

MASTER'S THESIS

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Barriers for implementing Circular Public Procurement; a case study of procuring Employee Mobility Solutions in Norwegian municipalities.

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PART 1: Kappe

Summary

This Master Theses, titled "Barriers for implementing Circular Public Procurement: a case study of procuring Employee Mobility Solutions in Norwegian Municipalities," explores the barriers Norwegian municipalities may have when incorporating Circular Public Procurement (CPP) principles into their procurement of employee mobility solutions. Using qualitative data from interviews with eleven municipal officials and industry experts, the study identifies and analyzes key barriers challenging the adoption of circular principles to both their financial and sustainable goals.

The paper starts with highlighting the importance of public procurement (PP) in driving the transition to a circular economy (CE). Specifically, it focuses on employee mobility solutions and examines barriers to their procurement through circular approaches. The guiding research question is: *“What are the barriers for circular public procurement of employee mobility solutions in Norwegian municipalities?”*

The literature review covers the shift from traditional Public Procurement (PP) methods to Green Public Procurement (GPP), Sustainable Public Procurement (SPP), and finally Circular Public Procurement (CPP). It discusses the differences and connections between these concepts and their role in promoting CE.

Regarding implementing Circular Economy (CE), the review provides an overview of the 9R framework of Kirchherr et al. (2017), which categorizes strategies from smarter product use to recovering materials. The Master Theses focuses specifically on the two most circular strategies; R0 Refuse and R1 Rethink which is fundamental in procurement optimization.

Finally, the literature review covers the barriers of CPP, and how they have been categorized by prior research.

The paper adopts a qualitative case study approach, conducting semi-structured interviews with nine respondents from four municipalities and two industry experts in February and March of 2024. The interviewees included procurement officials, top municipality management, and mobility managers.

The four main barriers identified are as follows:

Lack of Top Management Knowledge: The top management often lacks awareness of the financial and environmental implications of current mobility policies. They may also fail to understand the potential of available circular solutions.

Decentralized Decision-Making: Decentralized ownership of existing mobility solutions and decision-making on need-assessment and procurement, hinder the change towards utilizing circular procurement principles.

Financial and Human Resource Constraints: Short-term financial constraints and insufficient expertise restrict municipalities' ability to invest in CPP for their long-term financial and sustainable goals.

Organizational Culture Resistance to Change: Organizational resistance to change, driven by employee preferences and cultural norms, restricts the adoption of shared or circular solutions of employee mobility.

Our results confirm that the transition to CPP is not merely an extension of GPP; it demands a systemic change encompassing organizational structures, policies, and cultures. Future research could benefit from a broader empirical base, including municipalities at different stages of CPP integration, other fields of procurement, and a more diverse range of stakeholders, including suppliers and end-users.

1.0 Literature Review and Theory

1.1 The evolution of Public Procurement

Public procurement (PP) can be defined as “*the acquisition of goods and services by government or public sector organizations*” (Uyarra & Flanagan, 2010) and is leveraged by public actors like municipalities to acquire education, leisure, and social services (Walker & Preuss, 2008).

While the main goal of public procurement is to acquire products and services so end-users can fulfil their tasks, public procurement can also be used to achieve social, environmental or other objectives, known as horizontal objectives (Arrowsmith, 2010). When including these horizontal objectives, purchasing is “*made not only because of the benefits from those products, works or services directly, but also because of the other resulting benefits*” (Arrowsmith, 2010, p. 169).

Horizontal objectives can be divided into three parts, 1) environmental objectives, such as green public procurement with requirements to the environmental properties, 2) social objectives, for example social clauses and 3) economic and political objectives, like promoting local actors or SMEs in public larger procurements (Kristensen et al., 2021).

It started with Green public procurement (GPP) trying to include environmental criteria in procurement. GPP was defined as “*a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured*” (European Commission, 2008, p. 4).

Later, a new term was developed with the focus on sustainability, and considering both the environmental, social, and economic aspects of procurement. Sustainable public procurement (SPP) was defined as “*a process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only for the organization, but also for the society and the economy, whilst minimizing damage to the environment*” (United Nations, 2013, p. 11).

Both terms green public procurement (GPP) and sustainable public procurement (SPP) have been used to identify how public procurement can be used as a policy instrument for reaching environmental quality objectives (Aldenius & Khan, 2017).

1.2 Towards Circular Public Procurement (CPP)

Sönnichsen and Clement (2020) made an extensive literature review on public procurement. Their research scrutinized the literature on GPP and SPP and introduced the term circular public procurement (CPP). Their concept of CPP is considered on methods, tools and practices from the circular economy.

Circular Economy can be defined as, “*an economic system that is based on business models which replace the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (ecoindustrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations*” (Kirchherr et al., 2017, pp. 224-225).

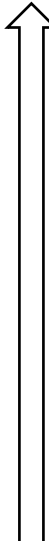
Kirchherr, Reike & Hekkert (2017) introduced their 9Rs framework (Potting et al., 2017) for distinguishing between the most circular economy strategies to the most linear economy strategies.

The top CE strategies in their framework are the R0 Refuse, R1 Rethink and R2 Reduce strategy with the goal of smarter product use and manufacture. In the middle there are R3 Reuse, R4 Repair, R5 Refurbish, R6 Remanufacture and R7 Repurpose with the goal of extending lifespan of product and its parts. At the bottom there are R8 Recycle and R9 Recover with the goal of getting a useful application of the materials.

The top two circular strategies aim to “*make product redundant by abandoning its function or by offering the same function with a radically different product (R0-Refuse)*” and “*make product use more intensive (e.g. by sharing product) (R1-Rethink)*” (Kirchherr et al., 2017, p. 224).

Table 1

The 9R framework

| Circular economy | | Strategies | | |
|---|---|--|--|--|
|  Smarter product use and manufacture | R0 Refuse | Make product redundant by abandoning its function or by offering the same function with a radically different product | | |
| | R1 Rethink | Make product use more intensive (e.g. by sharing product) | | |
| | R2 Reduce | Increase efficiency in product manufacture or use by consuming fewer natural resources and materials | | |
| | R3 Reuse | Reuse by another consumer of discarded product which is still in good condition and fulfils its original function | | |
| | Extend lifespan of products and its parts | R4 Repair | Repair and maintenance of defective product so it can be used with its original function | |
| | | R5 Refurbish | Restore an old product and bring it up to date | |
| | | R6 Remanufacture | Use parts of discarded product in a new product with the same function | |
| | R7 Repurpose | Use discarded product or its parts in a new product with a different function | | |
| Linear economy | Useful application of materials | R8 Recycle | Process materials to obtain the same (high grade) or lower (low grade) quality | |
| | | R9 Recover | Incineration of materials with energy recovery | |

(Kirchherr et al., 2017, p. 224)

The principle of "Refuse" (R0) suggests municipalities could significantly benefit from adopting a more stringent approach to mobility procurement. By refusing to purchase or lease more vehicles than necessary, municipalities can avoid the resource inefficiency associated with maintaining underutilized vehicles. Implementing strict needs-assessment protocols before acquiring new vehicles can help in this regard, potentially leading to a decrease in the total number of vehicles owned or leased, thus aligning with circular economy principles by minimizing waste and resource use.

The "Rethink" (R1) principle encourages a fundamental reassessment of mobility needs and solutions within municipalities. This could involve exploring alternative, more flexible forms of transportation, such as car-sharing schemes or using electric bicycles for shorter trips, which can be more efficient and better utilized. Rethinking mobility in this way not only

addresses issues of underutilization but also promotes the adoption of greener, more sustainable transportation options, contributing to broader environmental and sustainability goals.

CPP can be considered as the knowledge of green public procurement with circular principles (European Commission, 2017). The European Commission defines circular public procurement as *“the process by which public authorities purchase works, goods or services that seek to contribute to closed energy and material loops within supply chains, whilst minimizing, and in the best case avoiding, negative environmental impacts and waste creation across their whole life-cycle”* (European Commission, 2017, p. 5).

Transitioning to a circular economy requires actions from all actors, with public institutions often presented as one of the key ones due to their purchasing power.

