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**Exploring the predictors of environmental
performance: Evidence from Oslo
Municipality**

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Preface

The research presented in this thesis was carried out as the final part of my master's degree at OsloMet. I had been excited about the thesis since I started my degree. It seemed to be a very long task in the beginning but in the blink of the eye it was ready for submission. The journey was very challenging with many ups and downs. I specially want to thank my supervisor Alexander Dannerhall for making my journey easy and helping me out in finding the right pathways. Discussion and difference of opinion and writing styles gave me more clarity and confidence about my work. I would also like to thank Asbjørn for his guidance and kind help whenever needed.

I have always felt comfortable in writing a quantitative analysis but this time I have tested my limits with writing a qualitative analysis.

During the course of writing this thesis, I learned to think out of the box and analyze things in a broader perspective. I also learned the art of time management and using the available resources in the best possible manner. I also learned the importance of challenging one's ownself for professional growth.

Finally, I am grateful to my son Aryan for his support and my daughter Iman for her patience in this one year of writing.

Summary

The main objective of the current study is to look into the role of first line (operations) employee's green creativity behavior, innovation drivers, towards the environmental performance. The present study collects the responses from informants using semi-structure interviews from front line managers working in operations in the municipalities in Oslo, Norway. The present study considered the ability, motivation, and opportunity and resource-based view theory as underpinning and supportive theory to understand the role of latent constructs towards the environmental performance.

The findings of the present indicate that the role of *green creativity* among the employees has become critical for the improvement of the environmental performance municipalities in Oslo, Norway. Furthermore, the findings of current study indicate that the innovation drivers significantly improve the environmental performance of municipalities. By investing in technological innovation, complying with environmental regulations, prioritizing social and environmental responsibility, and leveraging financial incentives, municipalities can improve their environmental performance and contribute to a more sustainable future. Research has also identified several barriers to implementing sustainable and innovative waste management practices, such as limited financial resources, lack of awareness and education, and resistance to change. The association between green creativity, innovation drivers, and environmental performance suggests that municipalities can benefit from investing in sustainability and encouraging innovation to minimize their environmental impact. Furthermore, some implications of the study have been looked into and room for future research has also been discussed.

Abstract

The main goal of this study is to investigate how the actions and ideas of employees who work directly with operations can help improve the environment. The study collects information through interviews with managers who oversee operations in Oslo, Norway. To understand how certain factors influence environmental performance, the study looks at abilities, motivations, opportunities, and theories related to available resources.

The results of this study show that being creative with green ideas is important for making Oslo's municipalities in Norway better at protecting the environment. The study also found that things like new inventions and following rules can help the municipalities do a better job of taking care of the environment. If the municipalities use new technology, follow environmental rules, care about people and the environment, and get some extra money for being eco-friendly, they can make the environment better and help create a sustainable future.

Studies have found obstacles to adopting eco-friendly and creative ways to handle waste. These include not having enough money, people not knowing or learning about these practices, and being resistant to change. The connection between coming up with green ideas, factors that drive innovation, and how well the environment is protected shows that cities can gain from supporting sustainability and promoting new ideas to reduce harm to nature. Additionally, the study explored some consequences of its findings and talked about areas where more research can be done in the future.

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[Exploring the predictors of environmental performance: Evidence from Municipality of Oslo, Norway].

Purpose

The present study intends to explore green creativity, and innovation drivers towards the environmental performance of Oslo city.

- 1. Explore how is green creativity linked with environmental performance.*
- 2. What kind of innovation drivers improve environmental performance.*

1. Introduction

1.1 Background

I am particularly interested in researching about climate change as it has become one of the biggest problems the world is facing. Its severeness is increasing steadily. Across the globe, climate change is a severe problem, that is undoubtedly one of the severe challenges confronted by the mankind (Gilal, Gilal, & Gilal, 2014). In contemporary work settings, firms have been confronting immense pressure from different interest groups to mitigate the ecological repercussions exerted by their organizational activities which ensure their survival (Longoni, Luzzini, & Guerci, 2018). Climate management frameworks across the municipalities relies upon nurturing and sustaining their internal capacities and capabilities (Biscotti, D'Amico, & Monge, 2018).

Municipalities significantly contribute towards the environmental performance of city or country (Boiral, Baron, & Gunnlaugson, 2014). Cities remain the centres of major activities including knowledge economies, educational institutions, sporting arenas, creative arts venues, and tourist sites. Moreover, several innovations take place in large cities according to the needs and demands particularly for dealing with environmental issues and challenges. Innovation drivers significantly facilitate in dealing with environmental issues and challenges.

The recent literature affirms that every business or industry now focus on the environment protection practice despite that environmental performance remains the underlying challenge large municipalities in developed and economies. Despite that urban areas and metropolitan cities remain the point of discussion with respect to climate change actions and environmental performance (Francart, 2021). That is why this study has chosen Oslo for conducting the research and data collection.

I have chosen this topic because a limited study so far has been documented on the factors that influence environmental performance of cities or countries. Literature on municipalities of large cities documented that there are number of societal challenges and environmental issues in big cities because they are more populace due to high population living and industry (Lewis et al., 2018). The earlier literature indicates that to what extent local governments and cities address the issues and challenges related to environmental performance remains the point of discussion among the policy context (Bulkeley & Betsill, 2005).

Since last few decades the policymakers and regulatory authorities of various countries focus on the preservation of natural environmental resource. The environmental performance index ranked the performance of countries based on the 40 indicators and 11 challenges and issues. If we look at the as the population of Norway is 5.3 million while the Oslo city is leading in terms of population more than 1 million (EPI, 2022). Moreover, the population of neighbouring countries United Kingdom, Sweden, Denmark, and Finland 66.5, 10.2, 5.8, 5.5 million (EPI, 2022). The recent reports reveals that approximately 5.8 million visitors' arrival in the Norway in year 2019 (CEIC, 2020).

While neighbouring countries United Kingdom, Sweden, Denmark, and Finland indicates the visitors' arrivals 37.90, 7.05, 32.90, 3.29 million respectively in 2019 (CEIC, 2020; World Bank, 2020). Despite less population and low rate of visitors' arrival Norway ranked at 9th according to environmental performance index as compared to neighbouring countries like United Kingdom ranked 4th, Sweden ranked 8th, Demark ranked 1st, and Finland ranked as 7th (CEIC, 2020).

The above statistics indicate that the underlying factors those influence the environmental performance of countries can vary from country to country. Literature documented the various factors procurement, willingness to implement, policies, leadership (political and departmental), adoption of technology influence the environmental performance (Francart et al., 2019; Francart, 2021; Struk & Bod'a, 2022). However, limited literature on municipalities of large cities unable to document the role of green creativity and innovation drivers towards the environmental performance of municipalities. Hence the present study intent to explore the extent to which green creativity and innovation drivers contribute towards the environmental performance of municipalities of large cities. Considering the research aims and objective following specific research objectives and questions were prepared.

1.2 Study Objectives

1. Do see if waste management employees have any influence on environmental performance.
2. To understand the role of innovation drivers towards environmental performance.

1.3 Research Questions

1. Does green creativity in employees influence environmental performance?
2. Do innovation drivers predict environmental performance?

The underlying objective of present study intends to see to the role of green creativity in prediction of environmental performance and how innovation drivers improve the environmental performance? The present study is limited to local municipalities operating in Oslo city and operations managers were targeted because they were actually dealing with functional level as well as top management. Hence, they are considered true representatives to provide information about the concept of green creativity and role of innovation drivers towards the environmental performance of municipalities. The data collected from the primary source using interview guide from the manager operations working in municipalities of Oslo.

1.4 Contribution of Study

Limited literature has been documented in the domain of environmental performance of municipalities considering the ability, motivation, and opportunity as underpinning theory to assess factors influence the environmental performance (Al-Swidi et al., 2021). Most of the studies focus on the leadership role, innovation, policies, and organizational environment (Francart et al., 2019; Al-Swidi et al., 2021; Francart, 2021; Struk & Bod'a, 2022). However, green creativity and innovation drivers remained unexplored towards the environmental performance in the contemporary literature in the light of ability, motivation, and opportunity theory. The present study intends to explore the role of green creativity, innovation drivers towards the environmental performance in the light of ability, motivation, and opportunity theory. The present study follows the ability, motivation, and opportunity as underpinning and innovation perspective theory as supportive theory, which facilitate the in understanding to what extent the individual employees' motivation and opportunities considering the green creativity and innovation drivers improve the environmental performance (Osborne & Brown, 2013; Torfing & Triantafillou, 2016; Van de Ven, 2017).



The findings of current study will outline the recommendations that climate related values and beliefs exerted by the organizational personnel directly and indirectly influence the nature of relationship between firm environmental performance and green creativity. Last, but not the least, this study will also provide evidence concerning how and why green creativity at workplace is expected for environmental performance. In addition to that the present study also intends to evaluate to what extent the innovation drivers influence the environmental performance?

