

Circular economy promotion and disclosure among Canadian municipalities

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Abstract

Purpose – Municipalities have the potential to become models of the circular economy (CE). This paper aims to examine the impact of the municipal council's characteristics on municipal CE disclosure and promotion.

Design/methodology/approach – This paper is based on the resource dependence and upper echelons theories. For a sample of the 100 largest cities in Canada, a mixed methodology is used to code and analyze data and test the hypotheses.

Findings – Municipal councillors' education and experience related to the environment or sustainability are both likely to affect CE disclosure, and their sector membership (public or private) moderates the relationship between CE disclosure and councillors' experience. This experience may be reinforced by membership in the private sector, which has applied CE principles more extensively than the public sector has. Municipal councils with a greater number of councillors from the private sector appear to perform better in matters of transparency and to disclose more CE information on their public websites.

Practical implications – Municipalities could use the findings to foster their transition to CE by implementing a CE-related training plan for their councillors. A CE-dedicated section on their websites could improve transparency and inform and educate residents about CE.

Social implications – The public sector could learn from the private sector's best practices regarding CE.

Originality/value – This paper contributes to the literature by providing empirical evidence of the transparency and engagement of municipalities toward CE. The authors extend the resource dependence and upper echelons theories to a new context, that of public organizations.

Keywords Circular economy, Circular economy promotion and disclosure, Municipal governance, Website disclosure

Paper type Research paper

1. Introduction

A circular economy (CE) can be broadly defined as the “production and consumption of goods through closed-loop material flows that internalize environmental externalities linked to virgin resource extraction and the generation of waste (including pollution)” (Sauvé *et al.*, 2016a, p. 49). This type of economy has been presented as an alternative that can

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simultaneously support activity and environmental objectives, unlike a linear sustainability model (Suárez-Eiroa *et al.*, 2019). With its excessive extraction of natural resources and large accumulations of waste, the linear economy model is no longer viable, hence the urgency of implementing the CE (Council of Canadian Academies, 2021). Differing from the linear economy because of its closed-loop economic model, in which the output of one activity becomes the input of another, a CE promotes better use of resources and waste and advocates a transition away from the linear economy model (Geissdoerfer *et al.*, 2017). This paper investigates CE disclosure and promotion in a Canadian context.

Only 7.2% of the global economy was circular in 2023, having decreased from 9.1% in 2018 and 8.6% in 2020 (Fraser *et al.*, 2023). CE could offer practical solutions for obtaining sustainable development (Suárez-Eiroa *et al.*, 2019) without exceeding the safety limits of the planet (Fraser *et al.*, 2023). For example, in Canada, better management of plastic waste through a CE vision could reduce carbon pollution by 1.8 million tonnes and generate billions in revenue by creating around 42,000 jobs by 2030 [1].

Sustainable development and CE are related concepts. According to Sauvé *et al.* (2016a), the World Commission on Environment and Development defines sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” (p. 49). This definition raises the question of which means and practices can be used to achieve such an objective. Suárez-Eiroa *et al.* (2019) note that the pressures exerted on the global environment have continued to grow over the past decades, causing several planetary limits to be exceeded despite efforts to curb these pressures (Steffen *et al.*, 2015). This is mainly because of the dominance of the linear flow vision, which leads to excessive resource consumption and waste (Korhonen *et al.*, 2018).

Growing urbanization requires city leaders to reinvent models to limit resource consumption and reduce waste and emissions (Sauvé *et al.*, 2016b), in line with the objectives of the CE. Sauvé *et al.* (2016b) see the city as a living environment, a place of production and exchanges, a system of localized actors (public, private, cultural, social, economic, etc.) and an innovative institution with the potential to become a model of the CE. Affirming that “momentum towards a CE in Canada is building,” Canada’s Circular Cities and Regions Initiative, launched in 2021 by the Federation of Canadian Municipalities and several provincial councils, helps to lead cities to a circular transition. According to the Council of Canadian Academies report, Canada’s “unique geography and population distribution means that accelerating regional circular development strategies will be as important to the country’s CE transition as sector-specific efforts” (Council of Canadian Academies, 2021). The authors affirm that Canada has reached a turning point where it has become critical to promote and implement CE. This motivates us to examine municipal CE disclosure and promotion in the Canadian context.

Canada, with its three levels of government – federal, provincial and local – provides an interesting setting for this study. Canadian local governments are responsible for the protection of persons and property, local transportation, planning and development, public utilities, local social-welfare services, parks, recreations and culture (Makarenko, 2007). However, they have no obligations in terms of promoting and providing disclosure about CE or the environment. Further, municipal autonomy to regulate environmental matters differs from one province to another. According to Campbell and Maclaren (1995), who conducted one of the few studies on Canadian municipal environmental reporting, the Canadian Environmental Protection Act (CEPA, 1999) has managed to impel some municipalities to publish a State of the Environment report, but lack of a common indicator has greatly hindered the report’s widespread use. It follows that if some cities do report on the environment, it is because the municipal council has voluntarily adopted this practice.

While many factors can have an impact on the development of environmental practices and environmental communication and promotion practices in cities, some research highlights the central role of governance in the development and dissemination of sustainability practices (Evans *et al.*, 2005, 2006) and, more specifically, of CE practices (Bolger and Doyon, 2019; Yalçın and Foxon, 2021). Fassio and Minotti (2019) define CE governance as:

A political–social management system that includes multiple levels of power: local, national, and international governments, citizens and NGOs, academia, and private businesses. Everyone takes part, everyone contributes, everyone benefits: a “governance for transition” that facilitates and guarantees the integration and circularity necessary for the paradigm shift (Fassio and Minotti, 2019, p. 7).

In fact, municipal governance plays an essential role in defining strategies and policies that could encourage CE (Frantzeskaki *et al.*, 2018). City councils are responsible for the final decisions regarding CE in their city (Turcu and Gillie, 2020), and they have a central role to play in promoting CE practices (Bolger and Doyon, 2019). City councils can turn to the United Nations’ report entitled “Planning Sustainable Cities” for recommendations on how to promote sustainable urban transitions (United Nations Human Settlements Programme, 2009).

Municipalities can thus play a dual role: as organizations, they can report on their CE environmental practices (Sauvé *et al.*, 2016b), and as political actors, they can promote these practices (Bolger and Doyon, 2019). We analyze the impact of council members on their city’s CE disclosure and promotion by taking a look at their level of education and experience with environmental and sustainability issues.

Municipalities’ websites should reflect a concern for CE and communicate it to residents. Given the dearth of empirical evidence regarding the CE reporting practices of public and private organizations, recent literature has called for more empirical studies on CE communications (Opferkuch *et al.*, 2022). We respond to this call by investigating the CE disclosure practices of municipalities. More empirical work, particularly quantitative research, is needed to provide guidance for practitioners in implementing CE principles in their organizations (JW Kirchherr and van Santen, 2019). Therefore, our empirical research aims to shed light on the influence of municipal councils on CE disclosure. In addition, our study is motivated by the recent calls for research into unexplored issues in the public sector, such as the role of social and environmental accounting (Steccolini, 2018), including sustainability accounting, accountability and disclosure (Kaur and Lodhia, 2019).