1.3 Connecting green, sustainable and circular public procurement

As the concepts of GPP, SPP and CPP have many similarities, for semantic simplification, both Sönnichsen and Clement (2020) and Ntsonde and Aggeri (2021) propose using the term CPP when referring simultaneously to GPP, SPP, and CPP in their research.

Other researchers, however, underline the differences between CPP, SPP, and GPP, and set forth a specific definition for CPP. Alhola et al. (2019) points out that even if SPP and GPP literature is closely linked to the circular economy, it does not fully address the concept of a circular lifecycle, and that SPP and GPP are more product- and technology-oriented.

CPP aims to include networks and ecosystems and introduces circular procurement as *“a procurement of competitively priced products, services, or systems that lead to extended life spans, value retention, and/or remarkably improved and non-risky cycling of biological or technical materials, making use of and supporting the circular business models and related networks”* (Alhola et al., 2019, p. 105).

Yet, insight in the managerial and institutional dynamics that are able to support and implement circular public procurement practices, have not yet been outlined (Sönnichsen & Clement, 2020).

CE has been paired with PP in recent years, but CPP is more than introducing green criteria into the mix as it also requires new ways of thinking about needs, processes and the organizations (Alhola et al., 2019; Witjes & Lozano, 2016).

When Sönnichsen and Clement (2020) did their review on CPP, they found only two articles (Alhola et al., 2019; Witjes & Lozano, 2016) under the keywords circular public procurement. The rest were found under green and sustainable public procurement, even if they were conceptually comparable to CPP.

Klein, Ramos & Deutz (2020) also highlighted the need for more research into the process of integrating Circular Economy in Public Procurement, including how to overcome barriers for CPP.

1.4 Barriers for Circular Public Procurement

While there have been researchers studying barriers and enablers of green and sustainable public procurement, the literature on barriers and enablers for CPP is scattered.

Barriers and enablers of SPP and GPP has emphasized factors such as inadequate expertise and the importance of active top-level management (Brammer & Walker, 2011), policy issues (Melissen & Reinders, 2012), and a lack of financial and human resources (Grandia, 2015).

Sönnichsen and Clement (2020) reviewed the transition from green and sustainable to circular public procurement from an organizational and operational aspects but did not do a comprehensive analysis of barriers and enablers. Others, like Kristensen et al. (Kristensen et al., 2021) explored barriers for circular public procurement practices in Danish municipalities, and one of their findings was that the procurement department in these municipalities lack competence to this concept.

Qazi & Appolloni (2022) did a systematic review on barriers and enablers toward circular procurement but did not specifically address public procurement. They explored 55 barriers and enablers for adopting a circular procurement. They proposed a framework dividing the barriers and enablers into micro-organizational level, meso-level (for example supply chain or networks) and macro level factors (for example political, economic, or technological factors at a national or global level, and further into 11 different subsections).

Table 2

Barriers and enablers for Circular Procurement

| Level | Subsections of barriers and enablers for Circular Public Procurement |
|--------------------|--|
| <i>Micro-level</i> | 1. <i>Sourcing strategy</i> |
| | 2. <i>Specifications and requirement of materials</i> |
| | 3. <i>Need identification of material</i> |
| | 4. <i>Cost</i> |
| | 5. <i>Revers logistics</i> |
| | 6. <i>Resource constraints</i> |
| | 7. <i>Skills, knowledge and Expertise</i> |
| | 8. <i>Top management</i> |
| | 9. <i>Organizational culture</i> |
| <i>Meso-level</i> | 10. <i>Stakeholders</i> |
| <i>Macro-level</i> | 11. <i>External environment</i> |

(Qazi & Appolloni, 2022)

1.4 Sustainable mobility

Sustainable mobility is a theme that the municipality should be concerned about in their policies regarding circular procurement. The concept of sustainable mobility appeared in the 1992 EU Green Paper on The Impact on the Environment (European Commision, 1992), as a community strategy for “sustainable mobility”. The Green Paper had focus on environmental protection, safety and security, consumer protection, labor rights and social policy. The external costs of transport were made explicit, but little was said about long-time effect on climate. The paper could be described as European Union (EU) response to the challenges raised a few years earlier by the United Nations (UN) report, Our Common Future (The World Commission on Environment and Development, 1987).

Holden, Gilpin & Banister reviews the literature regarding the evolvement of research within sustainable mobility over three decades (Holden et al., 2020). The studies can be grouped into four generations; The first techno-centric and the three others more increasingly acknowledge the limitation of preceding efforts to achieve sustainable mobility, and open for a more diverse set of alternatives. They conclude with that there is a need of a bold set of new narratives.

Banister (2008) states two fundamental principles for traveling in general; It is only the value of the activity at the destination that results in travel. The second principle is that people minimize their generalized costs of travel, mainly operationalized through a combination of the costs of travel and the time taken for travel (Banister, 2008, p. 78). The principles of the Sustainable mobility paradigm; Making the best use of technology, regulation and pricing, land-use development and clearly targeted personal information is outlined by the author. Furthermore, there is a need of strong support for enlarging the scope of public discourse and empowering the stakeholders through an interactive and participatory process to commit themselves to take part of the shift of the paradigm.

As Banister (Banister, 2008) highlights also Foltýnová & Jordová (2014) states that stakeholder involvement is important. Through their paper they analyzed the improvement of policy documents at the city level. They indicate that the environment of the politics influences the implementation process of sustainable mobility measures, though the effect is not fatal and usually does not prevent the measure implementation (Foltýnová & Jordová, 2014).

Guiding in both making plans and implementing them has had an important role and May (2015) reviews the background to the preparation of guidance at a European level and also at a national level in selected European countries. The paper identifies weaknesses in the preparation of Sustainable Urban Mobility Plans, highlighted by those preparing the guidance, and by the earlier research. From this background the principal barriers to effective plan development and implementation is listed (May, 2015).

Holden et al. (2019) reviews thirty years of research and practices in the name of sustainable mobility. From nine narratives derived from agents and strategies they developed three grand narratives: low mobility societies, collective transport 2.0 and electromobility. The authors conclude with all the three grand narratives must be applied if sustainable mobility is going to be achieved. To be credible the narratives are being argued for according to their feasibility, acceptability, and centrality. *All three are needed because it is of little help for a narrative to deliver sustainability but fail to be feasible or acceptable* (Holden et al., 2020, p. 6).

The theme “What can Smart Mobility mean to Sustainable Mobility?” has been researched by Wallsten et al. (2022). They wanted to find out how public servants look at smart mobility in comparison with the goal of having sustainable mobility in the city of Stockholm. The authors

conclude that commercial interests are working intense with smart mobility, which will not necessarily result in sustainable mobility. The politicians must have focus on how digitalization should be used to achieve sustainability (Wallsten et al., 2022).

Santos et al. (2023) made a literature review regarding the companies influence on how employees transport themselves to work. *“Their conclusion was that companies can play an important role in promoting more sustainable mobility by reducing car use on commuting trips and by offering employees clean and more efficient transport alternatives to promote workers’ well-being and quality of life”* (Santos et al., 2023).

The municipalities should also consider New Mobility Solutions in their planning. Garus et al. (2022) made a review on this theme, where the purpose was to find if deployment of new mobility solutions have changed the travel behavior. As NMS they included carsharing, dynamic ridesharing, micro mobility sharing services, and personal and shared autonomous vehicles. Their conclusion was that studies made could not show that travel behavior had changed, but that further studies were needed (Garus et al., 2022).

As some of this theory has shown the municipalities, along with the other public institutions, is able to influence the development of a more sustainable transport.

2.0 Research design and Methods

2.1 Introduction

This section offers a detailed overview of the methodology employed in this study. It begins by outlining the research approach adopted, followed by an explanation of how the municipalities were selected for inclusion. Additionally, this section describes the structure of the interviews and discusses how the collected data were integrated with other sources to inform the research findings.

The research question needed a thorough examination of municipal organization structures, involving interviews with various bureaucrats within the same entities. To capture diverse perspectives within each organization, informants holding different positions were interviewed. This approach enabled a multifaceted view of the issues at hand. Consequently, a qualitative case study methodology was utilized, as it is effective for understanding existing practices and identifying the drivers and barriers to achieving municipal goals or implementing policies (Kristensen et al., 2021).

