Decision-making of municipal urban forest managers through the lens of governance

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ABSTRACT

Awareness of the benefits of urban trees has led many cities to develop ambitious targets to increase tree numbers and canopy cover. Policy instruments that guide the planning of cities recognize the need for new governance arrangements to implement this agenda. Urban forests are greatly influenced by the decisions of municipal managers, but there is currently no clear understanding of how municipal managers find support to implement their decisions via new governance arrangements. To fill this knowledge gap, we collected empirical data through interviews with 23 urban forest municipal managers in 12 local governments in Greater Melbourne and regional Victoria, Australia, and analysed these data using qualitative interpretative methods through a governance lens. The goal of this was to understand the issues and challenges, stakeholders, resources, processes, and rules behind the decision-making of municipal managers. Municipal managers said that urban densification and expansion were making it difficult for them to implement their strategies to increase tree numbers and canopy cover. The coordination of stakeholders was more important for managers to find support to implement their decisions than having a bigger budget. The views of the public or wider community and a municipal government culture of risk aversion were also making it difficult for municipal managers to implement their strategies. Decision-making priorities and processes were not the same across urban centres. Lack of space to grow trees in new developments, excessive tree removal, and public consultation, were ideas more frequently raised in inner urban centres, while urban expansion, increased active use of greenspaces, and lack of data/information about tree assets were concerns for outer and regional centres. Nonetheless, inter-departmental coordination was a common theme shared among all cities. Strengthening coordination processes is an important way for local governments to overcome these barriers and effectively implement their urban forest strategies.

1. Introduction

Policy instruments that guide the planning of cities, such as the new urban agenda within the UN Habitat program, recognize that urban greening can help solve some of the pressing environmental and societal challenges of cities (UN-HABITAT, 2018), such as climate change resilience (Doherty et al., 2016) and public health (Shanahan et al., 2015). The agenda also recognizes the importance of establishing new institutional arrangements to assist governments to implement these solutions and strengthen their decision-making (UN-HABITAT, 2018).

A dominant aspect of urban greening is the planting and retention of trees (Escobedo et al., 2010; Norton et al., 2015). Urban expansion, densification, and consolidation are challenges facing the greening agenda (Haislind and Konijnendijk, 2015; Boulton et al., 2018). The densification of existing inner-city areas creates conditions that make it harder to retain urban greenspaces (Fargione et al., 2016; Nastran and
Regina, 2016; Meerow and Newell, 2017). They also make it difficult to retain and grow healthy urban trees (Vogt et al., 2015), thus impacting net-gain of tree-canopy cover (Kaspar et al., 2017; Guo et al., 2018). Consequently, many cities are actively setting long-term goals to plant and retain more trees, and increase tree-canopy cover (e.g., 202,020 Vision Australia, 2019). The success of this agenda depends largely on the people who make decisions about urban trees and who implement those decisions. For trees in the public realm, this usually means the professionals who work for municipal governments and who make strategic and operational decisions (Pincetl, 2010; Lawrence et al., 2013). Here we use social data from interviews with urban forest municipal managers from urban Victoria, Australia, and analyze these data through the lens of governance. We will describe how municipal managers find support for their decision-making to implement their strategies of enhancing tree-canopy cover and tree numbers, and how they are addressing new challenges to deliver sustainable and liveable cities.

2. Theoretical foundations

The concept of governance can be broadly defined as the rules and processes of decision-making that allow stakeholders to influence and coordinate their needs (Lemos and Agrawal, 2006). Governance can help with understanding how people make decisions about what is collectively owned, such as the environment and natural resources in urban areas (Frantzeskaki et al., 2016), including urban forests and trees (Lawrence et al., 2013). Urban forest decision-making describes the process of what, why, and how decisions are made in relation to urban forests, including how trees are planted, protected, maintained, or removed (Konijnendijk, 2000).

