to the local urban Circular Economy in London, ON, Canada. It examined grassroots CE initiatives undertaken by local stakeholders and identify the significance of these activities for urban sustainability and formal activities. To understand the type of events, actors, opportunities,

incentives, motivations to participate, attitudes, and behaviours, two methods of data collection were mobilized: an inventory of CE actors, events, and groups and interviews with key stakeholders in the local London, ON-area CE. Previous CE literature explored in Chapter 2 points to a gap in the local or grassroots contribution to the CE. These two data collection methods aimed to bridge this gap by collecting information about formal and informal events, actors, and groups to create a snapshot of an urban CE.

3.4.1. Circular Economy Inventory

In the context of this study, the CE inventory was conducted to paint the picture of a mid-sized city's formal and informal urban CE, capturing the distinction between informal and formal actors, events, and groups, as well as their possible overlaps and/or complementarities. The CE inventory determined the type and variety of CE-related opportunities for Londoners to engage in CE. The data collected as part of the inventory was then mobilized within methods of information visualization and multimodal analysis. The London, ON-area CE inventory was conducted over seven months between September 2022 and February 2023 with an amendment made in August 2023 to provide a snapshot of the urban CE in London, ON. The objective of this inventory was to identify, as exhaustively as possible, the various formal and informal actors, platforms and events that contributed to, facilitated, and comprised the local urban CE during this timeframe and to identify any relationships, partnerships, collaborations, and spatial-temporal intersections between them (e.g., contributing to the same initiative, being co-present at the same event). The inventory aimed to capture three main types of contributions to the CE: actors, events, and groups that contributed to the London area CE through actions and practices

that reflect Prieto-Sandoval et al.'s (2018) definition of the CE, even where the actors themselves did not mobilize the term or language of 'Circular Economy' (CE) to describe their activities.

Actors included individuals, businesses/business owners, non-profits, branches of the City of London administration (e.g., municipal departments), and educational institutions that offer educational programming. Examples of actors include thrift clothing stores such as Chaotic Closet and Style Encore, and non-profits such as Climate Action London. The *events* consisted of one-day or multi-day events within the City, generally organized or co-organized by multiple actors. Examples include Vintage on the Block, a reoccurring pop-up event hosted by local thrift store owners to promote consignment, vintage clothing, and housewares to Londoners. *Groups* included community groups on social media sites (Facebook and Bunz), focus on providing users with a (digital) community or space to interact for CE-related actions and activities. For example, the Bunz²⁴ app focuses on trading, swapping, or selling clothing, housewares, and toys within the user's local area. In contrast, Facebook²⁵ focuses on providing individuals with groups or pages where people with shared interests can go. Some groups include Buy Nothing challenge groups, clothing swaps, and trade groups for parents.

The inventory was conducted across various source materials, both print and digital. The two print sources were encountered as individual instances: 1) a poster for the Green in the City Speaker Series encountered at a local grocery store bulletin board in 2022 and 2) the 2022-23 London Collection Calendar²⁶ distributed to residents (this calendar hosts "green tips" and ads for recycling, composting, etc. services). For electronic sources, this inventory began with an initial search on Google, Facebook, and Eventbrite search using the following key phrases:

²⁴ <https://bunz.com/>

²⁵ <https://www.facebook.com/help/1629740080681586>

²⁶ <https://london.ca/living-london/garbage-recycling/collection-calendar>

"environmental events in London, ON"; "sustainability events London, ON"; "sustainability talks London, ON"; "circular economy London, ON." This search led to relevant events, actors, and digital communities captured in the inventory. Google search results led to websites that hosted frequent public facing CE or CE-related events that were then included in the CE inventory, such as Pillar Non-profit²⁷, Green Economy London²⁸, London Environmental Network²⁹, and relevant organizations' social media pages (specifically Facebook), which provided other sources for other relevant CE stakeholders and events. Elsewhere, Facebook searches led to relevant community groups (ex., local swap and trade groups) and events posted by organizations, often, Facebook events included registration links to Eventbrite. And Eventbrite helped source events included in the CE inventory, this also led to the discovery of relevant organizations' social media pages (businesses and non-profits).

The data collection for the inventory occurred concurrently with semi-structured interviews with key informants, who also identified relevant businesses, organizations, and events that likewise were added to the inventory. All the applicable actors, opportunities, and events from print and electronic sources as well as interviews were added to the inventory and stored as a Microsoft Excel spreadsheet. Details recorded in the spreadsheet included the event/organization/platform name, a brief description, and the nature of linkage to the CE (e.g., ethical production; sustainable materials, low/zero waste, swap/trade). A list of thirteen terms was chosen to represent the linkages to the CE, including “sustainable materials”, “low waste”, “inform”, “behavioural shift”, “sustainable production”, “reuse”, “repair”, “gift”, “swap/trade”, “divert from landfill”, “revitalize/transform”, “conservation”, and “sustainable consumption”.

²⁷https://pillarnonprofit.ca/?gclid=Cj0KCQjwiIOMBhDjARIsAP6YhSX04wjeImEg0VOBTh6FbrWc29LNMDszL8pxhXPk19xRs1ULzFXZN0YaAkwEALw_wcB

²⁸ <https://greeneconomylondon.ca/>

²⁹ <https://www.londonenvironment.net/>

The following terms were taken from the literature explored in Chapter 2, representing terms and phrases that were used to define, describe the CE, related CE activities/actions as displayed in

Table 3.1.

Table 3.1. List of thirteen terms chosen to represent CE linkages with a brief explanation and the related literature from which the terms were chosen.

Term	Explanation	Relevant Literature
sustainable materials	Defined as natural, recycled, recovered, reused, more efficient materials that are alternatives to the current fossil-fuel materials used.	The City of London, 2022a; Clube & Tennant, 2020; Prieto-Sandoval et al., 2018
low waste	Also referred to as waste reduction, waste management, and waste recovery.	The City of London, 2022a; Alaerts et al., 2019; Bengtsson et al., 2018; Prieto-Sandoval et al., 2018; Clube & Tennant, 2020
inform	Provide sustainable education or information to make informed decisions.	The City of London, 2022a; Bengtsson et al., 2018
behavioural shift	Encouraging or educating consumers/others on shifting or changing behaviours to be more sustainable related to personal consumption and lifestyle.	The City of London, 2022a; Bengtsson et al., 2018; Cohen & Munoz, 2015
sustainable production	Related to production cycles and systems including material to construction such as use renewable/recycled/recovered resources, efficient systems, locally produced/distributed, cleaner production	The City of London, 2022a; Cohen & Munoz, 2015; Bengtsson et al., 2018; Prieto-Sandoval et al., 2018
reuse	Second hand materials and pre-owned goods.	The City of London, 2022a; Cohen & Munoz, 2015; Alaerts et al., 2019; Bengtsson et al., 2018; Prieto-Sandoval et al., 2018; Clube & Tennant, 2020
repair	Maintain and repair, option, and opportunities to repair (ex. repair cafes/fairs).	Cohen & Munoz, 2015; Alaerts et al., 2019; Bengtsson et al., 2018; Prieto-Sandoval et al.,

		2018; Clube & Tennant, 2020
gift	Exchange of gifts or commodity for no compensation.	Cohen & Munoz, 2015
swap/trade	Alternative to current market through agreements to trade or swap items in lieu of monetary compensation	Cohen & Munoz, 2015
divert from landfill	Diverting waste from the landfill	The City of London, 2022a;
revitalize/transform	Transforming the economy, society, cycles of production/consumption, resources, and markets to be more circular.	Cohen & Munoz, 2015; Bengtsson et al., 2018; Prieto-Sandoval et al., 2018; Clube & Tennant, 2020
conservation	Conserving resources or biodiversity.	The City of London, 2022a; Bengtsson et al., 2018; Prieto-Sandoval et al., 2018; Clube & Tennant, 2020
sustainable consumption	Reduced or lowered volume of consumption of personal materials and resources	The City of London, 2022a; Cohen & Munoz, 2015; Alaerts et al., 2019; Bengtsson et al., 2018; Prieto-Sandoval et al., 2018; Clube & Tennant, 2020;

As the spreadsheet became populated with entries, natural groupings based on CE phenomenon types emerged. A total of six phenomena types were identified, comprised of *events* (public and private events ranging from activities, workshops, lectures, and markets); *social media* (online communities, sites, and groups from Facebook and Bunz); *businesses* (all consignment, vintage stores, and businesses owned by non-profit and for-profit organizations which offer textiles, housewares, sustainable services); *non-profit organizations* (local organizations specific to or engaging Londoners and London, ON); the *City of London staff* (departments that deal with relevant environmental policies and programs); and *education institutions* (that offer educational programming or professional training which directly impact

policies or service offered, e.g., Centre for the Environment and Sustainability at Western University³⁰).

3.4.2. Semi-Structured Interviews

In addition to the CE inventory, I conducted semi-structured interviews with key stakeholders, including City of London staff, business owners, local environmental non-profits, and residents. These interviews supported the development of an in-depth understanding of CE cycles of production and consumption in London, ON, by identifying differently positioned informants' understandings of the local CE, the impacts of CE activities, and motivations for informants' participation in informal CE practices. These stakeholders engage in CE-related activities through work or their lifestyle. Informants were recruited using public-facing information (e.g., London-area business directories, corporate websites, Facebook groups) and at public events (such as London-area talks) In addition to these recruitment methods, I leveraged my pre-existing connections within the non-profit environmental community and City of London to recruit informants.

The study received full ethics approval from Western University Non-Medical Research Ethics Board (NMREB) for recruitment, semi-structured interview activities, and research instruments. All informants were provided with a letter of information and written informed consent (See **Appendix A** for the approval letter). Informants were free to withdraw at any point following their participation before the writing process began. Informants consented to audio recordings for interviews anonymized before and during transcription. All interview-related data is stored in an encrypted password-protected folder of my personal laptop. Two semi-structured

³⁰ <https://www.uwo.ca/enviro/index.html>

interview guides were created to correspond to the two targeted populations (see **Appendices B and C** for semi-structured interview guides). Each guide was developed with a similar breadth of questions asking respondents to describe motivating factors for engaging with the CE, describe the community, prior environmental knowledge, environmentally friendly behaviour, perceptions of power, and perceptions of environmental tools/knowledge for the public (ex. sustainable tips, incentives/rewards for sustainable behaviour, sustainable programs). The interview targeting residents or members of community groups asks questions about perceptions of sustainability, where they get their information/knowledge on sustainability, and shopping habits.

Ten semi-structured interviews with guided questions/conversations were audio-recorded using Zoom. All the interviews took place virtually over Zoom, with two participants providing asynchronous responses. In the case of asynchronous interviews, additional or follow-up questions could not be asked. There are limitations to this data. The semi-structured interviews were conducted with recruited informants between September 2022 and February 2023 with an additional recruitment and interview period in August 2023. Upon request, some participants were also given the opportunity also provide asynchronous answers when time and availability are limited. To examine people's motivations for engaging in CE practices and understand the impacts of these activities, I engaged with two groups of informants:

- I. Ten key stakeholders positioned to engage with the CE from an urban governance or policy perspective. These key stakeholders included municipal-level government representatives, business leaders, and members local environmental non-profit organizations.

- II. One member of the public (London-area residents) who participate in CE-related activities, such as sustainability-themed workshops/programs, resource-sharing groups, and community swaps.

Recruitment occurred through email, in-person events, referral sampling, and social media. Participants' emails were obtained in one of three ways:

1. Email addresses were obtained based on my existing connections within the City of London (municipal government administration) and environmental non-profit groups.
2. Emails obtained networking at local-area sustainability events (e.g., talks, fairs, film screenings, town halls), where I introduced myself and my research to prospective interview participants, provide them with a printed copy of the study information sheet, and request their business card or their email should they express willingness to be contacted for purposes of an interview. In-person recruitment is limited to public-facing events ranging from free to attend to low-cost admission. They do not require an invitation but registration for the event may be required.
3. Emails obtained from public-facing websites (e.g., London-area business directories).

Beyond email recruitment, public-facing information such as public social media accounts (Facebook and Bunz) through digital pages or groups were used for recruitment throughout September 2022-February 2023, with additional interviews conducted in August 2023. The recruitment process for social media involved different approaches for Facebook and Bunz. The Bunz app allows you to post only to your local community based on location; a simple recruitment post was made with one response; however, this participant did not live or

participate in London, ON-based CE activities, which was a crucial part of the study criteria. I contacted moderators or administrators of 13 Facebook groups where posting was allowed, or the group rules did not explicitly state advertising was not allowed to confirm my post was acceptable. From these 13 groups, two moderators/administrators rejected my request, six were unresponsive (no posts were made in these groups), and four groups allowed me to post. The four groups I posted the recruitment message to had a combined total of 54,843 people, with some potential overlap of members between groups. I received three responses from these four groups, with only one informant who followed through with submitting the consent form and setting up an interview. Both methods involved sharing more information with prospective participants before confirming their interest and receiving consent. Each informant's participation was limited to one interview, on average each interview was 30 minutes in length. Following the interviews, the interviews were manually transcribed before moving on to thematic coding and transcribed data was analyzed.

3.5. Data analysis

3.5.1. Information Visualization and Social Network Analysis

To analyze the data from the CE inventory, I employed methods of information visualization to render visible the relationships, if any, between the actors, events, and groups identified. At its core, visualization provides an analytic framework that supports the identification of relationships within a dataset. However, visualization approaches to the data differs between qualitative or quantitative types and, in some cases, uses a mixture of both in the visualization and subsequent analysis (Ash et al., forthcoming). This study mobilized qualitative data visualization, or information visualization, which involves expressing, investigating, and

analyzing text-based data (words and symbols) (Ash et al., forthcoming). Qualitative data visualization, or information visualization, involves expressing, investigating, and analyzing text-based data (words and symbols) (Ash et al., forthcoming). The analysis process can display patterns, hierarchies, or relationships amongst the data and is typically digitally produced (Ash et al., forthcoming).

The analysis process – supported by a method known as exploratory data analysis (EDA) - can display patterns, hierarchies, or relationships amongst the data and is typically digitally produced (Ash et al., forthcoming). Exploratory data analysis (EDA) is a visual-based method used to support exploration of data, supporting the identification of patterns or trends through a visual overview of relationships, which then helps discern appropriate methods for further analysis (Ash et al., forthcoming). EDA allows researchers to explore multiple sources and search for patterns, including where they differ, effectively identifying themes within the data (Henderson and Segal, 2013). Data visualization artefacts may themselves also be visualized, including through the method of multimodal analysis (Ash et al., forthcoming).

By visualizing the CE inventory, the output is a relational map that displays the snapshot of the formal and informal CE captured in the seven-month data collection period. This research iterates on a qualitative visualization technique called a social network diagram. A social network diagram used social network analysis (SNA) and draws from the larger established literature of Network Analysis. Where "networks" are visually represented by individual nodes (social actors) and linkages (relationships represented via links connecting nodes), which embody the interaction of nodes and larger relationships amongst nodes (Ash et al., forthcoming; Pokorny et al., 2018). Network analysis uses line weight (intensity of connection) and directionality (arrows to display the flow of information/influence) of the linkages between nodes in addition to

qualitative metrics (ex., number of connections, number of linkages, density, distance from other nodes) (Pokorny et al., 2018). This constructed network allowed researchers to estimate the size and flow of information/influence based on the number of nodes and linkages (Pokorny et al., 2018).

Once the inventory cut-off date was reached, these actors, events, and digital platform groups were mapped using Miro³¹ visual platform to create a relational diagram. Miro is a digital visual platform or self-described “virtual whiteboard” (Miro, 2023). The platform uses a simple user interface that allows built-in templates (ex., mind map and flowchart) or starting from a blank canvas. The relational map was created using an empty mind map template in vertical and horizontal orientations. The software makes use of drag-and-drop elements over a large amount of space. The unconstrained canvas can make exporting the visual creations onto a single page difficult as the text size cannot easily be increased in the diagram. This results in figures that require zooming in or looking closer to read the information properly. This relational map places the local Circular Economy in the centre, with key entries (actors, events, and groups) in the Circular Economy inventory as nodes. These nodes are not arranged in any specific order; the symbology used is colours to differentiate between phenomenon types (events, social media groups, businesses, non-profit organizations, City of London departments, and education institutions) and arrow direction (showing relationships between events and actors). The colours of the nodes and lines are assigned based on the six phenomenon types (events, social media groups, businesses, non-profit organizations, City of London departments, and education institutions). Only interconnected nodes were included on this relational map to remain legible. Next, arrows were applied to display linkages between actor nodes (the social media groups,

³¹ <https://miro.com/about/>

businesses, non-profit organizations, City of London departments, and education institutions) and events. The arrows flow from event nodes to actor nodes. The interconnectivity or lack thereof of these actors and events is then analyzed in-depth to scan for patterns, groupings, and interactions as outlined by Henderson & Segal (2013). As a result of the data, two maps were created, one to depict the formal CE and the other to depict the informal CE captured.

In my study, I mobilised a modified approach to SND to understand the Urban CE of London, ON, as a network. Based on the analytic visualization technique of the social network diagram, I created a relational visualization to make apparent the intersections between different CE phenomena in London, ON. However, unlike social Network Diagrams, spatial organization and line weight are unimportant in my relational map; instead, the visualization uses colours and directionality of linkages to represent the CE of London, ON, as a network. Where colour is assigned by CE phenomenon types (e.g., businesses, social media) and two sets of linkages are expressed as follows:

1. Non-directional linkages that represent the connection of nodes to the larger urban CE of London, ON; and
2. Directional arrows flow from actor nodes into event nodes to depict the relationship between actors and events captured in the CE inventory.

My relational map uses words as nodes to represent actors, events, and groups and groups actors by phenomena type. I subsequently added non-directional linkages to display the node's connection to the urban CE of London, ON and directional linkages (arrows) to display the frequency of contribution of actors to the CE events. The purpose of data visualization in this study is two-fold: to analyze the data and uncover any related patterns or trends, second, to

formulate a narrative with the data (Ash et al., forthcoming). Data visualization uses vector graphics such as lines and points to display actors and elements, which can be grouped through colours and saturation (Manovich, 2011). Methodologically, exploratory visual data analysis answered questions about conceptual connectivity, identified patterns, identified differences, and displayed the connections between actors and/or nodes. Social network analysis furthermore enables researchers to classify the types of social interactions within a network, identify key nodes (actors), patterns of linkages (relationships), the level of connectivity, and the flow of information/influence/interactions (Himmelboim, 2017). The interconnectivity (or lack thereof) between the informal and formal networks was central to addressing my Research Question 1 about possible intersections and interactions between formal and informal sectors of the London, ON CE.

Himmelboim (2017) outlines three levels at which SNA may be conducted: nodes, linkages, and network level. Node-level analysis relies on directionality (flow of power or influence from node to node), centrality (focus on hubs, in-degree and out-degree relationships), and reciprocity (mutually initiated relationships between nodes in the network vs. all nodes). Where node-level analysis tells us the flow of influence of information between nodes and the role of (event/actor) nodes within a network. Centrality is measured based on node location, so it is not included in this analysis. Instead, the role of hubs (nodes with multiple linkages in the network), in-degree relationships (externally initiated relationships), and out-degree relationships (actor-initiated relationships) are used to describe directionality and reciprocity within the CE networks (Himmelboim, 2017). In addition, the role of bridges (connection through indirect communication such as social media) is important because ties are not visible but provide access to content, moderation, and network resources (Himmelboim, 2017). Bridges are sometimes known as brokers

when nodes access resources, information, or connections that other actors do not (Himmelboim, 2017).

Link-level analysis uses type (static vs. dynamic), weight (not used), and reciprocity (measured the same way as node level) (Himmelboim, 2017). The link types in the analysis are static, where they were established once and are unlikely to change (Himmelboim, 2017). Linkages expressed with direction depend on the nature of the relationship, where the direction of the arrowhead is determined by the flow of information/influence or direction of the interaction, e.g., Person A follows Person B on social media would be represented by $A \rightarrow B$ (Pokorny et al., 2018). Social network diagrams visualize what nodes are connected or disconnected from each other, and the strength of those connections/disconnections. SNDs and social network analysis tell us about the individual nodes (who/what is most interconnected), patterns of linkages, or hierarchical structures within the network (Himmelboim, 2017).

Network-level analysis is calculated through density, which can influence the rate of information flow in a network, and distribution of linkages. Undirected networks use the Granovetter formula $D = \frac{2N_1}{N(N-1)}$ and directed networks use a modified version where $D = \frac{N_1}{N(N-1)}$ D= network density, N_1 = number of linkages, and N = number of nodes (Chung et al., 2005). This formula can be used to calculate the maximum number of links possible used in the density equation for undirected networks is $N_{max} = \frac{N(N-1)}{2}$ while directed graphs use $N_{max} = N(N-1)$ with N_{max} = maximum number of possible linkages, N = number of actors. Granovetter formula for undirected networks is $V = (N-1)D$ and directed networks use where $V = \frac{(N-1)D}{2}$ where V = average acquaintance volume, N = number of actors in network, and D = network density ranging from 0 (sparse) to 1 (dense) (Chung et al., 2005). Distribution can be

calculated based on the frequency of degrees (number of linkages a node has in the network) in a network; a histogram is then created from these values, and the distribution can be analyzed and described (skewed or normal) the relationship of nodes and linkages in a network (Himmelboim, 2017).

3.5.2. Thematic Coding and Analysis

After the semi-structured interviews were transcribed, these transcripts used thematic coding and analysis. For this, I used Braun & Clarke's (2006) six-step thematic analysis framework to analyze the interview data (**Table 3.2.**); the data was iteratively coded using qualitative data software NVivo 14³². NVivo is a qualitative analysis software that enables individuals to analyze data, identify themes, and draw conclusions (Lumivero, 2023). Thematic analysis identifying significant themes of CE activities, motivations, understandings, and the impact that will emerge from my iterative analytic engagement with the interview data. This analysis informed my theorization of the significance of CE activities based on my findings in London, ON.

Transcription was conducted manually and used aliases for all participants such that real names were not used. All transcription was done using Microsoft Word, with documents stored separately in an encrypted password-protected folder alongside the NVivo project file (and separately from the participant key). During the transcription, I re-familiarized myself with the data and noted any information of interest as per Braun and Clarke (2006). Second, I imported each transcribed Word document into NVivo to begin coding, using Braun and Clarke's thematic analysis approach. Thematic analysis is a qualitative method used to identify, analyze, and

³² <https://lumivero.com/products/nvivo/>

inform the interpretation of themes within a qualitative dataset (Braun & Clarke, 2006). The analysis involved an inductive approach where data was coded without a pre-existing framework (codes or themes), instead driven by the data (Braun & Clarke, 2006). Due to the flexible nature of the thematic analysis, Braun & Clarke's (2006) six-step method is summarized in **Table 3.2**.

Table 3.2. Thematic Analysis Framework adapted from Braun & Clarke (2006).

Phase	Description of Process
1. Familiarization with data	Transcription of data, reading, reviewing, noting initial codes.
2. Level 1 coding	Start coding (level 1) entire data set, grouping similar ideas/excerpts.
3. Attaching themes	Begin grouping by themes, all codes should belong to a theme.
4. Review themes	Rework themes, if necessary, re-analyze entire dataset, a thematic map should be created.
5. Define themes	Continue refining themes, name or re-name themes, define themes to begin creating an analysis.
6. Construct analytic narrative	Re-read codes and themes, select all vivid or compelling excerpts, relate back to research questions and literature, produce report.

I worked with 1-2 transcripts at a time to start identifying initial codes (level 1 codes). After each transcript was coded, a word frequency query was conducted using the selected interview file (and/or asynchronous written responses) with a word minimum of 1 to identify the top 100 words mentioned in the transcribed file(s). With each query, small words such as *oh*, *um*, *okay* are added to the stop list, so that they are ignored in future queries. These queries are saved within NVivo, these queries were re-run after all transcription files were coded to continue removing irrelevant filler words. Anything that did not get coded but seemed relevant had an annotation explaining the passage's importance. Here is a sample list of my level 1 codes:

- Citizen action

- Education
- Environmental motivations
- Power & Influence
- Reuse, reduce, recycle
- Sustainability- food
- Sustainability- transportation
- Sustainability- energy
- Sharing
- Work- local contribution

Next, all transcripts were reviewed to transform generated codes (level 1) to develop themes that will act as the unit of analysis for this dataset (Braun & Clarke, 2006). Level 1 codes were reviewed and compared to the themes and continued adjustment of themes/codes as necessary. As themes are developed, some codes will be renamed to better-suited names or shorthand names to refine categories. Level 1 codes were reviewed and, if required, moved to new or more relevant categories as displayed in **Table 3.3**. Annotations were revisited and, if relevant, added to the appropriate code/theme. All codes were assigned to themes, and in some cases, sub-themes were created (levels 1 and 2) to help organize ideas and patterns (Braun & Clarke, 2006). Here a word frequency tool and visualization tool (word cloud) in NVivo were utilized to help explore the relationship between codes and subsequent themes and sub-themes.

Table 3.3. Example of themes and codes created in NVIVO.

