Business opportunities in waste management in the Czech Republic

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Abstract

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This thesis was conducted by the order of the Finland-Central Eastern European Countries Business Association. The objective was to research the business opportunities for Finnish SMEs in the waste management sector in the Czech Republic.

The objective was to acquire and provide new and practicable knowledge for the business association about the business environment, public decision-making affecting waste management operations, and required cooperation.

The research approach was qualitative. Semi-structured interviews were conducted to collect information. The selection of interviewees was based on their experience and expertise in the studied field.

The theoretical framework was structured before conducting the interviews. The interviews were conducted during April and May 2021.

The interviews were recorded and transcribed. The interpretation of the results was made based on the transcription.

The results highlighted important practicalities to be considered generally in the target market area, or specifically when operating in the waste management sector or cooperating with the municipalities in the Czech Republic.

Keywords
circular economy, circular business model, waste management, resource recovery, recycling, the Czech Republic

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1 Introduction

Nowadays, it is vital to notice the importance of circular business models. Demand for sustainable solutions is both societal and environmental. Sustainable business models can make a big impact in societies, and that is why they offer lots of new opportunities for companies. There is demand for waste recycling and resource recovery services, in addition to traditional waste recycling.

The thesis examines factors related to a circular business model, resource recovery, and the circular ecosystem enabling waste management activities. The focus is on business opportunities in waste management in the Czech Republic, from the circular economy perspective. Waste management is strongly linked to the circular economy and business. Especially, it is linked to resource efficiency from the circular business models perspective. Resource efficiency covers activities related to the recovery and recycling of materials, in this case, different waste materials. The goal is to collect and recover the materials back to the cycle enabling the efficient use of materials.

From the viewpoints of waste management and circular economy, reducing waste disposal is also a crucial factor. Consuming less, consuming products with more sustainable and easily recyclable or biodegradable materials is the key to more sustainable and responsible waste management altogether. Naturally, the waste management services operate firmly as a part of a society, so the efficient and environmentally responsible waste management linked to circular economy targets, is beneficial for citizens, municipalities, businesses, and the environment in the big picture. Decision-making, legislations, investments, and innovations have their crucial role enabling this development towards circularity on multiple levels, not forgetting the importance of businesses operating in the field of circularity, for example, waste management services.

The thesis is written by the order of the Finland-Central Eastern European Countries Business Association. The business association promotes trade relations between Finland and Eastern Central European countries, the Czech Republic being one of them. Therefore, the thesis topic has been delimited to the Czech Republic. The objective is to have a clearer picture of business opportunities in waste management in the Czech Republic, from the perspective of waste management operators.

1.1 Objectives of the study

The objective of the thesis is to research the business opportunities in waste management in the Czech Republic, from the circular economy and ecosystem perspective. Also, the

point of view of Finnish SMEs willing to operate in the market area is considered when conducting the interviews. The objective is to find out what kind of business opportunities there are for Finnish SMEs in the waste management sector. Especially business environment, effects of public decision-making on waste management operations, and cooperation are in focus. Acquired information can be utilized by e.g. Finnish SMEs which want to operate in the market area or consider internationalizing in this specific industry.

Also, Finland-Central Eastern European Countries Business Association can utilize this research because the expert interviews offered precise and market-specific information about market conditions and requirements for operations and required cooperation for companies in the market area. As aforementioned, the business association promotes trade relations between Finland and the Czech Republic for example. The objective is to provide new and practicable knowledge for the business association about the market and the required cooperation and operational processes in the waste management sector in the Czech Republic.

The purpose is that the outcome will be beneficial for the business association and for individuals and businesses who are interested in waste management and its linkage to the circular economy and ecosystem. The purpose of the research is also to benefit people who are willing to know more about waste management, the services, and the market conditions, and the cooperative environment in the Czech Republic.

1.2 Research problem setting and delimitation

The research question is about what kind of business opportunities there are for Finnish small and medium-sized enterprises (SMEs) in the waste management sector in the Czech Republic. The investigative questions were created according to the main research question. With the help of the investigative questions, it is possible to get the result for the research question as well.

Table 1. Research problem setting

Research question (RQ)
What kind of business opportunities are there for Finnish SMEs in the waste management sector in the Czech Republic?
Investigative questions (IQs)
IQ 1. What is the business environment like for waste management companies in the market area?
IQ 2. How does public decision-making affect waste management operations in the market area?
IQ 3. What kind of cooperation is needed when a waste management company operates in the market area?

The thesis topic has been delimited to the Czech Republic and business opportunities for SMEs in the waste management sector. Investigative questions focus on the business environment for waste management companies, the effect of the public decision-making process to waste management, and the cooperation waste management companies need.

The thesis topic has been also delimited to circular economy viewpoints and specifically to resource recovery perspective. According to the delimitation of the topic, subjects related to circular business models, circular ecosystem, and waste management are covered in the theoretical framework of the study.

1.3 Key concepts

The key concepts are introduced to help to understand the contents handled in the theoretical part.

Linear economy means the traditional industrial model, based on a take-make-waste process. At first, there is the extraction of raw materials, then production and turning materials into products. Products are then used or consumed and at the end, there is the disposal of products. This linear economy model is the mainstream economic model today. (Lacy 2020, 5-6.)

Circular economy is an economic system, based on circularity and material flows in loops. The idea of economic growth is decoupled from the consumption of scarce natural resources. Products and materials are kept in use for as long as possible, and at the end-of-life, they are cycled efficiently back into the system. Circularity means reshaping and rethinking value chains to reach net benefits and this way, added value through value circles. (Lacy 2020, 5-6.)

Circular business models are circular inputs, product as a service, sharing platforms, product use extension, and resource recovery (Lacy et al 2020, 19).

Resource recovery is the recovery process of materials, resources, and energy from waste or by-products (Lacy et al. 2020, 19).

2 Sustainable development and circular economy

The interrelation of sustainable development and circular economy is introduced in this chapter. Sustainability and sustainable development goals are extremely timely topics, as well as circular economy and its implementation in society.

2.1 Introduction to sustainable development and circular economy

One of the five global megatrends is climate change and resource scarcity, amongst urbanization, changing economic powers, demographic changes, and technological development (PwC UK n.d.) Globally, there is a growing demand for energy and resources due to population growth. Thus, waste prevention and investing in new waste recovery and recycling methods and services are vital in the name of resource efficiency. Knowhow in the circular economy through sustainable business models, innovations, and service solutions is needed. According to Charter (2019), the necessary reasons to shift towards the circular economy are global population growth, resource scarcity, policy changes, rise of sustainable awareness, social and technological innovations, new materials, and business opportunities (Charter 2019, 2).

The United Nations (2017) has set goals for sustainable development. The UN has altogether 17 interconnected sustainable development goals to be achieved by 2030. (Sojamo, Halonen, Korkman, Lund, Neuvonen, Rohweder, Ahola 2017, 213-234.) For example, the UN responsible consumption and production, goal number 12, is strongly related to circular economy objectives (Charter 2019, 1-2). Goal number 12 handles sustainable consumption production, and 17 e.g. investments and policies. The goals include targets e.g. for sustainable consumption and production framework implementations, sustainable management actions, the efficient utilization rate of natural resources by 2030, reducing waste generation, and promoting sustainable principles, practices, and policies. (Sojamo et al. 2017, 226-227, 231-234.)

Today’s linear economic model is not resource-efficient. It is based on take-make-dispose thinking, while a circular economic model is based on the efficient use of resources from economic and societal perspectives. Still, there is no common universal definition for the circular economy. Is waste management and recycling a part of the circular economy then? Lifecycle waste management and recycling of materials play a vital role in the circular economy. Eliminating waste disposal and maximizing materials lifecycle through recycling to re-manufacturing is at the core of resource-efficient thinking. Preventing waste starts from the design level of a product. New waste can be prevented and minimized by using recovered and recycled materials in re-manufacturing. (Charter 2019, 1-2.)

Also, sustainable consumption plays an important role. Sustainable consumption means consuming products and services that minimize the use of natural resources, minimize emissions and pollution, and reduce waste (UN Environment Programme n.d.). The whole product and service lifecycle is observed whether the consumption of certain materials and products is on a sustainable level.

Key activities, how to prevent waste, are product design, availability of repair parts, product life extension services, and recovery services (Charter 2019, 15). Policies must respect resource efficiency and waste prevention higher. According to Lacy et al. (2020), a company striving for circularity needs to focus on design, use, use-extension, and end-of-use stages, when creating circular products. These sections cover the product lifecycle assessment aspects. In addition to products and services, a company also must consider its operations, culture, and organization, and ecosystem collaboration, to be able to evaluate its circularity. (Lacy et al. 2020, 234-235.)

Eco-design aims to that products are repairable and can be remanufactured and recycled. Waste legislation and corporate social responsibility have an impact on eco-design. (Charter 2019, 21.) Designing sustainable solutions has aspects of circular business models included in the process. The objective of the circular economy is to maximize the value of renewable material in the process by time and to extend the life of non-renewable material (Charter 2019, 26-27).

There is a wide range of new business opportunities what it comes to sustainable development solutions. Sustainable development offers huge potential for the business sector. Sustainability is a profitable and growing business. Interest and demand for innovative business solutions are on the increase globally. For businesses, implementations for sustainable development often require cooperation among public administration, organizations, and research and development. This is often beneficial from the point of overall economic growth and development. (Sojamo et al. 2017, 196-197.)

2.2 The shift towards circular economy

As aforementioned, sustainable development has its social, environmental, and economic dimensions. Therefore, sustainable development has interrelations e.g. between circular economy. The circular economy is one of the sustainable development approaches that affect business models, processes, and product-services. (Charter 2019, 27.) However, a more circular process is not automatically more sustainable (Charter 2019, 35). It is important to consider that e.g. designing an extended lifecycle or improving the potential for

recyclability may require more energy-intensive processing which is not energy efficient nor sustainable at all (Charter 2019, 160). Therefore, lifecycle assessment, from environmental, social, and economic aspects, is vital through considering materials selection and product design (Charter 2019, 161). The social value aspect in a life cycle context means considering the impacts from sourcing to end-of-life (Charter 2019, 162-163).

Policymakers need to evaluate which instruments to use when increasing circularity. Relations between programs and initiatives, need to be clarified. Consumers also need more updated information about circularity. Information needs to be accurate, transparent, comprehensive, and accessible. SMEs and start-ups are possibly more likely to carry out circular business models because they are more agile and flexible compared to large corporations. (Charter 2019, 28-29.)

A change towards the circular economy requires investments and physical development on infrastructure. Therefore, cooperation between the public and private sectors is important. Existing infrastructure is developed to meet the requirements of the circular economy. New structures are connected to the existing structure. Infrastructure development supporting circularity, combined with possible new country-level legislation and policies and business-level approaches (such as reverse logistics services), can make a big difference. (Charter 2019, 29.) Technology, and its adaptation with industrial processes, play a major role in the shift towards circularity (Charter 2019, 30).