Many stakeholders participate in making decisions about urban forests, yet municipal managers play a central role in these decisions. Stakeholders can be broadly defined as those who are affected by the decisions of decision-makers, and who have the power to influence these decisions (Reed et al., 2009). Non-government stakeholders are key for taking decisions about what is collectively owned, including the environment and natural resources (Folke et al., 2005; Arnouts et al., 2012), or a city’s public infrastructure (Rhodes, 1996; Stoker, 1998) and natural resources (Borgström et al., 2006; Ernström et al., 2010; Andersson et al., 2014; Forgione et al., 2016; Frantzeskaki et al., 2016). For instance, residential homeowners make many decisions related to trees that are privately owned (Kendal et al., 2010; Daniel et al., 2016), and community-led greening groups can influence what, why, and how public trees get planted, protected, maintained, or removed (Conway et al., 2011; Connolly et al., 2013) (Fig. 1). Yet, given that their resources and norms are vital for governing public assets (Davies, 2002; Bulkeley, 2010), the decisions taken by governments about assets that are collectively owned or enjoyed are still key (Kiser and Ostrom, 1982). For instance, many of the decisions that influence the strategic direction and day-to-day operations concerning public parks, trees, and greenspaces depend heavily on municipal managers (Sipilä and Tyrväinen, 2005; Mincey et al., 2013). Municipal managers can be highly influential in the decisions related to urban forests and are responsible for resolving the demands being placed on public urban trees.

To understand municipal managers’ views on governance we can either look at the formal mandates of the institutions behind them or elicit ideas directly from managers. Institutions can be broadly defined as human constraints or collectives that structure political, economic, and social interaction (North, 1991). The formal mandates of these institutions establish discourse, or a shared vision and rationale of a policy action, and rules, or what is allowed and not allowed in the management of what is collectively owned or enjoyed (Ostrom, 2005; Arts et al., 2006). Obviously, there is diversity within institutions (Ostrom, 2005); even government institutions and departments may suffer from lack of connectivity and coordination in their discourses (Morrison and Lane, 2005). In urban forests, these discourses can define why and how urban trees are important for municipal governments and the people they represent, and rules define what is allowed and not allowed in their management (Lawrence et al., 2013; Fig. 1). These are usually articulated in municipal documents, such as street tree regulations (called ordinances, bylaws, or other terms, depending on context; Mincey et al., 2013), as well as policies, strategies, and management plans (Davies et al., 2017), and can be complemented by other municipal planning instruments, such as zoning and urban growth regulations (Hill et al., 2010; Mincey et al., 2013). However, many of these formal municipal documents, such as management plans (Gibbons and Ryan, 2015), are sometimes limited in the information they can provide on urban forest governance, specifically, the stakeholders, resources, processes, and rules behind urban forest decision-making.

Empirical studies on the views of municipal managers can also provide us with insights on these issues. A key question here is how municipal managers are finding support to implement their strategies and address new challenges. The new challenges of urban greening include rapid urbanisation and densification; increased attention to public participation and environmental equity and justice; and changing climate and demographic patterns (Haaland and Konijnendijk, 2015; Boulton et al., 2018). In a recent review of existing empirical studies on the views of urban forest municipal managers, Ordóñez et al. (2019) argued that many of these studies are not focused on the processes that could support decision-making – the organizational procedures that help decision-makers govern or manage something effectively and efficiently (Ostrom, 2010; Arnouts et al., 2012) –, such as the coordination of stakeholders, but are more focused on issues of operational capacity (i.e., the resources needed to get the job done, including budgets and personnel; see Driscoll et al., 2015), strategic programming (i.e., a pro-active approach to management, including the existence of a strategy or plan; see Davies et al., 2017), public awareness (i.e., educating the public about the benefits of trees to reduce barriers for tree planting and retention; see Young, 2013), and the technical aspects of tree selection (i.e., what species of trees are planted; see Vecht and Conway, 2015) (Fig. 1). While these studies are insightful, they do not explore how municipal managers find support in processes to implement their strategies and address new challenges.