Themes	Codes
Sustainable behaviour	Food
	Transportation
	Energy
	Shopping habits
Work Experience Influence	Citizen action
	Sense of community
	Contributions to the local CE
	Barriers to scaling up current efforts

Finally, the transcripts were analyzed one last time to search for any information in the codes or excerpts to inform the analytical chapter. These themes were validated after the data is revisited. A summary of patterns was produced where connections will be drawn to the research questions (Braun & Clarke, 2006). Once themes were finalized, they create a logical thematic map with an analytic narrative relating to each theme and the larger research narrative (Braun & Clarke, 2006). The results of these analyses are discussed in the next two chapters, where **Chapter 4** presents the relational map using the CE inventory and multimodal analysis to explore patterns and linkages amongst the nodes (actors, events, groups) in the formal and informal spheres of the urban CE in London, ON ultimately creating an analytic narrative because of the relational map(s). **Chapter 5** presents the results of the interviews and explores the iterative process that took place during the thematic analysis and the final analytic narrative from the codes/themes.

Chapter 4

4. CE Inventory and Network Analysis

This chapter presents the results of the Circular Economy (CE) inventory and the data visualization methods (relational concept diagrams). It then presents the results of the analyses of these data and discusses their significance. The inventory was designed to capture, categorize, and understand the types and quantity of formal and informal CE actors and events – and interactions between them, if any – specific to London, ON, between September 2022 and February 2023 and revised in August 2023 to reflect new entries, modified business names and the removal of one entry not local to London, ON. This data was then used to generate and analyze the local formal and informal urban CE visualizations.

The CE inventory was designed to identify the nature, depth, extent, and interrelatedness (or lack thereof) of the London, ON local urban Circular Economy. The inventory aimed to capture three main contributions to the CE: events and actors that contributed to the London CE as defined by Prieto-Sandoval et al.'s (2018) definition. In some cases, actors or events use the term 'Circular Economy' (CE); other times, they do not use this term but work towards a CE through their actions or mission. "Events" include any scheduled happening within the City (London, ON), organized or co-organized by multiple actors, and occur as one-day or multi-day affairs, dedicated to aspects of the CE and CE themes (transforming systems of production/consumption, environmental quality, eco-innovation, economic prosperity, and human well-being; see Chapter 2). The term "actor" is used to describe businesses/business owners, non-profit organizations (NGOs) and grassroots efforts (projects and organizations), branches of the City of London administration (the City), and educational institutions that offer

academic programs or advocate for CE-related activities, and community groups on social media sites (Facebook³³ and Bunz³⁴).

The inventory yielded n=152 entries of actors and events, with the full breakdown in **Table 4.1**. The full CE inventory data can be viewed in **Appendix D**. During the timeframe of the inventory data collection, entries (of events and actors) were collected and stored in an Excel data sheet alongside details such as event name, description, sponsor(s), frequency, and organizer for events. Both events and actors were then linked to the CE based on their intersections with themes identified in the relevant CE literature (**Table 3.1**). Actors and events were further categorized based on the type of service or items offered (e.g., **Table 4.1** events are sub-categorized into markets, retail, and education/community events). At the same time, social media groups, NGOs and grassroots efforts/initiatives were categorized during the relational concept mapping phase. The total markets (n=20) were selected based on their relevance to the search criteria or where businesses already captured in the inventory hosted/featured a market, where a vendor list was included, and with a minimum of 1 relevant CE vendor required to be included in the CE inventory.

Actors, groups, and events were then differentiated between ‘formal’ and ‘informal’ categories. The classification process for this used the definitions of the formal and informal sphere offered by Gibson-Graham (2006), where the formal economy (typically referred to as “the economy”) is comprised of traditional markets or activities regulated by the state and the informal economy as “market and non-market economic activities that are unregulated or even unrecognized by the state.” (p. xi). Gibson-Graham’s definitions use the comparison of formal

³³ Facebook pages and groups are digital platforms users can access to connect based on location, shared interests, and mutual connections. See more <https://www.facebook.com/help/1629740080681586>

³⁴ The Bunz app is a digital community to trade, swap, or sell for a low price based on your nearest city. Read more: <https://bunz.com/>

and informal to explain that the two spheres operate within the same system, which makes defining the boundary between the formal-informal continuum based on questions being asked and the lens used to examine activities (Peterson, 2012).

Table 4.1. Summary of London, ON CE actors and events from CE inventory broken down into sub-categories. Grey boxes indicate no sub-categories or not applicable counts.

Phenomenon Type	Count	Sub-categories	Description	Sub-Category Count
Events	20	Market	Maker market event feature sustainable and local vendors and organizations usually small businesses.	12
		Retail	Event hosts a mix of small business and larger business both local and non-local (i.e., bridal show).	2
		Education/Community	Event is focused on environmental education or community building with an environmental focus.	6
Businesses	58	Clothes/Accessories	Stores that sell sustainable clothing and accessories (new sustainably produced, vintage, thrifted).	35
		Beauty	Stores that sell sustainable beauty related products (cosmetics, skincare, bath products, haircare).	3
		Other	Other businesses that sell sustainable products related to categories not listed (used furniture/electronics, gifts, musical instruments, florists).	7
		Restaurant/Grocery	Stores that offer or sell local, ethical, sustainable options for food (produce, meat, and other local food).	9
		Recycling	Business offering recycling services of non-curbside waste (organic, yard, electronics).	4
Social Media Groups	45	Free and gifting groups	Communities typically based on location (neighbourhood and city level) where items, food, and services are offered at no cost, and individuals can express items they are searching for within these groups.	8

		Thrift, clothing swaps (shop) groups	These pages or groups offer individuals a platform to swap (free) or shop second-hand (for a low price) for various clothing.	2
		Swape, trade, (sell) groups	The groups offer swapping or trading services (free) and low-priced market for selling various items like housewares, wedding items, puzzles.	4
		Parenting and mom-based groups	Offer access to second-hand market or free/reduced cost items related to babies and children.	11
		“Buy Nothing” group	The Buy Nothing project aims to promote a gift economy on a neighbourhood scale	20
NGOs/ Grassroots Efforts	17	ENGO	Non-Government Organizations focused on sustainability, environment, or the CE.	9
		Sustainable business	Organization focused on creating and/or promoting sustainable businesses usually clothing related.	4
		Food	Organizations or projects aimed at transforming food systems and providing alternatives to existing solutions.	3
		Art	Project hosted by an NGO focused connecting art, humans, and nature.	1
The City of London	6	-	Relevant City of London departments related to work on climate change, environmental education, and environmental services in the city.	-
Education	6	-	Institutions or programs that are focused on improving or implementing CE/sustainable practices (ex. Centre for the environment).	-

Actors, groups, and events were then differentiated between ‘formal’ and ‘informal’ categories. The classification process for this used the definitions of the formal and informal sphere offered by Gibson-Graham (2006), where the formal economy (typically referred to as “the economy”) is comprised of traditional markets or activities regulated by the state and the

informal economy as “market and non-market economic activities that are unregulated or even unrecognized by the state.” (p. xi). Gibson-Graham’s definitions use the comparison of formal and informal to explain that the two spheres operate within the same system, which makes defining the boundary between the formal-informal continuum based on questions being asked and the lens used to examine activities (Peterson, 2012). ‘Continuum’ in this context describes the formal-informal spheres and their intersection, instead of understanding them as binary concepts (Gaughan & Ferman, 1987).

There have long been challenges associated with studying the informal economy, from simply identifying/classifying informal actions/activities to implementing monitoring frameworks, policies, and legislation due to the varied nature of the informal economy. The informal sector needs to be addressed in the context of the formal economy, where economists use qualitative metrics and rely on goals aimed at formal economic growth (Peterson, 2012). As a result, the traditional (or formal) economy only recognizes “productive” or formal activities and “non-productive” informal activities are invisible (Peterson, 2012). Ignoring the informal sector is thus like collecting an incomplete dataset; rendering the informal visible allows for a comprehensive understanding of the CE. Recognizing informal economic activities allows decision-makers to better support workers and members of the informal economy through unrecognized activities like community organizing or unpaid domestic labour (Brown & McGranahan, 2016).

4.1. The formal CE Inventory

These previous scholarly definitions for in/formality were used to determine if actors and events are classified as formal or informal. In the CE inventory, actors and events are members

of formal organizations or were organized/hosted (events) by formal organizations, subject to regulations, structure, supervision, and the production of capital (Chen, 2005). The events and businesses only allow formal transactions (purchases) to acquire goods or services. Of the total entries (n=152), n=70 were classified as formal events or actors within four categories: events, businesses, the City of London, and Education actors included in the formal entries. These are summarized in **Table 4.2**.

Table 4.2. Summary of 69 entries categorized as formal CE inventory results with sub-categories only applicable to events and businesses. Where grey boxes represent no sub-categories or not applicable counts.

Phenomenon Type	Count	Sub-categories	Sub-Category Count
Events	11	Market	10
		Retail	1
Businesses	46	Clothes/Accessories	28
		Beauty	3
		Other	5
		Restaurant/ Grocery	7
		Recycling	3
The City of London	6	-	-
Education	6	-	-

The CE inventory contained a total of n=20 events (Table 3), over half of which (n=11) meet the definition of formal in that formal businesses host them and rely on formal exchanges for payments (compensated or monetary) to access/obtain goods offered at events. The events may be broken down into sub-categories of retail events (n=1) and markets (n=9), as summarized in **Table 4.3**.

Table 4.3. Formal event details adapted from the CE inventory.

Name	Type	Description	Sponsors	Organizer
Holiday Market Kick-Off	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.	Only in OEV Fridays	The Market at Western Fair District
Home for the Holidays' Market	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.		Punk Rock Flea Market
The Merry Market	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.		100 Kellogg Lane
Holly Jolly Market	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.		Covent Garden Market Canada
Reimagine's 2022 Eco Holiday Market	Market	Holiday-themed market featuring 20 local and package-free vendors ranging from clothing to jewelry and food. Also features community organizations.	The City of London, Downtown London BIA	Reimagine Co.
Vintage on the Block	Market	Re-occurring market with local businesses and thrift stores who set up booths for profit but focus on second hand items including clothing and housewares.	Filthy Rebena, Dugout Vintage, Dundas Place	Vintage on the Block
Bespoke Bridal Market	Market	Bridal Show with a variety of wedding related services and vendors. Focus on custom-made and local vendors related to the bride, wedding party, and guests.	Bisou Bridal	Duck & Dodo
Valentine's Makers Market	Market	Valentine's Day-themed market featuring local vendors ranging from clothing to jewelry and food. Event also celebrated Duck & Dodo featuring cake and raffles.		Duck & Dodo
Punk Rock Flea Market London	Market	Pop-up market featuring local vendors who offer handmade items from clothing and housewares to food.		Punk Rock Flea Market

London Bridal Expo	Market	Bridal Show with a variety of wedding related services and vendors.	RBC Place, Sophie's Gown Shoppe, Fresh Radio 103.1, Bridal confidential, OMAC Mortgages	London Bridal Expo
Sip & Shop Pop-Up	Retail	Opportunity to preview Carmina collection made from sustainable material and ethically produced.		Carmina Modern Essentials

One retail event (n=1) was captured in the CE inventory where, like markets, this event was hosted by a formal business subject to regulations and used formal payments. However, instead of offering multiple vendors, only one business and its products are featured at the event. In this case, the Sip & Shop was an event hosted by Carmina Modern Essentials³⁵, offering complimentary champagne and a chance to browse and learn about the sustainably made designs featured.

The markets feature local vendors ranging from clothing to jewelry to food and contain a mix of small and mid-sized businesses. Markets are events where vendors/businesses, organizations, and farms (usually small-scale, local producers) set up a table and sell their products directly to consumers in a designated place, from a single day to a multi-day event. The event space creates a temporary marketplace organized by location, theme, or likeness, such as farmers' markets offering fresh produce from local farms. Some markets follow a theme, such as winter markets (Holiday Market Kick-Off, Home for the Holidays' Market, The Merry Market, Holly Jolly Market), which feature vendors who offer festive and non-festive selections that make perfect Christmas gifts or the Valentine's Day Market which vendors featured Valentine's day related products or products for Valentine's Day gifts, a total of n=5 markets were themed. Other markets included Vintage on the Block, focused on providing Londoners with many

³⁵ https://www.faire.com/brand/b_wxb8eubnkt

second-hand clothing vendors³⁶ (vintage antiques and thrift clothing and housewares), as well as Punk Rock Flea Market London, which offers handmade and independent vendors a space to sell a range of items (clothing, accessories, and housewares).

Additionally, n=2 markers focused on the wedding industry, the Bespoke Bridal Market, which offers Londoners access to local and custom-made wedding gowns and wedding-related vendors. In contrast, the London Bridal Expo is a larger market where attendees must purchase tickets to access the event space with various wedding-related vendors (hair stylists, makeup artists, DJs, gown shops, and related vendors). How formal events contribute to the thematic links to the CE are summarized in **Table 4.4**.

Table 4.4. Summary table thematic links to the CE for formal events in the CE inventory.

Thematic links to the CE	Count
Sustainable material	11
Behaviour shift	3
Low waste	3

The evidenced thematic links to the CE (**Table 4.4.**) indicate the events feature sustainable material through vendors'/retailers' production of items, vendors/retailers promote behavioural shifts through education or encouragement, and produce less waste or have a waste management plan. The CE is characterized by five qualities: transforming systems of production/consumption, environmental quality, eco-innovation, economic prosperity, and human well-being. The formal events are primarily motivated by economic prosperity, with some organizers/events focusing on environmental quality or transforming production and consumption systems. As formal organizations host all the formal events, the focus on economic prosperity is unsurprising as it is required for the businesses to operate. Although the formal

³⁶ <https://www.downtownlondon.ca/explore-downtown/events/vintage-on-the-block/>

events (hosted by formal actors) are focused on economic gain, some vendors champion social responsibility, especially sustainability, in their business to varying degrees, expressed through environmental quality, or transforming production and consumption systems. A sub-set of events (n=4) featured n=11 sponsors, including businesses, Business Improvement Areas and municipal funding from the City of London. Event sponsors were exclusive to markets (**Table 4.3.**) and primarily consisted of businesses and municipal and grassroots funding.

During the collection period, Duck & Dodo³⁷ and Reimagine Co³⁸ were the only actors to host two events during the collection period (**Table 4.3.**). The two Duck & Dodo events were formal markets, but one focused on weddings, while the other was a themed market (Valentine's Day Market). In comparison, the Reimagine Co events fell within a formal market and the other an informal community event, with events ranging in frequency from annual (n=4), seasonal (n=2), once (n=1), and unknown (n=4). The formal event frequency indicates that re-occurring annual events and spontaneous (unknown frequency) events occurred most frequently during the collection period.

4.1.1.1. Formal Business Actors

There was a total of n=58 businesses, with the majority (n=47) classified as formal actors due to their recognition in the formal economy and ability to influence/be influenced by formal regulations and policies (Tanaka, 2008; Gibson-Graham, 2006). Details of these are provided in **Table 4.5.** The CE inventory captured a range of business models, from sole proprietorships to larger stores. The business captured in the CE has been broken down into the following sub-

³⁷ <https://www.duckanddodo.ca/>

³⁸ <https://reimagineco.ca/>

categories: clothes/accessories (n=28), restaurants/grocery stores (n=7), other businesses (n=5), beauty businesses (n=3) and recycling centres (n=3).

Table 4.5. Formal business details adapted from the CE inventory.

Name	Type	Description
It's Sew Katrina	Clothes/ Accessories	Online zero waste offering handmade and reusable items including cutlery pouches, sweeper covers, and gift bags.
Bianca La Luna Boutique	Clothes/ Accessories	Handmade knits items.
Welcome to Mel's Close	Clothes/ Accessories	Loungewear featuring hand-dye patterns.
The Sewing Studio by Valerie Martens	Clothes/ Accessories	From designing to creating clothing items for both individuals and retailers. Previously offered alterations and tailoring.
Carmina Modern Essentials	Clothes/ Accessories	Sustainable clothing brand that implements sustainable production made to last.
Pixie Painthings	Clothes/ Accessories	Unique jewelry featuring local, in-season, and ethically foraged foliage and plants.
Bisou Bridal London	Clothes/ Accessories	Offer green dresses which are vintage or pre-loved for a discounted price.
J&C Sewing Contractors	Clothes/ Accessories	Offering clothing alterations and repairs.
Iibury + Goose	Clothes/ Accessories	This retailer sources local vendors aimed at producing items made to last.
Joseph's Clothiers	Clothes/ Accessories	Formal men's apparel with an option for rentals.
The Retro Bag Canada	Clothes/ Accessories	Sustainable and cruelty-free purses and backpacks.
Skilled Accents	Clothes/ Accessories	Sustainable business that focuses on employing marginalized populations. Use recycled textiles, threads, and other sewing materials to create new pieces.
Silk Road Store	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and electronics.
Chaotic Closet	Clothes/ Accessories	A mix of thrifted and vintage clothing. Market themselves as an affordable option.
DugOut Vintage	Clothes/ Accessories	Vintage store that also host vintage market (Vintage on the Block) in the summer.
Filthy Revena Vintage	Clothes/ Accessories	Sustainable vintage store that offers vintage clothing and recycled/upcycling clothing.

For You Consignment	Clothes/ Accessories	Offer second-hand items including clothing, accessories, and housewares for low prices.
Old East Exchange	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.
Plato's Closet	Clothes/ Accessories	Clothing is sold to the store and resold to customers. Accepts gently used, recent, and name brand clothing.
Renew Community	Clothes/ Accessories	Offer gently used items including clothing, furniture, and housewares, and books. Proceeds go to Christian elementary education and other local community organizations.
Style 360	Clothes/ Accessories	Offer second-hand items including clothing and accessories.
Style Encore	Clothes/ Accessories	Clothing is sold to the store and resold to customers. Offer second-hand items including clothing, shoes, and accessories for discounted prices.
Talize	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.
The Sentimentalist	Clothes/ Accessories	Offer vintage items including clothing, furniture, and housewares.
The Ultimate Garage Sale	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.
Value Village	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.
Back in the Day Vintage	Clothes/ Accessories	Offer vintage items including clothing, vehicles, and housewares.
Back to the Fuchsia	Clothes/ Accessories	Offer vintage and antique items including clothing, furniture, and housewares.
EnviroDepots	Recycling	Recycling depot operated by the City of London. Accept yard waste, recyclables, electronics, ceramics, scrap metal, and more. Also accepts extra trash bags for an additional fee.
TryRecycling	Recycling	Recycling depot that accepts leaf and yard waste to be composted.
Green Valley Recycling	Recycling	Recycling depot that accepts unwanted goods, demolition waste and trash. Also offer recycled landscaping products.
Purdy Natural	Beauty	Small batch beauty and spa products made with natural ingredients
Love Alchemy	Beauty	Hair salon offering sustainable hair, beauty, and wellness products.
Lunah Beauty	Beauty	Skincare and wellness products made from natural ingredients.

Covent Garden Market	Restaurant/ Grocery	Market open 7 days a week offering local food, services, and host events.
Reimagine Co	Restaurant/ Grocery	Zero waste grocery store offering a large selection of food, tools, cleaning supplies, etc.
Grace Restaurant & Bodega	Restaurant/ Grocery	Focus on sourcing local, ethical, and in-season produce selection at the restaurant and bodega.
Craft Farmacy	Restaurant/ Grocery	Restaurant with locally sourced ingredients.
The Tea Lounge	Restaurant/ Grocery	Tea shop offering workshops, events, and ethically sourced tea.
The Root Cellar	Restaurant/ Grocery	Restaurant that uses local and in-season food. Aim to foster and connect to community through music, events, and education.
The Market	Restaurant/ Grocery	Market offering a range of produce, baked goods, and artisan made goods/accessories.
Grow & Bloom Co	Other	Florist featuring an urban garden offering expert knowledge, a variety of flowers/plants and preserved options.
Project Neutral in London	Other	Carbon footprint tool that allows individuals to measure and assess their carbon use.
Locally Made Marketplace	Other	Local gift shop featuring handmade and sustainable products from over 50+ local businesses.
Strings Guitar Shop	Other	Guitar shop offering a range of products, services/repairs, lessons, and a café.
Duck & Dodo	Other	Modern and vintage blend gift shop.

The included clothes/accessories businesses (n=16) were primarily thrift or vintage stores. The remaining actors (n=12) are businesses that have some sustainability component from materials to production from used to new material/sources (e.g., Joseph's Clothiers³⁹ offers rentals; It Sew Katrina⁴⁰ is a zero-waste shop). Beauty businesses constituted a small portion of actors (n=3) captured in the inventory, including beauty or wellness shops (n=2) and hair salons (n=1). The products sold at the beauty businesses are made from organic or natural ingredients

³⁹ <https://www.josephsclothiers.com/>

⁴⁰ <https://www.etsy.com/ca/shop/itssewkatrina>

with varying sustainability efforts (e.g., through packaging, small-batch, locally sourced or made).

Restaurants and grocery stores (n=7) that operate using traditional business models with various environmental elements (local, ethical, seasonal) offer produce, meats, fish, housewares, apparel and more. Covent Garden Market⁴¹ and The Market⁴² offer year-round access to local vendors you would see at a farmers' market; events are also frequently hosted by these organizations. The Root Cellar⁴³ and Tea Lounge⁴⁴ offer more than just restaurant or café options, such as musical performances (at The Root Cellar) and workshops (Tea Lounge). Grace Restaurant & Bodega⁴⁵ and Craft Farmacy⁴⁶ offer locally sourced products for their restaurants, whereas Bodega offers a small selection of local groceries. Reimagine Co focuses on providing zero-waste shopping and a space to host workshops and other events for the community; however, these are only accessed through formal payments.

Businesses that did not fit any specific category were grouped in the “other” category (n=5) and included gift shops (n=2), a florist (n=1), a guitar store (n=1), and an online carbon calculator (n=1). The businesses in this category were included for their sustainability efforts or services related to the CE, such as sustainable production or materials and encouraging behavioural shifts through services like repairs, lessons, and advice/information. Some businesses offer paid informal services like repairs and unpaid informal services like advice. For

⁴¹ <https://coventmarket.com/>

⁴² <https://themarketwfd.com/>

⁴³ <https://the-root-cellar.square.site/>

⁴⁴ <https://www.beteas.com/the-tea-lounge>

⁴⁵ <https://www.gracelondon.ca/>

⁴⁶ <https://www.craftfarmacy.ca/>

example, Grow & Bloom⁴⁷ offers advice and information on plants/flowers and Strings Guitar Shop⁴⁸ offers a café, community space, lessons, and repairs.

Recycling depots (n=3) are businesses that offer waste or recycling collection of items that are not picked up with the City's curbside waste and recycling programs⁴⁹, such as extra trash (three bag limit), yard waste, and electronics. Some recycling depots only accept specific materials such as compost and yard material (TryRecycling⁵⁰). In contrast, others accept a wider array, from construction waste to electronics to ceramics (Green Valley Recycling⁵¹). In addition, the City of London has created and operated one of these recycling depots, the EnviroDepots⁵² hosted by the City, cover the range of services offered for recycling and garbage collection but are not open year-round like the other recycling depots. Service fees to dispose of material depend on the volume and type of material, with prices ranging from free to price by weight. Some depots even sell landscaping materials (TryRecycling) and with some of the material upcycled to create new products (Green Valley Recycling). All these recycling depots offer an alternative to landfills and decrease the negative environmental impact through proper end-of-life handling of materials.

As summarized in **Table 4.5.**, formal businesses had several thematic links to the CE through thirteen links (**Table 3.1.**), which indicate most actors reuse materials to create new products or repair existing items in addition to other sustainable materials and implement sustainable production practices (e.g., low waste). The restaurant and grocery stores pushed for

⁴⁷ <https://www.growandbloomco.com/>

⁴⁸ <https://www.stringsguitarshop.com/>

⁴⁹ <https://london.ca/living-london/garbage-recycling/curbside-garbage-collection>

⁵⁰ https://tryrecycling.com/?gclid=CjwKCAjw38SoBhB6EiwA8EQVLis8YIRFi4qBOmNegKo7oDMqJqn0fssIWZT3cfqJ8Jm5QKp9z0zQ9RoC1jUQAvD_BwE

⁵¹ <https://www.greenvalleyrecycling.ca/>

⁵² <https://london.ca/living-london/garbage-recycling/envirodepots>

transformed or revitalized food systems to offer consumers alternative, more sustainable grocery options. The business also encourages individuals to shift to more sustainable behaviours through information and services such as repairing, thrifting, reusing, and shopping locally. The recycling depots can divert material from landfills and process them sustainably or suitably.

Table 4.6. Summary of thematic links to the CE for formal business entries in the CE inventory.

Thematic links to the CE	Count
Reuse	21
Sustainable material	11
Sustainable production	9
Revitalize/transform	7
Sustainable consumption	5
Low waste	5
Behaviour shift	3
Divert from landfill	3
Inform	1
Repair	1

Most formal businesses inventoried (n=50) have physical locations and sell their products at markets and online, providing several avenues to purchase items but only through formal compensation (monetary). There are added costs for businesses with a physical location that drive the need for economic prosperity to continue to operate. In addition, the businesses contain elements of the following CE characteristics: environmental quality, human well-being, and transforming production, and consumption systems. These businesses are concerned with environmental quality through reusing or repairing materials, sustainable materials, or sustainable consumption to lessen the environmental impact, transforming production and consumption systems, and using alternative materials (second-hand, recycled, low waste) and consumption habits (rentals, repair, reusing).