Based on the resource dependence and upper echelons theories, we assume that municipal councillors’ education and experience related to environmental sustainability have a positive effect on municipalities’ CE promotion and disclosure on their websites. Using a sample of the 100 largest cities in Canada, we provide evidence of the positive impact of municipal councillors’ education and experience on CE-related promotion and disclosure. Councillors’ sector membership (public/private) plays a moderating role in the relationship between councillors’ experience and CE promotion and disclosure. Municipal councils with few experienced councillors but with a larger proportion of members from the public sector report more extensively on CE, and councils with a good number of experienced members but with a larger proportion of councillors from the private sector also disclose more CE-related information. Although these results may appear contradictory, we suggest that they could be explained by a correlation between sector and education. Councillors from the public sector may have a more extensive educational background in environmental and sustainability issues, which could explain the first result. The public sector may attract more individuals with this type of background, who may be more

inclined to disclose a greater amount of CE-related information after joining a municipal council, despite their lack of experience. Regarding the second finding, we suggest that councillors from the private sector, with their greater CE experience, pay more attention to CE-related aspects and support municipalities' transition to CE, which is reflected in increased disclosure.

Drawing on the CE literature, Web-based voluntary disclosure and environmental practices in local governments, this paper contributes to the literature by providing empirical evidence of the transparency and engagement of municipalities toward the CE. Hence, it extends the resource dependence and upper echelons theories to a new context, that of public organizations. Based on our findings, we provide practical recommendations for municipalities.

The remainder of this article is organized as follows: Section 2 provides an overview of the literature, and Section 3 provides the theoretical background and hypothesis development. Section 4 describes the research methodology. Results are reported and discussed in Section 5. Finally, we present our conclusions in Section 6.

2. Literature review

CE may have multiple meanings (Kirchherr *et al.*, 2017), given that the concept was developed mainly by practitioners and policymakers who assembled and connected concepts from sustainable development and sustainability and placed them in a new framework (Corvellec *et al.*, 2022). This section presents the CE concept and its connections with sustainability, the state of CE in the public sector and the literature on CE-related disclosure.

2.1 *The circular economy and sustainability*

Analyses of the concept of CE have been underway for years, but the definition of this concept is still the subject of debate (Klein *et al.*, 2022b). Simply put, CE can be defined as an economy that seeks to balance economic development with environmental and resource protection (UNEP, 2006). However, such a narrow definition makes little distinction between CE and sustainable development, which was defined by the Brundtland Commission as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 15).

The term “circular economy” seems to constrain its definition. As pointed out by Murray *et al.* (2017), the term has both a linguistic and a descriptive meaning. This double meaning places CE in opposition to the linear economy cycle, which is too often associated with simple recycling. Thus, CE is often associated with materials management (Desing *et al.*, 2020) and its goal to reduce, reuse or recycle goods within the production, distribution and consumption processes (Cooper, 1999). From this perspective, CE is considered to focus on resource productivity and improving eco-efficiency, particularly based on the 5Rs of reduce, reuse, recycle, recover and restore. This perspective thus typically associates CE fully with the environmental dimension of sustainability (Opferkuch *et al.*, 2022). Other studies emphasize the need to think about CE beyond the goal of simply optimizing resources (Sauvé *et al.*, 2016a).

Some researchers claim that CE fulfills only economic and environmental targets of sustainable development (Sauvé *et al.*, 2016a), although others add a social dimension to CE targets (Kirchherr *et al.*, 2017; Murray *et al.*, 2017). More holistic definitions (Gunaratne *et al.*, 2021) of CE have been proposed, such as the one by Murray *et al.* (2017, p. 377):

The Circular Economy is an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being.

According to this definition, CE encompasses the social dimension of sustainability but is also a tool for achieving overall sustainability. Embracing this approach, several studies have investigated how CE activities can positively contribute to sustainable development (Geissdoerfer *et al.*, 2017; Walker *et al.*, 2022) and to the achievement of the UN sustainability goals (SDGs), including in the public sector (Droege *et al.*, 2021a, 2021b).

Recent research notes that the CE concept should be more open to critique (Hobson and Lynch, 2016). Corvellec *et al.* (2022) view CE as an umbrella concept that is meant to solve multiple problems but is difficult to operationalize due to its diversity of meanings. Decoupling economic growth from CE's environmental impact should not be a goal *per se* since circularity does not intrinsically lead to sustainability (Blum *et al.*, 2020). They propose a new multidimensional concept, sustainable CE, including material circularity, economic, social and environmental sustainability. Only material circularity, decoupled from the other dimensions does not intrinsically lead to sustainability. Moreover, the social and political implications of CE must be reconsidered so the concept can be within collective reach (Hobson and Lynch, 2016). CE must consider the role of the citizen as critical to obtaining a more circular society, replacing hyperconsumerism with more sustainable lifestyles. Addressing these issues and remaining open to criticism facilitates the implementation of a sustainable CE.

2.2 *The circular economy in the public sector*

Much of the work dealing with CE at the organizational level has focused on the private sector, leaving developments in the public sector relatively untouched (Droege *et al.*, 2021a, 2021b; Klein *et al.*, 2022a; Klein *et al.*, 2022b). However, the context of the public sector has great potential for accounting research (Steccolini, 2018) and has already underpinned the development of several administrative, organizational and managerial theories, such as institutional theory (Meyer and Rowan, 1977). Moreover, public organizations, similar to private companies, must adapt to future environmental and climatic challenges (Barreiro-Gen and Lozano, 2020). In addition, public sector organizations are major economic actors (Droege *et al.*, 2021a) that typically account for 15–20% of gross domestic product, according to Klein *et al.* (2022b). Lastly, public enterprises often serve as models for private organizations and citizens (Soberón *et al.*, 2020) and have consequently been identified as key actors in the development of CE (Khan *et al.*, 2020).

The OECD (2019) defines public sector organizations as organizations under government control whose purpose is to develop public goods or services. While public organizations differ from private organizations in part because of their underlying political nature (Droege *et al.*, 2021a) as well as their ability to establish benchmarks and legislative frameworks (Parchomenko *et al.*, 2019), it is important that they weigh the advantages of CE to rethink how they provide goods and services and consume and use their resources (Klein *et al.*, 2022b). Thus, there is no shortage of fields of application for CE in the public sector. Klein *et al.* (2020) highlight the issue of public procurement, which provides a significant opportunity for the development of CE in the public sector.

Although public organizations started to integrate performance culture and performance assessment into their practices in the 1990s (Arnaboldi *et al.*, 2015; Lapsley *et al.*, 2010), including around environmental issues (Parvez *et al.*, 2019), the development of CE-oriented assessment and performance practices is still a challenge (Droege *et al.*, 2021a).

Early studies report barriers to the development of CE practices in the public sector. Klein *et al.* (2022a) highlight that public sector decision-makers do not view CE as a priority, and some of their employees are reluctant to address it. The traditional bureaucratic culture of the public sector, which is attached to rules and procedures, is also presented as an additional difficulty (in contrast with the private sector) in situations in which disruption and innovation are necessary to initiate change toward circularity (Klein *et al.*, 2022a). In addition, ongoing policy changes do not facilitate the necessary momentum. Other factors, such as leaders' lack of commitment and the absence of governance, have been identified as obstacles to the development of CE in public organizations (Droege *et al.*, 2021a). Cultural aspects, as well as knowledge and awareness of CE among managers and staff, have been highlighted as major determinants of the development of practices (Droege *et al.*, 2021a; Klein *et al.*, 2022b).