Some of the important processes that could support municipal manager decision-making include stakeholder coordination, partnership creation, and public engagement (Fig. 1). Stakeholder coordination is important because not all decisions related to trees and greenspaces are made solely by municipal managers or are the direct result of municipal mandates. Non-governmental greening groups (Conway et al., 2011; Connolly et al., 2013; Varuzzo and Harvey, 2017), other municipal units (Young, 2013; Driscoll et al., 2015), and land owners and developers can influence decisions about urban greenspace and trees (Newig et al., 2010; Molin and Konijnendijk van den Bosch, 2014; Meerow and Newell, 2017). However, many greening groups only operate in specific areas, particularly in high-income communities (Conway et al., 2011; Greene et al., 2018). In addition, different stakeholders have different power, or the capacity to influence outcomes in the management process (Newig et al., 2010). The distribution of power among stakeholders may be uneven, with some stakeholders more connected to the higher levels of strategic planning within government and more capable of influencing resource allocation (Campbell, 2016). While partnerships can help managers coordinate the input of multiple stakeholders (Brandt et al., 2016; Forgione et al., 2016; Kozová et al., 2018), and address uneven power distributions (Campbell, 2016), many cities cannot afford to have a pro-active approach to partnership creation due to lack of resources (Newig et al., 2010; Molin and Konijnendijk van den Bosch, 2014). Public engagement receives a lot of attention in urban forestry (e.g., Gülsrud et al., 2018), since the mandate of municipalities is to provide services to the public. While some managers consider public consultation a way to enhance public acceptance of tree-planting programs (Kirkpatrick et al., 2013), most research on the view of municipal managers focuses on...
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<td>Stakeholders</td>
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<td>Rules of the Game</td>
<td>Ownership, Processes, Regulations, Access &amp; Rights, Participation, Monitoring &amp; Evaluation, Government Style</td>
<td>Processes Regulations Participation</td>
<td>Street tree bylaws or ordinances Coordination of stakeholders Coordination of departmental units Public participation</td>
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<td>Resources</td>
<td>Operational Funding, Operational Personnel, Knowledge, Delivery</td>
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Fig. 1. Urban forest governance framework used in this study, indicating concepts used for data aggregation and interpretation (based on Arts et al., 2006; Frantzeskaki et al., 2016; Buijs et al., 2016, 2018; Lawrence et al., 2013, and Boulton et al., 2018).

their views about raising public awareness rather than improving engagement (Ordóñez et al., 2019). It is still unclear how public engagement can support the decision-making of municipal managers.

Urban forest governance processes may vary among jurisdictional boundaries and cities, and these differences may reflect differences in the characteristics of urban areas, characteristics that may include level of development, population density, population growth. Many cities contain different urban areas varying from areas of high development and high population density, to areas of low density and high population growth, and everything in between. These characteristics and their variation influence the way we understand a local government as a unit of experience. This idea is reflected in lens of urban-rural gradients, a lens that has been useful for understanding the linkages between the ecological, social, and physical characteristics of cities and urban centres (McDonnell and Pickett, 1990; Pickett et al., 2001; Halls and McDonnell1, 2006; Dobbs et al., 2013). This lens can allow us to integrate insights from several case studies, helping us understand what is common or different among cities and urban centres, and helping us avoid the local trap (Buijs et al., 2018). Yet, most integrative studies on urban forest governance come from Europe. For example, Lawrence et al. (2013) for the UK, Germany, and Italy; Sipilä and Tyrväinen (2005) for Finland; Molin and Konijnendijk van den Bosch (2014) for Denmark; Kozóvá et al. (2018) for Slovakia; and Buijs et al. (2018) for several European cities, but mostly on citizen-led greening initiatives. While the urban-rural gradient lens could be useful for understanding urban forests, it has rarely been used to study urban forest governance using empirical data on the perspective of key stakeholders.

3. This study

This study aims to understand the issues and challenges, stakeholders, resources, processes, and rules behind the decision-making of municipal managers in an in-depth and qualitative manner. We focus on how municipal managers find support in processes to facilitate their decision-making. To meet these goals, this study asked the following research questions:

1) What are the priorities/strategies, as well as new issues and challenges, taken into consideration in the decisions made by municipal managers?

2) Who participates in these decisions?

3) What are the resources available for these decisions?

4) What rules and regulations are considered when making these decisions?

5) How is the public or wider community involved in these decisions?

6) How do these vary across urban centres?