4.1.2. Formal Municipality Actors- The City of London

The City of London staff and departments comprise the municipal government and are directly involved in policy, legislation, and programs as formal actors. Six departments were identified that work towards the CE or CE-related objectives through environmental planning (e.g., waste management plan, water plan), programs for Londoners (EnviroDepots), or specific sectors (transportation, water, infrastructure) that directly connect back to the environment. These departments are identified in **Table 4.7**. Each department is tasked with different goals and projects through similar paths, such as environmental or resource management, educational resources, sustainable funding, and programs. The larger strategic plans and funding are decided well before actual implementation. London, ON, is one of many cities committed to a Climate Emergency Declaration⁵³ and pledges to reach net zero by 2050, adopting a Climate Emergency Action Plan⁵⁴, which has a team dedicated to this initiative alone.

Table 4.7. The City of London department details adapted from the CE inventory.

Name	Description
Climate Emergency Resource Team	This department is responsible for everything to do with the London Climate Emergency Action Plan.
Construction and Infrastructure Services	This department oversees construction and infrastructure support services.
Climate Change, Environment and Waste Management	This department leads and coordinates the response to climate change, watershed protection, and waste management.
Water, Wastewater and Stormwater	This department provides critical drinking water, wastewater, and stormwater services.
Transportation and Mobility	This department provides the planning and maintenance services for transportation.
Parks and Forestry	This department provides services to protect London's forests and trees, parks, and street landscaping.

⁵³ <https://london.ca/living-london/water-environment/londons-climate-emergency-declaration#:~:text=Community%20energy%20use%20and%20greenhouse%20gas%20emissions&text=London's%20Climate%20Emergency%20Action%20Plan.75%25%20reduction%20by%202040>

⁵⁴ <https://getinvolved.london.ca/climate>

Each department is tasked with different goals and projects through similar paths, such as environmental or resource management, educational resources, sustainable funding, and programs. The varied roles of the municipal departments are reflected in the varied thematic links to the CE, as summarized in **Table 4.8**. The larger strategic plans and funding are decided well before actual implementation. London, ON, is one of many cities committed to a Climate Emergency Declaration⁵⁵ and pledges to reach net zero by 2050, adopting a Climate Emergency Action Plan⁵⁶, which has a team dedicated to this initiative alone.

Table 4.8. Summary of themes through which all City of London departments inventoried link to the CE.

Thematic links to the CE	Count
Inform	4
Behaviour shift	2
Conservation	2
Revitalize/transform	1
Sustainable consumption	1
Divert from landfill	1

The City departments most commonly aim to inform individuals, encourage behaviour shifts, and prioritize conservation. To a lesser degree, some departments (Climate Emergency Resource Team) aim to revitalize or transform the City's reliance on a linear economy and transition to a CE or promote sustainable consumption through resources or programs offered to Londoners. These departments prioritize the following CE characteristics: environmental quality (resource management, conservation), eco-innovation (recycling technology), and transforming

⁵⁵ <https://london.ca/living-london/water-environment/londons-climate-emergency-declaration#:~:text=Community%20energy%20use%20and%20greenhouse%20gas%20emissions&text=London's%20Climate%20Emergency%20Action%20Plan.75%25%20reduction%20by%202040>

⁵⁶ <https://getinvolved.london.ca/climate>

systems of production and consumption (waste management plans, environmental educational resources). The municipal government is funded through taxes, so economic prosperity is not a characteristic of City actors, unlike formal events and businesses previously discussed. Unlike business actors, City actors offer free programs and resources or grant programs that incentivize change (Home Energy Retrofits⁵⁷).

4.1.3. Formal Education Actors

Formal education actors (n=6) included any formal institutions offering professional training, education, and knowledge that directly influence the community, as summarized in **Table 4.9**. The educational actors were classified as formal based on ties to municipal government (Environmentalist in Residence at a London Public Library) and formal institutions (Fanshawe College and Western University) that influence and participate in the formal economy. The educational actors range from practical teaching to sustainable efforts by institutions and municipal government-funded programs. The educational actors belong to or are run by one of three organizations: Western University⁵⁸ (n=4), Fanshawe College⁵⁹ (n=1), and the City of London (n=1). Despite the Network for Business Sustainability's⁶⁰ status as a non-profit, it is still heavily associated with the formal institution of Western University. Membership to the network is free, but some events are reserved for academics or behind journal paywalls, mainly accessible to those associated with academia at Western University or elsewhere. The rest of the

⁵⁷ <https://london.ca/climateaction>

⁵⁸ <https://www.uwo.ca/about/index.html>

⁵⁹ <https://www.fanshawec.ca/about-fanshawe>

⁶⁰ <https://nbs.net/>

programs and centres (Centre for Environment and Sustainability⁶¹, Unbound Fashion⁶², Western Environment & Sustainability Network⁶³, Society of Graduate Students⁶⁴ (SOGS) Sustainability Committee) require you to be a student to access services and information. The barrier to entry into these spaces comes at the highest cost of all the formal actors. At the same time, the Environmentalist in Residence is accessible to the public through London Public Library.

Table 4.9. Formal Education programs, networks, and centre details adapted from the CE inventory.

Name	Description
Network for Business Sustainability	Non-profit institution hosted out of Western aimed at advancing sustainable development to improve the future.
Centre for Environment	Aimed at creating interdisciplinary sustainable teaching and learning through the Faculty of Science (host faculty), Faculty of Engineering and Faculty of Social Science, and other contributing faculties.
Unbound Fashion	Fanshawe's Fashion Design program and department aim to teach and showcase sustainable fashion. Featuring storytelling through an annual fashion show and magazine.
Environmentalist in Residence	The role is filled by a citizen who is an expert in grassroots action. This individual coordinated workshops and other interactive events to share knowledge and experiences.
Western Environment & Sustainability Network	Office of Sustainability at Western University which also supports over 20 student clubs. The network aims to create a collaborative platform for knowledge and creativity sharing.
Graduate Student Association-Sustainability Committee	The sustainability committee is one of many committees organizes by the Graduate Student Association at Western University. The sustainability committee works towards creating a sustainable campus through events and information for graduate students.

⁶¹https://sustainability.uwo.ca/academics/environment_sustainability/index.html#:~:text=The%20Centre%20for%20Environment%20and,complex%20environmental%20and%20social%20interactions.

⁶²https://first.fanshawec.ca/famd_design_fashiondesign_unbound/

⁶³https://sustainability.uwo.ca/get_involved/join_a_office/index.html

⁶⁴<https://sogs.ca/>

All the educational actors have thematic links to the CE through education (inform and behaviour shift) and efforts to revitalize or transform respective fields (e.g., fashion, campus sustainability), as summarized in **Table 4.10**. In comparison, fewer are focused on low waste and conservation. Like formal City actors, the educational actors were driven by CE characteristics, transforming production and consumption systems, environmental quality, and eco-innovation. The educational actors are typically funded through formal institutions (investments, tuition, grants) or municipal funding.

Table 4.10. Summary of thematic links to the CE for formal education actors in the CE inventory.

Thematic links to the CE	Count
Inform	6
Behaviour shift	6
Revitalize/transform	6
Conservation	1
Low waste	1

The formal actors and events had high visibility and often promoted events online, where I searched for relevant entries. The formal CE inventory events and actors equally contributed to the CE in London, ON, but their relationship with the CE differs. The contribution of informal entries differs from formal entries in their types of actors and events, number of entries, organizations hosting events, and types of business models. These include events, businesses, social media groups, and NGOs/Grassroots efforts.

4.2. The Informal CE Inventory

Informal events and actors are classified based on their host organization or main actor's relationship to the formal economy. In contrast, informal entries (actors and events) use what

would be considered low-value items in the formal economy, typically due to a lack of regulations and reliance on kinship networks (Tanaka, 2008). Gibson-Graham (2006) has provided a non-exhaustive list to define diversified markets (alternative and non-market):

- alternative capitalism firms (through alternative firms like non-profits)
- non-capitalist firms (e.g., communal)

This study considers alternative or non-capitalist models or organizations as informal entries. Of the total entries (n=152), n=83 entries were classified as informal events or actors, with four (of six) phenomena categories (events, businesses, social media groups, and NGO actors) included in the informal entries, as summarized in **Table 4.11**.

Table 4.11. Summary of informal CE inventory results with sub-categories applicable to four phenomenon types (events, businesses, social media groups, and NGOs). Where grey boxes represent no sub-categories or counts are not applicable.

Phenomenon Type	Count	Sub-categories	Sub-Category Count
Events	9	Market	3
		Education/community	6
Businesses	12	Clothes/Accessories	7
		Other	2
		Restaurant/ Grocery	2
		Recycling	1
Social Media Groups	45	Free/gifting groups	8
		Thrift, clothing swaps (shop) groups	2
		Swape, trade, (sell) groups	4
		Parenting and mom-based groups	11
		“Buy Nothing” group	20
NGOs/Grassroots Efforts	17	ENGO	9
		Sustainable business focused	4
		Food focused	3
		Art focused	1

4.2.1. Informal Events

A small portion of events (n=9) were classified as informal. These were then broken down into markets (n=3) and education/community events (n=6), as summarized in **Table 4.12**. These events were classified as informal due to their hosts' classification as informal actors or access to informal resources/organizations. Grassroots action march to demonstrate discontent with formal policies.

Table 4.12. Informal event details adapted from the CE inventory.

Name	Type	Description	Organizer
Talbot Street Christmas Market	Market	Christmas-themed market featuring local vendors ranging from clothing to jewelry and food.	Talbot Street Church
The Meaningful Market	Market	Market featuring local vendors who incorporate socially responsibility into their programming ranging from clothing to food.	Pillar Non-profit
Old South Fall Artisan & Vendor Market	Market	Market featuring over 100 local vendors ranging from clothing to jewelry and food. Proceeds go towards fundraising for Wortley Road Public School.	Wortley Road Public School Home and School Association
Tracing CareFull Paths, a project of The Coves Collective	Education/ community	Sewing circle hosted weekly and guided by an artist. The sewing circle embroiders images found in the Coves area.	London Public Library
Winter Dung A Town	Education/ community	Event features a market, street food, games, workshops, face painting, and art demonstrations.	London Artisan Connection
Bill #23 is Bullshit March	Education/ community	Bill 23's "More Homes Built Faster" Act has raised concerns for residents impacted and calls into question environmental concerns. As a result, this protest aims to voice these concerns. With guest speaker, Sam Trosow, current Councillor for Ward 6.	SOGS
Conservation Drainage Roundtable	Education/ community	This event includes a panel discussion, break-out sessions, and a networking opportunity. Topics of interest include saturated buffers, tile outlet wetlands,	Land Improvement Contractors of Ontario

		phosphorus reduction structures, and controlled drainage.	
Repair Café	Education/ community	Run by Reimagine Co., experts are brought into the repair cafes to help repair or provide guidance on repairs. Each session is hosted by a volunteer expert in their field.	Reimagine Co
Only in OEV Fridays	Education/ community	These events feature vendors from local businesses and organizations, artists, and musicians to promote the community in Old East Village.	OEV BIA

Informal markets follow the same format as formal markets (vendors and organizations gather in an event space), and vendors range from local/small to large businesses and only accept formal payment. The difference is that informal markets seek only local, sustainable, or socially conscious vendors, and organizations (e.g., NGOs) where markets were hosted by a church (n=1), parents association (n=1) and non-profit (n=1). Involvement with these churches, school associations, and some NGO positions is voluntary, and community based. The Old South Fall Artisan & Vendor Market was a fundraiser event. The surplus profit goes toward the Wortley Road Public School Home and School Association⁶⁵, where fundraiser money gives students more opportunities to participate in extracurricular activities or help purchase supplies. The Meaningful Market, hosted by a non-profit (Pillar⁶⁶), only features social enterprises where the organizations focus on incorporating environmental and socially responsible causes. The Talbot Street Church⁶⁷ focused on featuring local vendors for their Christmas market to help boost the local economy. It provided the space to host this event for the community, most likely holding many events in space. Informal markets epitomize characteristics of the CE surrounding human well-being through community building, its focus on environmental quality through supporting

⁶⁵ <https://wortley.tvdsb.ca/en/parents/home-and-school-association.aspx>

⁶⁶ <https://pillarnonprofit.ca/about-us>

⁶⁷ <https://talbotstreetchurch.com/>

ethical and local markets, and economic prosperity as monetary compensation is required to receive goods.

Education and community events made up most event entries (n=6), with these events focusing on providing experiences and learning which is free (not compensated). Winter Dung A Town and Only in OEV Fridays have a market or vendors in their events but also offer other unpaid informal experiences. Winter Dung A Town offered art, face painting, culture, games, and workshops, while Only in OEV Fridays featured live music, giveaways, and art installations. Bill #23 is the Bullshit March demonstration organized by the sustainability committee of SOGS⁶⁸ to push back against recent housing Bill 23 in Ontario to oppose building homes in the Greenbelt⁶⁹. Tracing CareFull Paths offers space to create art inspired by nature found in the ESA the Coves. The Conservation Drainage Roundtable featured a panel discussion on conservation drainage-related topics, followed by a networking session. Repair Café uses volunteer experts to help teach repairs for different products to encourage repair and gain knowledge on how to repair items, encouraging circularity.

Educational and community events are hosted by organizations where the main goal is to engage and provide to the community through an educational actor (SOGS Sustainability Committee) not included in CE inventory), community associations (London Artisan Connection⁷⁰, Land Improvement Contractors of Ontario⁷¹), City funding (municipal and BIA) and a business (Reimagine Co), host organization usually made from local community and sometimes voluntary positions (bottom-up). All informal events had free entry with free (live music and face painting) and paid activities (shopping). They are tied to the CE through human

⁶⁸ <https://sogs.ca/>

⁶⁹ <https://www.ola.org/en/legislative-business/bills/parliament-43/session-1/bill-23>

⁷⁰ <https://ldnartisan.ca/>

⁷¹ <https://www.drainage.org/>

well-being (community events, grassroots action), environmental quality (conservation), transforming systems of production and consumption (offering alternative compensated and uncompensated activities) and, to a lesser extent, economic prosperity to maintain operations as summarized in **Table 4.13**.

Table 4.13. Summary of thematic links to the CE for informal events in the CE inventory.

Thematic links to the CE	Count
Low waste	6
Sustainable material	5
Behavioural shift	4
Inform	3
Reuse	1
Repair	1

Most events are linked to the CE using low-waste materials or systems and other sustainable materials, creating or encouraging a behaviour shift through informing, and promoting reuse/repair. The informal events ranged in frequency from annual (n=3), seasonal (n=2), monthly (n=1), weekly (n=1), once (n=2), and unknown (n=1), which showed no clear trends or patterns with the frequency of informal events. These events focus on the following CE characteristics: human well-being, environmental quality, economic prosperity, and transforming systems of production and consumption. There is no entry cost and options to purchase items, but free activities are also offered. The organizers of the informal events are funded through private and municipal funding, so profits are used to help fund events with less focus on economic prosperity. Stable funding may be responsible for limited informal event sponsorship (Innovation Works, a coworking space focused on community building⁷²).

⁷² <https://innovationworkslondon.ca/>

4.2.2. Informal Businesses

The informal businesses (n=12) inventories were broken down into the following categories: clothes/accessories (n=7), other businesses (n=2), restaurant/grocery stores (n=2), and a recycling depot (n=1), as displayed in **Table 4.14**. These businesses are classified as informal due to their need for more regulation or recognition surrounding event/actor, which offers low-value and low-quality resources (used, repurposed, upcycled) (Tanaka, 2008). Informal businesses are run by informal actors, where they are alternative firms or non-market activities. Where alternative-to-capitalist charitable firms include Goodwill Industries⁷³, See the Worth⁷⁴, Mission Store⁷⁵, Salvation Army Thrift Stores⁷⁶, St. Vincent de Paul Store⁷⁷, Teen Challenge Canada- Thrift⁷⁸. All items sold by these organizations are donated, and while they are sold for money, they are sold at discounted prices that reflect the second-hand nature of the goods. While a non-market informal and uncompensated business also exists, the Free store is run by an NGO offering social services to those in need⁷⁹.

All stores in the clothing/accessories category (n=7) are run by non-profits and religious organizations dedicated to various social causes. Goodwill Industries focuses on people (employment for vulnerable groups), the planet (sustainable and circular initiatives), and prosperity (through community building). The Free store- is designed to help low-income families access essentials (household items, sports equipment, books). Life Spin⁸⁰, which

⁷³ <https://www.goodwillindustries.ca/>

⁷⁴ <https://seetheworth.com/pages/our-story>

⁷⁵ <https://missionservices.ca/help/missionstore/>

⁷⁶ <https://www.thriftstore.ca/>

⁷⁷ <https://ssvplondon.ca/our-story/>

⁷⁸ https://www.teenchallenge.ca/thriftstore?gclid=CjwKCAjw38SoBhB6EiwA8EQVLjXNPK5L90Mx-3iv5VkZ7AilXnAcdBCzxlnXqCugBmVKHdFWmo_3txoCKpYQAvD_BwE

⁷⁹ <https://www.lifespın.org/free-store>

⁸⁰ <https://www.lifespın.org/>

manages the free store, focuses on providing low-income families access to education, advocacy, and community-building activities. The Mission Store provides funding for the Mission is distributed to emergency disaster services, housing and shelters, churches, operation costs for thrift locations and social services (e.g., food banks, camps, school programs, classes). The Salvation Army uses funds to create programs like social services, housing/shelters, and churches. St. Vincent de Paul uses its revenue to cover overhead, and operations costs they also offers necessities to those in need in a joint effort with local catholic churches. Teen Challenge Canada's proceeds fund faith-based addiction recovery programs for adults; those in the program will sometimes have a work placement in the thrift store. See, the Worth takes spares and donations that would have been sent to the landfill, upcycles them into new garments, and provides skills training for workers. Clothing and accessories businesses are connected to the CE through transforming production and consumption systems, environmental quality, human well-being, and economic prosperity (required for operations).

Table 4.14. Informal business details adapted from the CE inventory.

Name	Type	Description
Goodwill Stores	Clothes/ Accessories	Triple bottom line organization (people, planet, and prosperity) aimed at diverting items from the landfill through multiple thrift store locations. Focus on creating social programs and training “green” workers or helping those experiencing systemic barriers.
Free Store	Clothes/ Accessories	Volunteer run and driven, the Free Store collects clothing, housewares in working condition. Due to the voluntary nature seasonal items are only accepted. Individuals or families in need are allowed to visit the Free Store weekly.
Mission Store	Clothes/ Accessories	Thrift store with three locations run by the Mission Services of London which offers clothing, furniture, and housewares. Two programs exist for those in-need to access clothing such as winter coats and household items.
Salvation Army Thrift Store	Clothes/ Accessories	Thrift Store offering clothing, furniture, and housewares. Proceeds go towards The Salvation Army’s faith-based programs, services, and emergency relief efforts.

St. Vincent de Paul Store	Clothes/ Accessories	Thrift store with two locations offering clothing, furniture, and housewares. Necessary items are provided free to those in need (arranged through church). Proceeds for towards operation costs.
Teen Challenge Canada- Thrift	Clothes/ Accessories	Thrift store offering clothing, furniture, and housewares. Proceeds go towards faith-based addictions treatment program at the Teen Challenge Ontario Men's Centre in Lambeth, ON.
See the Worth	Clothes/ Accessories	Fashion brand founded by Goodwill Industries, Ontario Great Lakes in London, Ont. Canada designed to revitalize fashion industry through upcycled material. Proceeds go towards training workers to become skilled workers.
Squeaky Wheel Bike Co-op	Other	Volunteer run and operated bike repair shop and space. Provides access to tools, expertise, parts, and accessories.
London Skateboard Co-Operative	Other	Co-operative skate shop that relies on membership to help run store and events.
London Food Co-op	Restaurant/ Grocery	The Co-op offers organic fruit, vegetables, and other locally sourced foods. Members have access to cheaper prices and additional discounts.
YOU Made It Café	Restaurant/ Grocery	Social enterprise driven by sustainability and social responsibility. Proceeds for sales support youth programs.
YOU Made It Recycling	Recycling	Recycling depot that processes businesses recycling. Offer youth training and employ youth workers skilled training.

Almost all host organizations use volunteers (excludes See the Worth), usually to help staff stores or help with donations and other programs. With a slightly smaller subset (n=5) using paid staff to help with the thrift stores, donations, and other programs, the Free store relies solely on volunteers. Despite clothing and accessory business actors being the most popular, about half of these thrift stores are run by faith-based organizations (Christian or Catholic). Access informal businesses through formal compensation (same as formal businesses), but (n=3) organizations have programs in place to offer free items to those in need (financial burdens), including Mission Store, St. Vincent de Paul Store, and the Free Store.

Where 'other' businesses include co-ops, which Gibson-Graham (2006) categorized as alternatives to capitalism. The alternative businesses with a co-op model provide individuals with an informal firm where users are compensated or pay membership fees. The two co-ops captured

include a bike co-op where membership fees give you access to space, tools, discounts, and other services (expertise and repair) to repair or maintain your bike⁸¹. The other is a skateboard co-op, where a membership fee allows access to events, community, and discounts⁸². These "other" businesses contribute to the CE characteristics of transforming production and consumption systems by offering an alternative to other skate and bike shops and human well-being through a focus on community building.

Restaurants and grocery stores (n=2) are alternative restaurants (London Food Co-op⁸³ and YOU Made It Café⁸⁴) that offer socially responsible products or use the surplus to fund sustainability and youth social services. The London Food Co-op allows non-members to shop. However, membership gives you discounted prices (10%), and you can volunteer to work in exchange for a further (10% one-time discount), where membership fees are used to supplement the inventory cost. The restaurant and grocery stores are motivated by CE characteristics of transforming systems of production and consumption (through alternative business models), environmental quality (through low waste and sustainable consumption), human well-being (community networks), and economic prosperity.

The only recycling depot included is an alternative market enterprise to support youth employment like YOU Made It Café. YOU Made It Recycling⁸⁵ is run by the same parent organization but a different entity focused on business recycling. They are thematic links to the CE through human well-being (focus on providing social services to youth and living wages) and

⁸¹ <https://www.londoncyclelink.ca/squeakywheel>

⁸² <https://londoneverything.com/business/london-skateboard-co-op/>

⁸³ <https://www.londonfood.coop/>

⁸⁴ <https://store.you.ca/>

⁸⁵ <https://store.you.ca/pages/woodshop-recycling>

environmental quality (aim to reduce the amount of material sent to the landfill), a full breakdown in **Table 4.15**.

Table 4.15. Summary of thematic links to the CE for informal businesses in the CE inventory.

Thematic links to the CE	Count
Revitalize/transform	7
Reuse	6
Repair	2
Sustainable production	2
Sustainable material	1
Divert from landfill	1

Across all businesses, a trend in informal businesses and their linkage to the CE can be seen where most entries aim to revitalize or transform their respective markets, reusing material, repairing items, and sustainable production (through sustainable material and diverting from landfills). The informal businesses embody the CE characteristics of transforming systems of production (through alternative business modes), environmental quality (larger sustainability commitments), human well-being (socially responsible, community building, and living wages) and, to a lesser extent, economic prosperity.

4.2.3. Informal Social Media Groups

Social Media groups (n=45) are communities or groups on Facebook and Bunz related to the CE through community sub-categories. These informal social media groups are self-organized and run by the community (administrators and moderators) (Himmelboim, 2017). **Table 4.16** provides the breakdown of social media groups. Sustainability or CE-related elements of social media groups of the gift economy (“Buy Nothing” group, free/gifting groups) and second-hand markets (parenting and mom-based groups, swape/trade/resell groups, and thrift/clothing swaps/shops).

Table 4.16. Informal social media groups and communities adapted CE inventory.

Group Name	Sub- Category	Description
Buy Nothing Argyle, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Carling/Huron Heights, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Cherryhill/Oxford Park/West London, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Fox field/Fox Hollow/Sunningdale, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Glen Carin, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Lambeth/Talbot/Bostwick, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Hamilton Road/Old East Village, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Medway/Masonville West/University Heights, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Oakridge/Hazelden/Hunt club, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Oakridge Crossing/Oak Crossing/Deer Ridge, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Old South, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Riverbend/Byron North, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Sherwood Forest/Hyde Park, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Somerset/Boler/Wickerson/Byron South, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.

Buy Nothing Stoney Creek/Northridge, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Summerside/Pond Mills /Glen Cairn, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Uplands/Stoneybrook/Masonville East, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Westmount/Southcrest, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing White Oaks/Westminster, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
Buy Nothing Whitehills/Hyde Park, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.
London Mom Swap & Buy	parenting and mom-based groups	Group for moms & caregivers to swap baby and children’s items.
Moms Offering Moms - Free Items London Ontario	parenting and mom-based groups	Group for parents to donate baby and children’s items to other parents.
Free - Trade Mommy and Daddy London On	parenting and mom-based groups	Group for parents to donate or trade baby and children’s items with other parents.
London MOM to MOM (formally free mom to mom)	parenting and mom-based groups	Group for parents to donate baby and children’s items to other parents.
Mom to Mom buy and sell for London Ontario & surrounding area	parenting and mom-based groups	Group for parents to sell used and new baby and children’s items to other parents.
Trade - Free Mommy London	parenting and mom-based groups	Group for parents to donate and trade baby and child items to other parents.
Free Mommy London	parenting and mom-based groups	Group for parents to donate baby and child items to other parents.
London, ON mom to mom buy and sell	parenting and mom-based groups	Marketplace for parents to buy or sell baby and child items to other parents.
Mom's Buy & Sell London, Ontario	parenting and mom-based groups	Marketplace for parents to buy and sell baby and child items to other parents.
London Ontario Moms - Buy Sell Trade New/Used Baby Stuff	parenting and mom-based groups	Group for parents to sell or swap new or used baby and child items to other parents.
Mommy Market London	parenting and mom-based groups	Marketplace for parents to buy and sell items to other parents.
FREE! Stuff London, Ont & Surrounding Areas	free/gifting groups	Community effort to provide essential and non-essential items to those in need.
Everything Free Store in London	free/gifting groups	Community group offering free items.