However, all is not bleak in the public sector as far as CE development is concerned. For instance, Klein *et al.*'s (2022b) study of the Portuguese central administration shows that CE is well implemented with regard to recycling or dematerialization practices, despite shortcomings relating to the purchase of used products, use of sharing platforms and the energy management of buildings. Although the public sector's vision of CE seems dated (it focuses on recycling and other Rs, such as reducing and reusing), the concept of CE seems to be increasingly understood in a holistic and broad manner (Kristensen *et al.*, 2021; Schulz *et al.*, 2019). Currently, there is immense potential for further imbedding circularity in public organizations, and the journey seems to have begun (Klein *et al.*, 2022b).

2.3 Disclosure and promotion of accounting information associated with the circular economy

Tiscini *et al.* (2022) point out that the first studies of the relationship between CE and accounting disclosure coincided with the first investigations into the effects of corporate governance on environmental protection. However, early studies tended to use some combination of concepts [corporate social responsibility (CSR) and CE] to address sustainability (Tiscini *et al.*, 2022).

Studies on accounting disclosure in the context of CE first looked at the private sector, by investigating the presence of CE concepts in sustainability reports (Opferkuch *et al.*, 2022), specifically in the content and modes of disclosure (Wang *et al.*, 2014). For example, Wang and Ren (2007) showed in their study of Chinese industrial companies that the disclosure of CE-related information was neither uniform nor standard, while Wang *et al.* (2014) found that the CE disclosure quality was low.

More recently, authors who study CE promotion and disclosure in sustainability reports base their investigations on the *Global Reporting Initiative* (GRI) principles (Dagilene *et al.*, 2020) or the *International Integrated Reporting Framework* principles (Peršić *et al.*, 2017). These studies show that CE issues are mainly not addressed (Opferkuch *et al.*, 2021). As Opferkuch *et al.* (2022) demonstrate, research addressing accounting disclosure related to CE has focused on the industrial and materials sectors. More recently, studies have shown that CE is of interest to companies in other sectors such as cosmetics (Fortunati *et al.*, 2020) or, more recently, the service sector (Pereira and Vence, 2021). These studies generally conclude that companies fail to disclose enough CE information, and their CE-specific communications are hard to distinguish from sustainability-specific communications. Opferkuch *et al.* (2022) encourage researchers to continue analyzing organizational CE communications, particularly in unexplored industries, to better understand how organizations implement and evaluate CE and how they promote and communicate CE-related information.

The issue of CE development in the public sector is beginning to receive significant attention (Droege *et al.*, 2021a; Klein *et al.*, 2022b), yet the communication of CE practices is still in its infancy. In contrast to the private sector (mostly manufacturing), there has been very little research on CE communication in the public sector. Recently, Klein *et al.* (2020) highlight that communication is one of the areas on which public organizations should focus when addressing CE. Droege *et al.* (2021a, 2021b), showed that reporting was poorly developed in Portuguese public administrations, leading Klein *et al.* (2022b) to underline the need to develop not only reporting methods but also communication in the public sector.

Beyond these studies, little is known about the disclosure of accounting information related to CE in the public sector. We therefore focus on public sector CE disclosure in our study of Canadian municipalities.

3. Theoretical background and hypothesis development

In Canada, municipal councils, formed by elected councillors, have both legislative and executive functions at the local level. They oversee the operations of the municipality, with responsibilities such as taxation, budgeting, planning and development (Makarenko, 2007). As mediators between residents and the municipal administration, municipal councils play a significant role in the public policy-setting process (Memeti and Kreci, 2016).

The municipal council, as a local authority, is similar to the board of directors in its role as a business-governing board. A large body of literature exists on the impact of board of directors' characteristics on voluntary disclosure (Ben-Amar and McIlkenny, 2015; Donnelly and Mulcahy, 2008; Lim *et al.*, 2007; Smaili *et al.*, 2022). Given the emergence of CE as a new economic model in the last decade and the essential role of higher education in the transition to CE (Ellen Macarthur Foundation, 2021), we suggest that the municipal councillors' educational level and sustainability-related experience influence CE disclosure and promotion.

According to resource dependence theory, the board's monitoring role is augmented by the role of providing essential resources and connections to the external environment (Pfeffer and Salancik, 1978). Boards adapt their composition to better deal with environmental issues and facilitate strategic change (Hillman *et al.*, 2000). Hillman *et al.* (2000) identified the various facets of board members' roles, such as business expertise, support and community influence. Businesses change their boards' composition and role as a function of their changing needs; for instance, an expert could be invited to join the board to advise and counsel management and the rest of the board (de Villiers *et al.*, 2011) with a view to improving the firm's performance (Nicholson and Kiel, 2007). More experienced directors or councillors, who have greater knowledge, skills and connections provide better advice and counsel (Hillman, 2005; Hillman and Dalziel, 2003) and could facilitate the transition of municipalities to CE. Directors with diversified backgrounds are more adept at understanding stakeholders' interests and responding to their demands, such as those related to CSR (Chang *et al.*, 2017). From the resource dependence theory perspective, municipal councillors' educational level and experience would impact CE disclosure and foster the transition to CE through improved CE-related knowledge and skills and better advice and decision-making. Given that councillors' connections also affect CE disclosure, we suggest that their professional sector (public or private) is a determinant of the connections that would affect disclosure.

In addition, upper echelons theory posits that organizational outcomes reflect the values and cognitive bases of the most powerful actors in organizations (Finkelstein *et al.*, 2009; Hambrick, 2007; Hambrick and Mason, 1984). Managers' personal values are drivers of social change and influence the formulation, adoption and implementation of CSR policies in

organizations (Hemingway and Maclagan, 2004). Applied in a municipal context, this theory views municipal CE disclosure as an expression of municipal councillors' values and cognitive bases. Upper-echelon characteristics such as age, functional track, career experience, education, socioeconomic roots, financial position and group characteristics have an impact on organizational outcomes such as performance or disclosure (Hambrick and Mason, 1984). Hence, based on the upper echelons and resource dependence theories, our study posits that councillors' CE-related experience, education and group characteristics, such as working in the public or private sector, affect municipal CE disclosure.

Post *et al.* (2011) report that board members with higher levels of education have a broader understanding of environmental matters and foster better decision-making, which has a positive impact on disclosure. Based on upper echelons theory, Le *et al.* (2021) provide recent empirical evidence of the impact of education on voluntary environmental disclosure and find that the overseas education of the sample board members in Vietnam has a positive impact on corporate environmental disclosures. Lewis *et al.* (2014) provide evidence regarding the positive impact of educational attainment on voluntary environmental disclosure. However, Fernandes *et al.* (2018), using a Brazilian sample, found no relationship between board level of education and environmental disclosure. Fernández-Gago *et al.* (2018) found no significant association between directors with more diverse educational backgrounds and more standardized CSR disclosure based on GRI guidelines. These results are explained by the moderation effects of directors' education on disclosure: independent directors, with diverse skills, educational backgrounds and points of view, understand stakeholders' interests and respond to their demand for increased disclosure. Moreover, Chang *et al.* (2017) found a U-shape relationship between board educational diversity and CSR for a Korean sample.

Overall, our theoretical background and prior literature indicate that the governing board's level of education influences voluntary disclosure. Given that CE is a new economic model and higher education plays an essential role in the transition to CE, we posit that the educational level of decision-makers will have an impact on CE promotion and disclosure. We therefore predict that municipal councillors' level of education regarding CE is positively associated with CE promotion and disclosure. Hence, our first hypothesis:

H1. Municipal councillors' education level is positively associated with CE promotion and voluntary disclosure.