Interviews are a powerful tool for delving deeper into the processes that informants are involved in. Unlike questionnaires or similar instruments, interviews allow informants to provide more detailed information that is crucial for this study. Therefore, the interviews were designed to support in-depth analysis using a semi-structured format.

Eisenhardt described the process of “Building Theory from Case Study Research” (Eisenhardt, 1989, p. 533) where among the important points are to look for “*cross-case pattern using divergent techniques*” and “*compare with similar and conflicting literature*”. As our selected municipalities represent a narrow number of informants, it was important to make the case very information-oriented to maximize the information received. A limited number of cases to obtain information from can be noted as a strategic case selection (Eisenhardt, 1989; Yin, 2014), and as a basis for the selection of municipalities a search of policies that included expressions like municipal sub plan/strategic plan/action plan regarding climate and sustainable or purchasing/procurement strategy, was also made. This is further explained in the description of the selection of municipalities.

2.2 Literature search

To gather relevant literature for this study, we utilized Google Scholar and Oria as our primary search engines. From the outset, we employed a variety of search phrases to capture the breadth of relevant topics. These included:

- Circular public procurement
- Sustainable transport solutions
- Barriers and enablers in circular procurement
- Circular procurement in municipalities
- Circular economy in municipalities

This comprehensive search strategy allowed us to explore the existing body of work extensively and to identify key themes and discussions relevant to our study. Additionally, the search process enabled us to trace the line of influence of other papers. We were able to follow up on citations within the literature, as well as newer papers that had cited these sources, thereby ensuring that both older and newer perspectives were considered. This approach not only enriched our understanding of the topic but also provided insights into evolving debates and emerging research areas that could be relevant to our study.

2.3 The mobility solution in municipalities and the car fleet

The basis of this research question was an interest in the mobility solutions employed by municipalities, specifically the utilization of in-house car fleets. As a critical measure, it was deemed important to ascertain the number of in-house vehicles each municipality maintained. This information aids in comparing the level of vehicle dependency across different municipalities, forming a key part of our data collection strategy.

To facilitate this, we utilized a digital tool developed by The Directorate for Administration and Financial Management (DFØ), which provides a comprehensive overview of vehicle registration data across public entities in Norway. This tool is accessible through the Norwegian Public Procurement Authority's website. Using this resource, we gathered statistics on the total number of vehicles, the count of fossil-free vehicles, and the trends in these figures over recent years for each municipality.

The Directorate for Administration and Financial Management (DFØ) has over several years developed this digital tool to give both the municipalities and the government an overview of the number of cars registered in total in the public Norway. Using this tool, we get the statistics on the number of vehicles, the number of fossil free vehicles and the development of those numbers the recent years, presented for each municipality.

The number of vehicles typically correlates with both the population size and the scope of municipal responsibilities, which in turn depends on the number of municipal employees. To refine our analysis, we cross-referenced vehicle data from DFØ with population statistics from the Central Statistical Office (SSB). We excluded the smallest municipalities (those with fewer than 20,000 inhabitants) and the few largest ones to focus on medium-sized municipalities, which typically have a more complex organizational structure but are not so large as to skew generalizability.

We then tabulated the data, combining information about the number of inhabitants and the in-house vehicle count for each selected municipality. An intriguing metric developed for this analysis was a constant we termed "SH," which represents the number of in-house cars per thousand inhabitants. This ratio helps normalize the data, making it easier to compare municipalities of differing sizes. The calculations are detailed in Table 1, which displays the SH values for municipalities with populations ranging from 20,000 to 100,000. Table 2 presents a selection of these municipalities, showing the number of inhabitants, vehicle count,

and the SH constant. To maintain confidentiality, the names of the municipalities are omitted in the tables.

Table 3

SH index

| Inhabitants | Number of municipal vehicles | SH-index |
|-------------|------------------------------|----------|
| 21317 | 134 | 63 |
| 29920 | 144 | 48 |
| 45891 | 370 | 81 |
| 97784 | 339 | 35 |
| 29989 | 131 | 44 |
| 25596 | 107 | 42 |
| 53259 | 229 | 43 |
| 27338 | 118 | 43 |
| 21568 | 122 | 57 |
| 84444 | 467 | 55 |
| 27286 | 156 | 57 |
| 30563 | 148 | 48 |
| 24587 | 177 | 72 |
| 31730 | 127 | 40 |
| 32382 | 212 | 65 |
| 24903 | 197 | 79 |
| 37855 | 95 | 25 |
| 20495 | 57 | 28 |
| 26206 | 95 | 36 |
| 27682 | 163 | 59 |
| 46382 | 157 | 34 |
| 42903 | 100 | 23 |
| 20615 | 85 | 41 |
| 28793 | 195 | 68 |
| 24159 | 128 | 53 |
| 48246 | 316 | 65 |
| 20344 | 129 | 63 |
| 28560 | 86 | 30 |
| 91515 | 371 | 41 |
| 23479 | 174 | 74 |
| 46797 | 123 | 26 |
| 32446 | 170 | 52 |
| 51240 | 254 | 50 |
| 21515 | 153 | 71 |
| 24283 | 113 | 47 |
| 20322 | 97 | 48 |
| 25440 | 96 | 38 |
| 62245 | 290 | 47 |

| | | |
|-------|-----|----|
| 37056 | 148 | 40 |
| 25980 | 152 | 59 |
| 31444 | 198 | 63 |
| 35475 | 154 | 43 |
| 65574 | 314 | 48 |

2.4 Selection of municipalities and informants

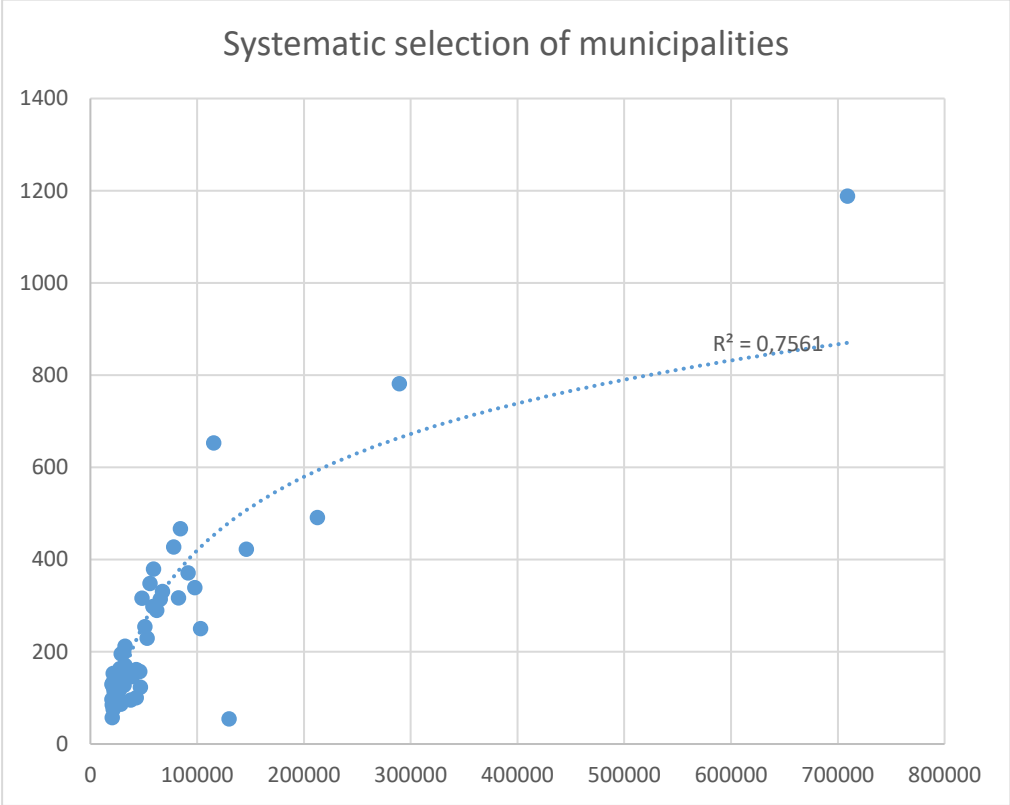
The selection process for municipalities involved analyzing data from 65 municipalities, which exhibited a range in the SH constant from 4 to 81. To determine if there could be a statistical explanation underlying the data, we plotted the number of inhabitants against the number of in-house cars. The x-axis represented the population of the municipalities, while the y-axis corresponded to the vehicle counts.