Freely Giving in London Ontario	free/gifting groups	Community group offering free items.
London Free-Store! (CANADA ONLY!!)	free/gifting groups	Community group offering free items.
FREEDOM (and cheap or free items) London, Ont.	free/gifting groups	Community group offering free items or low cost (less than \$50).
Free Food London Ontario	free/gifting groups	Community group offering free food and other items for those in need.
London Ontario Freecycle	free/gifting groups	Community group offering free items.
The Giving Tree London	free/gifting groups	Community group offering free items and trading opportunities.
London Ontario Wedding Swap and Sell	swape/trade/resell groups	London and surrounding area swap or buy group offering wedding-related item.
London Ontario swap buy trade	swape/trade/resell groups	Community to swap, trade, or buy items.
London Puzzle Swap	swape/trade/resell groups	Community to swap or trade jigsaw puzzles.
Bunz- London area	swape/trade/resell groups	Platform to swap, trade, or gift items based on your location (nearest city).
London Ontario Clothing Swap & Sell	thrift/clothing swaps/shops	Community offering swaps or sales of gently used clothing and shoes.
Online thrift store London Ontario	thrift/clothing swaps/shops	Page acts as an online thrift shop.

The ‘Buy Nothing’ groups (n=20) are based on the “Buy Nothing’ Project, which was launched in 2013 to provide a community and resources to those who would benefit from resources to promote the social and environmental causes⁸⁶. The group promotes and is linked to the CE by promoting reusing and gifting (Table 3.1.), building sustainable networks driven by needs (for those who cannot/do not want to access other markets) and reducing waste, contributing to sustainability. The Facebook groups offer groups based on a neighbourhood scale in each city. This project focuses on transforming systems (through gifting) and human well-being through (sustainable communities).

⁸⁶ <https://buynothingproject.org/about>

Parenting and mom-based groups (n=11) are the second highest volume of Facebook groups, encouraging members to swap, trade, and a resource to access lower-cost items. Horodnic et al. (2023) hypothesize that low-cost or rare items are a primary driver to access the informal market. Groups targeted primarily to mothers as opposed to other caretakers; dad is only mentioned in one group name. These groups share the CE characteristics of transforming production and consumption systems (through digital informal marketplace as alternatives to formal markets) and human well-being (through community building and creating sustainable communities).

Free and gifting Facebook groups (n=8) are created to foster communities that rely on help, care, and friendship networks which are informal (Tanaka, 2008). These communities work toward a CE through their efforts to transform systems of production and consumption (offering second-hand and informal markets and communities) and human well-being (building connections and sustainable communities).

Swap, trade, and resell groups (n=4) range from broad to specific (including puzzles and weddings), and this is the only informal social media sub-group to contain a digital platform outside of Facebook, Bunz, the Bunz app uses your location to connect you to the closest municipality in this case London, ON and surrounding town of St. Thomas, ON. Bunz works to transform systems of production and consumption (through non-market networks like swapping and trading) and human well-being (through sustainable kinship and resource networks).

Thrift and clothing swaps/shops are Facebook groups (n=2) created to give Londoners a (digital) space to find items in the informal market, both compensated at a lower price (thrift or sell) or uncompensated (swap or trade). These Facebook groups promote environmental quality through sustainable material (second-hand), transforming consumption systems by offering and

normalizing informal markets, and human well-being through sustainable communities or access to low-cost necessities- the full breakdown of thematic links to the CE in **Table 4.17**.

Table 4.17. Summary of thematic links to the CE for all informal social media groups in the CE inventory.

Thematic links to the CE	Count
Gift	44
Reuse	34
Swap/Trade	10

Thematic links to the CE were concentrated on three links related to the availability of gifting networks and second-hand markets (that promote reuse and swapping/trading). All informal social media groups incorporate environmental quality through increased reuse and lifecycle of items, transforming production and consumption systems through second-hand markets, and human well-being to build connections and a sustainable community.

4.2.4. NGOs and Grassroots Efforts

Gibson-Graham (2006) defines “socially responsible firms” as alternative capitalist firms that dedicate funds and efforts towards social responsibility, such as the environment (p. xiii). Non-profits would be classified as social responsibility firms, where the business model does not allow any profit to be held instead, money goes into the organization's other efforts/programs, overhead costs, or employee salaries (Gibson-Graham, 2006). There is some overlap between informal business entries and NGO/Grassroots entries as some storefronts are run by NGOs (Goodwill, See the Worth, Teen Thrift). The full breakdown of NGOs and grassroots efforts can be found in **Table 4.18**. The NGOs and Grassroots efforts comprise non-profit organizations (NGOs) and grassroots efforts (organization, project, collaborative efforts) with thematic links to

the CE through a mission of environmental education/programming, creating, and promoting sustainable businesses and sustainable food systems with a full breakdown in **Table 4.19**.

Table 4.18. NGOs and Grassroots Effort details adapted from the CE inventory.

Name	Type	Description
Climate Action London	ENGO	Organization focusing on educating and advocating for Londoners to implement the Climate Emergency Action Plan by 2030.
London Environmental Network	ENGO	Organization with a focus on environmental conservation and creating a sustainable city through environmental programs and events.
Circular Economy Club - London	ENGO	Local network for the Circular Economy club run by volunteers to bring CE activities to London, ON.
Reforest London	ENGO	Organization focusing on improving environmental and human health locally through tree planting and sustainable projects.
Thames Regional Ecological Association	ENGO	Organization focused on environmental education and conservation through programs and projects.
Canadian Environmental Law Association	ENGO	The organization works to protect human and environmental health through justice and policies. Services are free to individuals and groups.
Upper Thames Regional Conservation Authority	ENGO	Organization aims to create a healthy environment through conservation through a holistic ecosystem approach.
Bird Friendly London	ENGO	Organization focused on bird conservation and human well-being through nature to transform urban spaces to be more accessible for birds.
LOLA Bees	ENGO	Environmental education-based organization focused on bees and other pollinators through experiential learning.
National Diabetes Trust	Sustainable business	Charity collects clothing and small household goods and sold for profit. Profit supports Diabetes Canada. The organization works to divert waste, provide community-based programs, and research.
Goodwill Industries	Sustainable business	Organization works to create more sustainable, resilient, and well-trained communities.
See the Worth	Sustainable business	Organization works to revitalize clothing industry through clothing designed with upcycled materials, training programs, and community partnerships.
Green Economy London	Sustainable business	Network offers a collaborative and community-based hub for sustainable businesses.

Growing Chefs! Ontario	Food	The organization im to transform food systems to be more sustainable, accessible, and fun through education and community partnerships.
Forest City TREEats	Food	The interactive resource map offers Londoners a community of foragers, location of edible tree and shrubs to offer accessible and local food.
The Patch	Food	The collaborative program offers training, community garden spaces, and access to fresh local food. Excess food is distributed to local organizations in need.
Pillar- Art for Impact by Social Six 2022 program	Art	Creative program aimed at youth to connect art, nature, and community building.

Environmental non-government organizations (ENGOS) (n=9) are driven by the mission of environmental quality through grassroots action, education, and conservation projects. Sustainable business (n=4) focused organizations are NGOs (n=3) and sustainable business networks focusing on transforming systems through sustainable informal markets and educational resources, environmental quality through conservation efforts, and human well-being through sustainable and healthy workplaces.

Food-focused grassroots efforts (n=3) include organizations or projects aimed at transforming production and consumption systems of food and environmental quality through the promotion and availability of local produce. At the same time, human well-being is achieved through community gardens, foraging knowledge, and the connection to land. Pillar non-profit offered an art-based program connecting people to nature through art and spending time in nature to promote environmental quality.

Table 4.19. Summary of thematic links to the CE for all informal NGOs/Grassroots efforts in the CE inventory.

Thematic links to the CE	Count
Inform	12
Behaviour shift	12
Revitalize/transform	6
Conservation	4
Sustainable consumption	2
Divert form landfill	2
Low carbon	1
Sustainable material	1

The thematic links to the CE of NGOs and grassroots efforts are skewed towards creating a behaviour shift and providing education (or informing) around several CE-related issues (food, clothing, sustainability, art, sustainable businesses) where other actors are connected by their role in revitalizing and transforming systems by offering informal alternatives or resources, and environmental conservation and resource conservation (sustainable consumption, sustainable material, divert from landfill, and low carbon). NGO and Grassroots efforts are connected by collective efforts to preserve environmental quality through education and conservation, transforming production and consumption systems by offering informal alternatives, and human well-being through community building.

4.3. Thematic overlaps between formal and informal events and business actors

The inventory supports the distillation and description of the local urban CE in London, ON. The above sections provide a sense of the kinds of activities and entities that participate in this local CE, as well as how they do so in terms of how they ‘link’ to the CE thematically. Based on this inventory, it is evident that informal events thematically overlap through sustainable material use, but informal events skew towards low-waste processes or items. Formal and informal businesses differ in their thematic links to the CE, whereas formal businesses rely on

reuse and a wider array of thematic links to the CE. The informal business actors focus on reusing and revitalizing or transforming production and consumption systems.

The City departments and education actors classified as formal actors focus on informing residents of CE-related activities. The City departments focussed on informing, to a lesser degree, encouraging behavioural shifts and conservation efforts. Education actors focus on education through informing, encouraging behavioural shifts, and revitalizing or transforming systems of product and consumption. NGOs/Grassroots efforts are informal, but like municipal and education actors, the role of these efforts is to inform and encourage behaviour shifts. Informal actors include social media groups skewed towards the gift economy or reusing items.

While the inventory identifies where there are *thematic* connections and disconnections between the formal and informal ‘sides’ of the London-area CE, it does not inform an understanding of how integrated formal and informal aspects of the local CE are in terms of their interactions (i.e., interactions between formal and informal actors, organizations, events). To identify whether and how the informal and formal aspects of the local CE may or may not be interrelated, I produced a set of relational concept maps as described in **Chapter 3**. By visualizing connections between the inventoried actors, events, and organizations, I was able to analyze whether and where any such connections exist. These maps – and my analysis of their findings – are discussed in the next section.

4.4. Relational concept diagrams

The relational concept diagrams I present in this section follow the basic structure of a social network diagram (SND), where nodes (individual actors or events) and edges (interconnections or relationships amongst nodes) constitute a structural visualization of a

network and its connections (Ash et al., forthcoming; Pokorny et al., 2018). The resulting networks are formed by linking nodes to represent interactions between them. The number of links between nodes is known as degrees (Himmelboim, 2017). The relational diagrams were formed using the CE inventory data to visualize interactions between the formal and informal sectors of the CE in London, ON. Three resulting networks are discussed to analyze the formal CE (**Figure 4.1.**), informal CE (**Figure 4.2.**), and the informal-formal continuum or “whole” CE (**Figure 4.3.**). The resulting networks display actors (businesses and events) as nodes or names. Their connection to the CE is categorized by a colourful (blue, pink, red, purple, green, orange, red) categorical linkage (phenomenon types: events, business, City of London, NGOs and grassroots, and education actors), and grey and black lines depict linkages between actors and events or actor nodes.

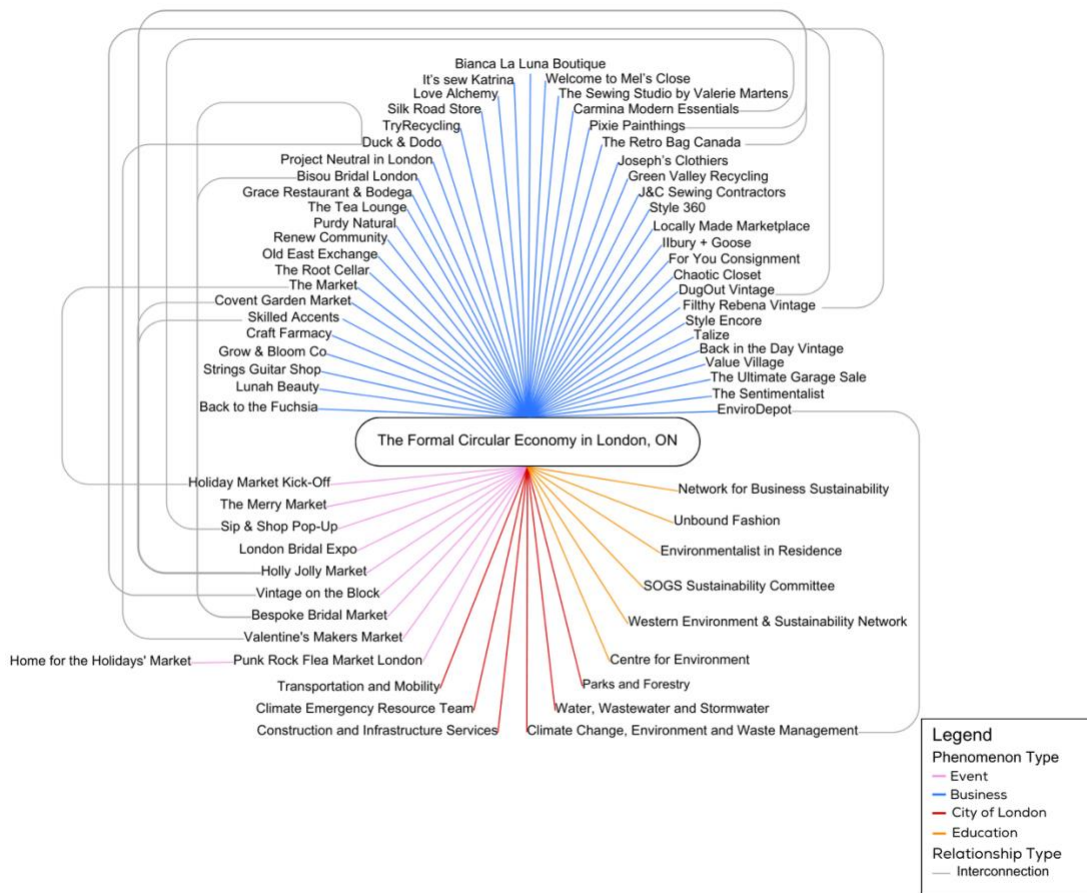


Figure 4.1. Formal CE network for the London, ON-area.

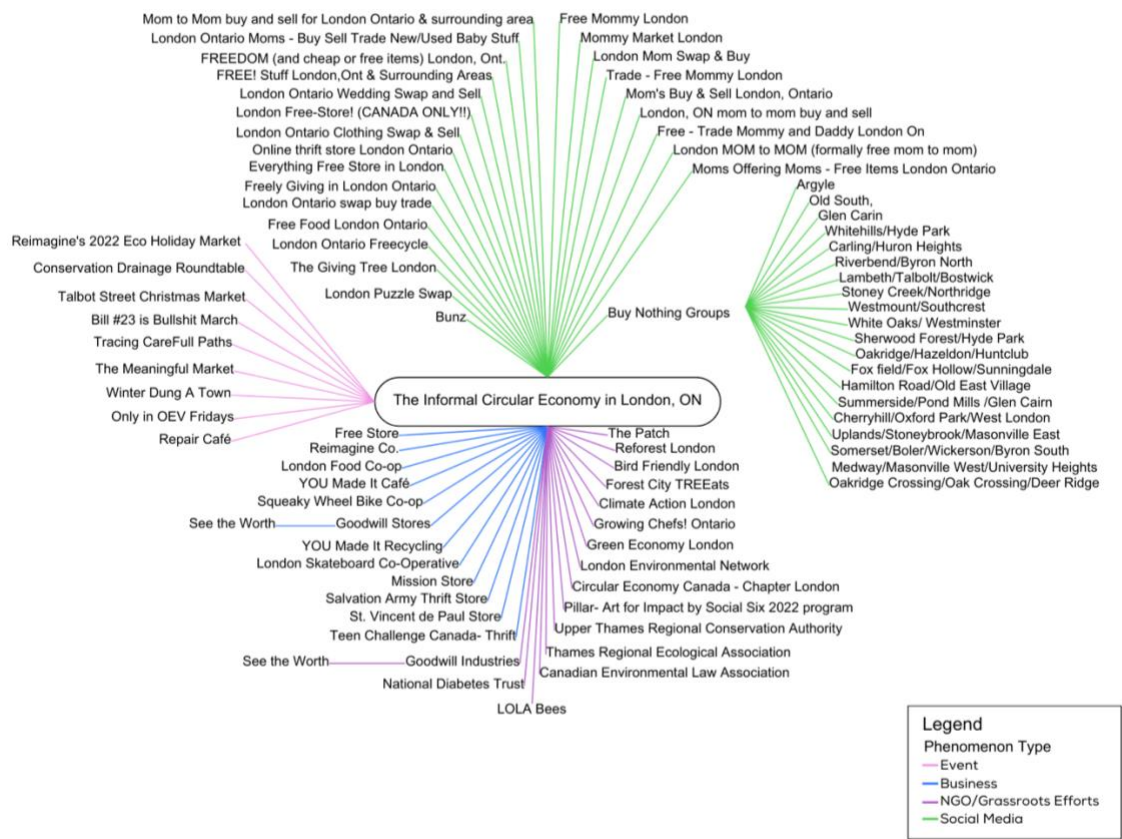


Figure 4.2. Informal CE network for the London, ON-area.

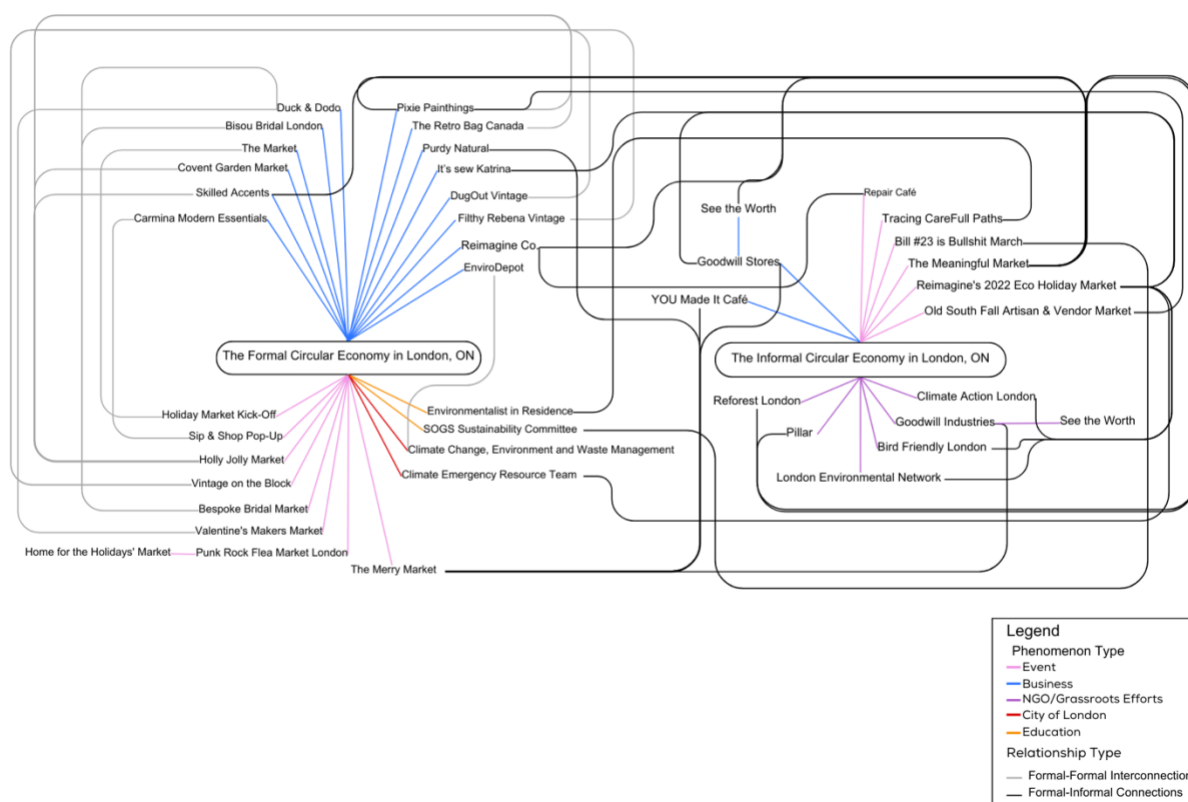


Figure 4.3. CE formal-informal continuum network for the London, ON-area CE.

As outlined in **Chapter 3**, I have adapted the structural social network analysis (SNA) outlined by Chung et al. (2005), which constitutes an approach for quantifying networks based on their structural variables of the resulting networks. In my diagrams, each event, actor, group, and organization inventoried comprises a node. The network variables include the total number of event and actor nodes (to determine network size), linkages (interconnections between nodes), network density (connectivity between nodes), and potential connection (maximum linkages possible in the network). The descriptive SNA methodology is adapted from Nooraie et al. (2020), where indicators (betweenness centrality, degrees, and brokerage roles) and holistic profiling of the formal-informal CE continuum help to shape the narrative of the resulting

networks. Betweenness centrality describes the popularity of a node (actor/event) in its ability to facilitate connections with other nodes through linkages, where the more linkages a node enables, the higher the betweenness (Nooraie et al., 2020). Betweenness centrality is used to determine the role of a node as a bridge or broker, which means that they facilitate a connection between two other nodes (Nooraie et al., 2020). Betweenness centrality informs an understanding nodes' connectivity, composition, and role in the resulting networks of the formal and informal CE in London, ON. Networks themselves can either be directed or undirected. Directed networks are those where information or influence flows from one node to another through linkages, and undirected networks are the inverse, where information or influence flows between nodes through their linkages (Himmelboim, 2017). Whether a network is directed or undirected is determined by the linkages within each network where mutual relationships result in undirected networks (Himmelboim, 2017). Whereas directed networks have a clear direction of information or influence (Himmelboim, 2017).

4.4.1. The Formal CE Network

The formal CE network contains events, businesses, the City of London, and education actors. Business actors comprise most of the formal actors seen in the formal network (**Figure 4.1**). As shown in **Figure 4.1**, the formal-formal linkages are concentrated between event nodes and business actor nodes except for one City of London actor linked to a business actor. The structural breakdown of the network is summarized in **Table 4.20**.

Table 4.20. Structural variables of the Formal CE with values rounded to the nearest 3 decimal places.

Variable	Formal Values
Number of Nodes (actors and events)	69
Number of Linkages (Formal-Formal)	12
Network Density (D)	0.005
Potential Linkages (N_{tMax})	2346

Based on the inventory, the resulting formal CE network (**Figure 4.1.**) is undirected, and displays linkages or interconnections between formal actors, events, and organization (formal-formal links). **Figure 4.1.** formal-formal linkages are predominately between event nodes and business actor nodes except in one cases, the City of London actor, and a business actor (EnviroDepot). The EnviroDepot (business) actor was managed by the City of London (Climate Change, Environment and Waste Management) where resources, information, and influence were controlled by The City. Within formal-formal linkages we see event nodes and business nodes linked typically in instances of markets. Here, organizers rely on recruiting local vendors and in return coordinate event logistics. These markets allow vendors to gain exposure a large audience and access high-volume crowds. In some cases, organizers also participate in the market event. Resources, money, information, and influence flow between event and actor nodes.

The nodes represent the size of the network; in the case of the formal CE, this network has the least number of nodes and is smaller than the informal CE. Additionally, a low number of formal-formal connections ($n=12$) may be traced back to $n=8$ source nodes (nodes that facilitate formal-formal linkages), as displayed in **Table 4.21.** The indicators (linkages, network density, protentional linkages) featured in **Table 4.20.** emphasize that the low number of linkages of the formal network are limited to a small number of event/actor nodes through nodes such as markets (events), retail (events), and a business (actor). Network density (D) is low, which

represents a sparsely connected network, which is evident based on the potential interconnection possible in the network (n=2346).

Table 4.21. Formal-Formal connection breakdown by source nodes and degrees (number of linkages per node).

Source Node	Degree
Holly Jolly Market	4
Bespoke Bridal Market	2
Vintage on the Block	2
Valentine's Makers Market	1
Holiday Market Kick-Off	1
Sip & Shop Pop-Up	1
EnviroDepot	1

The betweenness centrality, degrees, and brokerage roles are indicators that tell us about the connectivity of formal-formal linkages. Betweenness centrality or source nodes (**Table 4.21.**) are made from primarily market event nodes, and the retail event nodes are thematically linked to the CE by providing low waste products or packaging to consumers, ensuring vendors use sustainable materials for products, and to a lesser extent encouraging behaviour shifts from consumers. Markets are hosted by a mix of businesses and an organization to business actors. The sole business actor node (Envirodepot) is linked to a City of London actor and differs in its thematic linkage to the CE.

The most connected event (based on degrees) is the Holly Jolly Market hosted by the Covent Garden Market. The host organization offers physical space to host events and frequently hosts non-CE-related events and activities as well. The actor with the highest degrees is Duck & Dodo (a gift shop), which hosted two events, the Bespoke Bridal Market and the Valentine's Maker Market. The formal event nodes (**Table 4.21.**) can be classified as brokerage nodes where they act as consultants, defined as a node that "mediates contact between two individuals from a

different group” (Nooraie et al., 2020, p. 145). The formal event nodes act as consultants between two business nodes within the formal network.