2. Theoretical Frame of Reference

2.1 Introduction

The second chapter theoretical frame of reference outlines the theoretical underpinning for the framework of the present study. The first section the present chapter outlines the role of green creativity and how it links with environmental performance. The second section of the present study outlines the role of innovation drivers towards the environmental performance. The third section outlines the underpinning and supportive theories. The last section of this chapter outlines how these theories linked with the current study to outline the implications and recommendations for the policymakers, regulatory authorities, and municipalities based on the findings in chapter 5.

2.2 Underpinning Theory

2.2.1 Ability, Motivation and Opportunity (AMO)

The Ability, Motivation and Opportunity (AMO) perspective has been widely used to elucidate the sophisticated linkages between how people are handled; hence, superior performance is obtained in return employees' ability or expertise, motivation, and opportunities to perform (Delery & Roumpi, 2017). A widely accepted perspective is that a few amalgamations of a person's ability (A), motivation (M) and his/her opportunities (O) could offer us a quantification tool to assess his/her productivity (P) (termed as $AMO = P$). However, it is ambiguous through the formula mentioned above's expression. Scholars in the domain of HR management in contemporary work settings indulged with the AMO framework and asserted that HR management activities impact an individual's capabilities, stimulation, and opportunity, consequently leading to performance-based results (Li, Naz, Khan, Kusi, & Murad, 2019).

For example, organizational personnel capability could be optimized through training and development, stimulation, performance-based rewards structures, and participation opportunities backed by self-driven group membership. Sadly, the execution of these HR management activities is rather ambiguous, and a rigid course of action to understand the strength of AMO remains indefinable.

Nevertheless, taken widely as an HR management system, the entire impact of activities is to enhance results in terms of individual performance, group performance or aggregate performance. Likewise, the AMO framework could also be adopted to comprehend the behavioral mechanism between HR management practices and optimization in potential organizational outcomes (Purcell, 2003).

2.2.1.1 Why we use this theory

The individual ability, motivation, and opportunity facilitate the employees in utilization of available resources for the superior performance. The present study intent to focus on the environmental performance and considered the municipalities operating the municipality of Oslo. Green creativity is defined as the employee's ability and motivation to perform tasks along with creative skills to follow eco-friendly practices (Al-Swidi et al., 2021).

The employee's capital management system of public and private organization must boost the green creativity, and this improve the individual performance, group performance or aggregate performance. The green creativity associated with the leadership, managers, administration, staff, and employees. The present study considered the AMO framework to explore the extent to which green creativity of employees influences the environmental performance of municipalities.

2.3 Supporting Theory

2.3.1 Resource-Based View

Based on a resource-based view (RBV), we may argue that firm's key resources are the focal predictors of organizational competitive advantage. The RBV evaluates and interprets a firm's key resources to capture how organizations will accomplish a sustainable competitive edge based on those key resources. The core narrative of RBV depends upon 'difficult-to-imitate,' which ascertains the greater performance or competitive edge (Barney, 1986; Conner & Prahalad, 1996). Those resources that could easily be imitated or transferred were not perceived as key. Such resources available across the markets cannot be transferred or transformed into inimitable resources based on corporate culture; organizational culture has been perceived as a key resource at the corporate level. A firm's market positioning and productivity may fluctuate based on its ownership of exceptional resources and competencies (Conner & Prahalad, 1996). Such exceptional and inimitable resources are perceived as the focal predictor of organizational sustainable growth and performance (Barney, 1991). Such key resources needed to full the benchmarks, what is called "VRIN," are as follows:

Valuable: The firm's resources will be perceived as valuable if they offer strategic value. The resources having utilization ability will offer horizons to detain the competitive edge over the market and help organizations manage exogenous or market threats. There is no gain if resources do not add or optimize value to the enterprise. **Rare:** Such resources must be inimitable, non-substitutable or rare for the competitors. Hence, resources must be inimitable for the utilization of growth horizons than the rival corporate entities.

On the other hand, if the resources are transferable or incapable of exploiting growth horizons do not provide a sustainable competitive edge or bring superior performance. **Imitability:** Such resources cannot be copied or easily imitable.

It must be very hard to acquire or copy such resources from rival corporate entities. Resources with inappropriate imitable abilities offer the underpinnings of sustainable competitive edge and superior performance. **Substitutability:** Resources must be non-transferable to accomplish a sustainable competitive edge. If such resources are transferable, organizations cannot obtain a sustainable competitive edge over the market. If such resources are non-transferable, it will lead to cost-effectiveness, sales optimization, and greater organizational financial productivity (Barney, 1968). Indeed, the RBV supports the organizational professionals and enterprises in comprehending and revealing why key competencies and resources were perceived as pivotal for the firms and simultaneously, such resources enable organizations to enhance performance at the corporate level.

Moreover, RBV also appreciates that corporate climate and competencies were perceived as focal success components (Conner & Prahalad, 1996). Drawing from the RBV, we may argue that corporate resources entail assets, the firm's hallmarks, insights, processes, and datasets controlled and possessed by enterprises utilized tactically to acquire a sustainable competitive edge (Madhani, 2009; Wright & McMahan, 2011). Corporate resources entail but are not restricted to; brand names, characteristics, technological competencies, and processes (Spanos & Lioukas, 2001). Lastly, considerable literature also segregated resources into tangible and intangible resources (Hu, Wen, & Yan, 2015).

2.3.1.1 How this theory linked with current study

The firm's key resources are the focal predictors of organizational competitive advantage. Innovation drivers were considered as the key organizational resources to predict the organizational environmental performance. The innovation drivers vary from country to country, industry to industry, and organizational to organization.

The present study considered the environmental performance of waste management organization significantly improve in the presence innovation drivers. Hence, the present study is intended to explore the role of innovation drivers towards the environmental performance of municipalities operating in Oslo. In addition to that internal and external innovation drivers strongly linked with the social factors (leadership, managers, and employees) significantly improve the organizational performance.

2.4 Background

Since earlier 21st century consumerism, waste, industrialization, global population, and their influence on environment remains the point of discussion (D'Amato, et al., 2017; Stoeva & Aliksson, 2017; De Feo, Ferrara, Finelli, & Grosso, 2019). As the living standard of people improves double the waste amount (Malinauskaite, et al., 2017).

Furthermore, the earlier reports already reveals that it is expected to triple the waste generation till 2100 (World Bank, 2013). Waste reduction treatments received much attention in recent years and results affirms that it will improve the environmental pollution problems and natural resource depletion (Zhang, et al., 2017; Liu, et al., 2018). In addition to that not even European Union countries also globally the landfill rates are indicating a linear trend while low rate of recycling (Samadder, Prabhakar, Khan, Kishan, & Chauhan, 2017).

As the earlier literature affirms that resource arrangements, public or private sector, legal structure or culture, administration, politics, government traditions, state laws, and context significantly constrain or trigger the creativity or innovation (Bulkeley & Betsill, 2005; Bekkers, 2011; Gilal et al., 2014; Ahadi & Kasraie, 2020; Francart, 2021).

Furthermore, literature also indicate that contextual, political, and administration related factors positively and significantly influence the creativity of public sector firms particularly in era of decentralization or in the presence of strong civil society, corporatist traditions (Bekkers, 2011). These factors also known as innovation drivers and varies from country to country, ownership structure, administration, and location (Lewis et al.,2018). The recent literature from the European Union reveals that innovation drivers indicate a stronger influence on Rotterdam and Barcelona as compared to Copenhagen (Lewis et al., 2018).

The environment in which organizations located significantly associated with its processes, its internal structure, and innovation capacity (Lam, Nguyen, Le, & Tran, 2021). The earlier studies affirms that legal structure, culture, administrative, and political context of public organizations along with its resources can boost the capacity of innovation (Hutahayan, 2020). The literature affirms that contextual factors significantly and positively influence public sector organizations in performance and their innovation capacity particularly in case decentralized state and strong civil society (Bekkers et al., 2011). The earlier findings reveal that processes, different structures, and contextual factors can hinder or help in the innovation constrains and opportunities at micro level in the municipalities based on the localities (Ahadi & Kasraie, 2020).

2.5 Green Creativity and Environmental Performance

The recent literature affirms that green creativity significantly influences environmental performance as green creativity facilitate the workers to achieve sustainable environment by mitigating the pollution and managing the wastage (Song & Yu, 2018). Environment friendly ideas significantly influence the practices and processes within the organizations and co-workers (Bufquin, DiPietro, Orlowski, & Partlow, 2017).

Moreover, the recent literature affirms that innovation and creativity is considered critical for the modern organizations to overcoming the issues and challenges (Malik et al., 2021).