Although the coefficient of determination (R^2) did not yield a significant result, indicating a weak fit of the data to a linear model, the analysis revealed two distinct clusters of interest. These clusters consisted of municipalities that all had fewer than 100,000 inhabitants and fewer than 400 cars in their fleet. This clustering suggested potential patterns or similarities in vehicle usage that warranted further exploration.

The selection criteria for informants within these municipalities were guided by the need to understand various perspectives on mobility solutions. We aimed to include a diverse range of informants, from those directly involved in fleet management to decision-makers in procurement and policy implementation. This approach was intended to gather comprehensive insights into the factors influencing vehicle management and sustainability initiatives within municipal operations.

Figure 1

Selection of municipalities



From the initial group of 65 municipalities, we identified 10 within the two distinct clusters for further contact. These municipalities were approached via telephone and email to participate in our study. Our primary aim was to conduct interviews with 2-3 informants from each of four selected municipalities, thereby engaging 8-12 informants who possess extensive knowledge about municipal operations.

The selection of these municipalities was strategic; we sought to explore whether variations in the size of the car fleet might correlate with differences in the barriers and drivers for implementing Circular Public Procurement (CPP). The chosen municipalities represent a diverse range of SH numbers, indicating varying scales of in-house car fleets, which could potentially influence their approaches to CPP.

Despite reaching out to ten municipalities, not all were able to participate due to time constraints. However, we achieved our target of securing participation from four municipalities, each of which expressed willingness to allocate the necessary time for comprehensive interviews. The SH numbers of the in-house car fleets for these municipalities

are detailed in Table 1, highlighting significant differences between them, particularly between municipalities M1 and M4, as illustrated in Table 4.

Table 4
SH index for the selected municipalities

| <i>Municipality</i> | <i>SH-index</i> |
|---------------------|-----------------|
| M1 | 80-85 |
| M2 | 55-60 |
| M3 | 45-50 |
| M4 | 35-40 |

2.5 Informants

For each of the selected municipalities, our goal was to interview key figures who play a crucial role in administration and procurement. Ideally, this would include an administration top manager—either the municipal executive or one of their closest associates. Additionally, we sought to engage with the procurement manager and the manager responsible for the car fleet. Although it was not possible to secure interviews with all these specific roles in every municipality, the informants we engaged with collectively covered these critical administrative positions.

To gain additional perspectives on how municipalities handle Circular Public Procurement (CPP) and manage their in-house car fleets, we also reached out to two external experts. These experts were carefully chosen for their relevant expertise: one from a government organization and the other representing a private company specializing in car-sharing solutions. Their insights were particularly valuable for understanding the range of challenges municipalities face in relation to our research question.

To ensure confidentiality and protect the identities of our participants, both the municipalities and the informants have been anonymized. Details regarding the specific roles and positions of the informants within their respective organizations are provided in Table 5. This approach maintains the integrity of the data while safeguarding the privacy of our contributors.

Table 5

Overview of informants

| <i>Municipality</i> | <i>Informant number</i> | <i>Position</i> |
|---------------------|-------------------------|------------------|
| M1 | I1 | Procurer |
| | I2 | Top management |
| M2 | I3 | Procurer |
| | I4 | Mobility manager |
| | I5 | Top management |
| M3 | I6 | Mobility manager |
| | I7 | Procurer |
| | I8 | Top management |
| M4 | I9 | Procurer |
| Industry experts | E1 | Industry Expert |
| | E2 | Industry Expert |

2.6 Municipal policies

An essential component of our research involved examining the presence and influence of various sustainability-related policies within the municipalities. Specifically, we assessed whether existing policies on sustainability, sustainable mobility, mobility plans, green procurement, sustainable procurement, circular procurement, climate plans, or climate budgets had any observable impact on the practices within the municipalities.

The specific criteria used for this analysis are detailed in Table 6. We found that all the municipalities possessed at least some form of policy that could potentially foster a commitment to sustainable mobility practices internally. This examination helped to determine the extent to which formal policy frameworks support or enhance the implementation of sustainable and circular procurement practices within these organizations.

Table 6

Municipality policy or strategy

| <i>Municipality</i> | <i>Type of policy or strategy</i> |
|---------------------|---------------------------------------|
| A1 | Municipal sub plan Climate and energy |
| A2 | Strategic plan Climate and energy |
| A3 | Purchasing strategy |
| A4 | Action plan Climate and Energy |

2.7 Interview process

The primary focus of the interviews was to investigate the practices of procurement and identify barriers to adopting circular procurement methods within the municipalities. To ensure consistency and comparability of information collected from different informants, an interview guide was developed.

The central aim of the interviews was to explore the existing level of procurement—specifically, the extent to which Green Public Procurement (GPP), Sustainable Public Procurement (SPP), or Circular Public Procurement (CPP) is integrated within the organization. Additionally, the interviews sought to determine whether actual procurement practices deviate from formally stated policies or strategies. We also inquired about the existence of any performance measurement systems that might support or hinder the procurement processes.

Another critical aspect of the interviews involved uncovering the types of barriers that informants had observed, which could influence the adoption and implementation of sustainable procurement practices. This part of the discussion aimed to gather insights into practical challenges and facilitators in transitioning towards more sustainable and circular procurement models.

Details of the interview guide, translated to English, are provided in Table 7. The interview guide, as the interviews themselves were in the Norwegian language.

The interviews conducted with informants from the selected municipalities were qualitative and semi-structured in nature. Given the limited number of municipalities involved, each interview was particularly significant. The semi-structured format allowed for flexibility to deeply explore the responses of informants, particularly when new or significant leads emerged during the conversations.

This approach was crucial for gathering detailed and nuanced information that might not surface in more structured interviews. The ability to follow up on leads and probe deeper into the informants' experiences and perceptions allowed us to capture a richer, more comprehensive understanding of the issues at hand.

The findings from these interviews were analyzed in conjunction with established theoretical frameworks. Following the methodology proposed by Eisenhardt (1989), our analysis involved comparing the empirical data with both similar and conflicting literature to validate

our findings and enhance the robustness of our conclusions. Also, Yin (2014), the interpretation of data from such case studies should be supported by multiple sources of evidence.

Both authors of this paper actively participated in each interview session, although only one municipal representative was interviewed at a time. During these sessions, one researcher assumed the role of the primary interviewer, leading the discussion and posing questions. Simultaneously, the other researcher focused on identifying and following up on significant leads provided by the informant. This dual approach ensured comprehensive coverage of the topics discussed and allowed for immediate exploration of relevant points raised during the interview. Additionally, notes were taken to complement the audio recordings, enhancing the accuracy and depth of the data collected.

The interviews were conducted digitally using Google Meet, which facilitated a seamless interaction despite geographical distances. This digital format also allowed for the interviews to be recorded, greatly aiding the subsequent transcription process by ensuring that no details were lost or misunderstood. The recorded interviews varied in length, ranging from 32 minutes to one hour and 13 minutes, providing sufficient time to explore the topics thoroughly.

The interviews took place in February and March of 2024. For detailed durations and specific information about each interview, as shown in Table 8.