Empirical research provides evidence of the positive impact of top management experience on voluntary disclosure (Ma *et al.*, 2020; Reeb and Zhao, 2013). Ma *et al.* (2020), using a Chinese sample, note that top executives' academic experience shapes values and affects decision making and ultimately organizational outcomes (CSR disclosure). Board member experience also seems to have an impact on quality of disclosure (Reeb and Zhao, 2013). Experience, which can be understood as knowledge learned through action and performance feedback, has a positive impact on corporate outcomes (Kroll *et al.*, 2008), as does board vigilance. Moreover, having an active and CE-supportive leadership at the organizational level has been identified as one of the most important success factors for implementing CE in organizations (Klein *et al.*, 2022b). However, the literature on the impact of directors' skills on corporate outcomes also found insignificant results. Kang *et al.* (2018) provide evidence that, in some conditions, industry experience has no effect on firm performance, while Fahlenbrach *et al.* (2010) indicate that the skills of CEO outside directors do not add value to the firm. One explanation could be that director skills are multidimensional, which makes it difficult to obtain optimal skill diversity on the board (Adams *et al.*, 2018).

We assume that a municipal councillor's experience in sustainability or the environment helps the council to discuss, understand and adopt CE principles. Based on the above theories and literature, we hypothesize that:

H2. Municipal councillors' experience is positively associated with voluntary CE disclosure and promotion.

Despite its legislative influence and benchmark setting (Parchomenko *et al.*, 2019), the public sector does not consider CE a priority (Klein *et al.*, 2022a). Private companies seem more engaged in CE than the public sector is, particularly in its reduce and recycle targets (Barreiro-Gen and Lozano, 2020). Hence, the literature highlights a difference in the promotion of CE between the private and public sector. Moreover, both the resource dependence and upper echelons theories indicate that the network of connections (Hillman, 2005) or the group characteristics (Hambrick and Mason, 1984) of directors or councillors affect organizational outcomes.

Directors' networks of connections add value to an organization through access to information that may not be available to the public. Directors may gradually build their reputation and establish networks with politicians and regulators, which allows them access to key information in their sector (Renneboog and Zhao, 2011). Board interlocks, which occur when directors sit on the boards of two or more organizations, increase coordination and transactions between these organizations (Zahra and Pearce, 1989).

Therefore, councillors' membership in the private or public sector could interact with the level of their experience to affect CE disclosure. This leads to our third hypothesis:

H3. Municipal councillors' membership in the private or public sector interacts with their experience to affect voluntary CE disclosure and promotion.

4. Methodology

We opted for a mixed qualitative and quantitative methodology to code and analyze data and test our hypotheses.

4.1 Sample selection and data collection

Our sample consists of the 100 largest cities in Canada (see Appendix 1), selected from among a population of 5,127 municipalities, as identified by the 2016 Statistics Canada population census (Statistics Canada, 2017), covering 65% of the total population of Canada.

Our dependent variable, CE municipal disclosure, was measured using a content analysis approach. Content analysis is widely used in the analysis of social and environmental disclosure (Gray *et al.*, 1995b; Guthrie and Abeysekera, 2006). The content analysis was carried out in four steps.

We began by manually collecting and analyzing all the data available on the municipal websites that dealt with the environment in a broad sense (including CE and sustainability), given that the data were grouped together. These data, extracted in 2021, represented over 5,000 pages of text and images and amounted to more than 1.2 million words.

The second step was to develop a coding grid to help us select and code the CE-related information in general environmental disclosures. CE reporting is voluntary and generally based on standards and guidelines, the most prominent of which are the GRI sustainability reporting guidelines (Adams *et al.*, 2014). We analyzed the GRI for public sector agencies (GRI, 2005) combined with the last reporting standard available, the GRI Standards for Sustainability Reporting 2018, to identify CE-related themes and to develop our coding grid

(see the grid in [Appendix 2](#)). The coding grid consists of 17 items, grouped into seven categories: materials, energy, emissions, effluents and waste, environmental compliance, community and others.

Subsequently, we identified data dealing more specifically with CE. A content analysis of the data, consisting of “codifying qualitative and quantitative information into predefined categories to derive patterns in the presentation and reporting of information” ([Guthrie and Abeyskera, 2006](#), p. 120), was conducted using Nvivo software. Since meaning is generally established by sentences or paragraphs rather than words or pages ([Gray et al., 1995a](#)), our unit of analysis is the paragraph. Each paragraph containing CE-related information was coded. The data analysis was therefore based on a conceptualizing approach ([Gioia et al., 2013](#)), using CE-related themes and subthemes found in the GRI public sector grid, which we also included in our coding grid.

Finally, as we expected that words would provide maximum robustness in assessing the quantity of disclosure ([Campbell, 2003](#); [Krippendorff, 1980](#); [Wilmshurst and Frost, 2000](#)), we measured CE municipal disclosure by the total number of words coded.

The last step was to validate CE disclosure scores. To minimize subjectivity, the coding was conducted and validated by various members of the research team, as suggested by [Bhattacharjee \(2012\)](#). Cohen’s κ was run to determine if there was agreement between researchers ([Hallgren, 2012](#)). The coefficient of agreement $\kappa = 0.818$ ($p < 0.001$) shows moderate to strong agreement between the researchers.

In addition, to collect data on municipal governance, we used the information provided by the municipal websites and social networks (LinkedIn, in particular) in 2021. We collected the following information for each council or council member: education level, experience and membership sector (public or private sector). We supplemented the data collection with information manually collected from the corresponding municipal websites on the language of disclosure, council’s gender diversity and municipality’s revenue.

Our hypotheses are tested using a multivariate regression model.

4.2 Research design

[Table 1](#) presents our variable definitions and measures.

To test H_1 and H_2 , we estimated the following regression model (1):

$$CE_disclosure_{it} = \alpha_0 + \alpha_1 Education_{it} + \alpha_2 Experience_{it} + \alpha_3 Sector_membership_{it} + Controls + \epsilon_{it} \quad (1)$$

where, for municipality i and year t , $CE_disclosure$ is the extent of CE-related disclosure on the municipal website, $education$ is the CE-related education level of the municipal council, $experience$ is the CE-related experience level of the municipal council and $sector_membership$ is the total public/private membership of municipal councillors.

The following model (2) is used to test H_3 :

$$CE_disclosure_{it} = \alpha_0 + \alpha_1 Education_{it} + \alpha_2 Experience_{it} + \alpha_3 Sector_membership_{it} + \alpha_4 Sector_{it} X Experience_{it} + Controls + \epsilon_{it} \quad (2)$$

where, additional to model (1), $Sector X Experience$ is the interaction term used to capture the moderation effect of Sector on the relationship between Experience and $CE_disclosure$.