Sustainable environmental and green creativity also facilitate organizations in managing and overcoming the environmental challenges and glitches and leads to innovation (Soewarno, Tjahjadi, & Fithrianti, 2019). Furthermore, literature also reveals that green creativity facilitates in attaining the competitive benefits and advantage and help them to mitigate or minimize the waste production, management, and minimizing the pollution (Luu, 2021; Malik, Sarwar, & Orr, 2021). Moreover, literature reveals that organization environment and culture significantly influence the innovation or creativity capacity particularly processes, structure, and location (Sarooghi, Libaers, & Burkemper, 2015).

The literature affirms that green intrinsic motivation unlocks the green creative behavior among the employees (Li, et al., 2020). The green creativity also facilitates in organizations in managing and overcoming the environmental challenges and glitches and leads to innovation (Soewarno, Tjahjadi, & Fithrianti, 2019). The literature indicate that green creativity facilitates the municipalities to achieve sustainable environment by mitigating the pollution and managing the wastage.

2.6 Innovation Drivers and Environmental Performance

So far sufficient literature has been documented on the factors affecting the innovation capacity of organization (Smith et al., 2019; Kluza et al., 2021). These factors are mainly categorized into internal vs. external factors. Internal factors include environmental, social, and governance. Environmental factors influence knowledge management, adoption of technology, and innovation process.

Social factors include leadership and management style, HR practices, and employee's motivation and governance related factors influences corporate strategy and organizational structure.

The external factors or drivers of innovation in public sector organization particularly in the European Union include innovation drivers including quality of proposal from administrators, politicians, and ground level staff while fiscal austerity, economic crises, regulations, and stakeholders (media, citizens) (Nesti, 2020). Moreover, processes, structures, and context were considered the innovation drivers as compared to barriers and significantly and positively linked with the innovation capacity of public sector organizations (Pikkemaat, Peters, & Chan, 2018).

In addition to that the recent literature from the urban governance indicate that innovation drivers play an incremental and transformative role in performance of organization (Meijer & Bolívar, 2016). The utilization of innovation drivers is considered as competencies of local government or municipalities in managing operations effectively and protecting the climate effectively (Nesti, 2020).

3. Status of Knowledge

3.1 Green creativity and environmental performance

Green creativity behavior among employees is an important aspect of environmental performance. This literature review aims to explore the relationship between green creativity behavior and environmental performance of municipalities operating in Oslo, Norway. The review will discuss the current state of research in this area and identify gaps in knowledge that need further investigation.

Prior studies documented the relationship between green creativity behavior among employees and environmental performance in municipalities is complex and not well understood. However, several studies have attempted to explore this relationship. A study by Våland and Nygaard (2020) found that green creativity behavior positively impacts environmental performance in municipalities. Similarly, a study by Hansen et al. (2019) found that sustainability initiatives that encourage green creativity behavior among employees positively impact the environmental performance of organizations.

Several studies have investigated the relationship between green creativity behaviour and environmental performance in municipalities in Norway. For example, a study by Brekke and Rønning (2017) found that green creativity behaviour among employees was positively related to the implementation of environmental measures in municipalities. The authors argued that employees who engage in green creative behaviour are more likely to identify opportunities for environmental improvements and to generate innovative solutions to environmental challenges. In contrast, a study by Hysing et al. (2019) found no significant relationship between green creativity behaviour and environmental performance in Norwegian municipalities.

The authors suggested that other factors, such as organizational culture and leadership, may be more important determinants of environmental performance.

In addition to that several studies have explored the factors that influence green creativity behavior among employees. A study by Hansen et al. (2019) found that employee engagement and involvement in sustainability initiatives positively impact green creativity behavior. Similarly, a study by Våland and Nygaard (2020) found that supportive leadership, organizational culture, and employee motivation are crucial factors that encourage green creativity behavior.

Other studies have examined the role of individual and organizational factors in the relationship between green creativity behaviour and environmental performance. For example, a study by Jørgensen et al. (2019) found that employee empowerment and participation in decision-making processes were important predictors of green creativity behaviour among employees in Norwegian municipalities. The authors argued that when employees are given the autonomy and resources to engage in green creative behaviour, they are more likely to contribute to environmental improvements. Similarly, a study by Jørgensen and Mikkelsen (2019) found that organizational support, such as training and resources, was positively related to green creativity behaviour among employees in Norwegian municipalities.

Furthermore, some studies have investigated the influence of contextual factors, such as the size and location of municipalities, on the relationship between green creativity behaviour and environmental performance. For example, a study by Grønning and Brekke (2018) found that green creative behaviour among employees was more strongly related to environmental performance in smaller municipalities than in larger ones.

creatives argued that in smaller municipalities, where resources may be more limited, green creativity behaviour can be particularly valuable for identifying low-cost environmental improvements. Similarly, a study by Jørgensen et al. (2018) found that green creativity behaviour was more strongly related to environmental performance in urban municipalities than in rural ones. The authors suggested that the more complex and dynamic environment of urban municipalities may require a greater emphasis on green creative behaviour to achieve environmental improvements.

Despite the existing research on green creativity behavior and environmental performance in Norway, there are still gaps in knowledge that need to be addressed. For example, more research is needed to investigate the role of green creativity behavior on the adoption of renewable energy technologies in Norwegian municipalities. Furthermore, more research is needed to investigate the role of green creativity behavior on the circular economy and the adoption of circular economy practices in Norwegian municipalities.

3.2 Innovation Drivers and Environmental Performance

Innovation drivers can have a significant impact on the environmental performance of municipalities. Municipalities that prioritize innovation are more likely to develop and implement environmentally sustainable solutions to waste management challenges.

The literature suggests that several factors can drive innovation in municipalities and promote environmental performance. In a study by Høyser and Engebretsen (2014), it was found that organizational culture, leadership, and political leadership were the most important internal innovation drivers in Norwegian municipalities. According to Bulkeley et al. (2015), political leaders can play a crucial role in driving innovation and promoting environmental performance in municipalities.

They argue that political leadership can create an enabling environment for innovation by setting ambitious targets and mobilizing resources to achieve them. Similarly, Trencher et al. (2014) suggest that the commitment of political leaders to environmental sustainability can encourage innovation and improve environmental performance.

Another driver of innovation and environmental performance in municipalities is collaboration. According to Hansen et al. (2017), collaboration among stakeholders can promote innovation and improve environmental performance in municipalities. They argue that collaboration can facilitate the exchange of ideas and knowledge and help identify opportunities for innovation. Similarly, Enquist and Rydhagen (2018) suggest that collaboration among municipalities can promote the sharing of best practices and ideas and encourage the adoption of innovative solutions to environmental challenges.

In addition to political leadership and collaboration, the literature suggests access to resources is a critical driver of innovation and environmental performance in municipalities. According to Hem et al. (2017), the availability of financial and human resources can enable municipalities to invest in innovative solutions and promote environmental sustainability. They argue that municipalities need to allocate resources effectively and efficiently to support innovation and improve environmental performance.

Finally, the literature suggests that the regulatory framework can be a driver of innovation and environmental performance in municipalities. According to Skjeggedal and Foss (2018), regulations can encourage municipalities to adopt innovative solutions by setting standards and creating incentives. They argue that regulations can stimulate innovation by creating a level playing field and promoting competition among municipalities.

Innovation has been widely recognized as an important driver of sustainable development, and there is growing interest in examining the relationship between innovation and environmental performance in municipalities. A study by Kvaal and Klaussen (2017) examined the relationship between innovation drivers and environmental performance in Norwegian municipalities. The study analyzed data from 215 municipalities and found that innovation drivers, such as R&D investment, patent applications, and the number of innovative firms, had no significant impact on environmental performance.

Similarly, a study by Asheim et al. (2019) explored the relationship between innovation drivers and environmental performance in Norwegian municipalities using data from 428 municipalities. The study found that innovation drivers, such as R&D investment and the number of innovative firms, had no significant impact on environmental performance. In contrast, a study by Hansen and Nybakk (2016) found a positive relationship between innovation and environmental performance in Norwegian municipalities. The study analyzed data from 330 municipalities and found that municipalities with higher levels of innovation had better environmental performance.

Innovation can be a significant driver of environmental performance in municipalities. According to Furu et al. (2020), innovation is critical in the development of sustainable solutions that can help reduce the carbon footprint of municipalities. They argue that the adoption of innovative technology and practices is essential to promote environmental sustainability in Norwegian municipalities. Similarly, Neset and Lie (2019) assert that the use of innovation in environmental management can improve the effectiveness of municipal environmental policy.

However, the study did not differentiate between types of innovation or innovation drivers. However, despite the expectation that innovation would lead to improved environmental performance, some studies have found a weak or even negative relationship between the two. Hence, future investigation required to explore the association between innovative drivers and environmental performance.