This study complements existing literature on urban forest governance and stakeholder decision-making by exploring these topics through the perspective of municipal managers. This research makes a significant contribution to the existing literature since existing research on the views of urban forest municipal managers is not based on governance frameworks and only provides a limited understanding of urban forest governance and decision-making. This includes improving our understanding on how municipal managers find support in governance processes to implement strategies and address new challenges, processes such as coordinating stakeholders, creating new partnerships, and engaging with the public. While we recognize that this single-actor perspective limits a broader understanding of urban forest governance, particularly on the role of non-government, the purpose of this study is to explore decision-making from the perspective of this pivotal urban-forest stakeholder. In addition, the literature on urban greening governance is usually based on spatially discrete public open space and greenspaces, such as urban parks (see Haaland and Konijnendijk, 2015; Boulton et al., 2018). Focusing on urban forests, defined here broadly as all the trees in a city (Konijnendijk et al., 2006), is important because urban trees are not necessarily confined to discrete public greenspaces and provide the foundation for urban biodiversity in many other areas of a city besides urban parks. Trees can also exist in spaces surrounded by houses and buildings, and in both public and private lands, providing environmental and social services across different scales (i.e., as individual trees or as urban forest canopy; see Livesley et al., 2016). Therefore, in this study, we do not specifically refer to the urban forest as a publicly owned resource. This is because administrative boundaries, ownership, and/or tenure specifications for the urban forest are only vaguely addressed in many municipal documents (Schmied and Pillmann, 2003; Mincey et al., 2013; Ordóñez and Duinker, 2013; Ordóñez and Duinker, 2013; Watson, 2015). For example, in Australia, it is common for cities to strategically refer to the urban forest as a continuous resource, spanning both public and private areas (Kelly, 2014; Jones and Instone, 2016).
These questions are explored in several cities across the state of Victoria, Australia.

4. Methods

4.1. Context

The state of Victoria (34–39°S, 141–150°E), Australia, covers approximately 227,600 km², and is the country’s second smallest state. With 6.4 million people, it is also the second most populous state (ABS 2018). Climate across the state varies widely, but most of it is in a warm, temperate region, characterized by warm and dry summers, and cool and wet winters. Summer temperatures range 14–23 °C in the coast, 16–31 °C inland, and 11–20 °C in the mountains, and winter temperatures 7–14 °C, 5–16 °C, and 0–5 °C, respectively. Some areas receive rainfalls of more than 1000 mm per year, while others average as little as 327 mm per year (BMO, 2019). This varied but mild climate manifests in a diverse vegetation (Fig. 2).

The capital and most important urban area of the state is the Greater Metropolitan Area (GMA) of Melbourne (37.49°S, 144.58°E). Other urban centres across the state include regional city centres, such as Mildura, Shepparton, Wangaratta, Ballarat, Bendigo, and Geelong, the last three being the largest regional cities, all located within 150 km of the Melbourne GMA. Regional cities are important historical and economic areas, and some are becoming residential locations for people working in the Melbourne GMA (VPA 2018; Fig. 2).

The Melbourne GMA, also known as Greater Melbourne, covers 9992.5 km² and has the second biggest (approximately 4.9 million; City of Melbourne, 2018) and fastest growing (2.7 % growth from 2016 to 2017; ABS, 2018) urban population of Australia. It is characterized by a Mediterranean oceanic climate (Köppen classification; BMO, 2019) with a daily mean temperature of 9–15 °C, and a mean annual rainfall of 600–1100 mm (BMO, 2019). The GMA is divided into 32 local government authorities (LGAs; henceforth, local governments). Greater Melbourne is a rapidly urbanizing area, with clear policies aimed at urban densification and avoiding urban sprawl. Urban planning in Victoria is based on a hierarchical system of government, with the Victorian State government setting the strategic planning direction for cities, and local governments making decisions about locally significant matters (Infrastructure Victoria, 2016). Local government budgets are currently subject to rate capping (MAV, 2017).

Urban forests are important in urban planning in Victoria. For example, the City of Melbourne is a world leader in urban forestry (City of Melbourne, 2012; Gulsrud et al., 2018). Many other cities have recently developed urban forest strategies (e.g., City of Moreland, 2017) and currently participate in creating a metropolitan urban forest strategy for Greater Melbourne to coordinate the urban forest agenda efforts across city councils (Resilient Melbourne, 2019). Issues of priority in this agenda include the multifunctionality of urban greenspaces (Ives et al., 2013; Phelan et al., 2018) and having enough space for growing trees within intensified urban development (Kaspar et al., 2017).