Holistic profiling of the network was conducted by generating a histogram graphing the degrees (linkages between nodes) within the formal CE network (**Figure 4.4.**). Degrees represent the linkages for a single event or actor node (Himmelboim, 2017). According to Himmelboim (2017), self-organized or “real life” networks can graph the distribution of degrees (linkages a single node contains) to understand how connectivity is spread across actor and event nodes and the entire network. The distribution of degrees within a network can indicate the connectivity of a network and if this connectivity is evenly distributed among actors or exclusive to a small number of nodes (Himmelboim, 2017). Highly connected nodes are seen as holding more information or influence in the broader network, creating a hierarchical structure (Himmelboim, 2017).

A power-law distribution visualizes the distribution of degrees (linkages for a single node) where connectivity is limited to a few event and actor nodes, and the rest of the networks see much lower degrees, if any (Himmelboim, 2017). Within power-law networks, the linkages are highly (positively) skewed and tend to favour and benefit a few nodes where a preferential attachment is typically formed (Himmelboim, 2017). The skewed distribution creates a hierarchy where new nodes prefer to link to highly connected nodes, skewing growth in favour of nodes with (higher) degrees as the network grows (Himmelboim, 2017). Highly connected nodes increase their connectivity faster than less connected nodes. Theoretically, the network is described as "the rich get richer" (Himmelboim, 2017, p. 13). The highly connected nodes hold the most influence and, in some cases, access to information, which impacts the connectivity and flow of the rest of the network (Himmelboim, 2017). The formal-formal linkages most commonly contain

1 degree (linkage), while higher degrees ($n=2$, $n=4$) are less common. The distribution of linkages is positively skewed and follows a power-law distribution of the formal-formal linkages within a formal CE. **Figure 4.1.** shows nodes for markets as the most connected event nodes featuring a high frequency of degrees. As a result, there is a clear hierarchy of nodes in the formal CE where information, influence, and new nodes prefer the connected nodes.

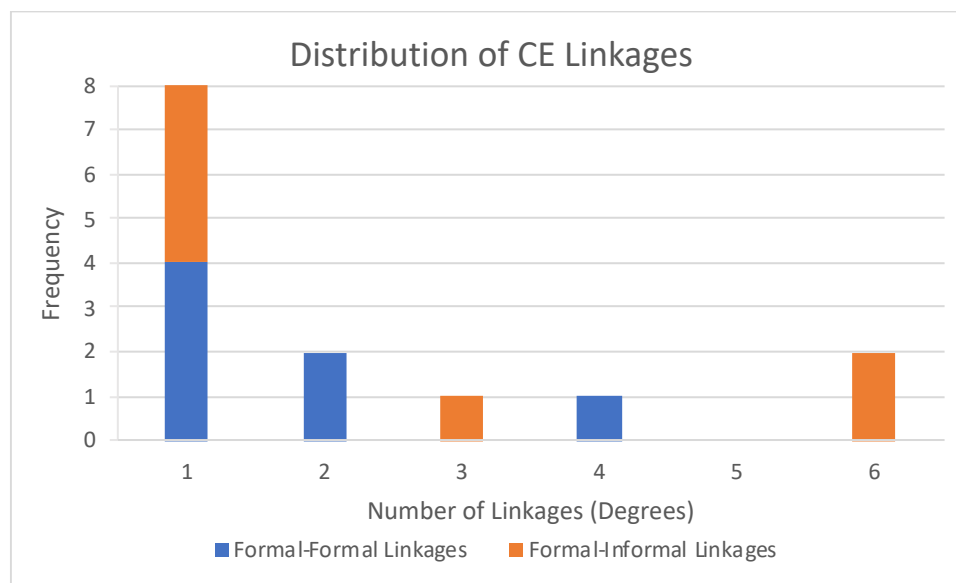


Figure 4.4. Histogram displaying the distribution of degrees for formal-formal linkages and formal-informal linkages.

4.4.2. The Informal CE Network

The informal network is visualized in **Figure 4.2.** Based on the visualization of informal entries in the inventory, the absence of linkages between event and actor nodes makes it impossible to determine if the network is directed or undirected. However, based on the nature of the event and actor nodes calculations in **Table 4.22.**, I interpret the network as undirected. This assumption relies on the potential for mutual or reciprocal linkages between nodes. In the informal network, the social media actor nodes are the most common type of node, outweighing the events and business and NGO/Grassroots Effort nodes. The informal CE network contains

more nodes than the formal network, but lacks comparative connectivity (linkages or density) between nodes. Instead, we see there are many potential linkages ($n=3403$). The lack of linkages or interconnections makes indicators from the informal CE network impossible to measure or discuss. Further different from the formal CE network, the informal network has a lack of informal-informal linkages.

Table 4.22. Structural variables of the informal CE.

Variable	Informal Values
Number of Nodes (actors and events)	83
Number of Linkages (Informal-Informal)	0
Network Density (D)	0
Potential Linkages (N_{tMax})	3403

4.4.3. The Formal-Informal CE Continuum

Next, I used SNA techniques to examine if, and the degree to which, the formal and informal CE networks were connected in terms of linkages between formal and informal CE actors, events, organizations, and businesses in the London, ON area. I term this holistic network combining of all the formal and informal nodes the ‘Formal-Informal CE continuum’ network, which is visualised in **Figure 4.3**. Like the formal CE and informal CE, the formal-informal continuum is undirected because the relationships are mutually beneficial, with information and influence emanating from both event and actor nodes (Himmelboim, 2017).

The formal-informal CE continuum network displays a new type of interconnection, formal-informal linkages (displayed by black lines in **Figure 4.3**). A full structural account of this network is provided in **Table 4.23**. The formal-informal CE continuum linkages are primarily among market event nodes, business actor nodes, City of London actor nodes, and NGO/grassroots nodes. Formal-informal markets differ from their formal-formal market linkages

in the increased types of actors. Aside from business actors, Figure 3 shows NGO/grassroots nodes and City of London actor nodes. Like the formal-formal market linkages, the formal-informal market linkages are mutual, where the different types of actor events benefit equally as organizers and actors are required to host a successful market. **Figure 4.3.** also shows linkages between informal education/community event nodes and formal education actor nodes or formal business actor nodes. These education/community event linkages to education or business actors are typically self-contained, where the event organizer is the education actor node or business actor nodes responsible for the education/community event node. The self-contained linkages between informal event nodes and formal actor nodes are reciprocal as they typically rely on resources from formal actors (funding, revenue, event space) to host these free informal events.

Table 4.23. Structural variables of the formal-informal CE continuum with values rounded to the nearest 3 decimal places.

Variable	Formal-Informal Values
Number of Nodes (actors and events)	152
Number of Linkages (Formal-Informal)	19
Network Density (D)	0.002
Potential Linkages (N_{tMax})	11476

The formal-informal CE is a larger network, with a higher number of linkages than the formal CE with a total number of $n=19$ formal-informal linkages coming from $n=7$ source event nodes (**Table 4.24.**). The network density value is lower than the formal network, indicating an even sparser connection between nodes in the resulting formal-informal CE network. The sparse connectivity between the formal and informal CE in London, ON, is further supported by the number of potential linkages ($n=11476$) that are not realized between formal and informal nodes. The formal-informal linkages are limited to several event nodes through markets and community/education events.

Table 4.24. Summary of formal-informal connections by source nodes and degrees (number of linkages per node).

Source Node	Degree
Reimagine's 2022 Eco Holiday Market	6
The Meaningful Market	6
The Merry Market	3
Old South Fall Artisan & Vendor Market	1
Tracing CareFull Paths	1
Repair Café	1
Bill #23 is Bullshit March	1

The betweenness centrality of source nodes in the formal-Informal Continuum (**Table 4.24.**) includes market event nodes (n=4) hosted by a mix of formal business actors and informal NGO/Grassroots efforts. Source nodes also include education/community event nodes (n=3) hosted by a mix of formal education actors and a formal business. The formal-informal markets are thematically linked to the CE similarly to formal markets, via CE themes of low waste, sustainable materials, and behaviour shift. The education and community events are thematically linked to the CE in different ways instead of focusing on informing participants, creating behaviour shifts, and, to a lesser extent, reuse, and repair. The most connected events based on degrees are the Meaningful Market hosted by Pillar Non-profit and Reimagine's 2022 Eco Holiday Market hosted by Reimagine Co. The most connected formal-informal events were sponsored events. The actor with the highest degrees is Reimagine Co., which hosted the Repair Café and Reimagine's 2022 Eco Holiday Market. In the formal-informal Continuum network, only (n=3) source nodes (**Table 4.24.**) act as brokers, whereas Reimagine's 2022 Eco Holiday Market and the Meaningful Market act as *liaisons*. *Liaisons* are defined as nodes that “mediat[e] contact between two individuals from different groups, neither of which is the group to which [they belong]” (Nooraie et al., 2020, p. 145). The event node is the liaison between business and

non-profit or grassroots effort actors. In addition, The Merry Market can also be assigned the brokerage role of a consultant between formal and informal businesses.

Holistic profiling of the network is possible through a histogram that graphs the degrees (linkages between nodes) for formal-informal linkages (**Figure 4.4.**). The resulting formal-informal linkage distribution histogram (**Figure 4.4.**) within the formal-informal continuum follows the same positively skewed pattern, forming a power-law distribution as the formal CE. Formal-informal linkages with 1 degree are the most common, followed by 6 and 3 degrees associated with market events. The formal-informal CE will see a hierarchy of information or influence towards connected nodes and grow fastest among the already connected nodes. In the instance of linkages between formal and informal CE nodes, the highly connected actor nodes are formal businesses (Duck & Dodo and Reimagine Co.). We see event nodes with high connectivity, such as Holly Jolly Market (**Table 4.21.**) hosted by Covent Garden Market, Reimagine's 2022 Eco Holiday Market hosted by Reimagine Co., and The Meaningful Market hosted by Pillar Non-profit (**Table 4.24.**). Well-established formal businesses or informal NGOs were the hosts of these highly connected events. The most common brokerage roles across the formal-informal continuum are assigned to event source nodes (**Table 4.24.**) which act as liaisons between businesses and NGOs/Grassroots efforts. Other phenomenon types – the City of London, education, and social media – are not connected through brokers.

4.4.4. A Disconnected CE

The SNA metrics (linkages, density, maximum number of potential linkages) point to a broad state of *dysconnectivity* within the London, ON CE. This disconnection or lack of linkages is primarily seen within the formal CE and formal-informal Continuum networks. Particularly

acute is the absence of ties between formal nodes and informal social media groups, which are completely siloed despite their large user base. There are also many informal business actors, NGOs/Grassroots effort actors, and events that are separate from each other, as well as formal event and actor nodes. Despite a seemingly flourishing informal CE (**Figure 4.2.**), the need for interconnectivity within the formal CE and between the formal-informal CE results in the slow growth of circular economy initiatives in a time of a proclaimed local climate emergency as described by Himelboim's "rich get richer" explanation for skewed connectivity (2017, p. 13). Although smaller than its informal counterpart in terms of the number of nodes, the formal CE is only marginally better in this regard, characterized by low connectivity. Further important is that within the formal network, the most disconnected categories of nodes include education actors (those with the most potential to raise awareness of the CE) and the City of London (which is the very entity that proclaimed the climate emergency).

4.5. Summary of findings

The three networks examined range in size from smallest to largest from the formal CE, informal CE, and formal-informal continuum. The formal CE has a higher level of visibility and more recognition. Despite this, the formal CE network is not the larger of the two spheres of the CE (formal and informal). Despite the size of the formal CE network, the interconnectivity is limited to the formal CE (formal-formal linkages) and formal-informal CE continuum (formal-informal linkages), while the informal CE network lacks any linkages. The degrees (number of linkages a single node contains) or source nodes of the formal CE are event and business actors in the form of markets and smaller businesses. The highest degrees in formal-informal CE are event nodes (markets) with actor nodes (businesses, educational). Across both the formal CE and

formal-informal CE continuum, markets have the highest degrees hosted primarily by formal businesses, except for one market hosted by an NGO. The highly connected nodes predominately featured in the formal CE linkages and formal-informal CE continuum are prone to faster growth as new nodes favour well-connected nodes. The skewed distribution of linkages creates fragmented growth in the larger urban CE, where the informal sphere will grow slower.

The actors that do not contain linkages will experience slower growth due to the favoured nature of connected nodes and less influence or slower rate of information flowing through them. The current structure and connectivity of the CE networks will result in the fastest growth of the formal-informal CE, followed by the formal CE, and stalled growth in the informal CE. More work should be done to create higher connectivity within the informal sphere through both informal-informal linkages and formal-informal linkages.

4.6. Missed opportunities

The low level of connectivity in the informal sphere shows an opportunity for further development and partnerships, specifically among NGOs/grassroots actors, social media actors, and informal events. Partnerships could take many forms, for example, a directory of social media groups managed by the City of London or an NGO to raise awareness of existing resources and cross-promote CE and CE-related events. A mix of formal and informal actors host informal events. However, informal actors could also advertise events or continue incorporating formal actors (business, education, City of London) to help with resources or expand their audience. Formal events should engage informal business actors and continue partnering with local businesses to improve connectivity within the formal-informal CE continuum.

Chapter 5

5. Thematic Analysis of Interviews

This chapter presents the results of the analysis of 11 qualitative interviews conducted with London, ON-area informants engaged with the local CE. These informants had different relationships to the CE, including as workers from Non-profit organizations and grassroots efforts (NGOs), the City of London (CL), business informants (BI), and private citizens (PC). The analysis of interview transcripts followed Braun & Clarke's (2006) methodology for Thematic Analysis using an inductive approach to distilling themes and patterns from the data. All informants were identified using an alphanumeric coding system that reflects their positionality in the CE (NGOs, CL, etc.) and the order in which they were interviewed (e.g., NGO1 = the first NGO/grassroots informant interviewed; CL2 = the second City of London representative interviewed, etc.). Formal actors represented just over half (n=6) of the informants in part due to availability, searchability, and proximity to the Circular Economy (CE) through work or personal behaviours. However, five informants were engaged with the 'informal' sector of the local CE through work or personal behaviours. The network analysis results (**Chapter 4**) illustrate the disconnect between the formal and informal CE networks. The near-equal divide of formal and informal actors could explain why formal and informal CE disconnection as they pertain to individual involvement with the local urban CE. The breakdown of informants amongst informant groups is summarized in **Table 5.1**.

Table 5.1. Informants by informant group, and the alpha codes designating each group.

Informant Group	Alpha Code	Number of Informants	Informants in 'Formal' CE	Informants in 'Informal' CE
Non-profit organizations and grassroots efforts	NGO	4	0	4
Business Informants	BI	4	4	0
City of London	CL	2	2	0
Private citizens	PC	1	0	1

The interviews aimed to gain an understanding of the local urban CE in London, ON from stakeholders' positionalities in formal and informal spheres, and their contributions to the larger formal-informal CE continuum. During the interviews, a semi-structured interview guide (**Appendix B** and **Appendix C**) was used to facilitate discussion of several issues, including stakeholders':

- motivating factors and personal and employment influences for participating in the CE;
- perceptions of environmental literacy publicly available to Londoners;
- perceptions of power in terms of capacity to implement sustainable initiatives or actions, and of the distribution of this power among stakeholders; and
- suggestions for improvements towards a CE and achieving broader sustainability efforts.

5.1. Motivational factors for CE participation

When discussing the factors motivating their participation in environmental sustainability, informants frequently cited various factors as contributing to or influencing their pursuit of employment or personal interest in the CE or CE-related field. These included education, environmentally conscious behaviour(s), insight into participation and environmental attitudes.

5.1.1. Environmentally Conscious Behaviour

A number of informants indicated that their post-secondary education motivated their participation in the CE. When asked about what led the informant to their current workplace (NGO1) stated,

“I have a Bachelor’s in International Development and Environmental Studies and every project I ever did in school or every internship, every community-based placement, volunteering, um they all were in different parts of like food systems...then after I graduated um I’ve worked in like Environmental Education Non-profits um for my whole career after that um but this one was the ideal choice of like mixing environmental education and hands on learning all into one.”

NGO1 discussed the alignment between education and personal interest. The alignment of interest and education was echoed by the informant (NGO3), who said:

“I’ve always been really interested in sustainability... I hike, I live on a farm, you know it’s just always been something that’s important to me, you know taking care of the planet so naturally it was great to be able to find a job that fit within that. I also when I was at Fanshawe um my final like my thesis project and everything I was repurposing a lot of textile waste, um so you know coming out of that it was pretty lucky that there was a job that was like related so much in everything that I worked on...”

Other informants said they wanted to pursue environmental-related degrees to gain a job in their desired field. CL1 expressed:

“[S]o[,] I am an environmental engineer, um by trade so licensed by a professional Engineers of Ontario. I’ve also got a Master of Environment and Business Degree from

the University of Waterloo which is sort of like a sustainability-themed MBA and I dedicated myself to working on environmental pretty much right from the onset...”.

CL2 provided a similar response indicating that university was the path to the environmental field. They acknowledged:

“[I s]elected to work in the environment 40 years ago – University”.

The other informants’ absence of reference to formal education (n=5) did not necessarily indicate that they did not obtain formal post-secondary education but rather that they identified other factors motivating their current employment decisions within the environmental field or a related field. BI3 indicated that they took an alternative route based on their interest and the opportunities available; they indicated:

“I didn’t go to college or university or anything like that, I was just working in a factory...I found an apprenticeship...”.

BI3 did not rely on formal education but took opportunities such as training and apprenticeships to help shape their current career, having managed, and owned several businesses. Comparatively, BI2 decided to do a training program after starting their business to enhance their current skills and advance their knowledge. As expressed by BI2:

“I just did a business training program through Fanshawe”.

Informant BI2 decided to start their business with no formal business knowledge instead of navigating a sole proprietorship through passion and learning on the job. For other Business Informants, their current employment was a second career. For example, NGO4 did attend a

post-secondary institution but left school and switched fields before eventually getting involved in their current sustainable grassroots organization. Informant NGO4 articulated:

“I did do some-I was thinking about going into landscape architectural at one point but that really didn’t, especially at the level I was at I only did two years, so they didn’t really get into sustainability that way but um I think it’s just general interest... I was a chef for 40 years and I was always cooking since I was 9 um I was always interested in plants.”

NGO4 decided to pursue another field but ultimately returned to their passion for plants after retiring from their former career and now running their sustainable grassroots organization. Similarly, BI1 and BI4 changed real estate and construction careers after some time. Informant BI1 indicated:

“I was in marketing for almost 30 years so this is kind of my second career and uh my husband and I own um few commercial units and one of our tenants uh was going to open a...shop. So, she decided to not go forward with that, I had done a little bit of work in the unit so it kind of gave me a bit of an idea”).

BI1 explained this was not a planned decision but rather made the decision based on an opportunity to open a store and expand on the retail market in London, ON. Informant BI4 started their career in construction before deciding to pursue a degree. Their business degree did not immediately find their current role; instead, they worked in retail before creating their own business. Informant BI4 stated:

“I went back to school, and got a Business Marketing diploma from Fanshawe [College]”.

There were some similarities in formal (CL1, CL2) and informal (NGO1, NGO3) informants to combine personal interests with education to gain employable skills/employment in the CE or a CE-related field. Additionally, formal (BI1, BI4) informants and one informal (NGO4) informant made a career change where this business or organization was an opportunity to express their interests and engage like-minded Londoners. They differ from formal informants (BI2 and BI3) who decided to forgo education before seeking employment in their desired field; they followed a linear path and only worked in their field before their current roles. BI2 sought education in the form of a course after becoming a business owner. Meanwhile, BI3 was able to get training through an apprenticeship.

5.1.2. Environmentally Conscious Behaviour

When asked if informants considered themselves environmentally conscious, except BI3, all informants answered 'yes,' although to varying degrees. The informants identified several actions and behaviours they practice that are CE or CE-related. Some informants focused their environmentally conscious behaviours on a specific area of sustainability (transportation, food, energy, clothing) typically influenced by their interests or knowledge. Where many informants focused their environmentally conscious behaviours on shopping habits. BI4 indicated:

“[I] buy products that have sustainable practices, we don't use any gas-powered lawn/garden devices”.

CL1 also focuses on shopping habits, stating that they:

“Try to live as lightly as possible... Use many reusable items[,] [r]e-purpose many items[,] [s]trongly encourage neighbourhood sharing of items.”

CL2 had overlapping reasons; they echoed:

“...oh we actually do quite a fair bit of garment sharing amongst a few different families.”

Additionally, NGO3 shares the focus on sustainability with their shopping habits, where the informant expressed:

“I love consuming you know local products everything from clothing”.

Sustainable food practices were common among informants. For example, NGO1 communicated “we have a garden and like I always take her to harvest things from food forests and stuff, and like at home we cook from scratch and we meal prep and meal plan and all stuff”. NGO4 also highlighted their garden, which they echoed by saying:

“...we don't throw out any food if we can possibly help it, if we do it goes to the compost. We cook from fresh, I hardly ever buy anything that's prepared...”.

Similarly, PC1 shared:

“...if I'm buying anything like- I mean typical like day-to-day groceries: milk, eggs, whatever you read the package when you're in store and I try to look for stuff that says like 'made with less water or made with whatever or like fish from sustainable fisheries'...”.

Some informants were driven less by interests or knowledge but by influence by others in their household (i.e., partner, children) to be more environmentally conscious. Although BI3 reported that they did not consider themselves environmentally conscious, they stated another household member was environmentally conscious. As a result, their family adopted ecologically conscious behaviour (ex., sorting waste and recycling). As BI3 said,

“You know, my husband is ha-ha... but we do a lot of recycling at the house and making sure everything is in the right container...”

In the case of BI1, their daughter thrifted, which helped give her insight into the popularity of second-hand and vintage pieces. BI1 stated:

“I have two daughters, one of whom is a big fashion person and also a huge thrifter so she’s been like searching the world for specific pieces and um you know certain archival type designer pieces and all that stuff.”

Similarly, PC1 stated that having a child was the catalyst to environmentally conscious behaviour, declared:

“I would say that having kids was one of the biggest motivators because I don’t know maybe it’s just society driven but babies come with a lot of stuff.”

Similarities amongst formal and informal informant’s environmentally conscious behaviours surfaced within the categories of these sustainable behaviours. For example, environmentally conscious behaviour included shopping habits amongst formal (BI4, CL1, CL2) and informal (NGO3) informants who described altered consumption and shopping habits. At the same time, some formal informants (BI1, BI3) and one informal informant (PC1) included the influence of family (partners and children). Another popular environmentally conscious behaviour exclusive to informal informants was food habits from composting to gardens, including NGO1, NGO4, and PC1.

5.1.3. Insights into Participation in the CE

When discussing sustainable behaviour and related topics, personal opinions and insights into what motivates the public to participate in the CE and associated fields of sustainability came forward. Informants had the opportunity to speak from their experience in specific fields; for example, business owners could provide insight into their clientele. For instance, a shift in public awareness has caused people to reconsider fast fashion, which has led to the fashion domain supporting second-hand clothing (ex., vintage, thrift, and upcycled). This was articulated by BP1 when they stated that:

“...people don't want to support like you know the fast fashion industry, don't want to buy online, they want to support a local business, they want a second-hand dress because they feel it's better for the environment...”

Similarly, BI3 reported that:

“I'm finding now too a lot more brides are buying second hand dresses and getting them customized um because a lot of the brides as soon as they're done are selling their dresses so I'm finding that's becoming more sustainable too why wear a dress once and then stash it in a box and stuff it into your closet and never going look at it again...”

Also making reference to second-hand shopping, BI4 indicated that:

“...we try to not promote "fast fashion" like Zara and Shein. We have heard from our customers more and more over the years, that they make the effort to only buy second hand. We have also heard from our consignors, that they see how their consumerism is out of control, now that they are a part of the

repurposing portion of their garment's lives. That they are trying to buy less, or buy better quality."

To this, BI4 added:

"We have watched over [the] years, that second hand shopping is no longer a "secret" of consumers, but buying second hand gives 'bragging rights'. It's been satisfying to watch the shift."

While NGO3 has continuously advocated for more sustainable consumption through second-hand items and caring for items already in your closet, they said:

"I have had several meetings about um yeah trying to communicate our story, sustainability, how to care for your clothes, how to be just more responsible when consuming fashion essentially."

In addition, personal perceptions of sustainability or outlook on the environment influence the connectivity informants expressed feeling to others and to initiatives within the larger environmental community. As NGO4 stated,

"[I]t's totally erroneous, one person can change the world um because you're not alone, you're not ever alone, that's a perception thing...hello get your head up and look around you because you're going to find an awful lot of people thinking the exactly the same way you do..."

This feeling was reiterated by PC1, who said,

"I have this mindset of like every small action count and every small action is multiplied on the grand scheme of things..."

This shift in the fashion industry has led to more educated consumers seeking sustainable clothing, whether second-hand, vintage, or ethically made, as seen by formal (BI1, BI3, BI4) and informal informants (NGO3), who are all in the clothing retail environment. Informants involved in the ‘informal’ CE (NGO4 and PC1) were the only informants to mention connectivity or community in the environmental sector and movements. The informal informants felt individual action was linked to a larger environmental community or contributed to larger positive environmental change.

5.1.4. Environmental Attitude

Based on the interview data, informants’ motivations for sustainable behaviour fell into two categories: eco-centric (e.g., conservation) and anthropocentric (e.g., saving money). Eco-centric motivations included an affinity for nature, connection to the Earth, preserving the Earth for future generations or general conservation. BI2 focused on values instilled in their childhood:

“...what drove me to have my business the way I run it now as more of a sustainable option is really just how I grew up and what interested me in my business. The main focus of my business is Earth...”