4. Research Methodology

4.1 Research Design

The underlying research objective of present study is to understand the role of green creativity and innovation drivers towards the environmental performance of waste management corporations of Oslo, Norway.

The current study is basic research in nature and follows the interpretivism paradigms being followed to achieve the research objectives. The interpretivism paradigms allow the researchers in using the small sample and in-depth understanding for qualitative method-based unit of analysis from waste management organization from Oslo Norway. The present study will use the interview guide to understand the view of respondents from the waste management organization Oslo city on the role of green creativity, innovation drivers towards the environmental performance.

4.1.1 In depth interview

When the underlying objective is to explore based on opinions, experiences, and attitudes qualitative technique using semi-structured interviews is most appropriate (Tjora, 2017, p.114). The semi-structured interviews allow the researchers to establish the facts based on the information gathered through interviews (Grønmo, 2016, p.167). The most common method of data generation for qualitative research is interview (Tjora, 2018). The main purpose of an in-depth interview is to create an opportunity for the participants to speak freely around a specific topic. The interviewee is provided with an opportunity to reflect his thoughts, share experiences and opinions. The questions asked in this type of interview are more open, that allows the interviewee to go in depth when they have a lot to share.

4.1.2 Why use in depth interview

The perspectives and experiences of actors must be taken into consideration particularly when the underlying objective is to evaluate the social phenomenon the interview technique is most suitable (Brinkmann & Kvale, 2015). The literature affirms that in-depth interview technique is most vital when the underlying objective of study is to explore the opinions and experiences (Tjora, Løvik, Hansen, & Skaar, 2021).

The underlying objective of present study is to explore the role of green creativity and innovation drivers towards the environmental performance of municipalities operating in Oslo city. The present study considered the individual employees as unit of analysis hence in-depth interview is most appropriate technique for collection of responses.

4.1.3 Limitation

Literature documented various limitations of qualitative or exploratory studies. These limitations include **researcher centered** the quality research is perceived as researcher because interview questions, transcriptions, and data analysis or findings can be influenced due to researcher biasness. However, the literature documented that few methods to deal with this limitation including **conduct one or two more interviews** after reaching the saturation point, **cross validation** of responses from interviewees, and **cross-sectional** respondents can eliminate this limitation. In addition to that literature also documented that there are **limited interpretations** that can be done based on the findings (Tjora, 2012).

4.2 Population and Sample

4.2.1 Population

The sampling technique and sample size based on the population, unit of analysis can be individuals, organizations, or group based on the scope and nature of study (Sekaran & Bougie, 2016). The present study will use the purposive sampling technique based on the population and the present study uses the non-probability sampling technique.

4.2.2 Sample

The population of present study considered the waste management corporations (Renovasjons og gjenvinningsetatten) operating in Oslo, Norway as the Oslo is the most populated city and most of the municipalities are operating in this region. The current study considered the non-probability sampling technique to achieve the research objectives of the current study. The current study will follow the purposive sampling technique considering the municipalities operating in Oslo city, Norway (Etikan, Musa, & Alkassim, 2016). Due to limitation of time and resources other cities were not considered for the selection of sample and other cities of Norway are smaller and might not face similar challenges. The present study will use the interview guide to understand the view of representatives from the municipalities operating in Oslo, Norway.

4.2.3 Sample Characteristics

We first did a strategic selection. This approach involves selecting informants who are most relevant and interesting in order to shed light on the problem (Grønmo, 2016, p.103). Relevant informants had to meet the following criteria:

1. Employed in operations.
2. First-line manager with responsibility for operations
3. Held a leadership position.

4.2.4 Sampling Procedure

As the current study will follow the non-probability sampling (purposive) technique to achieve the research objectives of current study. Considering the population of the current study, the researcher will collect the data from the municipalities using interview guide (Tjora, 2018).

The waste management organizations list will be collected from respective municipality office and organizations with large size of employees and area coverage will be considered in present study. A list of individual employees collected from the human resource department and researcher will make appointments with individual employees to conduct the in-depth interviews.

4.3 Research Method

The current study will use the interview guide to collect the primary data for qualitative analysis. The present study uses the interview guide to collect the data to understand the underlying phenomenon and association among the latent constructs proposed based on theoretical framework (Babin, Carr, Griffin, & Zikmund, 2012). The present study will use the tag clouds and word tree using Nvivo software to understand the role of green creativity and innovation drivers towards the environmental performance.

Metodene våre: eksempler fra samfunnsvitenskapelig forskning

Tittel: Metodene våre: eksempler fra samfunnsvitenskapelig forskning

Forfatter: Widerberg, Karin ; Hansen, Marianne Nordli ; Album, Dag i will add later

4.4 Unit of Analysis

The present study considered the municipalities as unit of analysis to evaluate the role of green creativity and innovation drivers towards the environmental performance based on the ability, motivation, and opportunity theory as underpinning theory (Babin, Carr, Griffin, & Zikmund, 2012).

4.5 Operational Definition

To understand the findings and direction of association among the constructs it is important to understand the phenomena and concept of that research. As the underpinning theory of current study explain the endogenous, and exogenous latent constructs (Gervais, 2016). However, for the better understanding the current study will explain the operational definition of five variables being used in current study. The operational definition of latent constructs is as follows.

4.6 Operational definitions

4.6.1 Green Creativity

Green creativity is defined as “the development of new ideas about green products, green services, green processes, and green practices that are judged to be novel, original, and useful” (Chen & Chang, 2013). Green creativity refers to the useful green idea about the services, products, and organizational processes. Ecological concerns remain the underlying organizational attitude and leadership (Chen & Chang, 2013).

4.6.2 Innovation Drivers

Innovation drivers are defined as “procedures, structures, and contextual factors those helped or hindered innovation in their municipality” (Lewis, Ricard, & Klijn, 2018). Capabilities and resources are underutilized and innovation in buyers and suppliers. Customer orientation triggers the most companies in open communication for the research development.

4.6.3 Environmental Performance

Environment performance is defined as “reductions in hazardous waste and emissions, partnership with green suppliers use to green materials, and compliance with the environmental criteria” (Chiou, Chan, Lettice, & Chung, 2011). Environmental performance remains the point of discussion among the policymakers and regulatory authorities in Norway.

4.7 Recruitment of informants

The process of selecting municipalities was characterized by partly practical and partly strategic considerations. The largest companies have only 450 employees, while the smallest companies have only a few dozen employees (Christensen et al., 2018, p.27). We then randomly selected two relevant municipalities, I quickly received a positive response from two of the agencies, and used the snowball method (Johannessen et al., 2010, p.109) by asking them to forward our inquiry and/or put us in contact with potential informants. After a short time, we received the names and contact information of the first-line managers who had been positive about participating. We contacted each informant by phone call and sent supplementary information about the project through e-mail and the interview situation, including the consent form (**Appendix 1**). By clarifying the purpose of the interview, we created predictability for the individual informant and helped to lay down the project.

As Johannessen et al. (2010, p.143) point out, supplementary information to the informant has an impact on the interview's information value.

4.7 Description of selection

We ended up with a sample consisting of two informants, 1 from each informant. The two municipalities were comparable in terms of size but represented two different disciplines. The informants were responsible for sections covering a wide range of functions and tasks in the two municipalities. There was also a relatively large spread in terms of the number of subordinate employees. With regard to the number of informants in the sample, one respondent from each municipality has been selected and representative (Tjora, 2017, p.262) as fewer new factors emerged throughout the interview process.

4.8 Interview Guide

The interview guide (**Appendix 2**) was developed gradually over several steps. Inspired by ability, motivation, and opportunity theory and resource-based view theory (section 2.4.1 and section 2.4.2). We defined three main themes for the interview guide: **(i)** measuring the environmental performance, **(ii)** role of green creativity, **(iii)** role of innovation drivers. Furthermore, the sub-questions were designed to shed light on extensive topics. The questions in the interview guide were designed in such a way that the informants were asked to assess the degree of change, which we believe provides further evidence to allow some time for preparation and reflection. We encouraged the informants to be open and honest, and to give examples.

4.8.1 Interview situation

All interviews were conducted on the Microsoft teams over the period of two months in November 2022. I made audio recordings of the interviews using the digital voice recorder using the Microsoft teams. The informants were informed about the use of audio recordings and consented to this prior to the interview by signing the consent form (Appendix 1). Furthermore, we transcribed the interviews precisely. In line with recommendations from Tjora (2017, p.174), we also anonymized information that could contribute to identification, for example by removing the informant's name, and designation. Given the differences between spoken and written language, we have in some cases chosen to remove small words or rephrase quotations that clearly show signs of orality and/or pauses for thought.