Materials are at the core of the circular economy. Managing the materials will require research and development, innovations, changes in infrastructure and processes, and possible changes in policies and legislation. Materials need to be more reusable, durable, recyclable, and separable. Materials re-use after recycling and re-use in other sectors is an important aspect. Therefore, recycling, instead of disposal, should be the end-of-life solution. However, circular economy strategies face technical and social challenges. Technical implementation challenges are related to engineering, chemistry, and material science. The social aspect includes people. People need information about circularity. (Charter 2019, 30-31.) This concerns both the labor force and consumers. Reskilling labor is one aspect. Education and guidance may help the process so that there is less unawareness about sustainability and circularity. This way circular economy strategies and business services could be more successfully implemented on various levels in society.

It is important that policymakers, businesses, and society all together are committed to circular economy development. Circularity needs to be considered on international, national, regional, and local levels (e.g. European CE Stakeholder Platform, EU Green Policies, UN Goals). For example, there is an increasing need to prevent and minimize waste and to

find further processing and re-use solutions for current waste. Especially urban areas are potential platforms for circular economy implementations and business services. Circular innovations require proper design. New technological solutions are key for this. (Martin Charter 2019, 32.)

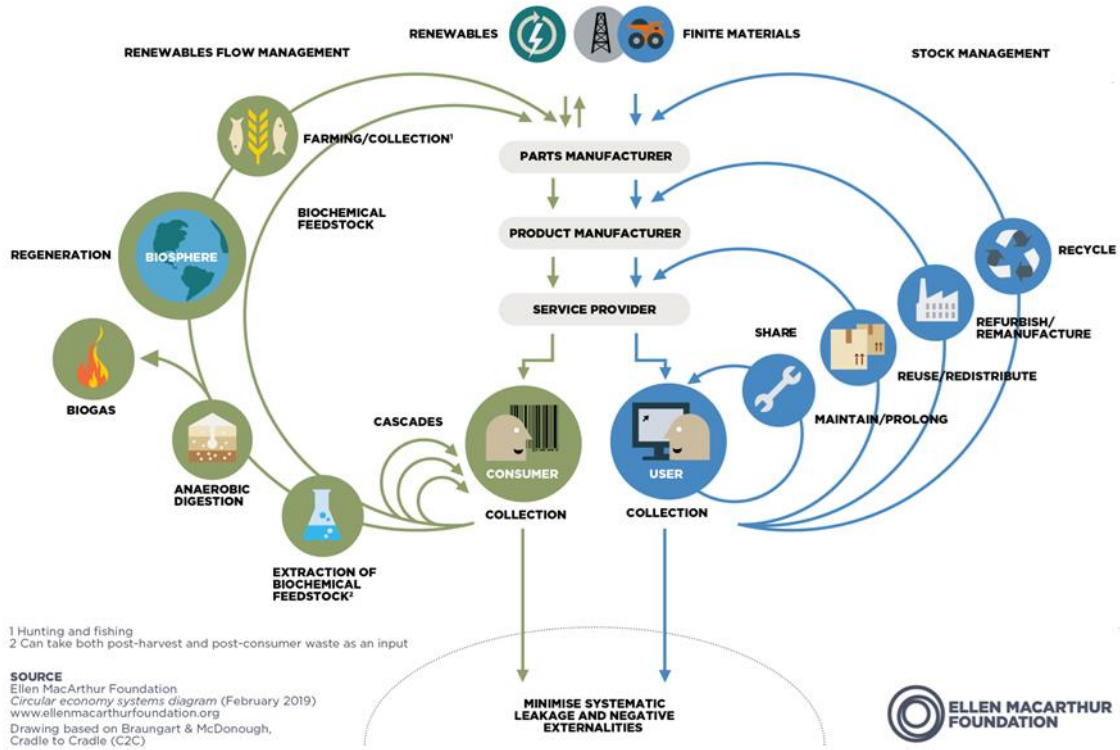

Figure 1. Circular Economy System Diagram (Ellen MacArthur Foundation 2017)

Figure 1 illustrates the flow of technical and biological materials through the technical (on the right side) and biological (on the left side) circles.

The Butterfly Diagram of Circular Economy by Ellen MacArthur Foundation (2017) shows that there are biological and technical cycles in the circular economy (Ellen MacArthur Foundation 2017). A technical cycle is more of a restorative, and a biological cycle is more of a regenerative kind of cycle. The cycles may also be overlapping. (Charter 2019, 71.) A technical flow includes e.g. recycling activities. (Ellen MacArthur Foundation 2017.) According to Ellen MacArthur Foundation (n.d.) the circular economy principles are designing out waste and pollution, keeping products and materials in use, and regenerating natural systems (Ellen MacArthur Foundation n.d.). Designing out waste and pollution starts from the product design and manufacturing levels. Is the product designed to be recyclable? Is the production carried out resource efficiently and sustainably?

Products and materials should be kept in use as long as possible, by maintaining the value of the materials in the long term and reducing value-loss over time. Supporting the

regeneration of materials and using renewable and sustainable energy sources throughout the value chain is vital. Products and materials should be designed to be renewable, recyclable, compostable, or biodegradable. Recycling is the final phase of the technical cycle. The first technical cycle is maintenance, repairing, and sharing; the second reuse; the third refurbishment and remanufacturing; and the fourth recycling. Recycling should be used as the last option after the first three technical loops if possible (Charter 2019, 3).

It is important to notice that companies operating within recycling activities are not just recycling companies. They have a wider environmental and economic impact. Specialized companies in the field of recycling and recovery activities add value and many of them have international potential to grow, if not already internationalized. (Kallinen 31 March 2021.)

3 Circular business models and circular ecosystem

This chapter introduces the five circular business models and wasted value and observes business models and wasted value in a value chain. Also, the waste hierarchy model, readiness for circularity and investments, and policies promoting circularity are introduced.

3.1 Circular business models

The overall concept of the circular economy is to utilize less raw materials, especially virgin raw materials, and generate less or zero waste. (Charter 2019, 157-158.) It is a model, that is based on material flow cycles and usage of renewable energy to push resource efficiency (Charter 2019, 148). The core idea is to minimize resource usage, waste generation, emissions, and energy leakage. Therefore, developing resource-efficient solutions, from economic, environmental, social, and lifecycle perspectives, is vital. Besides the other circular economy business models, recycling is one approach to improve resource efficiency. (Charter 2019, 113-114.) Recovery of materials is more efficient when integrating reverse logistics processes into circular economy approaches (Charter 2019, 120). This requires process integration and collaboration with stakeholders.

In an open loop, the open-source concept of the circular economy, recovered and recycled materials and products end up in the general market. Responsibility of products after the end-of-life ends up for society. It is a collective system where the responsibility lies more on consumers. However, consumers have limited power to drive the change towards sustainability. Companies are the more influential party in this progress. (Charter 2019, 151-153.)

In a closed-loop, the closed-source concept, the responsibility lies on companies, the influential parties in a circular production-consumption system. In a closed-loop concept, circular solutions are being offered for consumers. A closed-loop system requires that materials can be recycled at the end of life. In the big picture, this also requires a broad reverse supply chain system, so that materials flow in a closed loop is possible and efficient. (Charter 2019, 153-154.) Utilizing a closed-loop system promotes new technological innovations. Development in every closed-loop cycle requires integrity of different use cycles and encourages producers to think the whole lifetime of a product from the beginning of the production phase (Charter 2019, 155).

There are five circular business models defined from the perspective of the value chain. They are circular inputs, product as a service, sharing platforms, product use extension, and resource recovery. These business models are differently positioned in the value

chain and therefore they create value differently in circular business. (Lacy et al 2020, 19.) Altogether, these interconnected circular business models can have a huge impact, because as complementary models they can maximize the value of materials in a loop (Lacy et al. 2020, 18).

Table 2. Five circular business models in a value chain (Lacy et al. 2020, 19)

Circular business models	
1. Circular inputs	Circular inputs advantages of using renewable energy, and using bio-based, compostable, and recyclable materials.
2. Sharing platforms	Collaborative platforms for accessing services without owning the service product.
3. Product as a service	Product use is not based on ownership but on renting. This increases resource productivity.
4. Product use extension	Prolonging the product life. Repair, upgrade, and resale options.
5. Resource recovery	Recovery of materials, resources, and energy from waste or by-products.

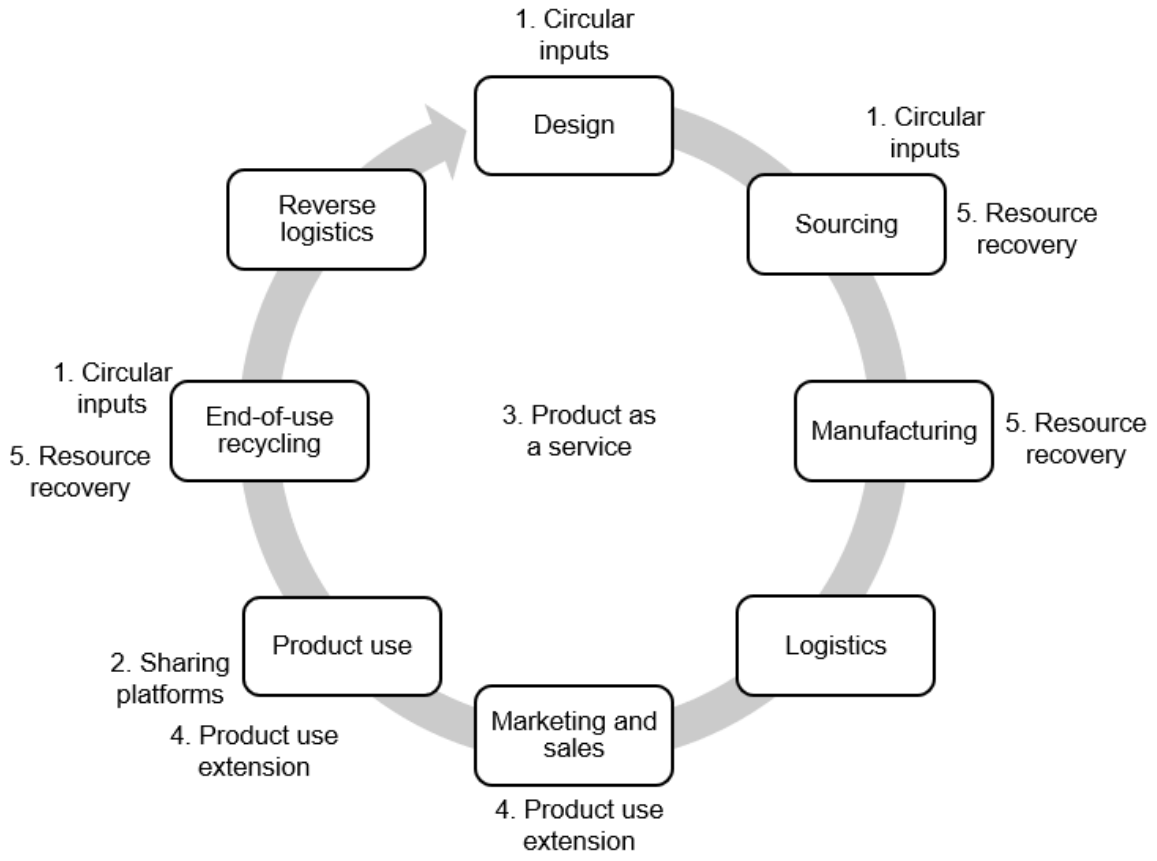

Figure 2. Circular value loop – the five business models (adapted from Lacy et al. 2020, 19)

Figure 2 explains the positioning of five circular business models in different stages of a value chain, from the perspectives of the value chain primary activities and the reverse logistics. It is noticeable that circular business models can belong to different stages of a value chain, as resource recovery. Through end-of-use recycling, sourcing and manufacturing can benefit from resource recovery, recovered materials.