Table 7

Interview guide

| | Main question | Sub questions |
|--------------------------------------|--|--|
| Introduction | Can you please tell your name and what your position in the municipality is? | |
| | Can you please confirm your consent of the interview based on the information received? | |
| Procurement of mobility | 1 How do your municipality assess the need for procurement of mobility solutions, such as vehicles, from a sustainability perspective? | Are mobility solutions other than vehicle fleet being considered that can cover |
| | | mobility needs? |
| | | What assessments and decisions does the municipality make prior to purchasing? |
| | | Who participates in the assessments and decisions? |
| | | Central/decentralised decision-making authority? |
| | | How is the purchasing department included, e.g. in the needs assessment? |
| | | How do you perceive the municipality's assessments of private car-sharing services? |
| Organization of vehicle fleet | 2 How does the municipality organise and follow up the existing vehicle fleet to make the best use of it? | Strategy and overall guidelines? |
| | | Central/decentralized responsibility for utilization of the vehicle fleet? |
| | | Use of technology/internal lease/use software? |
| | | How is the utilization rate of the cars measured? |
| Barriers and drivers | 3 To what extent do you think that the municipality thinks circularly when it comes to mobility solutions needs-assessed and acquired? | What do you think the economic and environmental potential will be if the municipality achieving the best possible utilization? |
| | | 4 What do you think are the main barriers that need to be overcome in order to be able to carry out more circular needs assessments and procurement of mobility solutions? |
| | | 5 How do you think the municipality can best overcome these barriers? |
| | | Strategies, organizational culture, senior management, competence/knowledge, technology, costs, logistics, availability and surroundings/external |

Table 8

Length of interviews

| Informant | Length of interview |
|-----------|-----------------------|
| I1 | 34 minutes |
| I2 | 45 minutes |
| I3 | 37 minutes |
| I4 | 33 minutes |
| I5 | 35 minutes |
| I6 | 38 minutes |
| I7 | 32 minutes |
| I8 | 36 minutes |
| I9 | 33 minutes |
| Expert 1 | 39 minutes |
| Expert 2 | 1 hour and 13 minutes |

2.8 Transcription and coding

The interviews conducted via Google Meet were initially recorded in MP4 format. To facilitate easier transcription, these files were converted into MP3 format. The transcription process was carried out using Microsoft Word, which allowed for a structured approach to converting spoken words into written text. These transcribed documents then served as the primary data source for the subsequent coding process.

For coding the interviews systematically, we utilized the classification framework for barriers and drivers as proposed by Qazi and Appolloni (2022). This framework provided a structured approach to categorize the information achieved from the informants, ensuring consistency and comprehensiveness in our analysis.

The creation of the codebook involved discussions between both authors to define and agree upon. The actual coding was performed by one of the authors to maintain consistency. After coding, the results were thoroughly reviewed through discussions between both authors. This step was crucial to ensure that no relevant information was overlooked and that the coding accurately reflected the interview content.

The codebook was based on Qazi and Appolloni's main barriers for implementation of circular procurement, see Table 9.

Table 9:

Categories of barriers

| Category number | Category name |
|------------------------|---|
| 1 | Sourcing strategy |
| 2 | Specifications and requirements of material |
| 3 | Need identifications of material |
| 4 | Cost |
| 5 | Reverse logistics |
| 6 | Resource constraints |
| 7 | Skills, knowledge, and expertise |
| 8 | Top Management |
| 9 | Organizational culture |
| 10 | Stakeholders |
| 11 | External environment |

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PART 2: Scientific article

Scientific article

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Sustainable Production and Consumption

Title:

Barriers for implementing Circular Public Procurement: a case study of procuring Employee Mobility Solutions in Norwegian Municipalities.

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Abstract:

This article examines potential barriers in implementation of Circular Public Procurement (CPP) within the context of employee mobility in Norwegian municipalities. Through a qualitative case study involving interviews with nine municipal officials and two industry experts, this research explores the complexities and challenges of integrating circular economy principles into public procurement processes of employee mobility solutions. Our main findings on the challenges of CPP adoption indicate four specific barriers. They are 1) lack of top management knowledge, 2) decentralized decision-making, 3) financial and human resource constraints, and 4) a culture of organizational resistance to change. This article contributes to the academic discourse on circular public procurement by providing practical insights that can inform policy and operational adjustments in municipalities, aiming to align procurement practices with broader circular and sustainability goals.

1 Introduction

Public procurement (PP), due to its high purchasing power, is considered a key player in society's transformation towards circular economy (Kristensen et al., 2021). The concept of circular economy is aimed at reducing resource input, waste, emissions, and energy by closing resource loops, and have recently received huge attention from a diverse range of stakeholders (Geissdoerfer et al., 2017). As an important facilitator for sustainable development, the potential of PP to drive the circular economy transition is immense.

However, transitioning from traditional procurement methods to Circular Public Procurement (CPP) presents its challenges and opportunities. This field, while promising, faces hurdles including hard-to-change linear procurement practices and a lack of comprehensive understanding of circular requirements. Klein et al. (2020) have highlighted the need for further research into the process of integrating circular economy into PP, how to overcome the barriers, and the potential for collaborative approaches to Circular Public Procurement.

This influence extends to Norwegian municipalities, where the procurement of employee mobility solutions can serve as a leading edge in the shift towards a more circular economy. In Norwegian municipalities, the procurement of sustainable employee mobility solutions presents a unique case for exploring the barriers of Circular Public Procurement. Sustainable employee mobility can be characterized by more sustainable or greener vehicle options, a better public transport network, livable walkable neighborhoods, and other elements. Although strong emphasis has been placed on emission reductions and electric vehicles, the notion of sustainable mobility includes virtually all mobility-related strategies which are considered 'good' and 'desirable' (Boussauw & Vanoutrive, 2017).

With a nearly 20% increase in municipal vehicle acquisitions from a total of 25,000 in 2020 to almost 30,000 in 2023 (Direktoratet for forvaltning og økonomistyring, 2024), Norwegian municipalities are at a critical juncture where exploring alternative, sustainable mobility solutions become imperative. This exploration is not just about reducing the number of vehicles, but building a more sustainable mobility strategy and rethinking how mobility is procured in line with the principles of Circular Economy.

This study, therefore, aims to delve into the complexities of CPP in the context of Norwegian municipalities by focusing on the procurement of sustainable employee mobility solutions.

The research question guiding this inquiry is:

“What are the barriers for circular public procurement of employee mobility solutions in Norwegian municipalities?”

This question seeks to uncover the challenges of implementing CPP, providing insights that could not only guide Norwegian municipalities but also offer valuable lessons for other regions and sectors.

Despite the recognized potential of CPP in contributing to a more sustainable and resource-efficient economy, there remains a notable gap in practical, applied research into its implementation within the context of municipal operations, particularly in the realm of employee mobility. Through this investigation, the study aims to contribute to the academic discourse on CPP and provide practical insights that can inform policy and procurement practices, aligning them with the global goal of achieving a faster sustainable development as outlined by the United Nations. It aspires to extend beyond the current understanding of CPP, exploring how municipalities can navigate the transition from linear to circular procurement processes, thereby enhancing their contribution to a more sustainable and circular economy.

2 Literature Review

2.1 The evolution of Public Procurement

Public procurement (PP) can be defined as “*the acquisition of goods and services by government or public sector organizations*” (Uyarra & Flanagan, 2010) and is leveraged by public actors like municipalities to acquire education, leisure and social services (Walker & Preuss, 2008).

While the main goal of public procurement is to acquire products and services so end-users can fulfil their tasks, public procurement can also be used to achieve social, environmental, or other objectives, also referred to as horizontal objectives (Arrowsmith, 2010). When including these horizontal objectives, purchasing is “*made not only because of the benefits from those products, works or services directly, but also because of the other resulting benefits*” (Arrowsmith, 2010, p. 169).

Horizontal objectives can be divided into three parts, 1) environmental objectives, such as green public procurement with requirements to the environmental properties, 2) social objectives, for example social clauses and 3) economic and political objectives, like promoting local actors or SMEs in public larger procurements (Kristensen et al., 2021).

Green public procurement (GPP) includes environmental criteria in the procurement process. GPP is defined as “*a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured*” (European Commission, 2008, p. 4).

Later, a new term was developed with the focus on sustainability, and considered both the environmental, social, and economic aspects of procurement. Sustainable public procurement (SPP) is defined as “*a process whereby organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only for the organization, but also for the society and the economy, whilst minimizing damage to the environment*” (United Nations, 2013).