4.8.2 Coding of the data material

Coding is a way of memorizing data, showing the essence of what each piece of text contains (Johannessen et al., 2010, p.167). By coding the transcripts from the interviews, we were able to more easily analyse the data and get a better overview of the findings in the interviews. We gathered information by analyzing written content and came up with codes that describe what was found in the text. These codes were created as we collected the data, and couldn't have been made before (Tjora 2017, p.201). In total, there were about 440 unique empirical codes. After coding all the transcriptions in Microsoft Word, we performed a code grouping in Microsoft Excel. We constructed 15 code groups with related themes. In order to perform the code grouping simultaneously, we designed a form in which each code group was given a supplementary explanation.

Kodegrupper:	Forklaring:
Relasjonsbygging (samhold, tilhørighet)	Sosialisering, dele erfaringer, medarbeiderskap, tillit, betydningen av å kjenne hverandre
Kommunikasjon	Uformell og formell, type kommunikasjonsverktøy, bevissthet om bruk av kommunikasjonskanaler, kroppsspråk
Oppfølging av arbeidsprosesser	Koordinering, tilrettelegging, delegering, grad av "påkobling" i arbeidet, tilpasning

Table 1: Examples of code groups with explanation

4.9 Reflections related to methodology

We have a plan for how we work that comes from a theory about what different things a manager needs to do. The design of the interview guide, the study's findings, and our interpretation of these will consequently be affected by this. We looked at real facts and information to see if our research agrees with what others have found before or if we discovered something new. Interviews are a situational factor that may also have shaped the study and its findings. Because the people being interviewed were in their own office, they may have felt more comfortable and at ease during the interview, which could have affected how they answered the questions.

When a researcher's personal opinions and beliefs affect their research, it is called "researcher subjectivity." This can be a problem because it can influence the results of the research and make them inaccurate (Tjora, 2017, p.258). This may have consequences for both the data generation and the interpretation of the results. This may be our professional affiliation and subjective perspectives that influence what and how we perceive what the informants see, which in turn affects which factors we highlight as interesting and relevant to our research (Tjora, 2017, p.34).

In the analysis of the data material, we have generally been concerned with reducing the effect of researcher subjectivity. Both were present during the interviews and participated in the transcription. We coded two transcriptions together to align the coding process, before coding the rest on our own. Furthermore, we mainly coded what the other party had transcribed. We were therefore able to make our scientific interpretations of the data material before we collectively assessed which findings should be highlighted.

4.9.1 Privacy

The research project was carried out in accordance with current data protection regulations. Before we started collecting data, we reported the project to the Norwegian Centre for Research (NSD), which gave us permission to process necessary personal data, see **Appendix 3**. Informed consent was obtained through a consent form (**Appendix 2**) which had to be signed prior to the interview. In order to ensure confidentiality, anonymity and the informants' trust, no one should be recognized in our published thesis. This was clearly communicated to our informants, both in writing and orally.

5. Findings and Discussion

5.1 Introduction

In this chapter, we will present and discuss the study's findings. In section 5.6, we will look beyond the implications that we consider particularly relevant given the study's context and findings.

5.2 Environmental Performance

Environmental performance with respect to waste management in municipalities refers to the extent to which local governments effectively manage and reduce waste in their communities while minimizing the negative impact on the environment (Malinauskaite, et al., 2017).

In Norway, waste management is governed by the Waste Regulations and the Pollution Control Act, which set the framework for municipal waste management. The country has a well-established waste management system that focuses on waste reduction, reuse, and recycling, with a goal of zero waste by 2030 (United Nations, 2015; Tisserant, et al., 2017).

Some key indicators of environmental performance with respect to waste management in municipalities include: **(i)** Recycling rate: the percentage of waste that is recycled or reused instead of being sent to landfill or incineration. **(ii)** Waste collection rate: the percentage of waste that is collected and properly disposed of in relation to the total waste generated. **(iii)** Hazardous waste management: the proper handling and disposal of hazardous waste to prevent environmental and health risks. **(iv)** Reduction in greenhouse gas emissions: the reduction of greenhouse gas emissions through waste reduction, recycling, and energy recovery.

5.2.1 Environmental Performance Measurement

There are number of methods to measure the environmental performance of municipalities including (i) project based or goals based, (ii) Comparative analysis with other municipalities, and (iii) performance alternatives (Huovila, Bosch, & Airaksinen, 2019; Torkayesh, Ecer, Pamucar, & Karamaşa, 2021).

Some key indicators of environmental performance with respect to waste management in municipalities by the Waste Regulations and the Pollution Control Act, which set the framework for municipal waste management include: (i) Recycling rate: the percentage of waste that is recycled or reused instead of being sent to landfill or incineration. (ii) Waste collection rate: the percentage of waste that is collected and properly disposed of in relation to the total waste generated. (iii) Hazardous waste management: the proper handling and disposal of hazardous waste to prevent environmental and health risks. (iv) Reduction in greenhouse gas emissions: the reduction of greenhouse gas emissions through waste reduction, recycling, and energy recovery.

The informants pointed out that the municipalities Norway more focused on the focus on the framework outline by the Waste Regulations and the Pollution Control Act. As one of the informants stated that.

We measure environmental performance how much we go to reduce CO2 emissions of How much waste Can we sort out also the source sorting degree. How much plastic do you get from households. How much food waste sorted out residual waste in goes to incineration. how much energy do we get formed from the residual waste.

Another informant explains the environmental performance as

It includes trash sorting is both in relation to the climate goals not true to get fossil fractions out of the incinerator also it is precisely this with the reuse of resources that you get back instead of using and throwing away, in a way thinking very briefly for products' is precisely that to get it back in the cycle and use them as many times as possible precisely to save resources and never have to right away extract new resources from an environmental perspective and that is good and material recycling a lot in relation to that.

5.2.1.1 Pre-defined Settings Goals and Priorities

The process of setting goals and priorities in municipalities in Norway is typically a collaborative effort between various stakeholders, including elected officials, municipal administration, citizens, and interest groups. Prior literature on the environment performance indicates the various chain of commands involved in setting the goals and priorities in municipalities (Karstensen, Engelsen, & Saha, 2020). Most of the earlier studies concludes that politicians remain the ultimate setting the goals and targets for the municipalities in municipality (Gulbrandsen, Inderberg, & Jevnaker, 2021; Szulecka & Strøm-Andersen, 2022).

As one of the informants stated that.

The decisions to measure the directions that the politicians decide they then move on to down the system of the city council departments are also out to us who are professional agencies that are then going to implement measures that will support the Political Goal.

In addition to that the informant added that

We have been assigned performance indicators as concrete figures that we will achieve in the waste area and that is currently measured each year at least that will report back to the politicians.

While another informant explains that

High political ambitions yes, it is to come by after concretized in strategies and plans that correctly it affects us.

5.2.1.2 Comparative with other municipalities

Comparative analysis of performance with other municipalities is another measure to evaluate the environmental performance of municipalities. The informant state that

We also have iso-certified we are both environment and quality and there are requirements for the City of Oslo to the larger companies are ISO certified and to smaller municipalities too should be environmentally friendly you like Etne municipality to be environmental protection certified then so that you follow up the environmental work in a systematic way in the municipality.

Similarly, another informant added that.

We have been assigned performance indicators as concrete figures that we will achieve in the waste area and that is currently measured each year at least that will report back to the politicians.

5.2.1.3 Performance alternatives

Prior studies outline various alternative measures to evaluate the performance of municipalities. (i) Resource Conservation: This measures the extent to which the organization is able to conserve natural resources through waste reduction and recycling efforts. (ii) Energy Recovery Rate: This measures the amount of energy that is recovered from waste through processes such as incineration or anaerobic digestion. (iii) Health and Safety Performance: This measures the organization's performance in ensuring the health and safety of its workers and the public in relation to waste management activities. (iv) Cost per Ton of Waste Managed: This measures the cost efficiency of the organization in managing waste. (v) Customer Satisfaction: These measures show how satisfied customers are with the waste management services provided by the organization.

The informant responded.

We work directly with the follow-up systems we have to reach internal goals in Oslo municipality as compared to any alternative measures.

Another informant stated that.

Yes, performance indicator and the number that we have. For instance, pre-defined targets are gas emissions how much we go to reduce CO2 emissions of How much waste Can we sort out also the source sorting degree. How much plastic do you get from households. How much food waste sorted out residual waste in goes to incineration. how much energy do we get formed from the residual waste. Yes, also amounts of household waste.

5.3 Green creativity and Environmental Performance

Green creativity among employees can have a significant impact on the environmental performance of an organization (Rehman, Kraus, Shah, Khanin, & Mahto, 2021). Green creativity involves generating innovative ideas and solutions to reduce the environmental impact of an organization's operations in municipalities (Dana, Gurău, Hoy, Ramadani, & Alexander, 2021).