CL2 expressed a similar feeling that eco-centric behaviour was part of their core values by stating:

“I wanted to dedicate myself to helping reduce and even eliminate the impacts of humanity on the planet and help regenerate things so um, pretty heavily ingrained in what makes me, me I guess could say.”

NGO4 added onto this affinity for nature as part of their life, who said,

“I mean I’ve always been really interested in sustainability like I love being outside I go camping every year, I go backpacking, I hike, I live on a farm, you know it’s just always been something that’s important to me, you know taking care of the planet so naturally it was great to be able to find a job that fit within that.”

Additionally, NGO2 felt the connection to the Earth had given them a purpose to adopt a simple life, expressed when they said:

“I think the main reason is uh simplicity living I think that you know when we’re connected to the Earth, and we’re connected to how we move around the Earth that I think that it gives us a better personal understanding and it actually in the long run makes our lives a little bit easier and in the long run a lot more efficient.”

PC1 shared that their eco-centric attitude is recent, associated with becoming a parent. They described:

“And then also it’s like wanting to preserve the earth and make a better place for them. All of a sudden, I’m invested I have these tiny humans that are going to grow up in this world. So, I want to protect it and make it the best place for them too so.”

In comparison, anthropocentric motivations included the availability of second-hand items and cost-saving. For example, BI4 noted two reasons for their anthropocentric attitude, the first as:

“Although it may have been born out of my economic situation, I have always been aware and supported environmental movements.”

BI4 added:

“Secondly, I loved second hand. Over the years I had become a little obsessed with resale. I loved it.”

On a similar note, informant BI3’s upbringing fostered their attitude:

“...well I’ve always been in sewing, I was even thinking back when I was in high school um my family was kind of poor so my mom, we would buy clothing from the second-hand store but I would actually sew it by hand”.

Elsewhere, PC1 speculated that

“... a lot of members in our neighbourhood group, like the motivating factor is probably to save money.”

Informants who described eco-centric attitudes included formal (BI2, CL2) and informal (NGO2, NGO4, PC1) informants. Some shared upbringings or hobbies where they built a connection to nature (BI2, CL2, NGO4, NGO2), while PC1 had a shift to an eco-centric attitude later in life from parenthood. Informants with a more attitude included formal informants (BI3, BI4) and one informal informant (PC1) who identified the lower cost of second-hand items as a driver for people in informal communities.

5.2. Influence of employment experience on CE participation

As in the discussion of employees in their current role, informants were asked about their current workplace and the role of the community, the organization's contribution to sustainability, and barriers their organization faced to scaling up existing CE efforts.

5.2.1. The Role of Community in the Workplace

Informants were asked if they felt a sense of community amongst their co-workers or customers, where community refers to a shared sense of values/goals. Within The City of London, workers (CL1 and CL2) identified that the large nature of the City organization fluctuates in the sense of community. CL2 said briefly:

“[The s]ense of community varies by area”.

CL1 however articulated a stronger sense of community, stating:

“I think one thing is pretty common amongst employees at the city. I mean we’re all focused on serving Londoners and you know despite the fact that every four years we’ve got new councillors and mandates can shift, and priorities can shift, you know the bottom line is, everybody is really focused on creating the best city that they can. So, I think that in itself sort of provides a sense of comradery and community amongst people.”

Informants in the NGO group all felt a sense of community within their team, such as NGO1, who expressed:

“...we have a really good work culture, so like on the education side of the organization we’re everyone is like really passionate about what they do, it’s not just a like job for them but what they’re passionate about like they want to be doing”.

NGO2 shared this view, saying:

“I think that there’s a really strong sense of community both internally and externally with other partners.” Adding “you know what I enjoy the most is the sense of community, you know that we you know this is such a good weird place to work”.

NGO3 added:

“I definitely feel such a great sense of community... we’re a really young team, we’re pretty much all under 20 so you know that does definitely add to the comradery and everything”.

Informants who worked in a public-facing role and interacted with volunteers shared positive experiences. NGO4 talked about their positive experience and gratitude for their volunteers, who noted:

“These are really keen people okay; I cannot stress they have taken time out of their own lives to help the world and that’s wonderful.”

NGO2 echoed the sentiment of positive experience with participants, stating:

“I’m always so um impressed by the sharing of knowledge and the determination of our participants”.

Business informants who work as team members (BP1, BP2, BP4) also reported feeling a sense of community among employees. BI3 has a larger number of staff employed during the busy season, but during the interview, it was limited to a few core members. BI3 shared the following:

“Yeah, definitely... we have fun when we’re here...my goal is to pass the trade onto young people so that’s why I train young people to give them the skills that um I had when I was their age that have carried me throughout my life.”

BI4 added:

“I employ other women who love their jobs (so they say, to their boss). However, the retention rate shows we are doing something right.”

A sense of community had also been established between customers and business owners for some businesses, as shown by this key quote from BI1:

“I have had [customers], because I’ve done a couple little pop-up markets and that sort of thing who are just very keen on the idea of pre-loved or vintage specifically and they’ll seek me out just for that reason often that gets into stories, storytelling as to why they chose that or why I chose this avenue so I think it’s good I think there’s definitely some unique connections I’m able to make with um them.”

Informant BI4 likewise expressed their feeling of community with their customer base; they stated:

“The sense of community is tangible. I started hearing this from our supporters.”

Informants engaged in the informal CE sphere (NGO1, NGO2, and NGO3) talked about their positive experiences with the community in their workplace, where coworkers shared a passion for environmental issues. Informants in public-facing roles mentioned their appreciation for their volunteers and participants (NGO2, NGO4). Formal informants with The City (CL1, CL2) shared different views, with CL1 emphasizing the varied level of the community depending on the team, and CL2 shared most workers are united through their missions to “serv[e] Londoners.” Business informants felt a sense of community among coworkers through creating a good workplace culture (BI3, BI4) and training young employees (BI3).

5.2.2. Contributions to the Local Urban CE

Informants were asked to identify and review their organization's contributions to the local CE, which included economic contributions, capacity building, climate action, and expanding CE markets. Supporting local and small businesses contributes revenue to the local economy, as stated by BI1:

"...part of it too is I am a small local business in London and um not a chain so just the mere act of buying from me does support a local family..."

This was echoed by BI3 when they said,

"I'm happy that it's going to be sustaining our economy..."

BI4 added on to the significance of economic contributions, saying:

"...pay a living wage according to the London ON numbers..."

Businesses were also working to expand the current CE market, as highlighted by BI1:

"...we really wanted to offer something different to the London market, something that would offer people the option of pre-loved...but also vintage..."

BI4 is reaching markets beyond London, ON; specifically:

"Our business is reaching consumers in other cities and towns across Canada, as we do ship..."

All business informants mentioned their use of sustainable materials and practices. For example, BI1 noted:

"I'm able to kind of support those sellers that way by buying their product and then I also work with a seamstress um who if the gown needs updating or repairs...I guess there's, talking about Circular Economy, I think I'm kind of supporting a number of people along the way..."

BI2 conversely remarked that:

“...for them [customers] locally, ethically [sourced material] that is also really important, but I think that is secondary to the spiritual qualities for most of my customers.”

BI2 also noted the collaborative nature of their business working with other local businesses to distribute their product, having said:

“I’m reaching out to other businesses now to sell my jewelry in those businesses...”

BI3 provided an example of their circular practices; having explained that

“we were doing manufacturing with some uh like some fleece for some outerwear and we really kept a lot of our scraps especially some of the bigger ones and we would keep them and find people who wanted our scraps...”

Like BI3, BI4 recirculates their materials through donations, as exemplified by the following interview excerpt:

“We offer to donate what we don’t select to Mission Services of London [MSL]. MSL has stated to us that almost everything that we donate gets used...”

In contrast to business informants, City-affiliated informants identified climate action as their most significant contribution to the CE. Climate action refers to taking steps to combat climate change and its related impacts⁸⁷. As stated by CL2:

“I sort of pivoted to focus entirely on uh, climate action.”

CL1 communicated their role within the realm of climate action as follows:

⁸⁷ https://www.globalgoals.org/goals/13-climate-action/?gad_source=1&gclid=CjwKCAiA-P-rBhBEEiwAQEXhHz1zGpoNW-PC-C0nUqqEXAkHMKkjVgCSPTXVbeGkZGIJWwgZcBQDDBoCDL0QAuD_BwE

“My area includes staff, actions, projects and programs in the areas of climate change, environmental, waste management...”

In further contrast, NGO informants identified their contributions to consist of implementing use of various sustainable materials (recycled, repurposed) or practices (composting, donating, preserving food) into their programs/services. NGO2 explained:

“...other agriculture organizations, they’re always blown away by the amount of products we reused... we even recycle our compost which has already been recycled...”

NGO3 also recycles material to make new products, as they explained:

“...we design based on excess so we design a lot with quilts and bedding...”

NGO4 instead focuses on sustainable practices around food:

“...you get a lot of food waste excuse me compost out of them so a lot of it can’t go straight to the foodbanks but one of my old chefs has volunteered to do some canning for us...”

NGO informants also focused on collaborations with educational institutions and local businesses to expand the reach and impact of their work. NGO3 explained the collaborative nature of businesses, stating:

“...it will end up either online, one of our pop-ups, one of our retailers- our B2B clients um and then it will go on to its second life...”

NGO3 added their collaborations with educational institutions, adding that they were:

“...also partnering with post-secondary institutions so we work with Fanshawe [college] and Western [University.]”

NGO1 conversely partners with organizations in the NGO space:

“[Our organization] is focused on like cooperating and collaborating as people that might see us competitors like we have all the programs that we’re planning and piloting with partners and we’re so transparent with them...”

Similarly, NGO4 partners with other NGOs as well:

“...we set it up so that...[1/3 of produce goes] to a charity food bank or wherever and give aways and whatever around town.”

As does NGO2, who said,

“I think one of the strengths of the organization is not only do we have a lot of services under our umbrella, but we also love to partner with other organizations...”

Businesses and NGOs overlap in their contributions to the CE through sustainable practices, materials used to create products or programs (BI1, BI2, BI3, BI4, NGO2, NGO3, NGO4), and their collaboration with local businesses (BI2, NGO1, NGO3). NGOs (NGO1, NGO2, NGO3, NGO4) and the City. City-affiliated informants (CL1, CL2) enact climate action through programs and partnerships. Formal sphere informants (businesses) primarily identified their contribution to the local CE as consisting of generating revenue for the local economy and expanding the current CE market. Meanwhile, the City focuses on providing climate action through policies. Informal informants (NGOs) frequently collaborate on programs, studies, and partnerships with local educational institutions.

5.2.3. Barriers to Scaling up Existing CE Efforts

As the interviews progressed, informants were asked about barriers to scaling up their organization's existing programs or contributions to the CE. While informants detailed how their businesses and organizations contributed to building the local CE, interviewees also identified barriers to their full participation in the local area CE, which limited the growth of the CE in London, ON. Business informants expressed cost-related barriers and competition as two of the most prominent issues. For example, BI1 stated:

“I wanted to make something in Canada I would pay astronomical fees and levies and import taxes to bring that fabric out of China to make it in a Canadian factory...what I’m ...that’s why all the factories are there, that’s part of it for sure, the cheap labour one, two you can do anything you want because there’s very little government control and some of the environmental impact...”

BI2 repeated the reference to high cost when they noted:

“I’m just trying to get them Canadian made and I’m realizing it’s a lot more expensive...”

High costs associated with transportation and import taxes to make things locally hinder businesses from being able to make things domestically in Canada. In addition to these high costs, business informants identified that they were also forced to compete with other companies that 'greenwash' (companies who inflate or lie about their company's sustainability⁸⁸) and divert consumers away from legitimate, sustainable businesses. For example, informant BI1 said that:

⁸⁸ <https://dictionary.cambridge.org/dictionary/english/greenwash>

“companies have been accused of "greenwashing" their goods/services, and occasionally I feel we are guilty of this as well, based on our business model of needing both types of consumers. But my guilt is often over ridden by the fact that our services offers a solution to over consumption...”

This sentiment was reiterated by BI3:

“there are so many companies that are you can flash the Canadian or made in Canada or Canadian company but a lot- it doesn't necessarily have to be made here so it's kind of, to me its deceiving...”

In addition to greenwashing, fast fashion brands alter consumer perceptions of the value of materials or labour, a point brought up by Informant BI3. Altered consumer perceptions lead many consumers to see clothing as disposable and seek lower prices regardless of ethical or sustainable factors. For instance, BI3 reported that in this context, repair or alteration services are seen as unnecessary or overpriced by consumers; they stated:

“Yeah, yeah, and so instead of even getting a repair most people are like well I'm just going to get rid of it so they'll either throw it away or they'll send it to a second-hand store.”

BI1 added that despite wanting to source from sustainable businesses, cost and visibility can impact a consumer's decision:

Informants from NGOs expressed various barriers, such as competing voices, funding, consumption patterns, and staffing issues. NGO3 pointed to the need to reinvent how information is presented to people and compete for attention, describing:

“...when you think about blog writing it is like kind of a bit passe, people aren't really looking for that so it's like how do we make it more digestible? how do we move it onto social media? Um how do we add visuals into it again to make it more digestible? This is something that we're constantly grappling with.”

NGO1, NGO2, and NGO3 shared the barriers to funding which impact each organization. For NGO1, these barriers were:

“...from funders I think just more consistent like stable funding...”

NGO2 shared this feeling when they stated:

“Yeah, 100% it's funding to be able to compete with larger ... companies you know on things ... being a non-profit you know our budgets are very tight...”

NGO3 meanwhile mentioned the strict requirements put in place by funders. They specifically mentioned that:

“...we get our transportation written in as for milage for cars I would rather that they were writing in, the funders accepting things like bus passes for the staff to utilize and also more active transportation.”

Consumption patterns impacted NGO3, who expressed that despite a business's best efforts, not all second-hand items or waste can be repurposed or re-sold, which can pressure smaller businesses or NGOs dealing with second-hand items. Informant NGO3 is quoted as saying:

"I think that we're like kind of like one of the leaders in this in the City at the moment I think that kind of like being based in donated goods/ retail, you do- we do take on the

burden that everyone is consuming and so it's sort of like how to most responsibly deal with that...".

In addition, staffing problems are prominent in smaller organizations, as seen in comments made by NGO4, who stated:

"I'm trying to get someone help me organize the other aspect of it you know just constantly staying on uh different sites...".

The City of London faced the issue of competing for resident's attention. CL2 for instance highlighted that:

"There's the City of London branding and everything else, it lands differently than messaging from a community board or community drive organization like LEN, Urban League or others...".

CL2 added,

"You know those sorts of old-school methods of community engagement and communication are much less prevalent now, so that's something that makes it pretty challenging."

Business, NGOs, and City informants identified a common barrier to scaling up CE efforts: competition for resident/consumer attention for different reasons. These informants indicated that the City, NGOs, and businesses were attempting to gain attention from Londoners to inform them of environmental resources/stores available. In service of this goal, informants indicated that the City and NGOs offered environmental programs, education, or products. In comparison, informants indicated that CE businesses tried to compete with other non-CE-related

businesses. Some sectors (NGOs and The City) were competing with other organizations on equally important causes such as social causes (ex., homelessness, youth services, addiction recovery); or, in the case of The City, competing with other departments in their organization on other priority areas.

While consumption patterns were an issue for both formal informants (BI1, BI3) and an informal informant (NGO3), consumption directly impacts how consumers value items, typically seeking out high amounts of low-cost/low-quality items, leading to an increased number of items sent to second-hand markets. Money was a shared struggle for formal (businesses) and informal (NGOs) informants in different ways. Businesses were burdened with an increased cost of creating products in Canada, and NGOs faced a similar battle of limited funding or strict guidelines from funding bodies. Both businesses and NGOs rely on an external population to provide them money to continue operating, whether it be consumers or funding agencies (which includes The City).

5.3. Perceptions of environmental literacy in London, ON

Informants (aside from PC1) were asked if they agreed that London residents have the tools or resources necessary to increase their environmental literacy or knowledge to support a flourishing local CE. Examples of resources included environmental events, alternatives to the linear economy, and community-based programs. Examples of 'tools' included environmental education/information, active transportation (buses, bikes, pedestrian paths), and incentive-based environmental programs. The majority of informants (n=6) stated that they agreed, with others agreeing partially (n=3), and one informant was unsure (NGO1).

The informants who agreed included BI2, BI3, CL1, CL2, NGO2, and NGO4. For instance, informant BI3 said:

“I do, um I think because um with the internet and the news and everything and everyone has their phone in their hand and they’re looking at it, I think it’s more the amount of how much work they want to put into it.”

CL1 added that:

“...residents of London [have] many existing tools through the City and other organizations to help with sustainability, climate change, etc.”

CL2 shared a similar view:

“I don’t think there’s any shortage of tools or information. Um, I think it’s more about capturing people’s attention. Um you know we’re living in a really busy time, um, and I think the way that our society has developed is really one that allows people without even realizing perhaps but to be pretty isolated in the information they consume.”

On a similar note, NGO4 stated:

“Well, it’s all out there and all you have to do is find it, even if all you’re on is Facebook there’s a million people you can ask, and they’ll direct you. The information’s out there, it’s out there more than it ever has been, it’s kind of frustrating because the world is on fire and now people are curious.”

NGO2 however focused their response more on transportation, they mentioned:

“I absolutely think so uh I think that I guess the simple answer um you know I think there’s a divide of people being car-centric or living you know on the far from the core of the city there’s that little bit of a learning curve, but I think there’s simplicity in that you know the joy that goes with that, I think that’s so valuable.”

These informants (BI3, CL1, CL2, NGO2, NGO4) believed it was up to Londoners to seek out environmental information and adjust their lifestyle accordingly, as there are ample resources and tools for individuals. BI2 had a different opinion, however. They instead said:

“For sure, um I’m a big believer that sustainability is like, I think it should be more looked at from bigger corporations like I think it’s more their responsibility more than the individual but that doesn’t mean that we don’t try, we don’t need to be ethical, um as far as like how accessible it is...”

Informants who partially agreed that Londoners have the required knowledge and resources included BI1, BP4, and NGO3. BI4 reiterated a similar feeling to those who believed there were enough existing tools and resources for Londoners to enhance their environmental knowledge and sustainable behaviour. Specifically, BI4 thought:

“Yes and no. The information is out there, it is promoted by companies and media every day.”

Informant BI1 responded similarly:

“Yes and no I would say. I think those who have any inclination seek it and it’s there I’m not sure how much their sort of is a push...there’s a whole pile of initiatives but uh and I think there would be some converts who are unaware who are now aware...I don’t know uh personally like I feel I know exactly where to look so it’s a tough question for me to look outside because I’m pretty plugged into all of that...”

Both business informants BI1 and BI4 partially agreed and believed that environmental educational resources are out there, but BI1 added they thought most interested people would

seek it out, like themselves. In contrast, others ignore environmental education or resources, the public need to be more connected to the environmental community. NGO3 specified that this information is in direct competition with a consumer culture that encourages excess consumption through various mediums:

“Um I think partially, I think there are like, one of the best I went to this year was EarthFest, there are like open resources especially places the public can access like libraries, like free resources I think the problem is you know on the other side we’re also having these like consumption is just constantly pushed in our faces so it’s so easy to like push away all the environmental stuff because consumption is so tempting...”

The sole informant who was unsure about environmental literacy slightly disagreed and emphasized that there needed to be more environmental resources for Londoners rather than more tools/information. As NGO1 said,

“I don’t know; I feel like there could be a lot more tools and resources for everyone in general. Like there’s certain things, like we don’t have like a city-wide compost project or um like and even though we’ve done a lot of work trying to get bus rapid transit and stuff, the transit system isn’t that great which makes people have to drive and go in vehicles and stuff so there are and there’s not good, like good bike lanes through the city, they’re very chopped up um and people don’t feel safe on them so there’s definitely like areas where there’s room for improvement.”

This question prompted a discussion that showed informants being more divided than on previous topics. Some formal sphere informants (businesses) felt there were existing resources

despite their different responses (yes and partially) to the question of environmental resources and tools to increase environmental knowledge and sustainable behaviour. BI2 was the only one who expressed that the responsibility for the CE should be placed on big corporations rather than on individual citizens, while BI1, BI3, and BI4 believed it was the individual's responsibility. The City informants (CL1, CL2) shared the views of business (BI1, BI3, BI4), where individuals have ample environmental tools and resources to further their environmental knowledge and behaviour.

Informal informants (NGOs) were the most divided group, with NGO2 and NGO4 aligning beliefs with the city where plenty of environmental resources and tools are available to Londoners. NGO3 partially agreed (aligned with BI1 and BI4) but brought up the prevalence of an excessive consumption culture. NGO1 deviated from these two categories (agree and partially agree) by disagreeing and instead stating there could be more tools from the city that reinforce environmentally friendly behaviour, like active transportation or composting programs.

5.4. Power and influence

Informants were asked to rank a list of four stakeholders (London residents, businesses, NGOs, and the City of London) from most to least powerful or influential in terms of that stakeholders' ability to create environmental action or change towards a strong London area CE. After giving their ranking, informants were asked what changes any of these stakeholder groups should make. Some informants chose to focus on the most powerful. The changes or suggestions they gave did not always reflect the informants' employment; many focussed on personal areas of concern. In this chapter, only relevant suggestions have been included for discussion.

5.4.1. Top-Down Views and Suggestions

Most informants (n=7) viewed power related to environmental action or change flowing from a top-down perspective (BI2, BI3, BI4, NGO1, NGO3, NGO4, and PC1). These informants identified The City as the most powerful or influential, followed by mid-tier stakeholders such as businesses or NGOs, and Londoners as the least powerful or effective. For example, BI4 ignored NGOs in their ranking and claimed:

“Governments passing legislation forcing growers/manufacturers to make the changes and hold them responsible for their pollution and consumption of resources. Then large companies. Then the consumer, who although, we vote with our wallet, it is hard to feed your family and not purchase things packaged in irresponsible ways. Consumers adapt, but some of us need to be forced to change.”

PC1 reported a similar ranking as BI4, stating:

“I think Londoners are last ha-ha. I would say probably the City first, and then businesses, then NGOs, then Londoners.”

BI3 likewise ranked:

“... the City of London first, um I’m going to put uh I’ll put business next because businesses tend to have a lot more garbage so that’s going to determine a lot to, they have more influence on when things are picked up and things like that... non-government organizations and then Londoners...”

NGO3 also followed this ranking, adding:

“...number 1 is the City of London that they have the potential to do the most change it’s more difficult than that so I would still put them at number 1. Probably businesses at number 2 and that really does include like chains and big box stores, and then 3 would be

non-profits, and 4 would be Londoners but I do think Londoners have a lot of power if everybody comes together so, but it's harder said than done."

BI2 ranked these groups slightly differently:

"I would say City of London, and then I guess non-government, business, then Londoners..."

NGO4 had initially ranked Londoners first, but then changed their ranking to position the City of London first, itemizing them as follows:

"...in terms of numbers the people if they do it, and in terms of power the government... Non-government of course any of the organizations dedicated to sustainability um eco-viability are going to have a huge impact... we can't change laws, we can't remove funding from gas & oil and then the middle layer is NGOs, like I said businesses I don't think they're that effective at all..."

NGO1 also reported a slightly different ranking of stakeholders than other informants who held a top-down perspective of power for sustainable influence and change. Differing from the previous classification identified NGOs as the most powerful or influential but important, NGO1 said,

"I would say NGO as the highest because I feel like we're like the front-line workers and we actually do the work um and then I would say City of London would be like the top... I would say Londoners and then businesses after that because I feel like businesses depending on what the business is, like typically they have their profit margins first and then they might have like some corporate social responsibility or some environmental focus like as a, as a like a buried 5% of what they do or 1% of what they do."

These top-down rankings of power place municipal government, organizations and businesses above individuals or citizens (Londoners) – a ranking scheme identified across both formal and informal sphere actors. Suggestions for improving the London, ON CE ranged from policies and regulations to transportation and housing. Informants suggested necessary changes from all stakeholders, with most of their suggestions directed towards the City, reflecting the overwhelming positioning of the City at the top of the hierarchy of ability to enact change. This was expressed by Informant NGO3 when they said:

“...well for sure I would love to see bans on a number of things um but I know that it doesn't go along like we can't jump too far ahead the rest of the world and the rest of Canada...put bans or restrictions on the type of businesses that they're allowing to move in, on you know the individuals who are building you know new homes and subdivisions, putting more restrictions of protecting land um and building more in like the downtown core rather than constant urban sprawl um yeah I just think that there's a lot more control and power that needs to be exercised...”

Meanwhile, BI4 advised that they:

“...would like to see laws made to promote environmentally friendly packaging. I would like to see timelier shift from fossil fuels to clean energy, by investing in training people to work in clean energy jobs...”

Elsewhere, Informant NGO1 indicated that:

“...we've done a lot of work trying to get bus rapid transit and stuff, the transit system isn't that great which makes people have to drive and go in vehicles... like good bike

lanes through the city, they're very chopped up um and people don't feel safe on them...".

NGO1 added:

"They [the City of London] could definitely do more but I don't know exactly what that more would be kind of like stepping out of the way and letting, letting like-letting the not-for-profits that like specialize in certain areas and do more with- and not be so restricted...".