Primary activities in a value chain are upstream and downstream value activities (Hollensen 2020, 23). In a simplified version of the value chain, upstream value activities include research and development and production stages, and downstream value activities include marketing and sales, and service stages (Hollensen 2020, 25). Reverse logistics activities come in at the consumption stage. Products and materials can be treated further from customers through reuse, repair, remanufacturing, and recycling activities.

Circular inputs, product use extension, and resource recovery focus more on the production to consumer to end-of-life cycle, whereas product as a service and sharing platforms on services. Services change the traditional relationship between the ownership of products and take consumption towards services. (Lacy et al 2020, 19-20.) It is important to notice that the value chain activities are affected by policies: regulations and the legislative environment.

The five circular business models are recognized and are used by public and private sector organizations when implementing circular economy strategies (Lacy et al 2020, 18). In this thesis, the focus is on resource recovery. Waste management and treatment are at the core of resource recovery and resource efficiency and recycling as well.

The value proposition is important to any business model. It defines the products and services creating value for existing and potential customers. The value proposition has financial, social, and environmental dimensions. An important fact to be noticed is that circularity has an increasingly more important role in business' economic competitiveness in the future. (Charter 2019, 91-93.)

The circular economy is an alternative and often a way more sustainable way of doing business for take-make-waste thinking in the linear economy. Companies can utilize circular business models on different levels, and they can cooperate and benefit from each other's services. For some businesses, their whole business idea can be derived from utilizing one or more circular business models at a time. They operate in a specific field or industry that is fully related to the circular economy. Some businesses may adopt one or

more of those circular business models to their already existing business activities to improve the sustainability and circularity of their business. (Lacy et al 2020, 20.)

The change towards the circular economy takes time. A company can change its operations towards the circular economy focusing on a certain value chain loop. Focus can also be on several so-called mini loops. These loops can cross industry boundaries, so businesses in different fields can cooperate and benefit from each other making a shift for more sustainable business. (Lacy et al 2020, 20.)

Overall, the circular economy business models offer numerous opportunities for businesses. Today's competitive environment, in addition to global challenges such as climate change, environmental problems, population growth, and resource scarcity, makes businesses think of new possible ways to operate and create added value. Transforming linear economy models towards circular has economic, ecological, and social impacts. Sustainable development and ecologically and socially responsible decisions and policies make a difference in societies. Resource scarcity, geopolitical and economic factors, and technological development drive the change towards the circular economy. (Lacy et al. 2020, 1-3.)

3.2 Wasted value and resource recovery

In this report, the examined waste type is a municipal waste. Municipal waste includes waste generated through households and the service sector. Municipal waste is opposite to industrial waste which is generated through industrial production sites.

There are definitions for types of wasted value in a value chain. The four types of wasted value in business are wasted resources, wasted capacity, wasted lifecycles, and wasted embedded value. (Lacy et al. 2020, 17-18.)

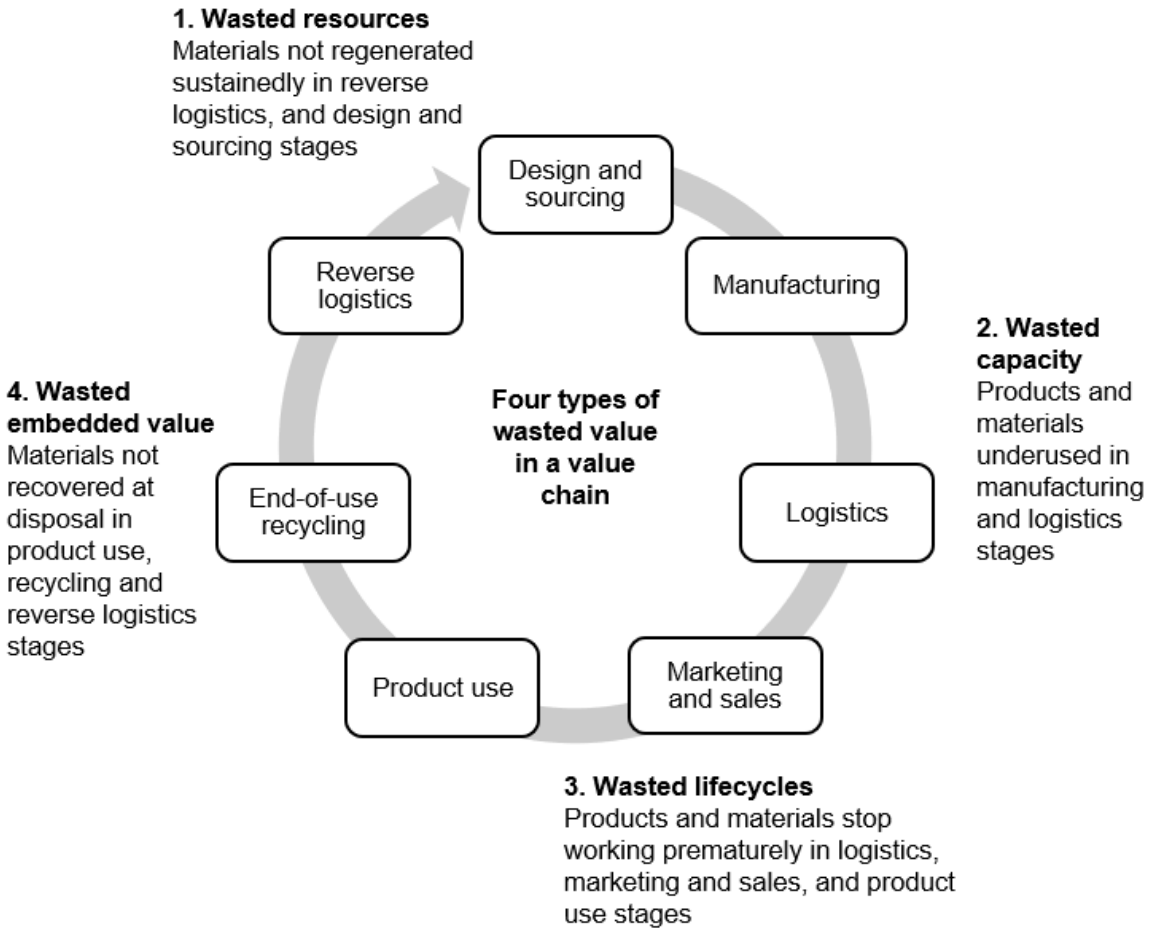

Figure 3. Four categories of waste (adapted from Lacy et al. 2020, 17)

Figure 3 illustrates how value is wasted in a value chain. The figure focuses on the wasted value of products and materials and it also considers the role of reverse logistics in a value chain.

The figure explains the idea of wasted value from the perspectives of the value chain primary activities and the reverse logistics. Resource recovery is an extension of traditional waste management. Nowadays, resource recovery is the most utilized circular business model (Lacy et al. 2020, 29). Resource recovery as a business model operates at the end-of-use and recycling stages of the value chain (Lacy et al. 2020, 17).

The wasted embedded value is collected, sorted, and recycled by resource recovery activities. The core idea in resource recovery is to maintain the value of the recovered materials continually and sustainedly through further processing activities. Hierarchy of waste is a model for evaluating which are the best and worst options when it comes to recovering materials and resources further. (Lacy et al. 2020, 29.)

It is important to notice that waste streams can create value. Of course, all unnecessary waste should be prevented in the first place. A closed-loop, technical cycle, is an optimal

solution to circulate waste back to the beginning phase of a value chain through a reverse logistics system.

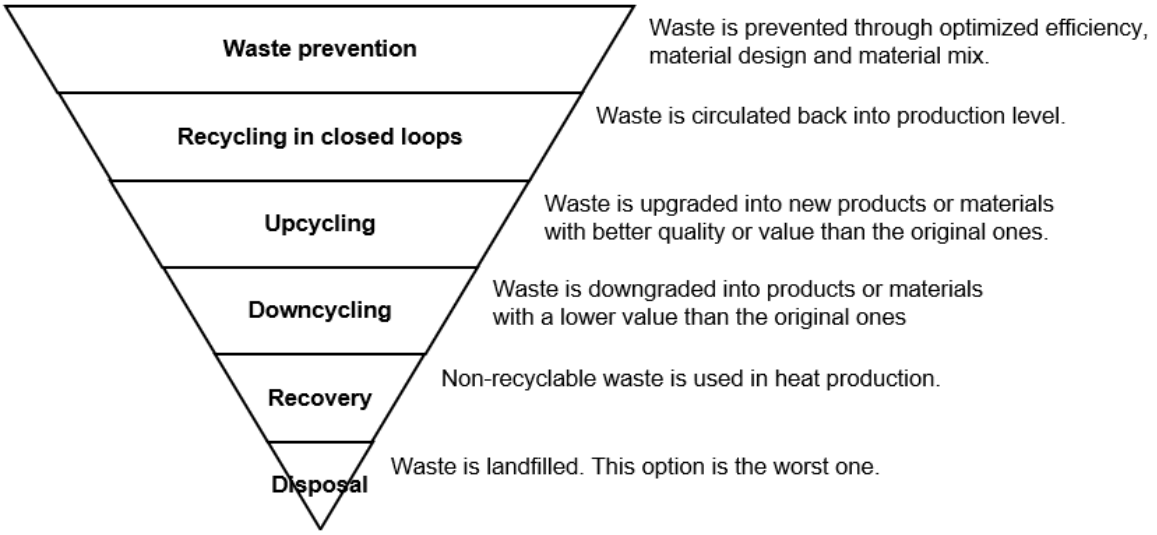

Figure 4. Hierarchy of waste from the circular economy point of view (adapted from Lacy et al. 2020, 29)

Figure 4 explains the waste hierarchy model, how waste is sorted hierarchically from the best option to the worst one. Waste prevention is of course the best option and after it, recycling options. In this waste hierarchy context, waste recovery means specifically converting non-recyclable waste into energy. Landfill disposal is the worst option.