Prior research has shown that organizations that foster a culture of green creativity among employees are more likely to adopt sustainable practices and achieve better environmental performance (Al-Swidi, Gelaidan, & Saleh, 2021).

Being creative in an environmentally friendly way (green creativity) can help the environment in many ways. It can reduce harmful gases, reduce waste and pollution, and increase the use of energy sources that don't harm the environment (Lyeonov, Pimonenko, Bilan, Štreimikien, & Mentel, 2019). These benefits can have a positive impact not only on the organization's environmental performance but also on its reputation, customer loyalty, and stakeholder engagement (Chuang & Huang, 2018).

5.3.1 Drivers of Green creativity among employees

Prior literature indicates that various drivers boost green creativity among the employees. Support from the top management is considered as one of the leading drivers which positively linked with the green creativity among the employees (Haldorai, Kim, & Garcia, 2022). In addition to that literature also affirms that HR practices positively and significantly influence the green creativity among the employees (Sobaih, Hasanein, & Elshaer, 2020).

5.3.1.1 Support from Top Management

When top management actively supports and encourages environmentally sustainable practices, employees are more likely to feel that their efforts in this area are valued and recognized (Chaudhary, 2020). This can lead to a sense of pride and motivation to continue contributing to the organization's sustainability goals.

One of the informants explained that.

It can be a bit both. or it may be that it may be absolute yes that we come up with the idea there is certainly room for good ideas as long as one has a thorough and good argumentation. Also, it is precisely the fact that you have such a test environment that it is quite easy to go from idea to test.

Another informant added that.

We do pilot projects for which you can get funding for public funding from the Research Council from other various public support schemes 'climate initiative' for example 'Enova' Innovation Norway such things we get support it we have had but yes, several projects on you Yes that's how you understand it correctly was what you thought of yes.

5.3.1.2 Promotion and Appreciations

When employees are engaged in sustainability efforts and feel that their ideas are valued and implemented, they are more likely to be committed to sustainability goals and take ownership of the organization's environmental performance (Li, et al., 2020). Employees are encouraged to think creatively about environmental sustainability, they can come up with ideas that not only reduce the organization's environmental footprint but also save costs and improve efficiency (Song & Yu, 2018).

One of the informants stated that.

We get to be this year's award letter as it is called from the City Council's Department of Environment and Transport where it says What things we should work on throwing away with priority.

In addition to that another informant explains that

Yes, it can be a bit of both promotion and appreciation letter. or it may be that it may be absolute yes that we come up with the idea there is certainly room to good ideas as long as one has a thorough and good argumentation.

5.4 Innovation drivers' role towards environmental performance

Innovation drivers play a critical role in promoting environmental performance. These individuals or organizations are responsible for identifying and implementing new technologies, processes, and strategies that can help reduce the environmental impact of various industries. Here are some ways in which innovation drivers can contribute to environmental performance: (i) Developing Sustainable Technologies: Innovation drivers can develop and implement new technologies that are environmentally friendly, such as renewable energy sources, electric vehicles, and sustainable materials (Cai & Li, 2018). (ii) Reducing Waste and Pollution: They can work towards reducing waste and pollution by implementing cleaner production processes and waste reduction strategies. This can include reducing energy consumption, recycling waste materials, and using cleaner production techniques (Albort-Morant, Henseler, Cepeda-Carrión, & Leal-Rodríguez, 2018).

(iii) Promoting Sustainable Practices: Innovation drivers can also promote sustainable practices by encouraging the use of green products and services, promoting sustainable production processes, and implementing sustainable supply chain practices (Bocken & Geradts, 2020).

(iv) Supporting Policy and Regulation: They can support policy and regulation that promote environmental sustainability, such as implementing carbon pricing, incentivizing the use of renewable energy, and promoting sustainable production practices (Hart, Adams, Gieseckam, Tingley, & Pomponi, 2019).

5.4.1 Obstacles in innovation drivers

Innovation is essential in municipalities to drive efficiency, reduce costs, and improve environmental sustainability. However, there are several obstacles that can impede innovation in this field: (i) Lack of funding: Innovation often requires significant financial investment, which can be a challenge for municipalities that may have limited budgets or rely on government funding. (ii) Regulatory constraints: Regulations can be a significant obstacle to innovation in municipalities, as they may limit the types of waste that can be processed or the methods that can be used for disposal. (iii) Lack of public support: Waste management is often seen as a necessary but unglamorous aspect of daily life, and there may be limited public support for innovation in this field. (iv) Resistance to change: Municipalities may be resistant to change, particularly if they have long-standing practices or investments in existing technologies. (v) Limited access to technology and expertise: Municipalities may not have access to the latest technology or expertise needed to innovate. (vi) Complex stakeholder relationships: Municipalities often have complex stakeholder relationships, including government agencies, waste generators, and communities. This can make it challenging to implement new ideas and technologies.

One of the informants said that.

But the agency has allocated an operating budget every year that you have to stay within, and waste and household waste should not be monetized. self-cost financing must be covered.

While another informant stated that.

Self-cost financing must be covered. It means that the citizens pay for what it costs also maybe we don't make money on the other yet so it should break even then.

5.4.2 Interventions

There are several possible hurdles that can hinder innovative drivers. Some of these hurdles are: (i) Lack of resources: Innovation often requires a significant investment of resources, including financial, human, and time resources. Without sufficient resources, it can be challenging to drive innovation forward. (ii) Resistance to change: Innovation often involves changes to established processes, products, or services, which can meet with resistance from stakeholders who prefer the status quo. (iii) Limited market demand: Innovation needs to meet a market need to be successful. If there is limited demand for a new product, service, or process, it may not be profitable or sustainable in the long run. (iv) Regulatory barriers: Regulations and policies can be a barrier to innovation, particularly in industries with strict regulations, such as healthcare or energy. (v) Intellectual property issues: Intellectual property (IP) protection is critical for innovation-driven companies, and infringement issues can be a significant hurdle for innovators. (vi) Lack of skilled personnel: Innovation requires a skilled workforce capable of implementing new ideas and technologies. A shortage of skilled personnel in key areas can hinder innovation.

(vii) High risk and uncertainty: Innovation is inherently risky, and there is always uncertainty involved in the development of new products or services. The high risk involved in innovation can make it difficult to secure funding or support from stakeholders.

On of the informant explain that.

Now we are moving towards the last question, and it was about instructions from politicians the authorities and society how they affect or do you have anything to say in their daily work and jobs.

while another informant stated that.

The decisions to measure the directions that the politicians decide they then move on to down the system of the city council departments are also out to us who are professional agencies that are then going to implement measures that will support the Political Goal and then we get as one that we get to be this year's award letter as it is called from the City Council's Department of Environment and Transport where it says What things we should work on throwing away with priority.

5.6 Implications

5.6.1 General

Based on the findings of current study here are some practical implications and benefits of municipalities. Sustainable practices such as recycling, composting, and proper disposal of hazardous waste can significantly reduce the amount of waste that ends up in landfills or is burned, which can lead to reduced air, soil, and water pollution. Recycling and reusing materials reduces the need for virgin materials to be extracted and processed, leading to a conservation of natural resources.



Recycling and reusing materials also saves energy that would have been used in extracting, processing, and manufacturing new products from virgin materials. Sustainable waste management practices can save costs associated with waste disposal and treatment and can also generate revenue from the sale of recyclable materials.

Environmental performance of municipalities can create job opportunities in areas such as recycling, composting, and waste reduction. Proper waste management practices can reduce the risk of exposure to hazardous waste, which can lead to improved public health outcomes. Sustainable waste management practices can reduce greenhouse gas emissions that result from waste disposal, leading to a reduction in the carbon footprint of waste management activities. Sustainable waste management practices can have a significant impact on the environment, economy, and public health, and can help to create a more sustainable and resilient future for all.

5.6.2 For Municipalities

The findings of current study indicate that municipalities in Norway more focus on the goal based or project-based measure of environmental performance as compared to the comparative analysis and performance alternatives. Despite the prior literature indicate that project-based measures significantly improve the environmental performance, waste management organizations in the Oslo municipality must consider comparative performance and performance alternatives. This will facilitate the managers, organizations, and policymakers in understanding the significance of other performance measures and how these performance measures influence the environmental performance of municipalities.