We use three control variables:

Variables	Definition	Measure
<i>Dependent and independent variables</i>		
CE_disclosure	The extent of CE-related disclosure on the municipal website	The total number of words used by the municipality to disclose/promote CE-related information on its website, coded using the grid (see Appendix 2). CE_disclosure is measured by groups of 100 words (the value 1 for CE_disclosure means 100 words)
Education	The CE-related education level of the municipal council	The total CE-related level of education of the municipal council, representing the sum of individual levels of each municipal councillor, taking the value 3 if a councillor has a degree in environmental or sustainability areas, 1 for a degree in natural sciences or management, 0 otherwise
Experience	The CE-related experience level of the municipal council	The CE-related experience level of the municipal council is the sum of individual levels. The individual level of a municipal councillor was coded 3 if the councillor's main experience was related to environmental or sustainability areas, 1 for natural sciences or management, 0 otherwise
Sector membership	The total public/private memberships of municipal councillors	A dummy variable coded 1 if the CE-related experience level of the council is higher than or equal to the median level of the sample (3), 0 otherwise. The sum of individual sector memberships of municipal councillors was used to compute the dummy variable. The individual sector membership is coded 1 if the councillor works in the public sector, 0 otherwise
<i>Control variables</i>		
Language	The language of disclosure	A dummy variable coded 1 if the disclosed information was in English and 0 otherwise (French disclosure)
Diversity	The gender diversity of the municipal council	The percentage of women on the municipal council
Council size	The size of the municipal council	The number of municipal councillors
Size of municipality	The population of the municipality	The municipality's population as listed in the 2021 Census
Total_Revenue	The municipality's total revenue	The municipality's total revenue (in \$ million)
<p>Notes: We had initially planned to grant two points to councillors with a degree or experience in the environmental field and three points for sustainable development. As it was very difficult to distinguish between these two categories, we awarded three points to each councillor who had a degree or experience in either field. Statistics Canada, Census of Population, available at www12.statcan.gc.ca/census-recensement/index-eng.cfm</p> <p>Source: Created by authors</p>		

Table 1.
Definition of variables

- (1) The language of disclosure controls for cultural and legal differences between Canadian provinces that are expected to influence voluntary environmental disclosure (Pucheta-Martínez and Gallego-Álvarez, 2020). Quebec, the only Canadian province with a majority French-speaking population, is a civil law province, whereas the common law system is used in the other provinces;
- (2) Prior research has used the size and gender diversity of the governance body as determinants of disclosure (Radu *et al.*, 2022). The variable Diversity is added to our model to control for the council's gender diversity, and a positive coefficient for Diversity is expected, in that having women on the council makes it more likely that sustainable initiatives will be promoted and more extensive disclosure will be provided (Baalouch *et al.*, 2019; Rupley *et al.*, 2012); and
- (3) We control for the size of the municipality (population) and its budgetary capacity, which are likely to positively affect sustainability disclosure (García-Sánchez *et al.*, 2013), using the variable Total_Revenue representing the municipality's total revenue. Total_Revenue is highly correlated with the population of the municipality ($r = 0.64$). Given that the variables Council Size and Total_Revenue are highly correlated ($r = 0.62$), we opted to use only Total_Revenue to capture the expected positive influence of the municipality's council size on voluntary CE disclosure.

5. Results and discussion

5.1 Descriptive statistics

Descriptive statistics of our sample are presented in Table 2. The average extent of the CE-related disclosure of the sample is 4,497.3 words, and the CE_disclosure of municipalities is highly dispersed (standard deviation of 51.5). The municipal council's average level of education is 3.02, equivalent to one councillor with a degree in environmental or sustainability areas or three councillors with a degree in the natural sciences or management in each municipal council. The experience level of the municipal council amounts to an average of 5.6, equivalent to an average of two councillors whose main experience is related to environmental or sustainability areas, or six related to the natural sciences or management in each council.

The size of the municipal councils in our sample has an average value of 12.0 and a standard deviation of 6.6. As for their composition, the municipal councils in our sample

Variables	Mean	Median	SD	Minimum	Maximum
CE_disclosure	44.973	24.860	51.529	0	230.29
Education	3.020	2.500	2.992	0	15
Experience	5.600	5	3.954	1	29
Sector membership	3.490	3	3.815	0	33
Sector membership (dummy)	0.590	1	0.494	0	1
Language	0.830	1	0.378	0	1
Diversity	0.371	0.374	0.145	0.101	0.727
Council size	11.950	11	6.608	7	65
Size of municipality	240,233.6	109,684	375,829.5	52,662	2,794,356
Total_Revenue	846.195	281.706	1,840.806	67.536	14,007

Table 2.
Descriptive statistics

Notes: $N = 100$. For the definition of the variables, see Table 1
Source: Created by authors

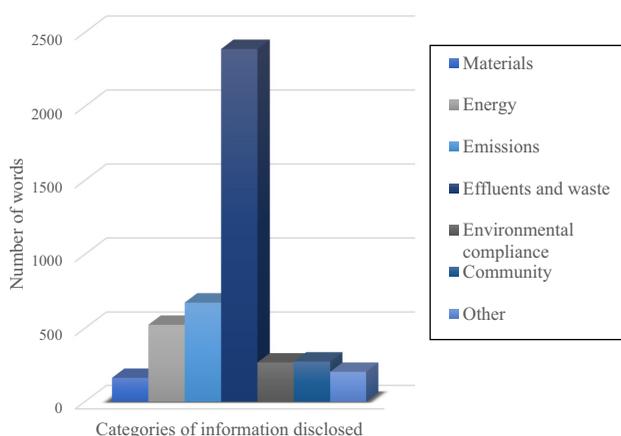
have on average one municipal councillor (out of 12) with a degree in environmental or sustainability areas, three (out of 12) with a degree in the natural sciences or management, two (out of 12) with experience mainly related to environmental or sustainability areas or six (out of 12) related to the natural sciences or management. The municipal councils therefore have councillors with pertinent experience for dealing with environmental issues, but only a small number of specialized councillors with education related to CE.

As for public/private sector membership, the average value of the computed sum of individual memberships is 3.5 (standard deviation 3.8) and the median is 3, meaning that, on average, the municipal councils in our sample have three councillors from the public sector out of 12. The dummy variable used to measure sector membership shows an average of 0.6 and a standard deviation of 0.5, which means that 60% of the sample has more than three councillors from the public sector.

CE disclosure in English accounted for 83% of the disclosure. The municipal councils are composed, on average, of 37.1% women councillors (four out of 12 councillors). The average population of the municipalities in the sample is 240,233.64 residents, with the largest municipality (Toronto) recording a population of 2.7 million and the smallest (North Bay) of 52,662. The municipalities' average total revenues are \$846.2m.

The CE disclosure grid consists of 17 coded items grouped into seven categories: materials, energy, emissions, effluents and waste, environmental compliance, community and others. Our disclosure grid is based on GRI reporting guides. Our analysis of municipal disclosure identified a new category of CE-related information, centered on communities, and we added this category at our disclosure grid. The structure of the disclosed CE information by category is presented in Figure 1. As expected, the most disclosed category is effluents and waste, reflecting a relatively narrow vision of CE as reduction of garbage through recycling. This category represents 53.1% of all the information disclosed by the municipalities (see Appendix 2 for the number of words disclosed by category), followed by information about emissions reduction (15.0%) and energy reduction (11.7%).

The Pearson's correlation matrix is presented in Table 3. As expected, we observe a significant and positive correlation between CE disclosure and councillors' education



Source: Created by authors

Figure 1. Circular economy disclosure level by information category

Variables	1	2	3	4	5	6	7
1. CE_disclosure	1						
2. Education	0.303*	1					
3. Experience	0.113	0.656*	1				
4. Sector membership	0.087	0.340*	0.220	1			
5. Language	0.126	-0.015	-0.120	-0.377*	1		
6. Diversity	0.026	0.184	0.156	0.082	-0.113	1	
7. Total_Revenue	0.369*	0.427*	0.545*	0.160	0.115	0.049	1

Table 3.
Correlation matrix

Note: * $p < 0.01$. For the definition of the variables, see [Table 1](#)
Source: Created by authors

($r = 0.303$, $p < 0.01$). Significant correlation with CE disclosure is also reported in [Table 3](#) for municipalities' total revenue ($r = 0.369$, $p < 0.01$).