Both terms green public procurement (GPP) and sustainable public procurement (SPP) have been used to identify how public procurement can be used as a policy instrument for reaching environmental quality objectives (Aldenius & Khan, 2017)

2.2 The introduction of Circular Economy

Circular Economy describes “*an economic system that is based on business models which replace the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro level (products, companies, consumers), meso level (ecoindustrial parks) and macro level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations*” (Kirchherr et al., 2017, pp. 224-225).

Kirchherr, Reike & Hekkert (2017) introduced their 9Rs framework, adopted from (Potting et al., 2017) for distinguishing between the most circular economy strategies to the most linear economy strategies. The top CE strategies in their framework are the R0 Refuse, R1 Rethink and R2 Reduce strategy with the goal of smarter product use and manufacture. In the middle there are R3 Reuse, R4 Repair, R5 Refurbish, R6 Remanufacture and R7 Repurpose with the goal of extending lifespan of product and its parts. At the bottom there are R8 Recycle and R9 Recover with the goal of getting a useful application of the materials, as shown in Table 1.

The top two circular strategies aim to “*make product redundant by abandoning its function or by offering the same function with a radically different product (R0-Refuse)*” and “*make product use more intensive (e.g. by sharing product) (R1-Rethink)*” (Kirchherr et al., 2017, p. 224).

Table 1

The 9R Framework

| <i>Circular economy</i> | <i>Strategies</i> | |
|--|-------------------------|---|
| <i>Smarter product use and manufacture</i> | R0 Refuse | <i>Make product redundant by abandoning its function or by offering the same function with a radically different product</i> |
| | R1 Rethink | <i>Make product use more intensive (e.g. by sharing product)</i> |
| | R2 Reduce | <i>Increase efficiency in product manufacture or use by consuming fewer natural resources and materials</i> |
| <i>Extend lifespan of products and its parts</i> | R3 Reuse | <i>Reuse by another consumer of discarded product which is still in good condition and fulfils its original function</i> |
| | R4 Repair | <i>Repair and maintenance of defective product so it can be used with its original function</i> |
| | R5 Refurbish | <i>Restore an old product and bring it up to date</i> |
| | R6 Remanufacture | <i>Use parts of discarded product in a new product with the same function</i> |
| | R7 Repurpose | <i>Use discarded product or its parts in a new product with a different function</i> |
| <i>Useful application of materials</i> | R8 Recycle | <i>Process materials to obtain the same (high grade) or lower (low grade) quality</i> |
| | R9 Recover | <i>Incineration of materials with energy recovery</i> |
| <i>Linear economy</i> | | |

Kirchherr, Reike & Hekkert, 2017, s. 224 (adapted from Potting et al. (2017, p.5))

2.3 Towards Circular Public Procurement (CPP)

Sönnichsen and Clement (2020) made an extensive literature review on public procurement. Their research scrutinized the literature on GPP and SPP and introduced the term circular public procurement (CPP). Their concept of CPP is considered on methods, tools, and practices from the circular economy.

CPP can be considered as the knowledge of green public procurement with circular principles (European Commission, 2017). The European Commission defines circular public procurement as “*the process by which public authorities purchase works, goods or services that seek to contribute to closed energy and material loops within supply chains, whilst minimizing, and in the best case avoiding, negative environmental impacts and waste creation across their whole life-cycle*” (European Commission, 2017, p. 5).

Building on Kirchherr et al. (2017) principle of "Refuse" (R0) suggests municipalities could significantly benefit from adopting a more stringent approach to mobility procurement. By refusing to purchase or lease more vehicles than necessary, municipalities can avoid the resource inefficiency

associated with maintaining underutilized vehicles. Implementing strict needs-assessment protocols before acquiring new vehicles can help in this regard, potentially leading to a decrease in the total number of vehicles owned or leased, thus aligning with circular economy principles by minimizing waste and resource use.

The "Rethink" (R1) principle encourages a fundamental reassessment of mobility needs and solutions within municipalities. This could involve exploring alternative, more flexible forms of transportation, such as car-sharing schemes or using electric bicycles for shorter trips, which can be more efficient and better utilized. Rethinking mobility in this way not only addresses issues of underutilization but also promotes the adoption of greener, more sustainable transportation options, contributing to broader environmental and sustainability goals.

2.4 Connecting green, sustainable and circular public procurement.

As the concepts of GPP, SPP and CPP have many similarities, for semantic simplification, both Sönnichsen and Clement (2020) and Ntsonde and Aggeri (2021) propose using the term CPP when referring simultaneously to GPP, SPP, and CPP in their research. Other researchers, however, underline the differences between CPP, SPP, and GPP, and set forth a specific definition for CPP. Alhola et al. (2019) points out that even if SPP and GPP literature is closely linked to the circular economy, it does not fully address the concept of a circular lifecycle, and that SPP and GPP are more product- and technology-oriented.

CPP aims to include networks and ecosystems and introduces circular procurement as “*a procurement of competitively priced products, services, or systems that lead to extended life spans, value retention, and/or remarkably improved and non-risky cycling of biological or technical materials, making use of and supporting the circular business models and related networks*” (Alhola et al., 2019, p. 105). Yet, insight in the managerial and institutional dynamics that are able to support and implement circular public procurement practices, have not yet been outlined (Sönnichsen & Clement, 2020).

CE has been paired with PP in recent years, but CPP is more than introducing green criteria into the mix as it also requires new ways of thinking about needs, processes and the organizations (Alhola et al., 2019; Witjes & Lozano, 2016). When Sönnichsen and Clement (2020) did their review on CPP, they found only two articles (Alhola et al., 2019; Witjes & Lozano, 2016) under the keywords circular public procurement. The rest were found under green and sustainable public procurement, even if they were conceptually comparable to CPP.

Klein, Ramos & Deutz (2020) also highlighted the need for more research into the process of integrating Circular Economy in Public Procurement, including how to overcome barriers for CPP.

2.5 Barriers for Circular Public Procurement

While there have been researchers studying barriers and enablers of green and sustainable public procurement, the literature on barriers and enablers for CPP is scattered.

Barriers and enablers of SPP and GPP has emphasized factors such as inadequate expertise and the importance of active top-level management (Brammer & Walker, 2011), policy issues (Melissen & Reinders, 2012), and a lack of financial and human resources (Grandia, 2015). Sönnichsen and Clement (2020) reviewed the transition from green and sustainable to circular public procurement from an organizational and operational aspects but did not do a comprehensive analysis of barriers and enablers. Others, like Kristensen et al. (2021) explored barriers for circular public procurement practices in Danish municipalities and found that if municipalities still continue to rely on end-users to set demands for circularity, circular public procurement is hard to establish on a systematic level.

Qazi & Appolloni (2022) did a systematic review on barriers and enablers toward circular procurement but did not specifically address public procurement. They explored 55 barriers and enablers for adopting a circular procurement. They proposed a framework dividing the barriers and enablers into micro-organizational level, meso-level (for example supply chain or networks) and

macro level factors (for example political, economic, or technological factors at a national or global level), and further into 11 different categorized subsections.

Table 2
Barriers and enablers for Circular Procurement

| Level | Subsections of barriers and enablers for Circular Public Procurement |
|--------------------|--|
| <i>Micro-level</i> | 1. <i>Sourcing strategy</i> |
| | 2. <i>Specifications and requirement of materials</i> |
| | 3. <i>Need identification of material</i> |
| | 4. <i>Cost</i> |
| | 5. <i>Revers logistics</i> |
| | 6. <i>Resource constraints</i> |
| | 7. <i>Skills, knowledge, and Expertise</i> |
| | 8. <i>Top management</i> |
| | 9. <i>Organizational culture</i> |
| <i>Meso-level</i> | 10. <i>Stakeholders</i> |
| <i>Macro-level</i> | 11. <i>External environment</i> |

Barriers and enabler for Circular Procurement (Qazi & Appolloni, 2022)

Qazi & Appolloni’s (2022) findings show that strategies to implement circularity at the functional level play a significant role in circular procurement, and that an alteration of procurement processes needs to happen in the increased pressure of resource depletion.