The urban forest of Greater Melbourne has some important characteristics. Its uneven tree-canopy distribution varies according to neighbourhood age, income, and education level (Kendal et al., 2012; Dobbs et al., 2013). Low tree diversity is a concern in Greater Melbourne. Local governments have a long history of planting exotic European tree species in parks and streets, such as “English elms” (Ulmus procera and/or minor) and “London planes” (Platanus x acerifolia). To
maintain the European heritage of their central districts, some cities only allow exotic trees in these areas (e.g., City of Ballarat, 2018). More natural areas contain more native and/or indigenous tree species, such as river red gum (Eucalyptus camaldulensis; City of Moreland, 2017). Climate change is a major challenge, with significant droughts, heatwaves and flooding causing various impacts to urban trees in recent decades (May et al., 2013; Nitschke et al., 2017).

4.2. Design & methodology

This study used qualitative research methods to elicit and analyse the views of municipal managers from a sample of cities across Greater Melbourne and regional Victoria. Qualitative research is an exploratory, descriptive, and explanatory approach that seeks to understand the experiences and opinions of individuals or collectives, while relying heavily on their views to generate this knowledge (Creswell, 2018). The method of Grounded Theory, a strategy of inquiry based on interpretative procedures, was used here to discover concepts, generate theory, reveal the underpinnings of social phenomena, and build a model for understanding an issue from the perspective of our participants (Glaser and Strauss, 1967). Rather than relying on lengthy descriptions, Grounded Theory generates results in terms of the frequency and hierarchical structure of ideas (Corbin and Strauss, 2015).

Because the intention was for municipal managers to elaborate on the research questions in this study (i.e., questions 1–5 above, section 3 “This Study”) with some context, participants in the study were asked to think about specific instances of urban forest decision-making, specifically, events of tree planting, removal, or retention. This approach brought the decision-making process to life from the perspective of those making or participating in decisions. It connected the strategic direction and day-to-day operations of a city’s urban forest activities with events that illustrated change in the urban forest. As discussed above, we did not make the questions specific about public or private trees because many municipalities, including Australian ones, define the urban forest as a continuous resource, comprised by both privately and publicly owned trees (see Ordóñez and Duinker, 2013; Jones and Instone, 2016). While we recognize that most decisions that municipal managers make would be about publicly owned trees, we did not assume this in our questions. It was up to the participant to decide whether they wanted to refer to public or private trees.

An adapted urban-rural gradient approach was used to understand the unique experience of a city or urban centre, relying on similar approaches in Greater Melbourne (see Theoretical Framework; also Dobbs et al., 2013; Hahs & McDonnell 2006). Cities representing four local government types were used: 1) a state capital city centre and central business district (centre); 2) local governments surrounding the city centre (inner); 3) local governments in the outskirts of Greater Melbourne (outer); and 4) several regional state cities (regional). These local government types range from areas of high development and population density (centre, inner), to areas of low density and high population growth (outer), and everything in between. While there are variations in the way cities are classified in different state government departments, with different typologies referring to different characteristics, such as intensity of development, age of area, residential patterns, and population growth, the classification used here responded to the planning guidelines of the Victoria Planning Authority (2018; Fig. 2). The urban-rural gradient lens was not used to generalize results for all local governments in Victoria, as this assumes representativeness. Rather, the lens allowed the exploration of the research questions in cities that share similar characteristics and represent units of experience.

A common misconception of the method of Grounded Theory is that it ignores existing theory, but instead we share the perspective that the method can expand and/or build on previous theory (Suddaby, 2006). The framework adapted from urban greenspace and urban forest governance studies that was presented in Section 2 (Fig. 1), was used to aggregate ideas generated by the data analysis.