Variance inflation factors (VIF) are calculated to test independent variable multicollinearity. The average mean of the VIF for the model (2) is 1.57, and the maximum VIF is 2.20, indicating no collinearity.

5.2 Multivariate analysis

[Table 4](#) presents the results of regression tests. Model (1) is the basic model, using only controls, with an R^2 of 14.4%. The addition of the explanatory variables to model (2), used to test H_1 and H_2 , increases its explanatory power (R^2 of 22.0%). Model (3) includes the interaction term and is used to test H_3 .

Consistent with recent empirical evidence ([Le et al., 2021](#)), results reported in the second column of [Table 4](#) confirm our first hypothesis regarding the positive influence of councillors'

Variables	Model (1)	Model (2)	Model (3)
<i>Control variables</i>			
Language	11.825 (13.070)	6.029 (14.271)	2.742 (13.532)
Diversity	6.278 (33.771)	-0.804 (33.301)	6.385 (31.567)
Total_Revenue	0.010*** (0.003)	0.011*** (0.003)	0.012*** (0.003)
<i>Independent variables</i>			
Education		6.059*** (2.233)	7.178*** (2.137)
Experience		-4.214** (1.769)	6.545* (3.533)
Sector membership		-0.745 (11.163)	58.892** (20.224)
<i>Interaction</i>			
Sector x Experience			-13.096*** (3.788)
Intercept	24.335 (18.063)	36.731* (21.713)	-14.289 (25.289)
Observations	100	100	100
R-squared	0.144	0.220	0.309
Adj R-squared	0.117	0.167	0.257
F	5.37	4.36	5.89
Prob>F	0.0018	0.0006	0.0000
Mean VIF	1.02	1.57	

Table 4.
Regression of
circular economy
disclosure on
councillors'
education and
experience

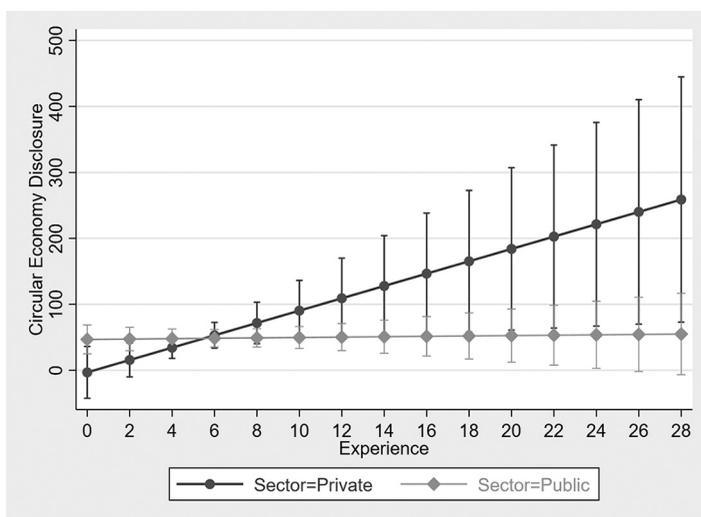
Notes: Standard errors in parentheses. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. For the definition of the variables, see [Table 1](#)
Source: Created by authors

education level on CE disclosure. The coefficient on Education is positive and significant at 1% ($b = 6.059, p < 0.01$).

The coefficient on Experience is negative and significant at 5% ($b = -4.214, p < 0.05$) if the main effect is examined without considering the interaction. When the moderator is introduced, the effect of Experience on CE disclosure becomes positive and significant at 10% ($b = 6.545, p < 0.1$), as does the effect of Sector membership on CE disclosure ($b = 58.892, p < 0.05$). Hence, the second hypothesis, which predicts a positive association between councillors' experience and extent of CE-related disclosure, is confirmed. The interaction term's coefficient is significant and negative ($b = -13.096, p < 0.01$), confirming the third hypothesis regarding the interaction of councillors' membership sector and experience affecting CE disclosure.

Consequently, we provide evidence of the moderation effect of councillors' sector membership (private/public) on the relationship between councillors' experience and CE disclosure. If the municipal council has more councillors from the private sector (Sector membership = 0), then the effect of Experience on CE disclosure is positive (a total coefficient of $6.545 + 0 = 6.545$). If the municipal council has more councillors from the public sector (Sector membership = 1), the effect of Experience on CE disclosure becomes negative ($6.545 - 13.096 = -6.551$).

Figure 2 illustrates the moderation effect of sector membership. Regarding councillors from the private sector (Sector=Private), when the municipality has fewer experienced councillors, the extent of CE disclosure is less than that of municipalities with fewer experienced councillors from the public sector. However, starting with a level of total experience higher than 5, municipalities with councillors from the private sector seem to disclose more than their counterparts from the public sector. A level of total experience of five is equivalent to one councillor experienced in environmental or sustainability areas and two experienced in the natural sciences or management or five in the natural sciences or management, out of a total of 12 on the municipal council.



Source: Created by authors

Figure 2. The moderation effect of councillors' sector membership on the relationship between CE disclosure and councillors' experience

5.3 Discussion of findings

The CE disclosure of Canadian municipalities in our sample centers on garbage recycling. Similar to prior research, we note the difficulty of distinguishing between CE-specific information and sustainability-specific information (Opferkuch *et al.*, 2022). This perspective means that CE promotion and disclosure focus on resource productivity and improving eco-efficiency, notably based on the 5Rs – reduce, reuse, recycle, recover and restore. This is consistent with the findings of Desing *et al.* (2020), who show that CE is often associated with materials management, which promotes reducing, reusing or recycling within the production, distribution and consumption processes (Cooper, 1999).

Environmental training, or informing residents specifically about CE, has a modest place in municipal disclosure and promotion (see Appendix 3 for an example). We acknowledge the attempt of some municipalities to inform and educate residents about some forms of CE, such as the importance of reducing the generation of waste, decreasing energy and material consumption, recycling and reimagining transportation in a CE, particularly through active transportation. Thus, several municipalities understand CE in a more holistic way and view it as more than just recycling. This expanding understanding of CE in organizations has been highlighted by Kristensen *et al.* (2021) as well as by Schulz *et al.* (2019). Our results allow us to accurately characterize the content of this holistic view. Therefore, our results suggest that changes are taking place regarding CE in the municipal sector, a notion that seems to be in line with the work of Klein *et al.* (2022b). As municipalities could play a major role in changing attitudes toward CE, their contribution must continue and be consolidated.

We noted considerable variability in the form of CE-related disclosure and promotion, although this information is very difficult to find on the municipal websites. Consistent with Wang *et al.* (2014), the CE disclosure quality seems low. To improve transparency and reporting practices, we recommend the creation of a section dedicated to CE that assembles all CE-related information, including public education efforts. Thus, both municipalities and residents could become more aware of CE principles and apply them to foster a transition toward CE.

Municipal councillors with education and experience in environmental or sustainability areas could be vectors of the CE. Consistent with the prior literature on the governing board's impact on voluntary environmental disclosure, our findings highlight the positive impact of councillors' education related to the environment or sustainability on CE disclosure and promotion. Resource dependence theory assumes that boards adapt their composition to facilitate strategic change (Hillman *et al.*, 2000), and this could include a transition to the CE. Upper echelons theory considers education and experience to be important characteristics that affect organizational outcomes (Hambrick and Mason, 1984). Municipal councils are constituted by elected councillors, and their education is not an issue if voters do not apply pressure in that regard. Municipalities could encourage and promote CE principles and practices by implementing a training plan for their councillors, including training on the environment or sustainability or more specific training on CE. Municipal resources (councillors' knowledge and skills) would be upgraded using this training plan.