3 Methods

A qualitative case study was applied in the research. Qualitative methods can be useful to understand the current practices and the drivers for development towards the goals or an implementation of policies of the municipalities (Kristensen et al., 2021).

The data collection method was a qualitative semi-structured interviews with a total of 11 respondents. Nine of the informants was from four different municipalities, and the last two were industry experts.

3.1 Selection

Four different Norwegian municipalities were chosen on the basis of

- 1) Municipal size between 20.000 to 100.000 inhabitants to exclude the very small and the very few large municipalities in Norway.
- 2) Proactive attitude towards circularity or sustainability in written updated strategies to exclude the municipalities that do not have a clear strategy towards circularity or sustainability.
- 3) Public insights of employee mobility projects to find municipalities where employee mobility solutions have been discussed, explored, or piloted.

Also, we needed willing persons interested in participating in the research. From a list of potential candidates, the municipalities were called until we had four positives from responding municipalities. The four municipalities are shown in table 3.

Table 3

Overview of participating municipalities

| Municipality | Inhabitants |
|--------------|-------------|
| M1 | 40-60.000 |
| M2 | 20-40.000 |
| M3 | 60-80.000 |
| M4 | 20-40.000 |

Our aim was to interview up to three respondents per municipality, with those three coming from different parts of the organization. The three different parts were 1) top management, 2) procurement office and 3) the mobility office or someone with mobility responsibility within the organization. The number of respondents and their role are shown in table 4. To contribute to a deeper professional perspective, two separate industry experts were also interviewed.

Table 4

Overview of participating informants

| Municipality | Number of respondents | Respondent roles in the municipality |
|-----------------------|-----------------------|--|
| M1 | 2 | Procurer, Top management |
| M2 | 3 | Procurer, Mobility manager, Top management |
| M3 | 3 | Procurer, Procurer, Top management |
| M4 | 1 | Procurer |
| E1 | 1 | Industry Expert |
| E2 | 1 | Industry Expert |
| 11 respondents | | |

3.2 Interviews

All interviews were conducted remote and digitally where the respondent was either at their work office or at their home office. All interviews were conducted with only one respondent at the time, and while they were alone. The municipal interviews lasted from 32 to 45 minutes, and the two industry expert interviews lasted from 39 to 73 minutes.

An interview guide was established, and both authors of this paper participated in the interviews. The industry experts were interviewed first, as the guide was tested on them before interviewing the municipality respondents.

All interviews were conducted in Norwegian, and in February and March of 2024.

3.3 Transcript and coding

The interviews were video recorded to MP4 files and further converted to audio-only MP3 files for easier transcription as the file size is reduced significantly. Transcription was made with a text editor software where the MP3 files were imported and made to a transcript.

All interviews were coded using Qazi and Appolloni (2022) categorization of barriers, as shown in Table 2, by one of the authors.

4 Results

This chapter presents the findings from our interviews conducted with the nine individuals across four Norwegian municipalities, augmented by insights from two leading national experts in the field of sustainable employee mobility in public organizations.

By using the 11 barrier categories from Qazi and Appolloni (2022), we can categorize our main findings being part of four of those categories.

- Category 6: Resource Constraints
- Category 7: Skills, Knowledge, and Expertise
- Category 8: Top Management
- Category 9: Organizational Culture

Within those four categories, we have identified the four main barriers for CPP of employee mobility solutions. We have named them as follows:

1. **Lack of top management knowledge** (Top management, and Skills, Knowledge, and Expertise categories)
 - 11 of 11 respondents addressed this topic
2. **Decentralized decision making** (Top Management category)
 - 9 of 11 respondents addressed this topic
3. **Financial and human resource constraints** (Resource Constraints category)
 - 6 of 11 respondents addressed this topic
4. **Organizational culture resistance to change** (Organizational Culture category)
 - 10 of 11 respondents addressed this topic

4.1 Lack of top management knowledge

A failure in understanding as-is and the potential of available circular solutions.

Both our municipality participants, and experts were mostly coherent in addressing the top management as the place to start for a change towards circular public procurement of employee mobility, and that may also be the initial barrier.

For the municipalities that have started a change towards circular procurement of employee mobility, the root barrier seemed to be that the Municipal Chief Executive and his or her top management needed a good understanding of that the existing procurement solutions are neither economical nor sustainable viable for the long-term future. For a circular change to happen, the top management needs more viable data and insights on the actual costs of the existing mobility solutions, and that is something the municipalities usually don't have.

Our respondents say that available data and insights for the executives are mostly based on vehicle depreciation and leasing cost in the financial statements, but municipalities that have looked further indicate that the real costs are partly in employee time usage on vehicle maintenance and administration.

"If the level of knowledge of senior management with regard to costs for service vehicles had been higher, savings processes would have been achieved immediately" (E2).

"We lack focus from top management to initiate major work" (I9).

A common example was the hidden cost of healthcare workers using increasingly more time on vehicle administration and maintenance than estimated.

“When healthcare professionals spend time in car workshops, it becomes the wrong priority” (I8).

Another example told was vehicles that are mostly parked and scarcely used, but that information about financial and sustainable waste is being kept within the municipal department and is not shared with decision-makers.

“In the beginning, we had no control, either over the number of or use of our cars. We didn't know the actual need” (I3).

- Barrier 1a) Top management does not understand the lack of sustainability and cost inefficiency within their current employee mobility procurement and management policies.
- Barrier 1b) Top management don't have viable data or insights to show how circular procurement can improve both the sustainable and economical aspects of the municipality organization.

4.2 Decentralized decision making

Decentralized ownership of employee mobility makes it hard to change towards circular procurement.

The municipalities' respondents had or still have a decentralized ownership of employee mobility solutions, and that seems to be a common trait amongst Norwegian municipalities. Those who have started a change towards a more centralized ownership of need-assessment, procurement, and administrative handling, indicate that this has been a deliberate choice to address the sustainable and economic challenges they had with a decentralized ownership.

A decentralized ownership of employee mobility solutions is by the respondent explained as a system where each municipal department owns their own vehicles, both in defining their need for vehicles, procuring them (as part of the multi-year tenders negotiated by the municipal procurement team), administrating them, and using them.

“Each department has its own vehicle manager, and they just order their vehicles through the purchasing department” (I8).

As indicated by the respondents, a decentralized ownership means that there is no supervisory control of the efficiency or sustainability of the total vehicle fleet, there is less or no sharing of vehicles between departments, the total usage of each vehicle is presumed lower than in the optimal solution, and there is lower vehicle competence and interest in optimizing circular procurement of mobility throughout the municipal organization than in a centralized mobility administrative unit.

“All department managers are authorized to purchase their required number of cars within their budget” (I2).

There is a common perception by the respondents that a decentralized mobility ownership is reducing the economic and sustainable potential of mobility optimization, but it is also challenging to change towards a more centralized solution.

- Barrier 2a) Ownership to both need-assessing, procuring, and managing the employee mobility solutions is decentralized throughout the municipal organization, and there is a lack of circular competence, time, coordination, and willingness to advance circularity procurement.

4.3 Financial and human resource constraints

Short-term financial constraint makes it hard to invest in a long-term circular optimization.

Municipalities are continually struggling with budgeting and short-term cost control. The respondents indicated that it is difficult to find money to both develop enough data and insights to make qualified decisions on the effects of circular mobility solutions, and even harder to create and run a centralized unit for the employee mobility solution over time.

“The municipalities have limited capacity to make changes, and we must contribute to good decisions and highlight the benefits” (I4).

Several respondents also reported that finding human resources with the right competence, skills and perseverance was important to achieve long-term success.

To create a system of circular procurement and management of employee mobility, the municipality must invest short-term financing to achieve long-term sustainability and cost-efficiency.

“We don’t have the capacity to run development projects that can save the municipality costs in the long term” (I9).

For the participant municipalities that have got the furthest, it is still a challenge to justify the cost of an administrative central unit, when alternatives are cutting budgets in healthcare or educational departments.

- Barrier 3a) Municipalities have continuous financial short-term constraints that creates a barrier for investing in data and insights into more sustainable mobility solutions on the long-term.
- Barrier 3b) Building insights and creating change takes years and demands perseverance and continuity. Even if budgeting for change is made, it is difficult to find the right employees to take on the task of implementing circularity on a long-term basis.