4.3. Data collection

In-depth, semi-structured, interviews were conducted by the lead author with urban forest municipal managers during April to July 2018. Participant recruitment followed sampling procedures typical to the Grounded Theory method (Corbin and Strauss, 2015), based on willingness to participate and open to any adult professional. Participants working in an urban forest management capacity in a local government were approached and invited to participate in the interview via email, using stratified snowballing techniques to connect with other participants from the different local governments (Fig. 2). The study aimed for at least 20 participants, which is the median of participants in qualitative research studies on the views of urban forest managers (Ordóñez et al., 2019). The following recruitment protocol was followed: 1) at least two cities representing one local government type (except centre, which included only one city) were contacted; 2) at least two people in each city were contacted; and 3) one-to-one interviews were scheduled wherever possible. Some of these parameters were not met due to lack of participant availability. For example, four cities only had one participant; three cities had three participants; and three interviews were carried out with two participants at the same time. All other local governments had two participants each and most interviews were carried out one-to-one. The local governments in the study fit within broader Melbourne socially as well as geographically in terms of population sizes, income level, cultural diversity, and other socio-demographic indicators (Table 1). Together, the local governments studied represented a population of 1.77 million, or approximately 28% of Victoria’s population of 6.4 million. Interviews were carried out in English, and were audio recorded to capture the direct voice of participants. These audio-recordings were all transcribed. Ethics approval for research with human subjects was obtained from the University involved (Ethics ID Number: 1750430), and informed consent was obtained from all participants. In order to adhere to the privacy policy in the Ethics with human subjects guidelines, and because some contact information for urban forest managers in the participating local governments is publicly available, we do not openly reveal the local governments studied to ensure participant anonymity and confidentiality.

4.4. Data analysis

All transcribed and audio data were imported into NVivo 12 Pro (developed by QSR International, 2018). Grounded theory describes an inductive research method where theory is derived from the data and grounded on the view of participants. Coding is the principal technique of interpretation in grounded theory. Coding is done via the interpretation of participant responses and by assigning words that convey ideas that densify or simplify the meaning that the participants are trying to communicate. These ideas are then grouped into other ideas of a higher hierarchy (also called code clusters or themes in grounded theory). The procedure of grouping codes into clusters or themes is also known as hierarchical grouping, and it helps to add structure to the codes generated in the interpretative analysis, allowing researchers to assign relationships and relate ideas at a higher level of abstraction. Ideas are extracted until no more information can be extracted from the data (also called coding or theoretical saturation in grounded theory; see Corbin and Strauss, 2015). Codes in this study were assigned to the data to convey ideas that emerged from the transcribed text, rather than being forced upon the data (i.e., inductive interpretation; see Kelle, 2007). Codes in this study were aggregated into hierarchical groupings that related to the themes in our analytical frameworks (Figs. 1 and 3). Only codes mentioned more than twice, and in more than two interviews were used for this aggregation (Table 2). Sources were classified by government type (Fig. 2; “cases” in Table 2). Once the coding was finalized, we classified areas of text according to the specific instances
of urban forest decision-making, chiefly, events of tree planting, removal, or retention, mentioned by the participants (“types of events” in Table 2). The query and relationships functions of NVivo 12 aided the exploration of codes across local government types and types of events (Table 2). The data analysis was carried out by the lead author. The coding analysis resulted in an average of 99.9 ± 5.2 codes per interview. The coding analysis resulted in an average of 62.1 ± 2.4 min per interview. The coding analysis resulted in an average of 24 h of audio recordings with an average of 12 local governments representing four different local government types, as based on our classification (i.e., centre, inner, outer, and regional). The data represented a total of 24 h of audio recordings with an average of 62.1 ± 2.4 min per interview. The coding analysis resulted in an average of 99.9 ± 5.2 codes per interview. Results are presented in terms of the frequency of ideas and their aggregation, or clustering (Fig. 4) and coding patterns of ideas across local government types (Fig. 5).

First, urbanization processes, particularly those related to urban expansion and densification, are frequently mentioned as issues that make it difficult for municipal managers to implement their strategies. These processes have brought stakeholders, such as state actors, other municipal departments, and developers, into the decision-making process of managers (Fig. 4). The coordination of departments and stakeholders were frequently mentioned as important processes for managers to support their decision-making, more so than some operational issues, such as bigger budgets (Fig. 4). However, implementing these coordination processes depended on key capacities, such as the capacity to communicate strategies to stakeholders (Fig. 4). The effect of urbanization processes on tree retention and removal was very evident given that participants were mostly thinking of tree removal events as specific instances of their decision-making (Fig. 5).

Second, the public or wider community was mentioned frequently by municipal managers. Community views, a culture of risk aversion, increased demand for active use of greenspaces or parks (e.g., for sports), and increased infrastructure conflicts, were frequently mentioned as issues that make it difficult for municipal managers to implement their strategies. Strategies of tree retention, trees in private lands, and positive promotion of urban trees were frequently mentioned as ways to counterbalance the loss of trees in public and private spaces (Fig. 4).