Collecting products and materials at the end-of-life to recovery and recycling needs proper collection infrastructure and attitude to do so, from both consumers and businesses. Also, reprocessing and upgrading waste to new materials and products, needs to meet the quality criteria and requirements of quality-conscious consumers. (Lacy et al. 2020, 30.) Cost and quality are still key factors for consumer purchasing decisions (Lacy et al. 2020, 31). The more circular product design is considered, the more potential resource recovery activities can offer from the viewpoint of business opportunities (Lacy et al. 2020, 34).

Circularity can benefit the whole value chain and develop reverse logistics activities further, by creating take-back loops for materials and products. Reverse logistics is a process that aims to return and recover materials from consumers back into the value chain (Lacy et al. 2020, 35). Different circular business models can together maximize the value creation in the value chain (Lacy et al. 2020, 39). Policies and legislation, investments, collaboration, and knowledge sharing drive a shift towards a more circular model. (Lacy et al. 2020, 37). This development requires consumer engagement, circular design, further deployment of reverse logistics activities and technology (Lacy et al. 2020, 39).

According to Charter (2019, 3) recycling as a part of the circular economy should be seen further down-the-line option compared to the current situation. Materials should be utilized and kept in a closed-loop system as long as possible so that the highest value and longest utilization rate could be achieved. (Charter 2019, 3.) However, recycling solutions can be seen as take-back loops. Valuable materials are collected back to the system for further processing. This means recycled materials are forwarded for example to remanufacturing and part harvesting processes, or recycled through ordinary recycling, upcycling or downcycling activities. Overall, the most important thing is that materials are collected, sorted, and recycled properly.

Digital, physical and biological technologies are key technologies enabling the circular economy. Circular business model, such as resource recovery, benefits from e.g. using blockchain-based digital anchor-based systems. (Lacy et al. 2020, 45.) Blockchain enables materials tracking throughout the whole supply chain system. Digital anchors enable tracing and linking the materials to a blockchain. (Lacy et al. 2020, 47-48.) The type of technology used also determines the public willingness to invest. Investment rates for different technology solutions vary. Digital technologies are preferred over physical and biological technologies when investing. Technologies invested, are scaling faster and becoming more affordable to use. (Lacy et al. 2020, 52.) Biological technologies include e.g. bio-based materials and bio-energy, such as processing plants and incineration (Lacy et al. 2020, 58-59). A business can utilize more than one circular technology at once as well.

3.3 Readiness for circularity

Readiness for circularity can be assessed from the points of operations, products, culture, and ecosystem. These factors are interlinked and are assessed in the next paragraphs.

Companies may utilize open-loop or closed-loop applications in their business, but still, the entire system should be a closed-loop system, so that materials keep flowing in a system and do not end up in landfills. (Lacy et al. 2020, 235-236.) Therefore, products and materials should be returned to the right channels from customers to capture the material value. This requires developed reverse logistics systems. Also, partners and suppliers are vital because they enable the supply and collection infrastructure operations. (Lacy et al. 2020, 251-252, 254.) Taking products and materials back from end consumers requires also technological solutions (Lacy et al. 2020, 272-273).

SMEs and start-ups, in comparison to large companies, might acquire circularity at an organizational level somewhat easier, because they are more often able to build their organ-

izational culture to be circular in the first place (Lacy et al. 2020, 275). A company's organizational culture enables the implementation of the circular economy, through its operations, products and services, and ecosystem (Lacy et al. 2020, 278).

For companies operating in the circular economy, cross-sectoral, cross-industry, and cross-regional collaboration is vital. This means cooperation with stakeholders in the market area and beyond throughout the different value chain activities. Connecting with investment and governance bodies, educational and research institutes et cetera is important. Cooperation with stakeholders enables scaling the circular business activities and supports investments in circularity. (Lacy et al. 2020, 283.) This way, circular initiatives, and business operations become more efficient and profitable overall.

A company needs to consider the broader ecosystem from the company and industry perspectives and cooperate with peers and competitors as well. Cooperation with stakeholders and having partners in the industry and the region enables a more circular ecosystem for a company to operate. (Lacy et al. 2020, 284.) The functional circular ecosystem includes factors, such as sharing of know-how, collaboration, investments, and policies. Sharing information between local and regional partners supports circular thinking and initiatives. Bilateral and multilateral collaboration with partners and public and private stakeholders supports circular solutions. Investments support circular innovations. National and international policies support a regulative favorable environment for circularity. (Lacy et al. 2020, 285-286.)

A collaborative circular ecosystem creates considerable business value, as digital platforms enable companies to share knowledge, ideas, and resources. For example, waste from one company or industry can be a resource for another company or industry. (Lacy et al. 2020, 291-292, 297.) Close collaboration with suppliers and partners in the ecosystem enables reverse flows of recycled materials and products (Lacy et al. 2020, 293).

Also, governments can partner with circular businesses to achieve overall circular goals (Lacy et al. 2020, 296). For example, reducing waste generation and finding solutions for waste recycling, collection and recovery is one mode of action in partnership. The regulative environment is an important element to consider when shifting towards circularity. Shaping functional reverse flows of materials in logistics and between businesses and industries might need new regulations. The broader the collaboration in a circular ecosystem is, the more business opportunities there are. All parties including businesses, governments, and societies can benefit from this development.

3.4 Investments and policies promoting circularity

Financial services can support circularity. There are banks, commercial investors, and non-commercial capital providers that can help companies in their circular initiatives. The European Investment Bank (EIB) is an example of capital providers, who provide long-term financing for initiatives that are following the EU policy goals towards circularity. Also, corporate venturing is an option to support and invest in companies with innovative circular business ideas. (Lacy et al. 2020, 302-304.)

Then, there are public investments to support circular economy initiatives. Public policies influence how circular companies can operate, develop and scale up their activities. Those policies benefit both businesses and societies. Policymakers have the power to affect the regulative environment, guidelines, and investments. This way, it is possible to affect and change for example consumer buying behavior and product standards, and product's recycled content requirements on a bigger scale. An example of public policies is The EU Circular Economy Action Plan that has targets e.g. for waste management. (Lacy et al. 2020, 311-313, 318.)

By affecting consumer awareness and improving the infrastructure, capability, and technology for waste collection and sorting systems through public policies, it is possible to improve the recycling rates of municipal waste and reduce landfilling rates (Lacy et al. 2020, 316).

In addition to public infrastructure and awareness improvements for waste management processes, it is vital to consider reverse logistics solutions as well. Public policies and government actions can support investments in reverse logistics infrastructure. When waste has been collected and sorted, the recycled materials can be delivered back to the manufacturing stage. A closed-loop, reverse logistics system, enables more efficient and sustainable resource usage when materials of waste are recycled back to the production system, remanufacturing, from the end of value chain. (Lacy et al. 2020, 317.)

Upcycle and downcycle streams for end-of-life materials are an option as well. Policymakers have a strong ability to drive collaboration and cross-sectoral partnership of businesses and other stakeholders, to speed up the progress towards the more circular ecosystem and circular solutions throughout the value chain activities (Lacy et al. 2020, 317). Policymakers have an important role to offer guidance and regulations related to waste definitions, waste hierarchies, taxation, product quality, and safety, and making infrastructure investments, to support circular initiatives and the ecosystem (Lacy et al. 2020, 324).

As aforementioned, high volumes in the utilization of natural resources, overconsumption, and disposal of materials have huge impacts on the social and ecological environment (Lacy et al 2020, 4). The EU regulations and policies concern the EU member states. In addition to sustainable development and societal progress, the circular economy enables businesses to enter new market areas with new competitive product and service innovations (Lacy et al 2020, 6).

The 2030 Agenda for Sustainable Development by United Nations (2017) includes 17 specified main objectives and 169 sub-objectives for sustainable development. The international goals stand for welfare, environmental state, and prosperity. These goals are naturally highly interconnected, and therefore international cooperation is required to make some progress. Greener economy and corporate social responsibility goals, which are linked to the circular economy, have also been evaluated in these goals. This global action plan defines sustainable development goals by type of action. The plan recognizes that also businesses, non-governmental organizations, and cities, in addition to governments, have a crucial role when innovating and implementing new sustainable solutions and achieving progress. (Sojamo et al. 2017, 12-14.)

As stated before, there are economic benefits from the advancement of circular economy processes (Charter 2019, 36). The European Union Action Plan for the Circular Economy is one of the policies promoting the change towards CE. Policies and new technologies have an important role to meet the increasing demand for resources, products, and services. (Charter 2019, 36.) The European Investment Bank (2020) supports circularity in multiple sectors, such as waste management (European Investment Bank Group 2020).

In addition to the European Union level frameworks and legislation to promote the circular economy, there are local-level circular economy approaches as well (Charter 2019, 45). With policies, it is possible to promote innovations and encourage investments by the private sector; affect the behavioral environment on different stages, including consumers, households, businesses, etc.; capture waste at the higher level of the waste hierarchy; and create markets for secondary materials (Charter 2019, 49).

The circular economy approach is a more advanced approach than e.g. just the traditional recycling activities (Charter 2019, 70). Circularity benefits the economy and employment, in addition to environmental benefits. Businesses have chances to influence this development. However, governance and cooperation locally and internationally play the key role to achieve successful development in circularity (Charter 2019, 70).

4 Waste management in the Czech Republic

This chapter observes the current situation of waste management in the Czech Republic. It goes through the role of municipalities in waste management and aspects of development. In addition to this, the trends and development in the waste management industry are introduced from the Czech and EU perspectives.

4.1 Waste management in municipalities

Municipalities are obligated for organizing specified municipal waste collection points for citizens by law. Citizens are responsible for disposing of their municipal waste on the specified sites. This is stated in section 17. (Act on Waste and Amendment of Some Other Acts 185/2001.) According to section 43, the Czech Republic has national and regional level waste management plans. Regional authorities guide the regional-level waste management plans in the Czech Republic. The authorities are responsible for organizing proper municipal waste collection and disposal services. (Act on Waste and Amendment of Some Other Acts.) Regional plans must comply with the guidelines of the national-level waste management plan (Ministry of the Environment of the Czech Republic n.d.).

OECD Environmental Performance Review (2018) points out that the Czech Republic has made improvements in its waste recovery and recycling rates during the years 2004-2016. However, raw materials of waste could still be utilized more effectively. The Czech Republic has an export-oriented economy, and its economy leans strongly on industrial and agricultural activities. The Czech Republic has not so many natural resources, so it needs to import many strategic raw materials for industrial use from abroad. Thus, it is vital to notice the need for waste management policies related to waste prevention, reduction, and recycling in the country. (Waste, materials management and circular economy 2018.)