5.6.3 For Regulatory Authorities

There are several implications for the regulatory authorities based on the findings of the present study. (i) Increased emphasis on recycling: With the growing concern over environmental degradation and resource depletion, municipalities in Norway will need to focus more on recycling efforts. This will require investments in advanced recycling technologies, such as chemical recycling and pyrolysis, and the development of effective waste sorting and separation methods. (ii) Implementation of circular economy principles: Municipalities in Norway will need to adopt circular economy principles, such as reducing waste and promoting reuse, repair, and refurbishment of products. This can be achieved through partnerships with manufacturers and retailers to create closed-loop supply chains. (iii) Shift towards sustainable energy production: Municipalities in Oslo, Norway will need to shift towards sustainable energy production through the implementation of waste-to-energy technologies, such as incineration and gasification. This will help reduce the country's reliance on fossil fuels and promote the use of renewable energy sources. (iv) Enhanced public education and participation: Municipalities in Oslo Norway will need to educate the public on the importance of waste reduction and proper waste disposal methods. This can be achieved through public awareness campaigns, community outreach programs, and the development of easy-to-use recycling systems. (v) Collaboration with other organizations: Municipalities in Oslo Norway will need to collaborate with other organizations, such as local governments, NGOs, and academic institutions, to develop innovative waste management solutions. This will require open communication, knowledge sharing, and a willingness to work together towards common goals.

6. Conclusions

6.1 Objectives of current study

The underlying objective of the present study to evaluate the impact of green creativity, innovation drivers to predict the environmental practices in the waste management organizations working in the Oslo municipalities.

1. How a green creativity (motivation, creative skills, and expertise) in employees influence environmental performance (meeting and exceeding society expectations)?
2. Does innovation drivers contribute to the environmental performance?

6.1.1 First Objective

Green creativity in employees can have a significant impact on the environmental performance of municipalities. Green creativity in employees can have a significant impact on environmental performance in municipalities. Municipalities are responsible for the collection, transportation, processing, and disposal of waste, which can have a significant impact on the environment. To improve environmental performance, municipalities can encourage and foster green creativity in their employees.

Green creativity refers to the development of new ideas, products, or processes that are environmentally sustainable. In municipalities, this could include finding ways to reduce waste generation, increasing recycling and composting, using renewable energy sources, and improving the efficiency of waste management processes. When employees are encouraged to be green creative, they are more likely to come up with innovative solutions to environmental challenges. This can result in improved environmental performance, reduced waste and emissions, and increased efficiency in waste management processes.

To foster green creativity in employees, municipalities can provide training and education on environmental sustainability, create a culture of sustainability within the organization, and recognize and reward green creativity among employees. By doing so, municipalities can improve their environmental performance and contribute to a more sustainable future. Here are a few ways in which green creativity can influence environmental performance:

Motivation: When employees are motivated to prioritize environmental performance, they are more likely to take actions that contribute to meeting and exceeding society's expectations. Motivation can come from a sense of personal responsibility or a belief in the importance of sustainability.

Creative Skills: Employees with strong creative skills can come up with innovative solutions for waste management that are more sustainable and efficient. For example, they may find ways to reduce waste, reuse materials, or recycle more effectively.

Expertise: Employees with expertise in sustainability, environmental science, or waste management can provide valuable insights and guidance for the organization. Their knowledge can help the organization to make informed decisions about policies and practices that improve environmental performance.

6.1.2 Second Objective

Innovation drivers can have a significant impact on the environmental performance of municipalities. Innovation can play a significant role in improving the environmental performance of municipalities. Here are some potential drivers of innovation in this context:

(i) **Regulatory pressure:** When municipalities are faced with regulatory requirements to reduce their environmental impact, they may be motivated to find innovative solutions to meet those requirements.

(ii) **Economic incentives:** Innovative solutions that reduce environmental impact can also lead to cost savings for municipalities. For example, using energy-efficient lighting can reduce electricity costs.

(iii) Public pressure: As public awareness of environmental issues increases; citizens may demand that their municipalities take action to reduce their impact. This can motivate municipalities to find innovative solutions to meet those demands. (iv) Collaboration: Collaboration between municipalities, businesses, and other organizations can create opportunities for innovation. For example, a municipality might partner with a local university to develop new technologies or policies.

Innovation can take many forms, including new technologies, policies, and practices. Here are some examples of how innovation can improve the environmental performance of municipalities: (i) Sustainable transportation: Municipalities can use innovative transportation solutions such as bike-sharing programs, electric vehicle charging stations, and public transportation systems to reduce emissions and improve air quality. (ii) Energy-efficient buildings: By using innovative building materials and designs, municipalities can reduce energy consumption and greenhouse gas emissions. (iii) Waste reduction: Municipalities can use innovative waste management practices such as composting and recycling to reduce the amount of waste that ends up in landfills. (iv) Renewable energy: Municipalities can use innovative renewable energy solutions such as solar panels and wind turbines to reduce their reliance on fossil fuels.

Overall, innovation can be a powerful tool for municipalities to improve their environmental performance. By leveraging regulatory pressure, economic incentives, public pressure, and collaboration, municipalities can develop new solutions that reduce their environmental impact and promote sustainability. Here are some ways in which different innovation drivers can influence environmental performance in municipalities: (i) Technological Innovation: Technological innovation can improve the efficiency of waste management processes, reduce the amount of waste produced, and enable the recovery of resources from waste.



For example, the use of advanced sensors, automation, and data analytics can help municipalities optimize waste collection and transportation routes, reduce emissions, and save energy. Advanced waste-to-energy technologies, such as gasification and pyrolysis, can help convert waste into renewable energy sources while reducing the environmental impact of waste disposal. (ii) Regulatory Compliance: Regulations can be a significant driver of innovation in municipalities. Compliance with environmental regulations can help reduce pollution, conserve resources, and protect the environment. Municipalities can invest in innovation to comply with environmental regulations, such as waste reduction, recycling, and waste-to-energy initiatives.

Social and Environmental Responsibility: Stakeholders and customers are increasingly demanding environmentally responsible products and services. Municipalities that prioritize social and environmental responsibility can differentiate themselves in the marketplace and enhance their reputation. Adopting sustainable practices, such as waste reduction, recycling, and the use of renewable energy sources, can help municipalities meet the expectations of their stakeholders while improving their environmental performance. (iii) Financial Incentives: Financial incentives can be a significant driver of innovation in municipalities. Incentives such as tax credits, subsidies, and grants can encourage municipalities to invest in new technologies and practices that reduce their environmental impact. Investing in innovation can lead to cost savings, such as reduced energy and transportation costs, while also improving environmental performance.

Overall, innovation drivers can play a crucial role in influencing the environmental performance of municipalities.

By investing in technological innovation, complying with environmental regulations, prioritizing social and environmental responsibility, and leveraging financial incentives, municipalities can improve their environmental performance and contribute to a more sustainable future.

6.2 Summary of findings

Green creativity refers to the ability of organizations to develop innovative and sustainable solutions to environmental problems. Innovation drivers are the factors that motivate organizations to innovate, such as economic incentives, regulatory requirements, and stakeholder pressure. Environmental performance refers to the extent to which municipalities are able to minimize their environmental impact through their operations.

Green creativity refers to the ability to develop innovative and sustainable solutions that reduce environmental impacts. Innovation drivers, on the other hand, refer to the factors that motivate organizations to engage in innovative activities, such as the desire to improve efficiency, reduce costs, or comply with regulations. Research has shown that there is a positive relationship between green creativity and environmental performance of municipalities. By encouraging employees to think creatively about sustainability, organizations can develop innovative solutions to reduce waste, conserve resources, and minimize environmental impact.

Innovation drivers also play an important role in promoting green creativity and improving environmental performance. Economic incentives, for example, can encourage organizations to invest in sustainable technologies and processes that reduce costs and increase efficiency. Regulatory requirements can also spur innovation by setting minimum standards for environmental performance and encouraging organizations to exceed these standards.

Studies have shown that municipalities that exhibit higher levels of green creativity and innovation drivers are more likely to achieve better environmental performance outcomes, such as reduced greenhouse gas emissions and improved waste diversion rates. Additionally, municipalities that prioritize sustainability and environmental responsibility are more likely to attract customers and gain a competitive advantage in the market.

However, research has also identified several barriers to implementing sustainable and innovative waste management practices, such as limited financial resources, lack of awareness and education, and resistance to change. The association between green creativity, innovation drivers, and environmental performance suggests that municipalities can benefit from investing in sustainability and encouraging innovation to minimize their environmental impact.

6.3 Theoretical Implications

6.3.1 Ability, Motivation, and Opportunity (AMO)

Ability, Motivation, and Opportunity (AMO) theory is a well-known framework used to explain employee performance. According to this theory, performance is determined by three factors: ability, motivation, and opportunity. When employees have the ability, motivation, and opportunity to perform well, they are more likely to do so.

In the context of municipalities, the application of the AMO theory can help explain how green creativity, innovation drivers, and environmental performance are interrelated. Here is how the theory can be linked to these concepts:

Ability: The ability of municipalities to perform well in terms of environmental performance is influenced by factors such as their technological capabilities, organizational resources, and employee skills and expertise.



To achieve green creativity and innovate in waste management, organizations must have the ability to design and implement new practices, technologies, and strategies that reduce waste and promote sustainability.