Finally, the issues affecting decision-making in urban forests is not the same across the types of local government. Unsurprisingly, urban expansion, increased active use of greenspaces, lack of data/information about tree assets, and infrastructure conflicts were more frequently referenced in outer and regional local governments. Lack of space to grow trees in new developments, excessive tree removal, public consultation, community views, stakeholder coordination, strategies for trees in private land, political leader support, and climate change, were ideas more frequently raised in centre and inner local governments. Nonetheless, a culture of risk aversion, strategy/plan implementation, inter-departmental coordination, and budgets, were shared ideas among all local government types (Fig. 5).

### 6. Discussion

The results of this study have helped us answer our question about the priorities/strategies, and new issues and challenges, being taken into consideration by municipal managers in their decisions. These
results support the findings of recent reviews on the challenges of urban greening and urban forestry, particularly urban expansion and densification (Haaland and Konijnendijk, 2015; Boulton et al., 2018). We extend this literature by using empirical data to elaborate on the consequences of these challenges for manager decision-making. A consequence of these new challenges is that multiple stakeholders are participating more in the decisions of municipal managers, including state actors, developers, and residents. Co-governance (Ostrom, 2010; Arnouts et al., 2012; UN-HABITAT, 2018), also termed in other contexts as network or polycentric governance, can better engage multiple stakeholders in the decisions related to urban greenspace (Frantzeskaki et al., 2016; Forgione et al., 2016; Buijs et al., 2016; 2018). Our results

Table 2
Selected participant characteristics.

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<th>Characteristic</th>
<th>Details</th>
<th>Number of cases / Details</th>
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<td>Gender</td>
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<tr>
<td></td>
<td>Male</td>
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</tr>
<tr>
<td></td>
<td>Other</td>
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<td>Number of years in urban forests/greening</td>
<td>Average number of years working in the field of urban forestry or urban greening</td>
<td>17.5 ± 1.8 years</td>
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<td>Number of years in local government</td>
<td>Average number of years working with local government</td>
<td>8.9 ± 1.9 years</td>
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<tr>
<td>Education</td>
<td>Post-graduate degree</td>
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<td></td>
<td>Bachelor’s degree</td>
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</table>
show that implementing co-governance depends heavily on the coordination of departments within municipal government and the coordination of other stakeholders. These involve two key processes: how municipal managers coordinate the inputs of other departments and stakeholders; and how municipal managers communicate their strategies to other departments and stakeholders. Our results also show that local governments are responding to these pressures by developing new strategies not focused on increasing canopy cover and the number of trees, such as strategies of tree-retention and trees in private lands.

Our results confirm the findings of studies that suggest that processes, such as inter-departmental coordination (Young, 2013), are critical for urban forest managers to make decisions. Here we contextualize the importance of these processes alongside other factors, particularly issues related to the resources and regulations available to municipal managers. Many other past studies on the views of municipal managers that have focused heavily on the importance of resources, such as size of budgets and personnel (Ordoñez et al., 2019). This has generated a dichotomy as to whether good governance emerges from having enough resources or from effective coordination. Clearly, both are needed, but for local governments with healthy budgets, such as those studied here, effective coordination is becoming more and more important to implement strategies and address new challenges. In this study, the frequency of mention of ideas related to maintenance costs, budgets, and personnel mean that local governments are required to invest more personnel time and budget to maintain trees. This relates to research that shows that it is difficult to grow healthy trees in denser urban environments (Vogt et al., 2015). Nonetheless, the higher frequency of mention of ideas related to coordination processes also shows that governments are not monolithic institutions (Ostrom, 2005; Tosun and Lang, 2017). Policy coordination is not a new issue in urban forestry, and other authors have noted how local government policies are not necessarily perfectly aligned across departments (e.g., Rullion et al., 2002; Hauer et al., 2008; Rines et al., 2011; Zhang and Zheng, 2012; Mincey et al., 2012; Gweda and Shackleton, 2015; Ugolini et al., 2015, 2018; Benchimol et al., 2017). While activities such as the development of an urban forest strategy or plan can serve to align the policies and intentions of different local government departments and levels of government (Driscoll et al., 2015; Gibbons and Ryan, 2015; Davies et al., 2017), the long-term implementation of these strategies or plans still depends heavily on coordinating decisions across these departments and levels of government. Our study complements this literature on policy coordination and suggests that the coordination of policy must accompany coordinated decision making. Thus, improving the coordination of municipal department and stakeholder decisions is a critical aspect of urban forest governance.