We provide evidence of a differential effect of councillors' experience on CE disclosure and promotion according to whether the councillors have worked in the public sector or the private sector. Our results show that among the municipalities with a small number of experienced councillors, those with the highest number of council members from the public sector appear to disclose a larger amount of CE-related information. Our findings also show that among municipalities with a sizeable proportion of experienced councillors, those that have the highest number of councillors from the private sector are also likely to disclose a greater amount of CE-related information. Although these results appear contradictory, they

could be explained by a correlation between sector and education, with councillors from the public sector likely having a more extensive educational background in environmental and sustainability issues. Therefore, the first result (municipalities with few experienced councillors) could be due to the public-sector members' greater learning regarding these topics. The public sector therefore appears to attract more of these types of individuals, who subsequently may be more inclined to disclose a greater amount of CE-related information after they join a municipal council, despite their lack of experience. In addition, with regard to the second finding (municipalities with a large proportion of experienced councillors), as the literature notes the private sector's advance in CE practices and the immaturity of the public sector in that area (Guthrie and Farneti, 2008; Shil and Chowdhury, 2018), we could surmise that councillors from that sector, with their greater CE experience, pay more attention to CE-related aspects and support municipalities' transition to CE, and this is reflected in increased disclosure. Governance actors would thus be more active in CE issues when councillors hail from the private sector, particularly because this sector has outpaced the public sector in developing CE-related practices and disclosure (Klein *et al.*, 2020). Governance actors would also be more CE-proactive when councillors have private sector experience, whereas councillors from the public sector may lack practical and other experience even though they may be more educated on the subject. These councillors may also eventually become less active in CE as they accrue experience. The private sector's lead in CE provides an important example of how to develop CE governance in municipalities (Droege *et al.*, 2021b). This process may involve favoring the presence of more experienced individuals from the private sector and less experienced individuals from the public sector as a way to provide maximum support for municipal CE disclosure. These results confirm that cultural aspects and decision-makers' level of CE knowledge and awareness are major determinants of the development and reporting of CE practices (Droege *et al.*, 2021b; Klein *et al.*, 2022b).

These results could also be due to the need for more transparency in the public sector, which would translate into the growth of public reporting by public organizations (Grimmelikhuisen *et al.*, 2017), such as municipalities. The transition to CE requires transparency (Opferkuch *et al.*, 2022), and the need for more transparency could drive councillors from the public sector to increase their CE-related disclosure and promotion.

5.4 Robustness test

We run a robustness test with the most prominent category of CE-related information, effluents and waste, as a dependent variable. Results from this test (not tabulated) are similar to those reported in Table 4.

6. Conclusion

This study investigates the influence of municipal council characteristics on CE promotion and disclosure on websites. Municipal councillors' education and experience related to the environment or sustainability are both likely to affect CE disclosure and promotion, and their sector membership (public or private) moderates the relationship between CE disclosure and promotion and councillors' experience. This experience may be reinforced by membership in the private sector, which has applied CE principles more extensively than the public sector has. Municipal councils with a greater number of councillors from the private sector appear to perform better in matters of transparency and disclose more CE information on their public websites.

Based on our findings, we make some recommendations to municipalities. First, given that CE is a relatively new economic model, citizens need more information to understand it,

so more CE-related information or even training videos should be available. Municipal sites could do more promotion on the subject. Second, a better understanding of CE at municipal council levels is also desirable. Training programs on the environment, sustainable development or CE could be offered to municipal councillors to promote better decision-making. Third, this training should foresee discussion periods to facilitate the transfer of knowledge and good experiences between advisers with diversified experiences (in the public or private sectors). Finally, we recommend that municipalities simplify the structure of their sites and group information concerning the environment or sustainable development in a single section. A subsection on the CE could also bring together all the information on the subject.

This study makes several contributions. It extends the resource dependence and upper echelons theories to a new context, that of public organizations, and highlights the key role of education and experience related to CE. We note that municipal councils appear to adjust their composition to facilitate a transition to sustainable solutions. Upper-echelons theory considers education and experience to be important characteristics for affecting organizational outcomes (Hambrick and Mason, 1984). Councillors' networks, connecting the private and public sectors, make it possible to transfer to the public sector the knowledge and skills acquired through experience in the private sector, adding value to municipalities. We contribute to the literature on CE, Web-based voluntary disclosure and environmental practices by local governments by providing empirical evidence regarding these governments' transparency and increased understanding and engagement toward CE. Our findings also have practical implications. As previously recommended, municipalities could use our results to advance their transition to CE by implementing a training plan for their councillors, including CE training, to foster this transition. A CE-dedicated section on their websites could improve transparency and inform and educate residents about CE. The public sector could learn from the private sector's best practices if the latter would share its human capital to fill the roles of councillors, board members or advisors.

The above findings are subject to a number of limitations. First, although the resource dependence and upper echelons theories provide a framework for investigating the influence of governance on CE disclosure, other overlapping effects can interfere in this application. Second, the content analysis method is subjective (Guthrie and Abeysekera, 2006), but we reduced this subjectivity by coding and validating the coding with various members of the research team (Bhattacharjee, 2012). Third, we assumed that residents were the main intended readers of the CE-related information on the municipal websites. Other sources of information could exist, such as sustainability reports. Future research may extend analysis to these alternative sources and other theoretical settings to gain a holistic view of municipal CE disclosure and promotion. Finally, other factors could influence the quantity of municipal CE disclosure, such as councillors' compensation. In a Canadian context, this compensation varies considerably within and between municipalities. In the future, more in-depth research could be conducted on other municipal characteristics that influence municipal CE disclosure and promotion.

Note

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Appendix 1

Canadian municipalities

Municipality	Province or territory	National population rank	Provincial/territorial population rank
Abbotsford	British Columbia	35	5
Airdrie	Alberta	89	10
Ajax	Ontario	44	22
Aurora	Ontario	95	39
Barrie	Ontario	34	16
Belleville	Ontario	99	42
Blainville	Quebec	93	17
Brampton	Ontario	9	4
Brantford	Ontario	56	27
Brossard	Quebec	67	12
Burlington	Ontario	28	13
Burnaby	British Columbia	22	3
Caledon	Ontario	83	36
Calgary	Alberta	3	1
Cambridge	Ontario	40	19
Cape Breton	Nova Scotia	58	2
Chatham-Kent	Ontario	53	26
Chilliwack	British Columbia	70	15
Clarington	Ontario	60	28
Coquitlam	British Columbia	36	6
Delta	British Columbia	52	10
Drummondville	Quebec	73	14
Edmonton	Alberta	5	2
Fredericton	New Brunswick	92	3
Gatineau	Quebec	18	4
Granby	Quebec	84	16
Grande Prairie	Alberta	88	9
Greater Sudbury	Ontario	29	14
Guelph	Ontario	39	18
Halifax	Nova Scotia	14	1
Halton Hills	Ontario	90	38
Hamilton	Ontario	10	5
Kamloops	British Columbia	63	12
Kawartha Lakes	Ontario	73	33
Kelowna	British Columbia	42	7
Kingston	Ontario	43	21
Kitchener	Ontario	21	9
Langley	British Columbia	45	8
Laval	Quebec	13	3
Lethbridge	Alberta	59	5
Lévis	Quebec	33	8
London	Ontario	15	6
Longueuil	Quebec	20	5
Maple Ridge	British Columbia	71	16
Markham	Ontario	16	7
Medicine Hat	Alberta	87	8
Milton	Ontario	48	23
Mirabel	Quebec	100	19
Mississauga	Ontario	6	3