4.4 Organizational culture resistance to change

Of all the barriers, the organization resistance seems to be the most challenging one.

The last and final main barrier for circular public procurement of employee mobility in municipalities, was something that near every respondent indicated as the possible main barrier. And that was the barrier of changing how people within an organization work.

Those who are dependent on having the possibility of transporting them self as part of their work, has a difficulty of seeing carsharing or other solutions as an opportunity for themselves.

“Middle-aged men who want their own car and no electric car – they don't want to change”(I1).

“Employees can have a personal relationship with the cars they drive, color, type, etc”(I3).

The need of having their own vehicle key on their desk versus having to book a car is challenging for some employees.

- Barrier 4a) Employees tend to not see the bigger picture of sustainability, and resist giving up their “own” vehicle instead of sharing with others or adapting to other and more circular mobility solutions.

Barrier 4b) For middle-management, it is difficult to lead change within a department and the easiest solution is often to just continue the linear way of procuring mobility.

5 Discussions

This study underscores the complexity of integrating Circular Economy (CE) principles into Public Procurement (PP), particularly focusing on employee mobility solutions within Norwegian municipalities. Despite CPP's potential as a catalyst for CE, our findings suggest that current practices are not yet there to drive significant transformation toward circularity, aligning with the insights of Alhola et al. (2019).

We identify a pronounced gap in transitioning from Green Public Procurement (GPP) to CPP, which is evident in the municipalities' prioritization of updating the existing car fleet to electric vehicles over reducing and optimizing the overall fleet. This emphasis on end-user demands for CE in procurement processes appears inadequate for achieving system-level circularity, as highlighted by Kristensen et al. (2021). The gap is likely due to end-users' limited awareness and demand for innovative circular solutions, increased by the challenge posed by a more product-centered demand across municipal departments and units. Such a scenario underscores the necessity for systemic changes that extend beyond product-centric approaches to truly foster a shift towards CE.

The lack of clear policies and managerial support is a significant obstacle to the advancement of CPP. Our research underscores the need for explicit political and top managerial directives to empower procurement departments and proactive leaders, thereby facilitating more coherent and effective integration of CE in PP. From a national standpoint, it is also a need for establishing better guidelines for municipalities, which frame overarching CPP objectives and provide actionable pathways for their realization.

5.1 Discussion of the four main barriers identified

5.1.1 Lack of top management knowledge

The theory of transformative leadership highlights the critical role of top management in championing sustainable initiatives. Our findings align with Sönnichsen and Clement (2020), emphasizing the necessity for a clear mandate from top-level management that aligns with the organization's strategies and objectives. They also note that top management's awareness and knowledge are pivotal in developing effective CPP procedures. This perspective is supported by Brammer & Walker (2011), who underscore the importance of proactive top-level management.

To bridge the identified gaps, enhancing top management's understanding of CPP's benefits is crucial. Collaboration with entities such as The Norwegian Agency for Public and Financial Management (DFØ), The Norwegian Association of Local and Regional Authorities (KS), and other municipalities that are further along in implementing circular public procurement could prove beneficial. Municipal pilot projects can serve as tangible demonstrations of the economic benefits and sustainability impacts of CPP.

5.1.2 Decentralized decision making

While decentralized structures offer flexibility, they may hinder the implementation of CPP due to fragmented responsibilities and lack of coordination. This finding underscores the need for centralized governance structures to facilitate sustainability transitions. Moving towards a more centralized ownership function, with cross-organizational collaboration, it may ensure a more unified approach to CPP, leveraging internal expertise and fostering organizational coherence.

Although Ograh et al. (2021) and Leal Filho et al. (2019) highlight the benefits of decentralized decision-making for enhancing flexibility, responsiveness, and stakeholder engagement, our research

suggests that in the context of CPP, centralized governance may better align procurement strategies with overarching environmental objectives, ensuring that sustainability is not compromised by varying priorities and practices across different departments. This unified approach may streamline the procurement process and enhance municipalities' ability to meet their sustainability goals systematically and measurably.

5.1.3 Financial and human resource constraints

Financial and human resource constraints present significant challenges to CPP adoption, reflecting broader literature that emphasizes the importance of resources in enabling change. Interestingly, procurement departments do not appear to be fully leveraged in building the resources necessary for CPP adaptation. Investing in capacity building and continuous learning can mitigate human resource constraints, supporting the development of internal expertise in CPP. This aligns with findings from previous literature indicating that cost and financial constraints hinder the implementation of circular economy initiatives (Kirchherr et al., 2017). Agyemang et al. (2019) also report that high initial costs are a barrier to achieving circularity, while Jia et al. (2020) note that financial constraints are a primary obstacle as investments are crucial for maintaining infrastructure and human resources.

5.1.4 Organizational culture resistance to change

The resistance to change within organizational cultures is a well-documented barrier in the literature on organizational change. Our findings suggest that fostering a culture where employees might lose personal benefits, such as having their own municipal vehicle, is both challenging and time-consuming. But it can be addressed with incentives and the cultivation of cultural champions within the organization. This is consistent with literature indicating that employees are often not incentivized to embrace CE practices (Agyemang et al., 2019).

Kristensen et al. (2021) also report that barriers to developing new practices include a culture of risk avoidance and organizational distances between centralized procurement departments and end-user purchasers throughout the organization. Early inclusion of all employees and excessive communication may therefore be part of the solutions to reduce the negative aspects of change projects.

5.2 Overcoming the potential barriers

Echoing the Danish study (Kristensen et al., 2021), our findings also highlight the value of market dialogues and pilot projects in fostering CPP. Such initiatives provide platforms for experimentation, risk-taking, and learning, essential for navigating the complexities of CPP and exploring new procurement practices. However, expanding these dialogues to include a wider array of stakeholders, both internally and externally, is critical for addressing the multi-dimensional challenges of CE and ensuring system-level changes within a municipality.

Engaging with The Directorate of Public Management and eGovernment (DFØ) or The Norwegian Association of Local and Regional Authorities (KS) may therefore be a constructive start for municipality management seeking change, as it has benefited some of the municipalities interviewed here.

5.3 Limitations

While this study provides valuable insights into the barriers to CPP of employee mobility in Norwegian municipalities, it is not without limitations. The focus on a few selected numbers of municipalities and a narrow field of procurement, along with reliance on interviews, may limit the generalizability of our findings. It is therefore important that caution is taken in generalizing these results to other contexts.

6. Conclusion

The study has explored the challenges associated with implementing Circular Public Procurement (CPP) in the context of sustainable employee mobility in Norwegian municipalities. Through a comprehensive literature review, qualitative interviews, and systematic analysis, this research has illuminated potential barriers in how public procurement can be transformed to support principles of a circular economy.

The literature review discussed the evolution of public procurement, from traditional methods focused on acquiring goods and services for government functions to incorporating environmental, social, and economic goals. The introduction of circular economy concepts into public procurement practices was analyzed, emphasizing the need for a shift from green and sustainable public procurement (GPP and SPP) to a more integrated CPP approach. This segment highlighted how CPP extends beyond GPP by not only incorporating green criteria but also implementing CE strategies of refusing and rethinking as part of the procurement process.

The methodology section described the qualitative research approach, focusing on semi-structured interviews with municipal officials and industry experts to delve into the actual application and barriers to CPP.

Our results confirm that the transition to CPP is not merely an extension of GPP; it demands a systemic change encompassing organizational structures, policies, and cultures. Our findings indicate that the main barriers for circular public procurement of employee mobility in Norwegian municipalities is a lack of financial and circular knowledge regarding existing and potential employee mobility, coupled with restrained financial and human resources, a decentralized structure for decision-making and an organizational culture unwilling to change from a long-existing way of mobility.

Future research could benefit from a broader empirical base, including municipalities at different stages of CPP integration, other fields of procurement, and a more diverse range of stakeholders, including suppliers and end-users. Additionally, comparative studies involving other countries could offer richer perspectives on CPP practices and the challenges associated with their implementation.

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