Our research question related to how the public or wider community is involved in the decisions of municipal managers has helped us elicit important ideas about public engagement. To successfully implement an urban forest agenda, local governments must successfully engage with the public (Sipilä and Tynrőinen, 2005; Nastran and Regina, 2016; Kozová et al., 2018), not only for reducing barriers of public acceptance (Kirkpatrick et al., 2013; Young, 2013; Haaland and Konijnendijk, 2015) or to add more greenspace and trees, but to increase community stewardship of the urban forest (Connolly et al., 2013; Buijs et al., 2018). Yet, our results show that community views and a culture of risk aversion of local governments can make it difficult for municipal managers to implement their strategies. Our results show that implementing public engagement depends heavily on capacities related to how municipal managers coordinate the inputs of the public, and how they communicate their strategies. Implementing strategies currently being entertained by local governments about influencing the decisions about privately owned trees may be an opportunity for these governments to successfully engage the public. However, these strategies need to be aligned with equity considerations, given that many areas with an abundance of privately-owned trees usually represent high income residents (Conway et al., 2011; Varuzzo and Harvey, 2017;
Fig. 4. Frequency of mention of codes classified by themes based on data elicited from the municipal managers; note that ideas and themes reflect the content of our conceptual framework (Fig. 1).
This means that only engaging the communities located in areas with privately-owned trees to implement retention strategies may over-represent the views of high-income residents in engagement processes.

Our final question was about how all these issues above vary across urban centres. Our results show that not all urban centres are affected by the same issues or prioritize strategies in the same way. For example, only central and inner-urban centres were interested in public participation, and this could be related to the fact that they are dealing with a more engaged public, or that these cities have the resources to undertake extensive public consultation, or because they see benefit of engaging the public in their decisions (Gulsrud, 2018). In contrast, outer and regional centres find issues of urban expansion, increased active use of greenspaces, and lack of data/information about tree assets as more important in the decisions they make. Nonetheless, all urban centres considered coordination and a culture of risk aversion as important issues. It is difficult to discuss these results in the context of the research on the views of municipal managers, since most of this research focuses only on how personnel and budget sizes, among other operational issues, differ among urban centres (Ordóñez et al., 2019). Efforts to create metropolitan-wide strategies that integrate the diverse needs of a wide range of local governments will likely fail if they focus solely on increasing tree numbers and urban tree-canopy, and do not address issues of coordination, risk aversion, and public engagement.

7. Conclusion

Understanding urban forest governance and decision-making from a local government perspective can complement non-government perspectives. Urban expansion and densification in urban areas facing population growth and intensifying development are challenging the implementation of the urban forest strategies designed by local governments. But allocating more resources on the more tangible aspects of urban forests, particularly urban tree planting and urban tree maintenance, will not by itself improve the implementation of these strategies. Facilitating stakeholder coordination, partnership creation, and public engagement, may be more important for some local governments. No two municipalities are the same, and central and inner urban centres face different challenges and prioritize issues differently than outer and regional centres. Future research could focus on assessing how coordination processes influence urban forest management objectives, such as increase in tree-canopy cover and tree numbers, which are becoming key performance measures for delivering sustainable and liveable cities. Finding ways to quantify these relationships, and quantifying how municipal managers prioritize these issues, are also worth exploring. The empirical qualitative social science data presented here can help build quantitative data collection instruments, such as surveys or questionnaires. It is still unclear how the style of local government (e.g., authoritative government, etc.) can influence urban forest governance. This was not an issue mentioned by the participants of this study as an important issue. Also, capturing information about...
government styles is nuanced, since representative governments can be transient; government style typologies (e.g., populist vs. authoritarian) may not be applicable in some geo-political contexts; and eliciting this type of information directly from research participants raises issues about the effectiveness of social science research, since it is difficult to ask these questions without priming responders and influencing the answers.

Declaration of Competing Interest

The authors declare that there are no conflicts of interest.

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