The Czech Republic has well-developed policies and a legal framework what it comes to materials and waste management. The European Union has requirements and legislation for ecologically and environmentally adequate waste management activities. However, waste management is still at inadequate levels in the Czech Republic. For example, investments for improvements in recycling have been insufficient. Materials should be better utilized over their life cycle and so-called upcycling offers many options in waste management. Upcycling is transforming waste into a recoverable form with more value (Lacy et al. 2020, 29). In addition to recycling also waste recovery needs to be considered when new solutions and innovations are designed in the waste management sector. (Waste, materials management and circular economy 2018.)

Waste Management Plan aims to point out the possibilities of waste as a resource and to reduce, recycle, reuse and prevent waste. Increasing cooperation between organizations, businesses, and the government is the key to creating value-added solutions and more efficiency in waste and materials management. The Czech government is dedicated to taking actions to increase resource efficiency and sustainable material flows in the economy. (Waste, materials management and circular economy 2018.)

Waste Management Plan and Waste Prevention Programme, both are mandatory under the EU law. Raw Materials Policy. Besides the EU, also the Czech Republic has the interest to move towards the circular economy within actions related to waste management. Overall, it is important to pay attention to the waste treatment capacity and infrastructure in the waste management sector in the country. The Czech municipalities are responsible for managing the waste produced in their area. Municipalities can arrange waste management through municipal waste services or private waste services. Because many Czech municipalities are averagely smaller compared to the whole EU area, they face difficulties to run high-quality public services. To provide higher quality waste services altogether, there should be more organizational cooperation between Czech municipalities. (Waste, materials management and circular economy 2018.)

Waste management infrastructure and technology should be developed further in the Czech Republic. However, the local authorities face difficulties to arrange efficient waste services. Cost-efficiency and environmental performance in waste management and funding the development for needed infrastructure and technology is still lacking in the country. There is not enough information available on the economic performance of local waste management services. Also, the evaluations of the outcomes of investments for waste management services are lacking. Therefore, wider cooperation between regional authorities and operators is needed, as well as support and guidelines from the Czech government. (Waste, materials management and circular economy 2018.) Cooperation should also mean more transparency and evaluation what it comes to economic and environmental performance in waste management services. Cooperation would also offer business opportunities for businesses operating in the waste management sector.

There is potential for further improvements in recycling and separate collection of waste. The Czech Republic has quite a broad network of recycling sites with containers across the country. These collection points for packaging waste are easily accessible. Even though recycling rates and recycled waste have been growing in the past years, there is a need for further progress. Waste recovery and composting rates overall are low, landfilling is common, and the amount of mixed household waste is still high. (Waste, materials

management and circular economy 2018.) Added value in recycling should be more in focus at every level to get more recoverable waste (). (Economic and information instruments should be utilized more when observing profitability and functionality of the waste management sector.)

Waste as an energy source is a potential model to be utilized. Energy recovery is an important circular economy model because this way it is possible to prevent using primary resources imported from abroad. Municipal waste is already used to produce energy in the Czech Republic. Waste is a secondary energy source and considered a renewable energy source. (Waste, materials management and circular economy 2018.)

The Czech policies guide and encourage manufacturers to design and produce products so that they are easy to reuse, recycle and dispose. Products should be designed to be ecologically safe. Currently, the main target is to reduce unnecessary landfilling. Waste prevention is still more important, as well as reusing and recycling. The Czech Republic wants to move towards cleaner production and supports businesses with it, too. The country has a support program for example for SMEs that are operating within waste management, recycling, and prevention services. (Waste, materials management and circular economy 2018.)

4.2 Waste management industry

According to the Statistical Classification of Economic Activities in the European Community (2008) and the Standard Industrial Classification TOL 2008, waste management is classified under code E. Code E covers activities from water supply and sewerage to waste management and remediation activities. More precisely, waste management goes under code E38, which includes all activities related to waste collection, waste treatment and disposal activities, and materials recovery. (Eurostat n.d. & Statistics Finland n.d.)

Table 3. Statistical Classification of Economic Activities in the European Community, Rev. 2 (2008) (Eurostat n.d.)

E38 Waste collection, treatment, and disposal activities; materials recovery
E381 Waste collection
E3811 Collection of non-hazardous waste
E3812 Collection of hazardous waste
E382 Waste treatment and disposal
E3821 Treatment and disposal of non-hazardous waste
E3822 Treatment and disposal of hazardous waste
E383 Materials recovery
E3831 Dismantling of wrecks
E3832 Recovery of sorted materials

Table 3 illustrates how waste management and different waste management activities are classified. Table 3 classifies waste management into the collection, treatment and disposal, and materials recovery.

Industry revenue in waste collection, treatment, and disposal is predicted to be 2,679 million USD in 2023. The share of revenue in waste collection and waste treatment and disposal activities is estimated to be stable from now on, while the share of revenue in materials recovery is expected to slightly decrease until 2023. The statistic includes the following industry: NACE: E38. (Eurostat 2019a). The development of industry revenue in waste treatment and disposal is predicted to be stable from now on until 2023 (Eurostat 2019b). However, the recycling rate of municipal waste in the Czech Republic has grown hugely. The recycling rate was 34,1 percent in 2017 when it was just 12,4 percent in 2009. (Eurostat 2019c).

The trend is promising from an environmental aspect. It is positive development also for waste recovery and recycling services. Waste generation per capita was 2626 kilograms in the Czech Republic in 2018. The share of total waste in waste generation by households was 13,3 percent in the Czech Republic in 2018. The share of total waste in waste generation by households was 8,2 percent in the EU. According to Eurostat statistics (Waste treatment by type of recovery and disposal, 2018), approximately a half of treated waste was recycled through recovery activities in the Czech Republic in 2018. (Eurostat 2021a.)

The generation of municipal waste (2018) was 494 kg per capita in the Czech Republic, while the EU average was 495 kg per capita in 2018. Municipal waste includes mainly

waste generated by households, but it also includes a similar kind of waste from the service sector. (Eurostat 2021b.) The recycling rate of municipal waste (2018) was 32,2 percent in the Czech Republic when the EU average was 47,2 percent (Eurostat 2021c). The Czech recycling rate in municipal waste was 38 percent and the EU average 46 percent in 2017 (European Environment Agency n.d.).

The EU waste policy aims to improve waste management with the use of waste hierarchy, accelerate innovations in recycling and reduce landfilling. As part of the EU circular economy goals, the European Green Deal aims to promote economic resource-efficiency and competitiveness through the circular transition. (European Commission n.d.a.) The EU waste hierarchy's number one priority is to prevent all kinds of waste. Then come the next phases in order of importance: re-use, recycling, recovery, and disposal. (European Commission n.d.b.)

Waste management in the EU is based on the waste hierarchy model by the EU waste framework directive (European Commission n.d.c.) Targets of the directive are that the re-use and recycling rates of waste materials, such as paper, metal, plastic, and glass from households, are a minimum of 50 percent by weight by 2020. The re-use and recycling rates for municipal waste should increase at least to 55 percent by weight by 2025, 60 percent by 2030, and 65 percent by 2035, according to article 11. The directive states in article 4 that EU member states should develop waste legislation and policy transparently (Directive on waste and repealing certain Directives 2008/98/EC.)

According to article 16, the importance of self-sufficiency in the disposal and recovery of municipal waste from households has been noticed on the EU level. This requires new installations for municipal waste recovery, improvements in public infrastructure, and cooperation. The waste hierarchy model should be considered in recovery processes and waste needs to be collected separately, according to article 10. Member states should promote high-quality recycling and organize separate waste collection points, according to article 11. (Directive on waste and repealing certain Directives 2008/98/EC.) Separate collection of municipal waste fractions have a positive impact on the recycling rate overall (Final Report 2015, 28).

The national recovery plan for the Czech Republic focuses on e.g. green transition. Green transition supports sustainable economic growth and development and implementation of sustainable innovations. The Czech Republic receives 8,7 billion euros as financial support and 15,4 billion euros as a loan from the EU recovery package. (Finland Abroad 2020.) The recovery package is agreed by the European Commission between the European Parliament and EU member states (European Commission 2020).

The strategic framework for the Czech Republic 2030 (2017) states that the state should support the functions of local communities, such as waste management services (Office of the Government of the Czech Republic, Department of Sustainable Development 2017, 32). It clearly states that the Czech Republic is not self-sufficient what it comes to materials consumption. The EU level work for legislation and tax incentives is needed. The circular economy is seen as a solution to improve the resource-efficiency. The state supports waste hierarchy actions to prevent waste. Also, recycling is preferred over other lower hierarchy activities to achieve a more sustainable level of resource usage. The state needs to assist in building service infrastructure to help this environmental development. (Office of the Government of the Czech Republic, Department of Sustainable Development 2017, 58.) Cities and municipalities should increase the recycling rate of waste (Office of the Government of the Czech Republic, Department of Sustainable Development 2017, 89).

The state wants to support e.g. small and medium-sized enterprises with innovative initiatives because they have the potential to grow. Also, sustainable public finance and relevant investments are needed. Some municipalities and regions in the Czech Republic need to take action in acquiring more functional relations and service networks so that they can guarantee more efficient cooperation cross-regionally. (Office of the Government of the Czech Republic, Department of Sustainable Development 2017, 13-14).

5 Research method

Four semi-structured interviews were conducted to gather professional information from the experts who know the subject related to the research problem. Expert interviews made it possible to acquire new in-depth knowledge that you cannot access through academic literature. Four expert interviews were conducted in order to have answers to my investigative questions and the research problem.

5.1 Semi-structured interviews

A semi-structured interview (a theme interview) is an interview type to collect information in qualitative research. The advantage of a semi-structured interview is that interviewer can focus and deepen the questions, based on the interviewee's answers. The methodological point of a semi-structured interview is that you can underline people's interpretations of things and how they signify things. The semi-structured interview is based on themes that are set beforehand. The themes are based on the theoretical framework of the study. The purpose of a semi-structured interview is to acquire relevant and meaningful information, according to the research problem setting. A semi-structured interview is more flexible and based more on observation and interpretation than a structured interview. (Tuomi & Sarajärvi 2018, 87-88.) A semi-structured interview is structured enough to be practical and flexible at the same time.

Generalization of collected data or results is not an objective in semi-structured interviews, but the description of certain phenomenon, activity or operation. The quality of in-depth interpretation is more important than the size of the collected material in qualitative research. The selection of interviewees cannot be random, but it must be considered thoroughly, and the selected interviewees should be able to provide relevant information. The interviewees should know as much as possible or have experience on the studied subject. (Tuomi & Sarajärvi 2018, 97-98.)