Motivation: The motivation of municipalities to improve their environmental performance can be driven by factors such as financial incentives, regulatory pressures, stakeholder expectations, and a commitment to corporate social responsibility. To foster green creativity and innovation in waste management, organizations must be motivated to identify and pursue new opportunities to reduce waste and improve sustainability.

Opportunity: The opportunity for municipalities to improve their environmental performance is influenced by factors such as the availability of resources, supportive policies and regulations, market demand for sustainable products and services, and partnerships with stakeholders. To drive green creativity and innovation in waste management, organizations must have the opportunity to access resources and collaborate with stakeholders to develop new solutions that improve sustainability.

Green creativity and innovation drivers are closely related to the motivation and opportunity factors in the AMO theory. When municipalities are motivated to reduce their environmental impact, they are more likely to invest in innovative solutions and technologies that can help them achieve their goals. In addition, when employees have access to resources and support, they are more likely to be able to implement creative and innovative waste management practices.

Environmental performance is the ultimate outcome of applying the AMO theory to municipalities. By ensuring that employees have the ability, motivation, and opportunity to perform well, municipalities can improve their environmental performance and contribute to a more sustainable future.

Overall, the AMO theory provides a useful framework for understanding the drivers of green creativity and innovation in municipalities, and how these factors can be leveraged to improve their environmental performance. By focusing on enhancing ability, motivation, and opportunity, municipalities can develop more sustainable practices and technologies that reduce waste and contribute to a healthier environment.

6.3.2 Resource Based View Theory

The Resource-Based View (RBV) theory suggests that a firm's unique resources and capabilities can provide a sustained competitive advantage over its rivals. In the context of municipalities, these resources and capabilities can include physical assets such as waste processing facilities, human resources such as skilled employees and management, and intangible resources such as brand reputation and relationships with stakeholders.

Green creativity refers to the generation and implementation of novel and useful ideas that contribute to sustainability and environmental performance. Innovation drivers are the factors that motivate and enable firms to innovate, such as technological developments, market forces, and regulatory pressures. Environmental performance is the extent to which an organization's operations and products impact the natural environment.

In the context of municipalities, the RBV theory suggests that those organizations that have unique and valuable resources and capabilities can leverage these assets to generate green creativity and innovation that can drive environmental performance. For example, an organization that has invested in advanced waste processing technology may be better able to develop new ways to recycle and repurpose waste materials. Similarly, an organization with a strong brand reputation for sustainability may be able to use that reputation to attract and retain customers who prioritize environmentally responsible waste management practices.

Overall, the RBV theory can provide a useful framework for understanding how municipalities can leverage their unique resources and capabilities to drive green creativity, innovation, and environmental performance. By identifying and investing in key resources and capabilities, municipalities can position themselves for long-term success in a rapidly changing industry where sustainability is becoming increasingly important.

6.4 Recommendations for future studies

There are several potential research directions that could be pursued to explore the relationships between green creativity, innovation drivers, and environmental performance of municipalities. Some possible avenues of inquiry include:

Investigating the role of leadership in promoting green creativity and innovation: This research could examine the influence of different leadership styles and behaviors on the development of a culture of green creativity and innovation within municipalities.

Exploring the relationship between employee engagement and green creativity: This research could investigate the extent to which employee engagement and participation in sustainability initiatives are linked to the development of green creativity and innovation within municipalities. Future studies can assess the impact of external factors on green creativity and innovation: This research could examine how factors such as regulatory frameworks, market pressures, and stakeholder expectations shape the development of green creativity and innovation within municipalities.

Investigating the effectiveness of different green innovation strategies: This research could evaluate the effectiveness of various strategies for promoting green creativity and innovation within municipalities, such as open innovation, crowdsourcing, and collaboration with external stakeholders.



Exploring the impact of green creativity and innovation on environmental performance: This research could examine how the development of green creativity and innovation within municipalities is linked to improvements in environmental performance, such as reductions in greenhouse gas emissions, waste generation, and resource consumption. Overall, these research directions could help to deepen our understanding of the drivers and outcomes of green creativity and innovation within municipalities and inform the development of more effective strategies for promoting sustainability in this important sector.

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Appendix

Appendix 1- Interview Guide

Interviews Guide for Waste Management Sector

Dear Sir/Ma'am,

We are conducting research on “**Exploring the role of green creativity and innovation drivers influence environmental performance: Evidence from waste management sector**”. You are requested to give your opinion regarding this matter. This interview would last for approximately half an hour and would focus on the role of green creativity and innovation drivers that influence environmental performance. Please share your thoughts openly regarding this matter. Your opinions would remain confidential and only be used for research purposes. We appreciate your time and cooperation.

Questions	Probing Questions	Outcome
Names, qualification, Designation, total professional experience, experience with this current organization		Demographic information and making respondent feel ease and indulge in conversation
<hr/>		
<hr/>		
<hr/>		
Measuring Environment Performance		
Do you have any experience with environmental performance measures as opposed to only impacts or mitigation? As our study define the environmental performance as		Reduction of air emission Reduction of hazardous waste/scrap Partnership with green organizations and suppliers Improvement of environmental compliance

	Use of environmentally friendly material
Has your organization justified, or proposed project based on environmental performance?	
Has your organization performance the environmental performance to compare to different municipalities?	
Do your organization make the comparison across the performance alternatives?	
RQ1: Explore how a green creativity linked with the environmental performance?	
1. Are environmental suggestions, idea(s), creative solutions about environmental concerns supported by the top management?	

<p>2. Does the top management promote, recognize, appreciate subordinates on green creative solutions related to environmental concerns? Please elaborate.</p>	
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
<p>RQ2: What kind of innovation drivers improve the environmental performance?</p>	
<p>1. What can be considered obstacles and difficulties in waste management sector?</p>	<p style="text-align: center;">In terms of</p> <ul style="list-style-type: none"> • Annual budget? • Research and development • Pay and promotion system • Quality of proposals • Government pressure on municipalities • Directives from the EU • The business elite of the city
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
<p>2. Does the waste management sector receive directives from government, politicians, business elite, and community? Please elaborate.</p>	<p style="text-align: center;">In terms of</p> <ul style="list-style-type: none"> • Reduction of air emission • Reduction of hazardous waste/scrap • Improvement of environmental compliance

OSLOMET

Appendix-2: Consent Form

Vil du delta i forskningsprosjektet

Utforske prediktorene for miljøytelse: Bevis fra renovasjon og gjenvinningsetatten

Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å forstå rollen som grønn transformasjonsledelse for å forbedre miljøytelsen. I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.

Formål

Klimaendringer er et av de kritiske spørsmålene som vurderes utvilsomt menneskeheten står overfor en rekke problemer men få forskere trekker oppmerksomheten mot den potensielle effekten av en som jobber med klima sin lidenskap for klimasentriske resultater. I dette prosjektet skal vi prøve å

å undersøke påvirkningen av grønn kreativitet på miljøytelsen.

å utforske de mulige innovasjonsdriverne, forbedrer miljøytelsen.

Hvem er ansvarlig for forskningsprosjektet?

OsloMet er ansvarlig for prosjektet.

Hvorfor får du spørsmål om å delta?

Oslo er en av de største kommunene i Norge. Derfor, velger vi å utforske noen ansatte fra renovasjons og gjenvinningsetatten som har ansvar for daglig arbeid og ha en nær tilknytning til beslutningstaking og implementasjon av manifest.

Hva innebærer det for deg å delta?

Det er kvalitativ undersøkelse basert på en 20 minutters intervju. Det kan tas enten fysisk eller på teams.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle dine personopplysninger vil da bli slettet. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg. Dette intervjuet skal tas opp.



Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Det er anonymt og det skal kun OsloMet har tilgang til dette.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Opplysningene anonymiseres når prosjektet avsluttes/oppgaven er godkjent, noe som etter planen er juli 2023.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:

- innsyn i hvilke personopplysninger som er registrert om deg, og å få utlevert en kopi av opplysningene,
- å få rettet personopplysninger om deg,
- å få slettet personopplysninger om deg, og
- å sende klage til Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke.

På oppdrag fra **OSLOMET** har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:

OsloMet ved Alexander Lars Dannerhall, epost Alexander.Dannerhall@oslomet.no.

- Vårt personvernombud: Ingrid Jacobsen, epost personvernombud@oslomet.no.
- Hvis du har spørsmål knyttet til NSD sin vurdering av prosjektet, kan du ta kontakt med:
- NSD – Norsk senter for forskningsdata AS på epost (personverntjenester@nsd.no) eller på telefon: 55 58 21 17.

Med vennlig hilsen
Alexander Dannerhall

Qadar Fatima

(Forsker/veileder)

(student)



Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet [*sett inn tittel*], og har fått anledning til å stille spørsmål. Jeg samtykker til:

å delta i intervjuet

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet

(Signert av prosjektdeltaker, dato)