Informant NGO1 also suggested that,

"[The] City of London [should create] funding for business to make environmental changes...".

When asked, NGO4 suggested:

"[a]t the City level they could definitely do better that they talk one line at the end of the government at one end of the City and one end of the City is the actual opposite."

NGO4 also went on to suggest changes to responsibilities among City employees:

"The rest of the stuff that takes generations, that takes decades that should go to city staff, dedicated city staff with no interference, you know it should be a collaboration...".

Informants also described several changes businesses could take. NGO4 offered the following suggestion:

"...you can encourage the business you go to be more sustainable and...get their business online...".

Also focussing on business actions, NGO3 declared:

“I would love to see businesses like obviously become more accountable in terms of sustainability, that they’re not just pushing ultra-consumable products that you use once, you know that they have like a more rounded circular approach...”

Informants also mentioned that Londoners should take on increased accountability and responsibility for their environmentally conscious behaviours. NGO1 specifically thought that:

“... there’s thousands and thousands of people in London so if they made changes in their life like all of that could add up to more than what one not-for-profits could do...”

Informant NGO4 asserted:

“Um Londoners need to step up to the plate, they need to stop thinking about their own needs and their own turf.”

BI4 added a more detailed explanation, stating that individuals:

“...trying to make a difference, but staying vocal, writing letters and voting with our wallets can make a difference.”

In contrast, BI2 suggested action toward reducing packaging needed to be implemented across all stakeholders:

“I don’t know if this is City of London, non-government, business, business probably all three like for me I would think packaging is a big one.”

Informal (NGO1 NGO4) and formal (BI4) sphere informants suggested changes from Londoners in behavioural and lifestyle shifts to adopt more environmentally conscious behaviours. Most of the proposed changes were aimed at The City across formal (BI3, BI4) and informal informants (NGO1, NGO3, NGO4), with no two suggestions overlapping. Formal (BI3)

and informal (NGO1, NGO4) informants addressed Londoners and the environmental changes they need to make on the individual level to a more environmentally conscious lifestyle.

Informal sphere informants' (NGO1, NGO3) suggestions towards businesses aligned with their need to increase accountability or sustainability to increase the circulation of products or as a business model. Formal sphere informant BI2 was also the only informant to suggest a change across stakeholders to reduce packaging and packaging waste.

5.4.2. Bottom-Up views and Suggestions

A smaller number of informants (n=4), including CL1, CL2, BI1, and NGO2, identified a bottom-up perception of power to enact change amongst CE stakeholders. As BI1 said,

“I’d have to say its Londoners, and non-government, so that would be like um Reforest London, I think they’re, that would be maybe number two. I think business and the city would be at number three at tied...”

CL2 reordered the ranking slightly differently:

“Londoners at the top because ultimately the City of London is here to serve Londoners...I would say businesses are a pretty close second to Londoners...The City [then] NGOs” CL2 added “the City of London is sort of an execution stakeholder...”

NGO2 shared the same ranking:

“Londoners would be number 1 for most then I’m going to go to um businesses and then I’m going to say um the City of London and then Non-government organizations.”

CL1 provided a different ranking with an added stakeholder group, detailing:

“#1 Municipal Champions; either an individual name that is recognizable or a business that is recognizable[,] #2 Londoners and Businesses[,] #3 City of London (because of the reach)[,] #4 Non-government organizations (because of less reach)...”.

In this bottom-up perception, London residents were considered the most powerful or influential stakeholder to enact positive environmental change. Yet the bottom-up rankings, which had London residents as having the most power in growing the CE, did not follow a clear pattern of mid-tier and bottom stakeholders, with a mixture of business, NGO, and the City being interchanged as mid-tier and least powerful or influential. Yet despite identifying bottom-up power and influence, these informants also suggested changes primarily directed toward the City and, to a lesser extent, London residents and all stakeholders. NGO2 offered multiple suggestions, including,

“...a bicycle sharing program would be in the city which would be great, but I also wonder if we look at that cost and we were able to offer rebates to the citizens of London...”.

NGO2 further added:

“I also think if we could um loosen the city bylaws on growing healthy food for sale almost like a farm gate model that would uh would be another incentive there...”.

Elsewhere, BI1 offered suggestions for preserving greenspace, stating:

“I’m like you’re tearing down heritage buildings to put up these big skyscrapers when there’s all these open parking lots, surface parking lots which are the worst for community building and safety even... all through downtown like there’s tens of

thousands of square feet that are just sitting there barren basically and here we are taking green space or heritage stock out of the play to put up something else.”

CL1 noted that visibility, or lack of visibility, of responsibilities for stakeholders was an issue for stakeholders not addressed in the Climate Emergency Action Plan as only a few changes have been suggested to stakeholders including The City, Londoners, and NGOs. CL1 said:

“London does not have many in this category that are visible. The word visible is key. CEAP will hopefully change some of this.”

CL1 and CL2 both indicated that Londoners should continue making voluntary lifestyle changes that help shift consumer behaviour. CL1 specified that:

“...all ages - need to adjust their lifestyles before it is too late and governments are forced to regulate actions.”

CL2 affirmed this stance, stating:

“Oh yeah, I mean of course yeah there’s always things that the individuals can, that an individual can do, to uh, reduce their environmental footprint and send signals to the markets”.

CL2 also believed environmentally positive changes should be made across stakeholder groups, including included markets and policy, noting:

“I don’t want it to sound like you know it’s on the individuals to make [the only] changes needed...you know individuals are subjected to, uh, the whims or directions that markets have taken um, based on policy and regulation.”

Among informants who suggested changes for the City of London, formal (BI1, CL1) and informal (NGO2) informants raised various issues, including food, transportation, housing, and regulations for other stakeholders. Only formal informants made recommendations targeted at London residents (CL1, CL2) and across stakeholder groups (CL1).

5.5. Implications for formality and informality in the London, ON CE

Formal and informal sphere informants share more similarities than differences in terms of how they relate to and engage with the local London, ON, CE. Amongst those similarities are post-secondary education as a motivating factor combined with personal interests to further their career or obtain a career in the CE, specifically amongst City-affiliated and NGO informants (NGO1, NGO3). In addition, both formal (BI1, BI4) and informal (NGO4) informants have pursued a late career change to the CE or CE-related field. Formal (BI4, CL1, CL2) and informal (PC1) informants shared similar shopping habits and consumption patterns through garment sharing or ethical consumption. Formal (BI1, BI3) and informal (PC1) informants also reported having been influenced by their families to adopt more environmentally conscious habits in their household. Informants from these two groups also identified noticing the behavioural shift of the public to accept sustainable shopping habits in the retail sector (BI1, BI3, BI3, NGO3). The majority of informants, whether engaged with formal (BI2, CL2) or informal (NGO2, NGO4, PC1) CE spheres, are driven by eco-centric attitudes, with a few formal (BI3, BI4) and informal (PC1) informants being driven by anthropocentric attitudes. In the case of PC1, their environmental attitude is eco-centric, but they but identified anthropocentric motivations for other informal stakeholders' part of the same informal social media groups. The younger

demographic of workers across informal (NGO3) and formal (BI3) CE sphere informants contributed to workers' sense of community or shared life stage experience.

Across the formal (BI1, BI2, BI3, BI4) and informal (NGO2, NGO3, NGO4) CE spheres, informants use sustainable materials and practices, collaborate with local businesses (BI2, NGO1, NGO3), and offer programs for the public to sustain the local CE (CL1, CL2, NGO1, NGO2, NGO3, NGO4). Similarly, formal (CL2, BI1, BI3) and informal (NGO3) informants face shared barriers related to competing for attention from residents, whether it's for business, education, or helping further the CE in general. In addition, they reported being limited by financial barriers such as revenue or funding to keep operating (BI1, BI3, NGO1, NGO2, NGO3). These shared views extended to the existing environmental resources and tools for London residents, where informants expressed belief that it is up to individuals to adjust their behaviour and lifestyle to be more environmentally conscious because there is no shortage of information available on how to do so (CL1, CL2, BI1, BI3, BI4, NGO2, NGO3, NGO4). Informants (BI3, BI4, NGO1, NGO3, NGO4) who have a top-down view of power and influence for stakeholders to make environmental changes directed their suggestions at the City of London, highlighting policies centred on bans related to zoning/construction, conservation efforts, packaging regulations, mandated use of clean energy, incentives for businesses to increase environmental behaviours, waste collection and delegation of power to NGOs. In addition, these informants expressed wanting the City to address transportation sustainability through its bike lanes and increase public transit. Similarly, formal (CI1, CL1, CL2) and informal (NGO2) sphere informants who shared bottom-up views of power to enact change of environmental efforts or changes also focused most recommendations on the City in similar areas such as transportation (bike sharing) and creating more green spaces.

While there were many similarities, the formal and informal sphere informants also differed on numerous opinions. Some formal sphere informants (BI2, BI3) entered employment without a post-secondary education. The sense of community in informants' workplaces was built on the company culture, training opportunities, and united goals (CL2, NI3, BI4). Furthermore, formal (BI1, BI3, BI4) informants' workplaces were focused on making economic contributions to the CE and expanding the existing market for products in London, ON. When assessing the available environmental tools and resources for London residents to adopt CE materials and practices, BI2 was the sole informant to suggest large businesses should have a larger responsibility than individuals, and suggested packaging should be addressed across all stakeholder sectors despite having a top-down view of power to enact positive environmental change. The formal informant (CL1) who expressed a bottom-up perception of power also suggested the changes do not rely on one stakeholder group (e.g., London residents) but should be distributed among stakeholders.

Informal sphere informants differed amongst themselves in fewer respects than their formal counterparts. More specifically, informal informants (NGO1, NGO4, PC1) targeted their sustainable behaviour around food through practices like composting, gardening, and cooking from scratch or making homemade meals as much as possible. When discussing their environmental insights, informal sphere informants (NGO1, NGO2, NGO3) mentioned the community or connectivity associated with environmental movements. Informal sphere informants (NGO1, NGO2, NGO3) discussed their workplace culture, describing the positive experiences through shared passion and appreciation for members of the external community, such as volunteers (NGO2, NGO4). Informal informant NGO3 collaborated with educational institutions, something that formal informants did not mention. The sole informant) to identify a

lack of environmental resources was NGO1. Of those informal informants (NGO3, NGO4) who viewed the power to implement positive environmental changes as a top-down structure addressed the responsibility of businesses to be more sustainable.

Both informal and informal CE sphere informants' insights surrounding stakeholder action and changes centred less on informal changes at the individual level, converging on formal policies at the level of the City of London, even for those who understood the power to enact change for the local urban CE from a bottom-up perspective. Echoing established findings in the CE literatures on developed countries (Hidalgo et al., 2019; Malinauskaite et al., 2017; van Langen et al., 2021), the focus of my study's informants' suggestions for stakeholder engagement was on formal actors and activities and largely ignored or minimized the role of informal actors, with informants – including those active in the informal CE – reporting CE or CE-related practices as best enacted through formal policies and actors; in the case of this study, the City of London. Despite literature on regional and municipal CE studies suggesting a bottom-up approach as favourable for the urban scale (Kiss et al., 2015; Bengtsson et al., 2018), the informants' dominant perception of a top-down power structure aligns with van Langen's (2021) findings that proximity to the CE can skew power structures to view the CE through a socio-economic lens, ignoring the possible environmental benefits. The City of London workers (CL1 and CL2) had the most extensive knowledge of municipal governance and CE knowledge compared to the other informants, and this may be what led to their bottom-up power perceptions.

Although my study's informants may be classified as participating largely in either the informal or formal sectors of the London CE, this did not stop them from mentioning the other sphere. Even though the network analysis of inventoried CE events, actors, and organization

(Chapter 4) shows that there is a pronounced disconnection between the formal and informal sectors of the London, ON CE, qualitative interviews with informants in the local CE nuance this picture by identifying instances and areas of cross-pollination and collaboration across the formal-informal continuum, this analysis addressed my second research question through conversations with key stakeholders to understand their motivations for participation in the CE (work and personal), initiatives led by these stakeholders, and opportunities to participate. This was particularly true of formal sphere informants. For example, informants involved with a formal business, such as BI3, brought up informal events in their comments and volunteered their time and expertise to an informal CE event (repair cafe). Additionally, many formal informants (BI1 and BI4) were also highly involved in the larger environmental community outside their work in their personal lives through informal means (volunteering and behaviours). Conversely, informal informants - those employed with NGOs (NGO1, NGO2, NGO3, NGO4) - largely discussed their work in the informal CE sector and, less so, CE behaviours in their personal lives.

Chapter 6

6. Conclusion

This chapter summarizes the key research findings as they relate to the two research questions, and identifies the interconnections of the two empirical chapters. Next, this chapter identifies the contributions of the study and its limitations. It finishes with a discussion of opportunities for future research and policy recommendations aimed at the local urban Circular Economy (CE) in London, ON. This study linked informal CE activities to urban space by inventorying formal and informal CE stakeholders and events in London, ON, and then subjecting the inventory entries to exploratory visualization and network analysis to identify the extent and interconnections between formal and informal spheres of the London, ON CE. This research explored and explained the social dimensions of the CE through the lens of informality and the role of different stakeholder groups. Based on a qualitative and quantitative analysis of the formal-informal CE continuum, a visualization (**Figure 4.3.**) of this network shows the growth of each CE network (formal and informal, respectively) is directly dependent on the level of interconnections required for continued growth.

Based on the structural compositions of the London, ON CE, the formal CE network is smaller but contains a higher level of interconnections than the informal CE. The informal network is larger, less visible, less interconnected, and not densely populated. The clear disconnect between formal and informal spheres shows the uneven size of the different sectors. The formal network contains interconnections, while the informal sphere is smaller with no interconnections. Although the formal CE network is smaller than its informal counterpart, the increased connectivity level results in the perceived increase of power held by the formal CE and its actors and organizations.

Through interviews, a more nuanced understanding of the formal and informal sphere informants who shared some motivating factors for participating in the CE (education, personal habits, collaborative efforts). There was a shared perception across informal and formal informants that formal actors, specifically the City of London (“The City”), have more power regarding environmental change and influence. The formal informants had a higher degree of variation amongst themselves when describing the experience within their workplace, contributions to the local CE (through their work) and suggestions for stakeholders to create more positive environmental change as opposed to informal informants, whose answers were more heterogenous regarding the same issues (experience in the workplace, contributions to the local CE, and suggestions for positive environmental change). Furthermore, while the informal sector informants interviewed talked about partnerships and collaborations, various barriers to contribution (primarily monetary ones) prevent informal CE activities from growing as fast as their formal counterparts. Although the sample size (number of participants) limits the generalizability of the results, this interview-based approach offers insights that nuance the use of network diagrams and social network analysis (SNA) techniques to display and analyze the data to understand an urban CE. The visualization clearly illustrates the existing CE in London, ON, but raises questions about the type of linkages captured in the visualization as the interviews reveal that informal actors (NGOs) do focus on partnerships and collaboration which are not present in the informal CE network. The research also reveals a skewed perceptions of power within the local urban CE.

6.1. Contributions

The study builds on existing informality work in a developed country (Canada), whereas previous informality literature has come from developing countries. Much of the informal and formal CE literature discusses the two spheres as a binary, where only one sphere is of concern, and the other is ignored, such as when informality was first introduced under the "dualist" school (Lutzoni, 2016; Chen, 2005). Instead, this study adopts Brown & McGranahan's (2016) "inclusionist" framework, where the formal and informal CE spheres are part of the same system, and aims to examine the grassroots and citizen contributions to the CE on par with 'formal' contributions at the municipal scale. As such, this project highlights the need for CE research to capture the informal dimensions of the CE and pay more attention to the informal sphere rather than singularly favouring formal, macro-scale activities. Developed countries must include the informal scale when studying the CE instead of focusing solely on informal solutions, impacts, and frameworks. This research begins the work of closing this gap in CE scholarship. By encompassing the NGO sector and grassroots actors and making their contributions to urban circular economies visible in a developed country context, this research nuances understandings of 'informality' beyond how it is seen from a government or worker perspective, which typically focuses on the waste or recycling sectors. By examining a Canadian context of an urban CE, this study furthermore expands the geographical scope of existing research.

6.2. Limitations

6.2.1. Sampling Timeframe and Issues

The data collection period for the CE inventory and interview recruitment periods was limited to seven months, from September 2022 to February 2023, with a small window for

modification in August 2023. If the data collection period were 8-12 months, approximately double the number of entries could have been captured, increasing the CE inventory from the total 152 entries included. Formal entries (events and actors) were easier to identify for the CE inventory because of their visibility online, whereas informal entries were predominantly identified from two sources. In addition, there was an assumption that the actor and event nodes captured in the CE inventory were only attended by, staffed by, or served residents of London, ON. Larger actor nodes (businesses and NGOs) may serve the surrounding towns or residents who travel to London, ON, from elsewhere for their services, products, or projects.

To select informants, there was a level of subjectivity involved in determining if they fit into the CE or a CE-related role. While some informants were selected from the CE inventory, which identified their relationship to the CE, other informants were found through web searches or snowball sampling. These potential informants were thought to have a connection to the CE from the researcher's (my) perspective. Although multiple recruitment sources were utilized to recruit interview informants, several potential informants could not participate due to scheduling issues or became unresponsive when they were sent the consent forms for the study. A longer recruitment period could have led to more informants and a wider variety from the various stakeholder groups (businesses, city staff, NGOs, and private citizens).

6.2.2. Social Network Analysis Errors

In addition, a potential network sampling error assumes the resulting formal CE network and informal CE networks are undirected meaning that linkages represent a reciprocal relationship of influence and information sharing. The network density and maximum linkages possible formulas were adapted from Chung et al. (2005), who used the formulas for undirected

networks. The undirected network was assigned based on available information of linkages, but some individual linkages may in fact be directed changing the calculations. This study could be improved through increased scope:-

6.3. Direction for future research

Future studies that increase the scope and data collection period are needed to better understand the implications of this study's findings. The increased scope and timeline would yield more entries or informants (as well as a variety of informants) to increase the generalizability of the research findings. In addition, comparative studies with other mid-size or large cities building on this study's data and/or methodology would also allow researchers to build on the classification of a local CE based on the linkages, level of interconnectedness, stakeholder groups that may differ from London, ON. Differing levels of linkages of interconnectedness could tell us how to successfully increase the growth of the formal and informal spheres. Future studies should work on identifying more ways to capture a variety of informal and formal sphere actors, organizations, and events that make up local CEs. An emphasis should be placed on informal entries in the CE inventory, as they are typically less visible than their formal counterparts. To minimize any errors in the social network analysis calculations, statistical software could be used to expand the metrics used to complete the quantitative analysis of the CE networks through increased structural metrics of the CE network.

6.4. Policy Recommendations

The findings of this study show that interventions are needed to avoid stalled and fragmented growth of the urban CE in London, ON, particularly those aimed at increasing connectivity of

the informal CE network through linkages within and across the broader formal-informal CE continuum. The Climate Emergency Action Plan (CEAP) has outlined that the transition to a CE is critical to meeting the climate goals of The City; there is ample opportunity to integrate this study's findings into policies or as relevant background information where it can be developed into a program or recommendations. The study revealed that the low connectivity of the informal sphere was limiting its growth, and thereby the growth of the London, ON CE as a whole.

The low level of connectivity in the informal sphere provides an opportunity for further cross-sector growth for informal actors such as NGOs, grassroots initiatives, social media groups, and informal events. This study contributes to a deeper understanding of the CE in London, ON, where formal actors (specifically the City of London) are perceived as the most powerful in creating environmental change; this should be modified to change this perspective where all stakeholders become seen as responsible for driving positive environmental changes. Recommendations include changing messaging from the City to emphasize the distribution of responsibilities. Policy interventions for the City and other stakeholders should be aimed at increasing partnerships between formal and informal actors to increase the visibility and connectivity of the informal to the formal CE sphere through:

1. A publicly available and frequently updated directory of social media groups managed by The City or an NGO (e.g., Green Economy London, the Urban League) with deep ties to the City to raise awareness of existing resources and grassroots activities;
2. Creation of a website or wiki with resources linked to formal and informal events; and
3. Cross-promotion of city-sponsored CE and CE-related events by informal social media groups/pages.

Informants suggested CE or CE-related practices are best enacted through formal policies and actors (The City of London), which is not solely the case. Those who identified a bottom-up perspective of CE or CE-related practices and capacity for change reported that the City plays a small but important role in driving positive environmental change. However, ultimately, the responsibility falls on more than one stakeholder group where Londoners have the power to drive change if they unite in their actions.

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Appendix A

NMREB Approval Letter



Date: 26 August 2022

To: Dr Agnieszka Leszczynski

Project ID: 121229

Study Title: Formal and Informal Dimensions of the Circular Economy in London, Ontario, Canada

Short Title: Circular Economy in London, Ontario, Canada

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 09/Sept/2022

Date Approval Issued: 26/Aug/2022 12:45

REB Approval Expiry Date: 26/Aug/2023

Dear Dr Agnieszka Leszczynski

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. **All other required institutional approvals and mandated training must also be obtained prior to the conduct of the study.**

Documents Approved:

Document Name	Document Type	Document Date	Document Version
2.5. Semi Structured Interview Guide	Interview Guide	01/Aug/2022	clean
4.1.6f E-mail Script	Recruitment Materials	01/Aug/2022	clean
4.1.9f Verbal recruitment Script	Oral Script	01/Aug/2022	clean
4.1.15b Social Media Script	Recruitment Materials	01/Aug/2022	clean
5.5. Letter of Information and consent (Aug 25)	Written Consent/Assent	25/Aug/2022	clean

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Ms. Zoë Levi, Research Ethics Officer on behalf of Dr. Randal Graham, NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Appendix B

CE Semi-Structured Interview Guide for Environmental non-profits, City staff, businesses

Study Title: Formal and Informal Dimensions of the Circular Economy in London, Ontario, Canada

Name of Principal Investigator:

Dr. Agnieszka Leszczynski, Western University

Name of Interviewer:

Martha Paiz-Domingo, Western University

1. What led you to work in the [environmental, sustainable, business] field?
 - a. Have you worked outside the [environmental, sustainable, business] field, what was your experience?
2. What drew you to [organization x], your current place of employment?
 - a. Can you tell me more about your experience working at [organization x], your role, organization mission/values?
 - b. Is this [organization x] similar or comparable to your previous jobs in the [environmental, sustainable, business] field?
 - i. (*If participant has worked outside the environmental, sustainable, business field*) What is like compared to work in your other field?
 - ii. (*If participant has worked outside the environmental, sustainable, business field*) What has led to the change in fields? (ex. Salary, career trajectory/role, value in work, location, organization mission)
3. Do you feel a sense of community in [organization x] or [environmental, sustainable, business] field?
4. When interacting with other members of your organization, do the subjects of the environment and/or sustainability come up in conversation?
 - a. If so, how often would you say?
 - b. If so, how is the environment discussed? And your organization's role in fostering sustainability?
5. Do you see your organization positively contributing to local-level sustainability efforts or to boosting environmentalism in the London, ON area?
 - a. Why or why not? How so?
 - b. How does you/your organization promote/market/sell environmentally conscious activities – such as x [dependent on the organization and the interviewee's position within that organization]?
 - i. Do you find these efforts effective? Why or why not and how so?

- ii. Do people come to your organization/purchase products from you as a sustainable choice? i.e., to what extent do you think that people's own environmental consciousness influences their activities vis-à-vis your organization (business, NGO, city administration)?
 - iii. What do you feel these efforts are not addressing/where do you see them as being perhaps ineffective?
 - iv. How would you like to see these efforts/do you think these efforts could be improved and/or better supported?
6. Would you consider yourself an environmentally conscious person?
 - a. Why or why not, and how so?
 - b. What kinds of sustainability activities do you engage in on a regular basis?
7. Do you think other people have the tools/resources necessary to increase their environmental literacy and/or sustainable behaviour?
 - a. If not, how do you see the role of your organization and/or your position within that organization in promoting higher environmental literacy and/or sustainable behaviour?
8. How would you rank stakeholders in order the most powerful or influential to implement sustainable initiatives/actions?
 - a. Londoners, businesses, non-government organizations, the City of London
9. What changes would you like to see the most powerful stakeholder make?
 - a. What changes can be made at other levels?
10. Is there anyone else in your group/organization that you think it would be useful for me to contact? Would you be willing to put me in contact with them and/or be open to my mentioning that you recommended that I reach out to them for the purpose of this research?

Appendix C

CE Semi-Structured Interview Guide for Residents

Study Title: Formal and Informal Dimensions of the Circular Economy in London, Ontario, Canada

Name of Principal Investigator:

Dr. Agnieszka Leszczynski, Western University

Name of Interviewer:

Martha Paiz-Domingo, Western University

1. How long have you been a part of/participated in [group/event/activity x]?
2. What motivated you to participate in [group/event/activity x]?
 - a. Is there an element of saving money that motivates your participation?
 - b. Is there an element of environmental sustainability that motivates your participation?
 - c. Is there an element of community-building/participation that motivates your participation?
3. Do you feel a sense of community in [group/event/activity x]?
 - a. Why or why not? How so?
 - b. What role or meaning does this group have to you?
4. Would you consider yourself an environmentally conscious person?
 - a. If applicable: Do you feel you have the tools and resources necessary to increase sustainability at the local (London, ON area) level?
5. Can you think back to a time or period in your life before the [group/event/activity x], were you less sustainable/involved in sustainable behaviours?
 - a. What was different then? (ex. Resources, knowledge, access, disposable income)
 - b. What led to joining?
6. Do you see your [group/event/activity x]? positively contributing to local-level sustainability efforts or to boosting environmentalism in the London, ON area?
 - a. Why or why not? How so?
7. When interacting with other members of your [group/event/activity x]? do the subjects of the environment and/or sustainability come up in conversation?
 - a. If so, how often would you say?