There were four to five themes per interview. The interviews had three common themes that were the same in each interview and one to two separate themes (additional themes in the interview) related to the interviewee role. The common themes were common for a reason. This way you can evaluate the credibility of the research and information gathered. You can also evaluate how valid and reliable the results are when you summarize your findings. You conclude results based on the themes used in interviews. The separate themes were separate because this way you could easily adapt your interview themes to the interviewee role to get more specific information.

All the interviews were transcribed after the interview. The interviews were conducted on the online communications system Teams, and the interviews were recorded. Agreement for recording was asked before the interview, and the interviewees were informed that the recordings will be destroyed after the thesis project.

While writing the theoretical part there was a separate list where to add all the questions coming into mind during the writing process. This way it was easy to gather all the questions together so you could easily see which questions are being repeated throughout the writing process and which questions need to be answered later. This kind of list was a very useful tool overall. At the end of the writing process of the theoretical part, the main interview themes were formulated based on the listed questions. This was how the framework for the semi-structured interviews was formulated.

When evaluating the information gathered through semi-structured interviews, the point is that the interviewee stays in the background and the important material and findings, according to divided themes, are highlighted. The main focus is on the received information, not on the interviewee's role. Of course, the interviewee must be relevant to the studied subject. (Lahtela 25 March 2021.)

Interviews enable in-depth analysis, in addition to theoretical concepts. By interviewing experts, it was possible to get practical information about the industry and operating environment. The main focus in interviewing is on observing the feelings and reasoning of the interviewee. The interviewee offers one’s practical knowledge related to the subject. When you have conducted the interview, you can understand more the reasons and motives of some specific industry problem from the perspective of the interviewee. When analyzing the outcome, a proper interpretation is highly important. For example, using a semi-structured interview, as a qualitative research method, requires a thorough interpretation of interview results. You need to focus on the interviewee’s viewpoint and responses, and then be able to summarize the content into main results and conclusions. Interpretation may be hard sometimes. (Kallinen 31 March 2021.)

Interviews generate practical knowledge, and you can ask “why” and “how” questions. You can gather new information based on human experience, about their feelings and viewpoints. Observing the experience of an expert is important, but so is the observation of the environment and culture. Environmental and cultural factors have an impact on the field observed as well. They need to be considered in addition to human experience during the interview. Human experience and environmental and cultural aspects are considered when conducting the interviews. (Kallinen 31 March 2021.)

Reactiveness and listening skills are important when using a semi-structured interview as a data collection mode. The semi-structured interview enables more open conversation during the interview. Anyway, the stated themes direct the interview process, so all the themes (and questions) will be answered. The themes (and questions) were shared with the interviewee beforehand, so the interviewee had time for preparation.

Subjectivity is expected, not objectivity when conducting a semi-structured interview. Findings are less generalizable but offer valuable knowledge from the expertise. The gathered information offers opinions, perceptions, and attitudes related to the interview themes and questions. You cannot generalize results to the entire industry or area, but you can get valuable examples and development ideas of that specific industry and operational environment. (Kallinen 31 March 2021.)

5.2 Selection of interviewees

The interviewees were selected to be interviewed based on their experience and expertise in the studied field. The interviewees' expertise was related to business operations in waste management, the Czech market and business environment, market entry and cooperation on the local level in the Czech Republic, waste management industry development, the EU regulations and legislation, and/or procurement process for waste management services on the local level in the Czech Republic.

The first interviewee (interviewee 1) was selected because of his expertise and practical know-how in the waste management field and on specific waste management solutions. He was a sales manager at export sales in a Finnish SME operating in waste management and recycling services, providing waste collection and recovery solutions. The SME operates in Finland, internationally and it has also a retailer in the Czech Republic. The interview was conducted in Finnish (appendix 1).

The second interviewee (interviewee 2) was selected because of his practical knowledge and experience in the Czech market area. He was a leading consultant in consulting company that offers management consulting for example in Central Europe. He could offer in-depth insights about the Czech Republic as a market area and business environment. The interview was conducted in Finnish (appendix 2).

The third interviewee (interviewee 3) was selected because of his expertise in the EU regulations and legislation in waste management and environment-related subjects. He was a senior specialist in an administrative body in Finland. The interview was conducted in Finnish (appendix 3).

The fourth interviewee (interviewee 4) was selected because of his practical knowledge and experience in municipal duties in the Czech Republic. He was a mayor of a small municipality in the Czech Republic. He could offer a lot of practical information about the interrelations of municipalities and waste management in the market area. The interview was conducted in English (appendix 4).

5.3 Interpretation of results

The interpretation of results requires thematic categorization, based on the transcribed interview materials. The interview materials were categorized into themes for interpretation.

The research question and the investigative questions became more precise during the thesis writing process. After writing the theoretical framework with theoretic concepts and conducting the semi-structured interviews there was still a need for clarifying the research question and the investigative questions at the end of the thesis process.

The semi-structured interviews had common and separate themes. Themes were set before the interviews. Themes were formed based on the questions that had come up when writing the theoretical framework. On the other hand, the questions were based on the investigative questions in the research problem setting. Themes were formed for the interviews. Themes were adjusted so that each interviewee could provide expert information and so that each interview session was as beneficial as possible.

Table 4. Common and separate themes in semi-structured interviews

Themes	**Semi-structured interviews: Interviewees 1-4**			
	1	**2**	**3**	**4**
Waste management operations	X	X	X	X
Cooperation	X	X	X	X
Business environment	X	X	X	X
Retailing	X			
Finland’s reputation	X	X		
Waste management industry development		X	X	X
The EU legislation			X	
Procurement process				X

Waste management operations, cooperation, and business environment were common themes in all interviews. Retailing, the EU legislation, and procurement process were each

a separate theme in one interview. Finland’s reputation was a theme in two interviews, while waste management industry development was a theme in three interviews.

6 Results and interpretation

This chapter introduces the results of the semi-structured interviews. The common interview themes in semi-structured interviews were based on the three investigative questions. The separate, additional interview themes in interviews were related to the interviewee's role and expertise.

Table 5. Interrelation of investigative questions and common themes

Investigative questions (IQs)	**Common themes in semi-structured interviews**
IQ 1. What is the business environment like for waste management companies in the market area?	Business environment
IQ 2. How does public decision-making affect waste management operations in the market area?	Waste management operations
IQ 3. What kind of cooperation is needed when a waste management company operates in the market area?	Cooperation

The objective was to answer the investigative questions. Following the investigative questions, the common themes in every semi-structured interview were business environment, waste management operations in the market area, and cooperation. Investigative question 1 aims to answer the question about the business environment for waste management companies in the market area, investigative question 2 the question about decision-making and waste management operations in the market area, and investigative question 3 the question about cooperation.

Table 6. Separate themes

Separate themes in semi-structured interviews
Retailing
Finland’s reputation
Waste management industry development
The EU legislation
Procurement process

There were separate themes in each interview so that it was possible to have information related specifically to the interviewee’s role and expertise.

6.1 Results of common interview themes

The first phase before entering the market is to consider the legislation that sets frames for recycling activities in the target market area. An SME can consider having a retailer that sells certain products of an SME for waste collection and recovery services in the Czech Republic. If the European Union is the market area, knowing the EU legislation for recycling and waste management is the first step in the internationalization process of the company. The first criterion is that the legislation in the market area set frames and guides recycling activities and promotes the development of recycling. Central Europe is a competitive market area. It takes time to develop the business activities to be applicable for a certain market area and to promote one's presence there.

After the first step, it is crucial to study and survey the market area. You need to know how populated the targeted market area is. The company needs to know how many people are living in a certain area and how is the urbanization level in the area. Companies can specifically focus on suburbs and neighborhoods for example.

After this, the company needs to clarify the potential of the selected market. How much municipal and household waste is produced in the selected area. You need to know the volume. The next step is to check how the collection is currently organized and who is responsible for waste collection and who makes decisions related to it. A company must keep in mind how is the legislative environment possibly changing in the future and who are the biggest competitors in the area. It is crucial to know what the price is for waste management services and how the waste collection charge is paid.

When the focus is on household waste (waste that citizens produce) it is crucial to notice the role of municipalities or regions in waste management in the Czech Republic. Municipalities or regions are always cooperating in the field of waste management with the waste management companies. A municipality is principally the administrative party where the waste management operators need to be in touch. Waste management companies cannot operate without cooperation with municipalities. Municipalities and sometimes regions are responsible for waste collection, resource recovery, and recycling in the Czech Republic. So, municipalities have the authority to influence how waste management services are run in their area. Municipalities do not necessarily purchase waste management services directly from the service provider, but they still set frames to waste operators.

There are both municipal and commercial waste management companies operating in the Czech Republic. So, there are different steps to be considered before planning the inter-

nationalization of one's business operations. How is the ecosystem in the waste management field like? Who makes the decisions and acquires the services for waste management? Who buys the services? It is quite easy to cooperate with the municipal and governmental players in the Czech Republic. You can also quite easily get information in general about the market and conditions and requirements for commercial operators.

For a company that is willing to expand its operations abroad, financing is an essential part as well. The EU funding is one important source of financing. There is a possibility to have funding from the EU for many waste infrastructure projects. Importantly, this is an alternative to consider for any waste management company, in this case. The political aspects and waste management services are strongly related. The political environment of the area affects waste management services and their possibilities to operate. A waste management company needs always to take the decision-making process and legislation into account when planning operations.

Waste management services are usually purchased by a municipality. A municipality decides whether to buy certain waste management services or not. A municipality can publish a tender and the winner of competitive tendering will provide the agreed equipment and installations for a municipality. Also, a company's business partner, for example, a retailer in the target market area, can participate in a competitive tendering and provide the company's products for a municipality as a retailer. Therefore, it is vital to study the market area and select the retailers carefully.

A retailer abroad must be an established business. A company needs to know the local business environment, have networks there, and have the ability and willingness to cooperate with municipalities and customer segments. Experience in dealing with municipalities cannot be overstated. In the waste management field, also technical know-how on waste management projects is a huge advantage. Experience in the fields of business and construction management are both beneficial because you must be able to sell technical products. In many cases, waste management solutions offer expensive products that you need to sell with a consultative touch. The idea is not to sell these solutions with a price ahead. For example, a company must justify the total cost of ownership of the new waste management solution it provides, because there are many parties involved when organizing waste management services on the local level. It is vital to be able to handle the retailing network professionally, structurally, and regularly.

If a company in the field of waste management aims to enter the new market area, a company should know the competitors, potential customers (municipalities in this case), and the regulations in the waste industry. For example, a Finnish SME in waste management

should leave out the big cities or bigger municipalities when targeting possible customer segments. This is because the competitive environment is too strong and usually the large commercial waste management companies have too much power over the market, especially in projects in the big cities and municipalities. It is too difficult for SMEs in this specific industry to enter the competitive market and try to survive the competition and actually win competitive tendering.