(continued)

Table A1.
Sample of Canadian municipalities

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Municipality	Province or territory	National population rank	Provincial/territorial population rank
Moncton	New Brunswick	78	1
Montréal	Quebec	2	1
Nanaimo	British Columbia	62	11
New Westminster	British Columbia	81	18
Newmarket	Ontario	69	31
Niagara Falls	Ontario	64	30
Norfolk County	Ontario	86	37
North Bay	Ontario	98	41
North Vancouver	British Columbia	65	13
North Vancouver	British Columbia	96	20
Oakville	Ontario	27	12
Oshawa	Ontario	31	15
Ottawa	Ontario	4	2
Peterborough	Ontario	72	32
Pickering	Ontario	61	29
Port Coquitlam	British Columbia	91	19
Prince George	British Columbia	76	17
Québec	Quebec	11	2
Red Deer	Alberta	54	3
Regina	Saskatchewan	24	2
Repentigny	Quebec	68	13
Richmond	British Columbia	25	4
Richmond Hill	Ontario	26	11
Saanich	British Columbia	46	9
Saguenay	Quebec	32	7
Saint John	New Brunswick	82	2
Saint-Hyacinthe	Quebec	94	18
Saint-Jean-sur-Richelieu	Quebec	57	11
Saint-Jérôme	Quebec	75	15
Sarnia	Ontario	79	35
Saskatoon	Saskatchewan	19	1
Sault Ste. Marie	Ontario	77	34
Sherbrooke	Quebec	30	6
St. Albert	Alberta	85	7
St. Catharines	Ontario	38	17
St. John's	Newfoundland and Labrador	49	1
Strathcona County	Alberta	55	4
Surrey	British Columbia	12	2
Terrebonne	Quebec	47	10
Thunder Bay	Ontario	50	24
Toronto	Ontario	1	1
Trois-Rivières	Quebec	37	9
Vancouver	British Columbia	8	1
Vaughan	Ontario	17	8
Victoria	British Columbia	66	14
Waterloo	Ontario	51	25
Welland	Ontario	97	40
Whitby	Ontario	41	20
Windsor	Ontario	23	10
Winnipeg	Manitoba	7	1
Wood Buffalo	Alberta	80	6

Table A1.

Sources: Created by authors; Classification of municipalities according to [Statistics Canada \(2017\)](#)

Appendix 2

Canadian municipalities

Item	No. of words
<i>Materials</i>	16,303
a. Recycled input material used	8,677
b. Reclaimed products and their packaging materials	7,626
<i>Energy</i>	52,452
a. Energy intensity	7,751
b. Reduction of energy consumption	20,148
c. Reduction in energy requirements of products and services	24,553
<i>Emissions</i>	67,504
a. GHG emissions intensity	17,303
b. Reduction of GHG emissions	50,201
<i>Effluents and waste</i>	238,875
1. Management approach disclosures	9,353
2. Topic-specific disclosure	
a. Garbage: electronics, battery	7,714
b. Garbage: organic compost	67,750
c. Garbage: recycle	63,066
d. Circular economy	352
e. Garbage	–
Other	90,640
<i>Environmental compliance</i>	26,755
a. Garbage guidelines	26,755
<i>Community</i>	27,428
a. Active transportation	7,724
b. Environmental training/education	19,704
<i>Other</i>	20,410
a. Sustainability – generalities	20,410
<i>Total</i>	449,727

Notes: This grid is based on the Consolidated Set of the GRI Sustainability Reporting Standards 2018, available at www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/

Source: Created by authors

Table A2.
Coding grid –
circular economy
disclosure

Circular economy

The City of Richmond’s proposed vision for the circular economy is to maximize the value of resources, by design, through responsible consumption, minimizing waste and reimagining how resources flow in a sustainable, low-carbon economy.

Explaining the circular economy

The current linear economic model for the production of goods and services is based on raw material take-make-use-dispose. This model that seeks to boost short-term consumption is leading the planet to an unsustainable situation.



Figure A1.
Linear economy model, created by the city of Richmond

Note: See full size image

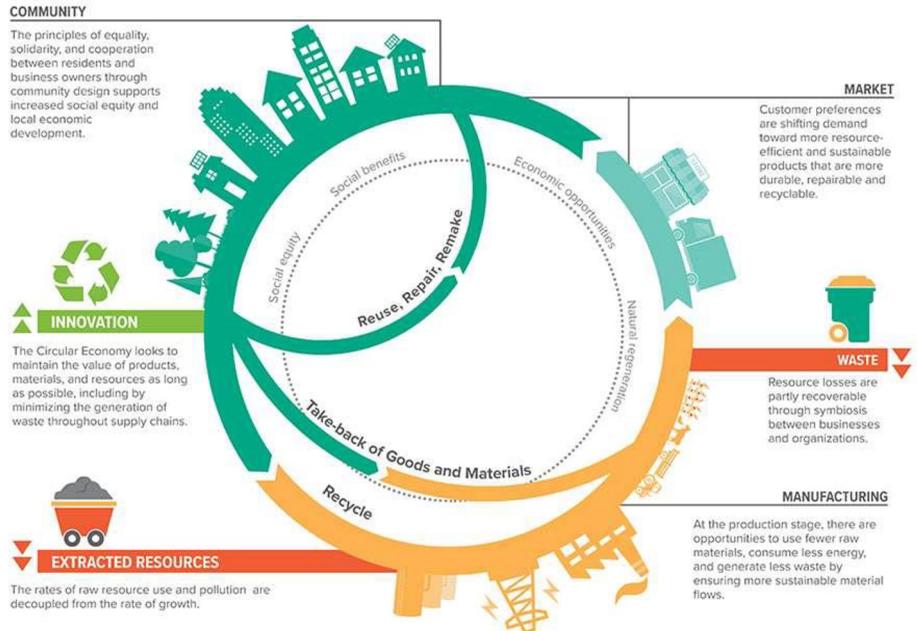


Figure A2.
Preliminary circular economy diagram, created by the City of Richmond

Note: See full size image

If the consumption of natural resources remains in the linear model, the reserves available for some materials will be depleted in a few decades. Coupled with inadequate waste disposal, this over-exploitation of natural resources has also led to environmental problems such as climate change, soil contamination, natural capital lost and human health problems. Thus, it is necessary to rethink the use and application of resources, energy and other assets in our economy and communities.

The paradigm of the take-make-use-dispose system is strongly challenged by the life cycle of nature and conflicts with sustainable development. In nature, there is no waste or landfill: all materials and elements fulfill a function continuously in the ecosystems and are reused in different steps.

Circular economy emerges as a counterpoint to the linear model. This new model combines economic growth with a development cycle that preserves and enhances natural capital, optimizes resource production and minimizes risk through the management of limited resources and renewable loops. In addition, it enables companies to reduce production costs and losses, generate new sources of revenue and reduce their dependence on natural raw materials.

Integrating circular economy into city procurements

In May 2019, Council approved a plan to integrate circular economy practices into the city's procurement process. And while this latest work has just begun, the City has focused on increasing the use of environmentally sound products and services since at least 2000. The reports below provide more information on this topic.

May 27, 2019	 Integrating Circular Economy Criteria into City Procurements	10	Minutes
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Source: Created by authors

Figure A3.
Detailed report on integrating circular economy into city procurements, created by the city of Richmond

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