- b. If so, how is the environment discussed? And your group's/organization's role in fostering sustainability?
8. What role, if any, do you think [group/event/activity x] has played in your sustainable behaviour and/or actions?
9. Where do you shop? What types of businesses do you shop from?
 - a. What are these stores like? (ex. atmosphere, experience)
10. When shopping for products like clothing and food, how important is sustainability in your decision to select a product?
 - a. Can you give some recent examples of when you have purchased a sustainable product?
 - i. How did you make your choice/decision? Was it researched in advance, or made spontaneously in the moment?
 - b. What other factors influence your decision?
11. On a scale of 1 to 10, where 1 is low and 10 is high, how important is sustainability in your decision to purchase or not purchase products?
12. In what area(s) of your life are you able to express sustainable behaviour or environmental action the most?
13. Do you believe your sustainable behaviour or environmental action directly/indirectly contributes to positive environmental change? (ex. Less waste, less plastic, diet, local product)
 - a. Do your groups activities factor into this belief? How so/why or why not?
14. Where do you get your information on products, promotions, and sales?
15. How would you rank stakeholders in order the most powerful or influential to implement sustainable initiatives/actions?
 - a. Londoners, businesses, non-government organizations, the City of London
16. What changes would you like to see the most powerful stakeholder make?
 - a. What changes can be made at other levels?
17. Is there anyone else in your group that you think it would be useful for me to contact? Would you be willing to put me in contact with them and/or be open to my mentioning that you recommended that I reach out to them for the purpose of this research?

Appendix D

Circular Economy Inventory Data

Table C1. Formal and informal event details captured in the Circular Economy (CE) inventory.

Name	Type	Description	CE Links	Sponsors	Organizer	Frequency	Formal/ Informal
Holiday Market Kick-Off	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.	Sustainable materials	Only in OEV Fridays	The Market at Western Fair District	Annually	Formal
Talbot Street Christmas Market	Market	Christmas-themed market featuring local vendors ranging from clothing to jewelry and food.	Sustainable materials, low waste		Talbot Street Church	Weekly	Informal
Tracing CareFull Paths, a project of The Coves Collective	Education/ community	Sewing circle hosted weekly and guided by an artist. The sewing circle embroiders images found in the Coves area.	Inform, behavioural shift		London Public Library	Seasonal	Informal
Home for the Holidays' Market	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.	Sustainable materials		Punk Rock Flea Market	Unknown	Formal
The Meaningful Market	Market	Market featuring local vendors who incorporate socially responsibility into their programming ranging from clothing to food.	Sustainable materials, low waste	Innovation Works	Pillar Non-profit	Unknown	Informal

The Merry Market	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.	Sustainable materials		100 Kellogs Lane	Unknown	Formal
Holly Jolly Market	Market	Holiday-themed market featuring local vendors ranging from clothing to jewelry and food.	Sustainable materials		Covent Garden Market Canada	Annually	Formal
Vintage on the Block	Market	Re-occurring market with local businesses and thrift stores who set up booths for profit but focus on second hand items including clothing and housewares.	Sustainable materials, low waste	Filthy Rebena, Dugout Vintage, Dundas Place	Vintage on the Block	Seasonal	Formal
Sip & Shop Pop-Up	Retail	Opportunity to preview Carmina collection made from sustainable material and ethically produced.	Sustainable materials, low waste, behavioural shift		Carmina Modern Essentials	Once	Formal
Winter Dung A Town	Education/ community	Event features a market, street food, games, workshops, face painting, and art demonstrations.	Low waste, behavioural shift		London Artisan Connection	Annually	Informal
London Bridal Expo	Market	Bridal Show with a variety of wedding related services and vendors.	Sustainable materials	RBC Place, Sophie's Gown Shoppe, Fresh Radio 103.1, Bridal confidential,	London Bridal Expo	Annually	Formal

				OMAC Mortgages			
Bill #23 is Bullshit March	Education/ community	Bill 23's "More Homes Built Faster" Act has raised concerns for residents impacted and calls into question environmental concerns. As a result, this protest aims to voice these concerns. With guest speaker, Sam Trosow, current Councillor for Ward 6.	Inform, behavioural shift		SOGS	Once	Informal
Bespoke Bridal Market	Market	Bridal Show with a variety of wedding related services and vendors. Focus on custom-made and local vendors related to the bride, wedding party, and guests.	Sustainable materials, behavioural shift	Bisou Bridal	Duck & Dodo	Unknown	Formal
Conservation Drainage Roundtable	Education/ community	This event includes a panel discussion, break-out sessions, and a networking opportunity. Topics of interest include saturated buffers, tile outlet wetlands, phosphorus reduction structures, and controlled drainage.	Inform, behavioural shift		Land Improvement Contractors of Ontario	Once	Informal
Repair Café	Education/ community	Run by Reimagine Co., experts are brought into the repair cafes to help repair or provide guidance on repairs. Each session is hosted by a	Reuse, repair		Reimagine Co	Monthly	Informal

		volunteer expert in their field.					
Only in OEV Fridays	Education/ community	These events feature vendors from local businesses and organizations, artists, and musicians to promote the community in Old East Village.	Sustainable materials, low waste		OEV BIA	Seasonal	Informal
Valentine's Makers Market	Market	Valentine's Day-themed market featuring local vendors ranging from clothing to jewelry and food. Event also celebrated Duck & Dodo featuring cake and raffles.	Sustainable materials		Duck & Dodo	Unknown	Formal
Punk Rock Flea Market London	Market	Pop-up market featuring local vendors who offer handmade items from clothing and housewares to food.	Sustainable materials		Punk Rock Flea Market	Seasonal	Formal
Reimagine's 2022 Eco Holiday Market	Market	Holiday-themed market featuring 20 local and package-free vendors ranging from clothing to jewelry and food. Also features community organizations.	Sustainable materials, low waste, behavioural shift	The City of London, Downtown London BIA	Reimagine Co	Annually	Formal
Old South Fall Artisan & Vendor Market	Market	Market featuring over 100 local vendors ranging from clothing to jewelry and food. Proceeds go towards	Sustainable materials, low waste		Wortley Road Public School Home and School Association	Annually	Informal

		fundraising for Wortley Road Public School.					
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Table C2. Businesses details captured in the Circular Economy (CE) inventory.

Name	Type	Description	CE Links	Formal/Informal
It's sew Katrina	Clothes/ Accessories	Online zero waste offering handmade and reusable items including cutlery pouches, sweeper covers, and gift bags.	Low waste, sustainable production, sustainable material	Formal
Bianca La Luna Boutique	Clothes/ Accessories	Handmade knits items.	Sustainable production	Formal
Welcome to Mel's Close	Clothes/ Accessories	Loungewear featuring hand-dye patterns.	Sustainable production	Formal
The Sewing Studio by Valerie Martens	Clothes/ Accessories	From designing to creating clothing items for both individuals and retailers. Previously offered alterations and tailoring.	Reuse	Formal
Carmina Modern Essentials	Clothes/ Accessories	Sustainable clothing brand that implements sustainable production made to last.	Low waste, sustainable production, sustainable material	Formal
Pixie Painthings	Clothes/ Accessories	Unique jewelry featuring local, in-season, and ethically foraged foliage and plants.	Sustainable production, sustainable material	Formal
Bisou Bridal London	Clothes/ Accessories	Offer green dresses which are vintage or pre-loved for a discounted price.	Reuse, sustainable material	Formal
J&C Sewing Contractors	Clothes/ Accessories	Offering clothing alterations and repairs.	Reuse	Formal

Ilbury + Goose	Clothes/ Accessories	This retailer sources local vendors aimed at producing items made to last.	Sustainable production	Formal
Silk Road Store	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and electronics.	Reuse	Formal
Joseph's Clothiers	Clothes/ Accessories	Formal men's apparel with an option for rentals.	Reuse	Formal
The Retro Bag Canada	Clothes/ Accessories	Sustainable and cruelty-free purses and backpacks.	Sustainable materials	Formal
Skilled Accents	Clothes/ Accessories	Sustainable business that focuses on employing marginalized populations. Use recycled textiles, threads, and other sewing materials to create new pieces.	Sustainable materials	Formal
Chaotic Closet	Clothes/ Accessories	A mix of thrifted and vintage clothing. Market themselves as an affordable option.	Reuse	Formal
DugOut Vintage	Clothes/ Accessories	Vintage store that also host vintage market (Vintage on the Block) in the summer.	Reuse	Formal
Filthy Revena Vintage	Clothes/ Accessories	Sustainable vintage store that offers vintage clothing and recycled/upcycling clothing.	Reuse, behavioural shift	Formal
For You Consignment	Clothes/ Accessories	Offer second-hand items including clothing, accessories, and housewares for low prices.	Reuse	Formal
Goodwill Stores	Clothes/ Accessories	Triple bottom line organization (people, planet, and prosperity) aimed at diverting items from the landfill through multiple thrift store locations. Focus on creating social programs and training "green" workers or helping those experiencing systemic barriers.	Reuse, revitalize/ transform	Informal
Free Store	Clothes/ Accessories	Volunteer run and driven, the Free Store collects clothing, housewares in working condition. Due to the voluntary nature seasonal items are only accepted. Individuals or families in need are allowed to visit the Free Store weekly.	Reuse, revitalize/ transform	Informal

Mission Store	Clothes/ Accessories	Thrift store with three locations run by the Mission Services of London which offers clothing, furniture, and housewares. Two programs exist for those in-need to access clothing such as winter coats and household items.	Reuse	Informal
Old East Exchange	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.	Reuse	Formal
Plato's Closet	Clothes/ Accessories	Clothing is sold to the store and resold to customers. Accepts gently used, recent, and name brand clothing.	Reuse	Formal
Renew Community	Clothes/ Accessories	Offer gently used items including clothing, furniture, and housewares, and books. Proceeds go to Christian elementary education and other local community organizations.	Reuse	Formal
Salvation Army Thrift Store	Clothes/ Accessories	Thrift Store offering clothing, furniture, and housewares. Proceeds go towards The Salvation Army's faith-based programs, services, and emergency relief efforts.	Reuse	Informal
St. Vincent de Paul Store	Clothes/ Accessories	Thrift store with two locations offering clothing, furniture, and housewares. Necessary items are provided free to those in need (arranged through church). Proceeds for towards operation costs.	Reuse	Informal
Style 360	Clothes/ Accessories	Offer second-hand items including clothing and accessories.	Reuse	Formal
Style Encore	Clothes/ Accessories	Clothing is sold to the store and resold to customers. Offer second-hand items including clothing, shoes, and accessories for discounted prices.	Reuse	Formal
Talize	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.	Reuse	Formal

Teen Challenge Canada- Thrift	Clothes/ Accessories	Thrift store offering clothing, furniture, and housewares. Proceeds go towards faith-based addictions treatment program at the Teen Challenge Ontario Men's Centre in Lambeth, ON.	Reuse	Informal
The Sentimentalist	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.	Reuse	Formal
The Ultimate Garage Sale	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.	Reuse	Formal
Value Village	Clothes/ Accessories	Offer second-hand items including clothing, furniture, and housewares.	Reuse, behavioural shift	Formal
See the Worth Store	Clothes/ Accessories	Fashion brand founded by Goodwill Industries, Ontario Great Lakes in London, Ont. Canada designed to revitalize fashion industry through upcycled material. Proceeds go towards training workers to become skilled workers.	Reuse, revitalize/ transform, sustainable material	Informal
Back in the Day Vintage	Clothes/ Accessories	Offer vintage items including clothing, vehicles, and housewares.	Reuse	Formal
Back to the Fuchsia	Clothes/ Accessories	Offer vintage items including clothing, vehicles, and housewares.	Reuse	Formal
Reimagine Co	Restaurant/ Grocery	Zero waste grocery store offering a large selection of food, tools, cleaning supplies, etc.	Revitalize/ transform, low waste	Formal
Grace Restaurant & Bodega	Restaurant/ Grocery	Focus on sourcing local, ethical, and in-season produce selection at the restaurant and bodega.	Revitalize/ transform, sustainable consumption	Formal
The Tea Lounge	Restaurant/ Grocery	Tea shop offering workshops, events, and ethically sourced tea.	Revitalize/ transform	Formal
London Food Co-op	Restaurant/ Grocery	The Co-op offers organic fruit, vegetables, and other locally sourced foods. Members have	Revitalize/ transform,	Informal

		access to cheaper prices and additional discounts.	sustainable production	
YOU Made It Café	Restaurant/ Grocery	Social enterprise driven by sustainability and social responsibility. Proceeds for sales support youth programs.	Revitalize/ transform, sustainable production	Informal
Craft Farmacy	Restaurant/ Grocery	Restaurant with locally sourced ingredients.	Revitalize/ transform, sustainable consumption	Formal
The Root Cellar	Restaurant/ Grocery	Restaurant that uses local and in-season food. Aim to foster and connect to community through music, events, and education.	Revitalize/ transform, sustainable consumption	Formal
The Market	Restaurant/ Grocery	Market offering a range of produce, baked goods, and artisan made goods/accessories.	Revitalize/ transform, sustainable consumption	Formal
Covent Garden Market	Restaurant/ Grocery	Market open 7 days a week offering local food, services, and host events.	Revitalize/ transform, sustainable consumption	Formal
Project Neutral in London	Other	Carbon footprint tool that allows individuals to measure and assess their carbon use.	Inform, behavioural shift	Formal
Duck & Dodo	Other	Modern and vintage blend gift shop.	Reuse	Formal
Locally Made Marketplace	Other	Local gift shop featuring handmade and sustainable products from over 50+ local businesses.	Sustainable production, low waste, sustainable materials	Formal

Grow & Bloom Co	Other	Florist featuring an urban garden offering expert knowledge, a variety of flowers/plants and preserved options.	Sustainable production	Formal
Strings Guitar Shop	Other	Guitar shop offering a range of products, services/repairs, lessons, and a cafe.	Repair	Formal
Squeaky Wheel Bike Co-op	Other	Volunteer run and operated bike repair shop and space. Provides access to tools, expertise, parts, and accessories.	Repair, revitalize/transform	Informal
London Skateboard Co-operative	Other	Co-operative skate shop that relies on membership to help run store and events.	Repair, revitalize/transform	Informal
TryRecycling	Recycling	Recycling depot that accepts leaf and yard waste to be composted.	Divert from landfill	Formal
Green Valley Recycling	Recycling	Recycling depot that accepts unwanted goods, demolition waste and trash. Also offer recycled landscaping products.	Divert from landfill, sustainable materials	Formal
YOU Made It Recycling	Recycling	Recycling depot that processes businesses recycling. Offer youth training and employ youth workers skilled training.	Divert from landfill	Informal
EnviroDepot	Recycling	Recycling depot operated by the City of London. Accept yard waste, recyclables, electronics, ceramics, scrap metal, and more. Also accepts extra trash bags for an additional fee.	Divert from landfill	Formal
Purdy Natural	Beauty	Small batch beauty and spa products made with natural ingredients	Sustainable materials, sustainable production	Formal
Love Alchemy	Beauty	Hair salon offering sustainable hair, beauty, and wellness products.	Sustainable materials	Formal
Lunah Beauty	Beauty	Skincare and wellness products made from natural ingredients.	Sustainable materials	Formal

Table C3. City of London department details captured in the Circular Economy (CE) inventory.

Name	Description	CE Links
Climate Emergency Resource Team	This department is responsible for everything to do with the London Climate Emergency Action Plan.	Conservation
Construction and Infrastructure Services	This department oversees construction and infrastructure support services.	Inform, behavioural shifts
Climate Change, Environment and Waste Management	This department leads and coordinates the response to climate change, watershed protection, and waste management.	Inform, sustainable consumption, behavioural shifts, divert from landfill
Water, Wastewater and Stormwater	This department provides critical drinking water, wastewater, and stormwater services.	Inform
Transportation and Mobility	This department provides the planning and maintenance services for transportation.	Inform, revitalize/transform
Parks and Forestry	This department provides services to protect London's forests and trees, parks, and street landscaping.	Conservation

Table C4. Education actors details captured in the Circular Economy (CE) inventory.

Name	Description	CE Links
Network for Business Sustainability	Non-profit institution hosted out of Western aimed at advancing sustainable development to improve the future.	Inform, behaviour shift, revitalize/transform
Centre for Environment	Aimed at creating interdisciplinary sustainable teaching and learning through the Faculty of Science (host faculty), Faculty of Engineering and Faculty of Social Science, and other contributing faculties.	Inform, behaviour shift, revitalize/transform

Unbound Fashion	Fanshawe's Fashion Design program and department aim to teach and showcase sustainable fashion. Featuring storytelling through an annual fashion show and magazine.	Inform, behaviour shift, revitalize/transform, low waste
Environmentalism in Residence	The role is filled by a citizen who is an expert in grassroots action. This individual coordinates workshops and other interactive events to share knowledge and experiences.	Inform, behaviour shift, revitalize/transform, conservation
Western Environment & Sustainability Network	Office of Sustainability at Western University which also supports over 20 student clubs. The network aims to create a collaborative platform for knowledge and creativity sharing.	Inform, behaviour shift, revitalize/transform
Graduate Student Association- Sustainability Committee	The sustainability committee is one of many committees organized by the Graduate Student Association at Western University. The sustainability committee works towards creating a sustainable campus through events and information for graduate students.	Inform, behaviour shift, revitalize/transform

Table C5. NGO details captured in the Circular Economy (CE) inventory.

Name	Category	Description	CE Links
Climate Action London	Environment	Organization focusing on educating and advocating for Londoners to implement the Climate Emergency Action Plan by 2030.	Inform, behavioural shift
London Environmental Network	Environment	Organization with a focus on environmental conservation and creating a sustainable city through environmental programs and events.	Inform, behavioural shift
Circular Economy Club - London	Environment	Local network for the Circular Economy club run by volunteers to bring CE activities to London, ON.	Inform, behavioural shift
Reforest London	Environment	Organization focusing on improving environmental and human health locally through tree planting and sustainable projects.	Inform, behavioural shift

Thames Regional Ecological Association	Environment	Organization focused on environmental education and conservation through programs and projects.	Inform, behavioural shift, divert form landfill, low carbon
Canadian Environmental Law Association	Environment	The organization works to protect human and environmental health through justice and policies. Services are free to individuals and groups.	Inform, behavioural shift, revitalize/transform, conservation
Upper Thames Regional Conservation Authority	Environment	Organization aims to create a healthy environment through conservation through a holistic ecosystem approach.	Inform, behavioural shift, revitalize/transform, conservation
Bird Friendly London	Environment	Organization focused on bird conservation and human well-being through nature to transform urban spaces to be more accessible for birds.	Inform, behavioural shift, revitalize/transform, conservation
LOLA Bees	Environment	Environmental education-based organization focused on bees and other pollinators through experiential learning.	Inform, conservation
Green Economy London	Sustainable business	Organization works to create more sustainable, resilient, and well-trained communities.	Inform, behavioural shift, revitalize/transform,
National Diabetes Trust	Sustainable business	Network offers a collaborative and community-based hub for sustainable businesses.	Divert form landfill
Goodwill Industries	Sustainable business	Charity collects clothing and small household goods and sold for profit. Profit supports Diabetes Canada. The organization works to divert waste, provide community-based programs, and research	Reuse
See the Worth	Sustainable business	Organization works to revitalize clothing industry through clothing designed with upcycled materials, training programs, and community partnerships.	Reuse, sustainable material

Growing Chefs! Ontario	Food	The organization aims to transform food systems to be more sustainable, accessible, and fun through education and community partnerships.	Sustainable consumption, inform, behavioural shift, revitalize/ transform
Forest City TREEats	Food	The interactive resource map offers Londoners a community of foragers, location of edible tree and shrubs to offer accessible and local food.	Divert from landfill, behavioural shift
The Patch	Food	The collaborative program offers training, community garden spaces, and access to fresh local food. Excess food is distributed to local organizations in need.	Sustainable consumption, inform, revitalize/ transform
Pillar- Art for Impact by Social Six 2022 program	Art	Creative program aimed at youth to connect art, nature, and community building.	Inform, behavioural shift

Table C6. Social Media details captured in the Circular Economy (CE) inventory.

Group Name	Sub- Category	Description	CE Links
Buy Nothing Argyle, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Carling/Huron Heights, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Cherryhill/Oxford Park/West London, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Fox field/Fox Hollow/Sunningdale, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Glen Carin, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse

Buy Nothing Lambeth/Talbot/Bostwick, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Hamilton Road/Old East Village, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Medway/Masonville West/University Heights, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Oakridge/Hazeldon/Huntclub , London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Oakridge Crossing/Oak Crossing/Deer Ridge, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Old South, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Riverbend/Byron North, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Sherwood Forest/Hyde Park, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Somerset/Boler/Wickerson/B yron South, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Stoney Creek/Northridge, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Summerside/Pond Mills /Glen Cairn, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse

Buy Nothing Uplands/Stoneybrook/Masonville East, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Westmount/Southcrest, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing White Oaks/Westminster, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Buy Nothing Whitehills/Hyde Park, London, ON	“Buy Nothing” group	Started from the buy nothing project to promote a gift economy on a neighbourhood level.	Gift, reuse
Trade - Free Mommy London	Parenting and mom-based groups	Group for parents to donate and trade baby and child items to other parents.	Swap/trade, reuse
Free Mommy London	Parenting and mom-based groups	Group for parents to donate baby and child items to other parents.	Gift, reuse
London Mom Swap & Buy	Parenting and mom-based groups	Group for moms & caregivers to swap baby and children’s items.	Gift, reuse
Moms Offering Moms - Free Items London Ontario	Parenting and mom-based groups	Group for parents to donate baby and children’s items to other parents.	Gift, reuse
Free - Trade Mommy and Daddy London On	Parenting and mom-based groups	Group for parents to donate or trade baby and children’s items with other parents.	Gift, reuse
London MOM to MOM (formally free mom to mom)	Parenting and mom-based groups	Group for parents to donate baby and children’s items to other parents.	Swap/trade, gift, reuse
Mom to Mom buy and sell for London Ontario & surrounding area	Parenting and mom-based groups	Group for parents to sell used and new baby and children’s items to other parents.	Reuse

London, ON mom to mom buy and sell	Parenting and mom-based groups	Marketplace for parents to buy or sell baby and child items to other parents.	Reuse
Mom's Buy & Sell London, Ontario	Parenting and mom-based groups	Marketplace for parents to buy and sell baby and child items to other parents.	Swap/trade, reuse
London Ontario Moms - Buy Sell Trade New/Used Baby Stuff	Parenting and mom-based groups	Group for parents to sell or swap new or used baby and child items to other parents.	Swap/trade, reuse
Mommy Market London	Parenting and mom-based groups	Marketplace for parents to buy and sell items to other parents.	Reuse
Everything Free Store in London	Free/gifting groups	Community group offering free items.	Gift, reuse
Freely Giving in London Ontario	Free/gifting groups	Community group offering free items.	Gift, reuse
London Ontario Freecycle	Free/gifting groups	Community group offering free items.	Gift, reuse
The Giving Tree London	Free/gifting groups	Community group offering free items and trading opportunities.	Swap/trade, gift, reuse
FREE! Stuff London, Ont & Surrounding Areas	Free/gifting groups	Community effort to provide essential and non-essential items to those in need.	Gift, reuse
London Free-Store! (CANADA ONLY!!)	Free/gifting groups	Community group offering free items.	Gift, reuse
FREEDOM (and cheap or free items) London, Ont.	Free/gifting groups	Community group offering free items or low cost (less than \$50).	Gift, reuse
Free Food London Ontario	Free/gifting groups	Community group offering free food and other items for those in need.	Gift
London Ontario Wedding Swap and Sell	Swape, trade, (sell) groups	London and surrounding area swap or buy group offering wedding-related item.	Swap/trade, reuse

London Ontario swap buy trade	Swape, trade, (sell) groups	Community to swap, trade, or buy items.	Swap/ trade, reuse
London Puzzle Swap	Swape, trade, (sell) groups	Community to swap or trade jigsaw puzzles.	Swap/ trade, reuse
London area	Swape, trade, (sell) groups	Platform to swap, trade, or gift items based on your location (nearest city).	Swap/ trade, gift
London Ontario Clothing Swap & Sell	Thrift, clothing swaps (shop) groups	Community offering swaps or sales of gently used clothing and shoes.	Swap/ trade, reuse
Online thrift store London Ontario	Thrift, clothing swaps (shop) groups	Page acts as an online thrift shop.	Reuse

Curriculum Vitae

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Post-secondary Education and Degrees: University of Western Ontario
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2021-2023 M.A.

University of Ottawa
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2014-2019 Honours B.A.

Honours and Awards: Sustainability Leadership Innovation Hackathon-
Team Zero to Go-First Place
2021

Related Work Experience Research Assistant
Canadian Ocean Coalition
2022-2023

Teaching Assistant
Western University
2021-2023

Conferences and Presentations: EnviroCon Graduate Student Conference 2023
London, Ontario, Canada
“Informal and Formal Dimensions of the London, ON CE”

Network for Economic and Social Trends, 2022
London, Ontario, Canada
“Climate Change and the City: Western Expert Panel Discussion of London's Climate Emergency Plan”