SMEs should focus on projects that small and medium-sized municipalities have. An SME can do this either alone or with a local network it has. There might be unfair competition and corruption what it comes to winning tenders in the big cities and municipalities in the Czech Republic. A company willing to operate in the market area can familiarize oneself with the old tenders and their requirements. This way, a company can have a wider understanding of the criteria and requirements for the service level and operations it should cover and prepare for the upcoming tenders. Also, if a company already has some activities in the market area it might be easier to have access to the financial instruments that are based on the EU funding. There has been a lot of EU fund-based waste management projects, e.g. for the development of new waste collection methods, during the last EU funding period in the Czech Republic.

Waste management and recycling belong to the concept of the circular economy according to the EU standards. The EU regulations also concern waste management, so it is evaluated with the EU waste hierarchy objectives. The waste hierarchy is a model that aims to prevent and reduce waste in practice. Prevention is the best option and landfill disposal the worst one. In between them, there are reuse, recycling, and recovery from the best option to the worst one. The waste framework directive sets the general boundary conditions for waste management in the EU. The waste framework directive sets the minimum level that the EU member states must achieve in the field of waste management. The national governments must implement the set directives into their legislation, securing the minimum level of implementation. The EU aims to cut down the amount of unsorted household waste continuously, because all the raw materials should be kept circulating in a cycle as well as possible, according to sustainability and circular economy goals. For example, it is forbidden to take unsorted mixed waste into landfills in the EU, and within a few years, it is also required to recycle textile waste separately.

If a company has better solutions e.g. in waste management to offer, it can try to sell those solutions in the targeted market area. With active marketing, a company may try to promote its waste management solution in the area. The challenge for example in the Central European market is that it is very competitive. There are already many highly

competitive German companies operating in the waste management sector in Central Europe.

There are requirements for waste management companies on municipal and regional levels. The crucial requirements are embedded in the Czech waste law, which rules what companies and municipalities must do in the field of waste management. The most important thing is that since 2030 it is forbidden to landfill waste. Smaller Czech municipalities can benefit from this development because there are challenges in landfilling for smaller municipalities. There are a lot of requirements for landfilling, and it is time demanding. According to the waste law in the Czech Republic, the producer of waste is not primarily the municipality, but the citizens. Every municipality, or sometimes regional entity, must handle the waste in some way, and the way is guided by various environmental laws and the waste law in the Czech legislation.

Several big commercial companies are operating in the field of waste management in the Czech Republic, and they usually have control over some areas. There are also local companies that are owned by municipalities. For example, small municipalities might have their own waste management company, or they might have a commercial company taking care of municipal waste management.

Cooperation is also a lot of presenting a company's operations and know-how it could offer in the market area. A company might meet the municipal representative together with its retailer. A company can be a backup for its retailer when the retailer negotiates with a municipality. A local retailer knows the market and how to operate in it, and the company has experience and know-how about provided solutions. Cooperation can support both business partners in the best scenario, both a company willing to expand its operations and a local retailer.

When a company wants to network in a targeted market area, it must start by presenting the operations and solutions it has. It must convince the possible buyer, a municipality, about its product and justify why implementing it would bring added value for a municipality compared to the current situation. When networking is commercial, a company should justify why they could achieve more together than alone. How to make operations more profitable for both companies? All in all, when planning networking and cooperation, a company should always keep in mind, what it can offer for the partner, and how it can be advantageous for a partner.

Corruption also exists in the market. Some municipalities might function that way they have already chosen the winner of the competitive tendering for some waste management

project. Also, e.g. large German companies operating in Central Europe form a very competitive environment, and this way limitations for cooperating and networking for smaller companies.

Companies can apply funds for waste management from the EU. Both local and international companies can apply for them for their operations in the Czech Republic. There are consulting companies that assist companies in finding out the requirements and conditions for the EU funds and applying for them. According to the interviewee, it is quite common that the Czech companies and municipalities aim to have this kind of financing for their operations from the EU. It is common to get the EU funds for waste management and infrastructure projects. The next funds of the EU funding period will be published in autumn 2021.

The EU competition legislation determines that competitive tendering in all the publicly financed and organized services is open for all companies registered in the EU. Tendering cannot leave any company out based on national factors. Conditions and requirements of tendering need to be bound for practical implementation only.

Even though the market area is competitive, the waste management business is not that competitive because of some operational limits in the Czech Republic. In waste management services there is a dependency on the ownership of landfills and sites. Municipalities that have municipal waste management companies have more advantages because they do not have to follow the business framework by the commercial companies. On the other hand, some municipalities might be forced to accept a certain price offered by some operator, if the municipality is not able to create a municipal company of its own. Usually, that is quite a time demanding to create a municipal company to oversee waste management. It is also very difficult for another commercial company to come to the market and compete with another company because there might be no further processing plant nearby the municipality. If the company is forced to take the collected waste somewhere else it ignites higher cost, and the operations are even less competitive then.

If the offered waste management solution has a lower total cost of ownership and lower CO2 emissions during the use, it is considerable and might offer something new. Because the competitive field is difficult, smaller companies are in many times forced to form some kind of joint ventures or partnerships to be able to operate in the first place.

6.2 Results of separate interview themes

6.2.1 Retailing

A retailer must have access to municipal networks. It must be able to sell technical products, must have experience in project management and project deliveries. Project management and conceptual selling skills are required. Selling new kinds of waste management solutions in the market area is not easy. A retailer must have skills in technical and consultative selling. If the retailer has an existing network that is always an advantage. Municipal networking is vital, but also networking with businesses is recommended. Waste management is a substantial business for municipalities also in the Czech Republic. It employs a lot of people. A company and its retailer must always discuss with the end-user when they want to proceed with operations and sell the waste management solutions. They need to discuss with municipalities and the retailer must also understand this.

6.2.2 Finland's reputation

The Nordic countries have mainly a positive reputation in the Czech Republic. Therefore, it might beneficial, from a marketing perspective, to be for example a Finnish company offering ecological and sustainable solutions for waste management. As aforementioned, Finland as a country has a good reputation in the Czech Republic. However, being successful in the new market area requires a lot of preparations and investments in the beginning and many companies do not necessarily have the courage or ability to do this. Willingness to invest is the starting point. A company that wants to internationalize must have a budget for market area research so that the targeted market is familiar on some level before entering it.

6.2.3 Waste management industry development and EU legislation

The waste management industry and its development are controlled by taxation. Landfilling has become more expensive in the Czech Republic recently. The cost is an important factor when new waste management solutions are implemented. Many municipalities, cities, and companies utilize the EU initiatives and programs to develop the waste management infrastructure. The total amount of waste produced per capita in the Czech Republic has been increasing.

Waste management is taxed by national authorities in the EU member states. Member states have their taxation systems for example for waste that is landfilled or incinerated. Waste management operators can apply for EU funding when they meet certain criteria.

Openness, transparency, and even-handedness are the objectives of EU funding. The EU environmental support measures are typically related to research and development.

Each EU member state can apply national legislation based on the minimum requirements of the EU directives. Companies must follow the competition legislation for enterprises, too. The minimum requirements must be carried out. The recycling targets in the EU are continuously tightened, and the targets are observed on the national level.

However, the competition in the waste management field is small. The systemic approach is to reduce and prevent waste. It is crucial and it is about awareness and education. People should be aware of how to reduce their waste production. Socially and ecologically responsible procurement, especially in waste management, is the way municipalities should buy their services. Purchasing ecological solutions and enabling and promoting recycling and reuse are required by the law in the Czech Republic. It is expected that collected fees for waste management will increase in upcoming years in the Czech Republic.

6.2.4 Procurement process

A municipality or town pays for a waste management company that a company handles the waste produced by people. A municipality collects fees from people and then the money is transferred to a company that fulfills the service of waste management. This is the general system across the country in the Czech Republic. However, there are differences in the amounts of fees that are collected from people. It depends on how expensive the services of the waste company are. This is the main difference between companies owned by municipalities and commercial companies. Commercial companies are focused on profits, so they expect their profit margins to be higher. Municipal companies focus primarily on providing public services and covering the costs. Waste management companies are responsible for processing municipal separated waste.

If the municipality is not satisfied with the current waste management company it can organize a competitive tendering to find another operator based on the commission law in the Czech Republic. However, it might be difficult to attract a better waste management operator in some municipalities or regions because the competition in the market is limited, as in an oligopoly. This means that in order to operate in the waste management field, you need special property and assets, such as special cars and machines. Or your retailer must have these if you just sell for example containers or some other specific solutions for the market.

As aforementioned, financing the waste management operations and services in a municipality is organized by collecting the fees from people and transferring the amount for the company. However, the collected fees do not cover completely the contracted price or finance, that is required by the commercial company. So, the other sources of financing are taxes. A municipality has a budget, which is partially constructed from government taxes. The central government transfers money to a municipality, and it uses this money for financing waste management services. Therefore, there are differences between municipalities, towns, and regions in their fee policies. The collected waste management fees from residents vary regionally.

The first step in the procurement process is to announce the intention to have a new waste management operator in the area. It is announced to the public information database where all the public commissions are published. A municipality must set up a certain estimated amount of money it will pay for the management now and in the future. Then a municipality must set some conditions what it expects from a waste management operator. What is the core of the services a municipality requires? The announcement is also a good way to perform premarket discussions with the potential suppliers so that a municipality can find an optimal level of conditions and optimal level of budget for the operations.

Then there is still the competition which means that the companies are assessed according to their price and their ability to fulfill all the technical and operational conditions. The last condition is usually the guarantee of the service level. This is a crucial factor in the assessment process. The service level must be kept all the time. Then the decision is made, and the contract is signed between the municipality and the selected waste management operator. If some parts of the contract are not fulfilled there will be some penalties and the last possibility is to cancel the contract completely.

6.3 Summary of results

If an SME is willing to operate in the Czech Republic, that requires knowing the EU legislation for recycling and waste management and a detailed market study about the targeted market, and having a targeted customer segment in focus. In this case, the customer segment is a certain area with a certain number of residents.

A company needs to study what kinds of waste management systems there are in the market area, and what kinds of solutions would best fit in the market area, from technical and systemic viewpoints. It is important to notice that there is no void space without any solutions e.g. for waste management in any market area.

Having contacts is crucial. Contacts play an important role in the Czech Republic as well as in Central Europe generally. Cooperation with a municipality is a must. Because of this reason, too, it is easier to target the smaller municipalities because bigger cities have stronger power structures and that may hinder business activities. The social and political power structures make networking and winning competitive tendering tougher for a small business. The structures also influence supporting the familiar operators and business partners. It is easier to reach the decision-makers in smaller municipalities.

It is always challenging to enter a new market area, especially if the targeted market is a big city with multiple competitors and strong political and social structures. However, smaller municipalities might already have their own municipal or commercial waste management company and they do not necessarily need a new operator in the area.

All in all, there is increasing demand for the operations in the upper stages in the waste hierarchy (reuse as products and waste prevention) in the EU. This is not necessarily so beneficial for traditional waste management companies even though it is beneficial overall. However, companies having new innovative solutions or technology for waste management might benefit from the development towards a more ecological ecosystem.

7 Discussion

This chapter looks into the results of the thesis. Reliability and trustworthiness of the results and chosen research method and ethics of the thesis process are evaluated. In addition to the consideration of results and conclusions and suggestions for further research, the thesis process and own learning are discussed.

7.1 Reliability and ethics

Before the thesis process, I did not know that much about the circular economy or circular ecosystem concepts, but I learned a lot by reading the latest publications and accessing electronic databases. Also, the definitions for specific waste types and streams were new to me. From this point of view, I believe I was able to conduct usable qualitative research by interviewing people, based on the theoretical framework I had written and the investigative questions I had formulated based on theory. I think the theoretical part should cover well the main theoretical concepts and subjects related to the research problem setting.

I tried to select the interviewees carefully so that the collected information would be reliable and trustworthy. The usability of the information from the research viewpoint was in focus. The selection of interviewees must always be careful and justified. I tried to select all interviewees that way they were experts in their specific field and could share in-depth knowledge. They needed to know the themes I had formulated, based on the investigative questions, for each interview in advance so they could prepare. I conducted four semi-structured interviews so that there would be enough interviews and enough collected information to be interpreted in the results.

I told what my interview was about and that the interview responses will be used for my thesis only. I also told that the results of semi-structured interviews will be aggregated so that a person will not be identified from the responses. Naturally, the participation was voluntary, and anonymity was guaranteed. I told them the interview recordings will be destroyed after the thesis process.

7.2 Consideration of results

I would reshape the objective and the research question now so that they were even more specific. I noticed that the results of this thesis could be more specific after all. I was able to collect a lot of good-quality data and received a lot of valuable information through literature, databases, and interviews. I tried to collect up-to-date data from reliable sources into the theoretical part to support carrying out the interviews in the empirical part.

I am quite satisfied with the results, but I could have formed the interpretation of the results better. It was hard to structure the results, according to the themes, in sub-chapter 6.1 because the themes were so interlinked to each other. The reason is they all were strongly based on the investigative questions. You could not write about just one theme at a time without losing the consistency of the text. In sub-chapter 6.2, it was easier to divide the themes into separate sub-chapters (6.2.1-6.2.4) because the themes were separate in the first place.

The purpose of this thesis was that the outcome would be beneficial for the business association and for individuals and businesses who are interested in waste management and its linkage to the circular economy and ecosystem. The purpose of the research was also to benefit people who are willing to know more about waste management, the services, and the market conditions and the cooperative environment in the Czech Republic.

The objective was to acquire and provide new and practicable knowledge for the business association about the business environment, public decision-making and waste management operations, and required cooperation. I feel like I succeeded to acquire usable information about this. The expert interviews offered precise and market-specific information about market conditions and requirements for operations and required cooperation for companies in the market area. I wish I had more actual data from the perspective of SMEs in the thesis.

7.3 Conclusions and suggestions for further research

The results confirmed that the circular economy is about working together to guarantee a more sustainable flow of materials. The interview results emphasized that the cooperative and legislative environment must always be assessed market-specifically.

The results highlighted many important practicalities to be considered generally in the market, or specifically when operating in the waste management sector or cooperating with the municipalities. This is the practical information either the business association can utilize when communicating with businesses, or individuals and businesses when willing to know the basics about operating in this kind of sector in this market and cooperating with municipalities.

According to the results, it is clear that there is a need for further research or development task about this topic. Because the importance of the market study was emphasized in the interviews multiple times, there might be use for a handbook or manual for SMEs. The

manual could guide about how to carry out a market study. The focus could be on required measures and steps for an SME before entering the market. What to consider and how to prepare?

7.4 Thesis process and own learning

If I started the thesis process now, I would reserve more time for writing it and scheduling it properly from the beginning, so I could finalize the thesis process better in time. I would also delimit the research problem and the subject more precisely from the beginning of the process. This way the working process would have been more efficient. You must be prepared for delays as well. Now I had not prepared for any delays or unexpected incidents in my personal life during the thesis process. Now I know how to better manage time and this kind of writing process.

Next time, when I have this kind of long writing process ahead, I will pay more attention to scheduling it. Especially, scheduling the information collection is important because the collection of information, transcription of the collected information, and interpretation of the results take a lot of time. After I had conducted the interviews, I had quite a short time to transcribe the interview materials and interpret them.

I am happy I learned many new contents from the theoretical viewpoint during the thesis process. I learned a lot about the circular economy concept and the utilized business models in the circular economy. I was able to develop my skills in information search. I noticed I was better able to collect relevant data from both electronic databases and e-books and literature. I was able to acquire know-how and skills what it comes to conducting semi-structured interviews online. My time management skills improved when I had to organize meetings for interviews and plan the finalizing of the thesis process. All in all, I acquired a lot of practical and professional skills and I can utilize those skills in the future.

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Appendices

Appendix 1. Semi-structured interview 1

The interview was conducted in Finnish.

Teema 1: Toiminta ja sen laajeneminen

- Miten arvioidaan uutta markkina-aluetta ja sen mahdollisuuksia?
- Potentiaalin arvioiminen kohdealueella?
- Miten ja mitä tekijöitä huomioidaan erityisesti?
- Vaadittava ympäristö ja vaadittavat asiat markkina-alueella?

Teema 2: Jälleenmyynti Tšekeissä

- Mitä kriteerejä jälleenmyyjälle on alueella?
- Jälleenmyyjäverkosto? Miten verkostoidutte alueella?

Teema 3: Yhteistyö eri tahojen kanssa

- Millaista yhteistyötä tehdään eri tahojen kanssa, kun viedään toimintoja Tšekkeihin?

Teema 4: Millaisena Tšekin liiketoimintamahdollisuudet nähdään?

- Osaaminen ja ratkaisut, mitä voidaan tarjota toimialalla kohdealueella?

Teema 5: Suomen maine Tšekeissä?

- Miten mainetekijä vaikuttaa viennissä ja toimintojen laajentamisessa kohdealueelle?

Appendix 2. Semi-structured interview 2

The interview was conducted in Finnish.

Teema 1: Jätehuollon toimiala ja sen laajeneminen Tšekkeihin

- Mitä tekijöitä yrityksen, joka miettii laajenemista Tšekkeihin, tulisi erityisesti huomioida?
- Mitä vaatimuksia Tšekeissä on kunnallisella ja valtiollisella tasolla jätehuollon toimialalla toimiville yrityksille? Kriteerit yrityksille?
- Mitä pk-yritysten tulee huomioida toimialan säätelystä alueella?

Teema 2: Yhteistyö eri tahojen kanssa

- Miten jätehuollon pk-yrityksen tulisi verkostoitua alueella?
- Millaista yhteistyötä yrityksen tulee tehdä eri tahojen kanssa (kunnat jne.), jotta se pystyy toimimaan alueella?
- Millaisia vaatimuksia ympäristö / kunnallistaso asettaa jätehuollon yrityksille?

Teema 3: Ohjelmat, rahoitus ja verotus osana jätehuollon kehittämistä alueella

- Miten verotuksella ohjataan jätehuollon kehittämistä?
- Miten EU-tason ohjelmilla, hankkeilla ja rahoituksella tuetaan jätehuollon kehittämistä alueella?

Teema 4: Tšekin liiketoimintamahdollisuudet jätehuollon toimialalla?

- Mahdollisuudet markkina-alueella ja potentiaali jätehuollon yrityksille?
- Millaiselle osaamiselle ja millaisille jätehuollon ratkaisuille on kohdealueella kysyntää ja tarvetta?

Teema 5: Suomen maine Tšekeissä?

- Miten Suomen mainetekijä vaikuttaa viennissä ja toimintojen laajentamisessa kohdealueelle?

Appendix 3. Semi-structured interview 3

The interview was conducted in Finnish.

Teema 1: Kotimarkkinana Eurooppa

- EU:n tavoitteet jätehuollon ja kierrätyksen suhteen?
- Mitä huomioitavaa on jätehuollon toimialalla lainsäädännöllisestä näkökulmasta, kun mietitään EU-markkinoille menoa?
- Millaiselle osaamiselle ja millaisille jätehuollon ratkaisuille on kysyntää ja tarvetta, ottaen huomioon EU:n tavoitteet jätehuollon ja kierrätyksen suhteen?

Teema 2: EU:n lainsäädäntö jätehuollon toimialalla (jätteiden keräys ja kierrätys)

- Toimialan säätely EU:ssa (jätteiden keräys ja kierrätys)?

Teema 3: EU:n ohjelmat, rahoitus ja verotus osana jätehuollon kehittämistä

- Miten verotuksella ohjataan jätehuollon kehittämistä EU-tasolla?
- Miten EU-tason ohjelmilla, hankkeilla ja rahoituksella tuetaan jätehuollon kehittämistä?
- Jätehuollon toimialan (erityisesti keräys ja kierrätys) tukeminen ja kehittäminen EU:n taholta?
- EU:n tuet vihreään talouteen?

Teema 4: Tarvittava yhteistyö ja vaatimukset jätehuollon toimialalla (EU-näkökulma)

- Miten jätehuollon pk-yrityksen tulisi verkostoitua tai millaista yhteistyötä siltä vaaditaan esimerkiksi paikallisten kuntien suuntaan, kun toimintoja laajennetaan EU-alueelle?
- Millaisia vaatimuksia jätehuollon yrityksen tulisi täyttää? Onko joitakin tiettyjä vaatimuksia? Onko oltava joitakin tiettyjä sertifiointeja tms.?

Appendix 4. Semi-structured interview 4

The interview was conducted in English.

Theme 1: Waste management industry in the Czech Republic

- Which criteria and requirements are there for waste management companies on the municipal, regional, and national levels in the Czech Republic?
- Which criteria and requirements are there for SMEs willing to operate in waste management?

Theme 2: The Czech Republic as a business environment

- How should an SME network in the waste management field to be competitive?
- What kind of cooperation should an enterprise do on the municipal, regional and/or national levels?
- How competed is the market area in waste management services in the Czech Republic?
- What kind of potential is there for waste management companies in the market? Is there a demand for certain innovations or solutions now?

Theme 3: Procurement process on a municipal level

- How is the selection and procurement process for waste management services like? Especially in waste collection and recovery services? How does it start? How is the decision-making process like?
- How is the procurement process in a municipality generally run?
- How is the buyer financing the purchase from a service provider?

Theme 4: Industry development

- How is waste management and treatment developed in the market area?
- What kind of allowances and support measures are there for waste management operators?
- Programs, funding, and taxation to improve the development of waste management?