

Circular Economy in Kanta- and Päijät-Häme

Geographic Mapping and Circular Economy Potential Study

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CIRCULAR ECONOMY IN KANTA- AND PÄIJÄT-HÄME GEOGRAPHIC MAPPING AND CIRCULAR ECONOMY POTENTIAL STUDY

Hämeen elinkeino-, liikenne- ja ympäristökeskus

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Contents

1. Introduction	2
1.1 Aim of Study	2
1.2 Objectives	2
2. Geometring of Company Operators	2
2.1 Kanta and Bäijät Häme Identified Sectors	
2.1 Kanta- and Faljat-name identified Sectors	0
Manufacturing	1
Infractultura	1
	1
	٥ ٥
	ð
Energy	9
Services	9
3. Interview results	10
PESTEL	
Political factors	13
Economic factors	13
Social factors	14
Technological factors	
Environmental factors	
Legal factors	17
SWOT Analysis	
4. Glimpse on Circular Economy in the Built Environment	20
Circular Economy Programs in the Real Estate and Building Sector	r
Case Study: Mainiemi Project in Padasioki Municipality	21
Case Study 2: Isku Center	21
5. Recommendations	
Recommendations for promoting Circular Economy principles	
based from company interviews	23
ELY centers as multidisciplinary actors of the administration	25
References	26

1. Introduction

Kanta- and Päijät-Häme's long-term vision for sustainability can be enhanced by embracing circular economy principles. The circular economy presents a major opportunity to reduce reliance on raw materials and increase efficient use of existing available resources. In the strategy period 2020–23, promoting the circular economy is one of the top themes, along with climate change mitigation and adaptation, and employment (Rosberg-Airaksinen, 2022). By incorporating circular economy principles, the region can potentially bolster economic competitiveness while creating value across sectors.

Companies can play a crucial role in promoting the circular economy and benefit from its economic potential. For example, companies can adopt innovative business models such as making efficient use of their material flows hence creating opportunities for sustainable economic growth. Moreover, municipalities and provinces can leverage the circular economy as a catalyst for economic progress and there is an opportunity to enhance the knowledge and resources of the region as well as beyond its borders.

It is important to recognize that the circular economy is not just a set of business models, but a holistic approach that emphasizes the importance of sustainability, resource efficiency, and waste reduction. By embracing this approach, municipalities and provinces can create a resilient and prosperous economy that benefits both the local community and the environment.

1.1 Aim of Study

Drawing inspiration from Winto's Kanta-Hämeen kiertotaloustoimijat (selvitys) in 2019 (Kinnunen et al., 2019), the aim of this study is to analyse the potential and current practices of circular economy in companies within Kanta- and Päijät-Häme. This study can serve as a baseline data that can inform the 'how' and 'where' the transition towards circularity could be seen as an opportunity within the region.

1.2 Objectives

To achieve the aim of this work, the following objectives have been formulated.

- To conduct a GIS mapping exercise to identify the location and spatial distribution of businesses within the region.
- To conduct interviews with businesses operating in the region to gain insight into their current practices and future goals regarding the circular economy.
- To analyse the findings using PESTEL and SWOT to gain a comprehensive understanding of the circular economy practices and its challenges and opportunities within the region.
- To present circular economy programs and case studies from the Real Estate sector as a baseline example for a specific industry.
- To publish a report in ELY webpage and present the findings at the FRUSH Innovating the Circular Economy event, to share insights and recommendations with stakeholders interested in promoting circular

2. Geomapping of Company Operators



Figure 1. Identified relevant sectors for Circular Economy in Kanta- and Päijät-Häme

For company data collection, we utilized the Vainu database to extract data on February 2, 2023, using the selection methods outlined in Winto Better World's report (Kinnunen, Lehtonen and Virolainen-Hynnä, 2019). A total of 19,303 companies were identified across various sectors (see Figure 01). The selection criteria for the main industry are the circular and bioeconomy:

- \rightarrow use a lot of natural resources, including primary production,
- \rightarrow in the field of activity of which creates relatively large amount waste,
- \rightarrow operators who offer repair and rental services,
- → energy and waste sector companies

Same filtering principles (Vainu main industry codes) as Winto study Kanta-Circular economy operators in Häme 2019.

The raw data from the Vainu database was filtered to include companies with contains address information and visiting addresses located in the Kanta- and Päijät-Häme regions, resulting in 18,145 filtered companies. Around 6% (1,202) of companies had missing address information or address points located outside the region. However, although the data processing methods were carefully executed, there is no guarantee that the data is error-free. Additionally, the Vainu database is continuously being updated, and extractions on different days may result in different outcomes. Therefore, the findings and conclusions of this report should be interpreted with caution.

The result of the mapping shown in Figure 2 indicates that the municipalities of Lahti and Hämeenlinna have a higher point density, showing a greater number of companies located in these areas. This is largely due to their higher populations, which offer more potential clients and projects for businesses to cater to. As such, these areas are particularly important to assess potentials of circular economy, as they may represent a key hub for companies interested in pursuing sustainable practices and innovative solutions.

Another key observation is that there are a limited number of company points located in litti municipality (Figure 3) which may be due to its recent transfer to the region.

Additionally, Figure 4 reveals significant differences in company distribution, with Lahti having a higher concentration of Real Estate companies compared to Primary Production, in contrast to other municipalities where Primary Production dominates. Understanding these variations is important for identifying potential opportunities and challenges for companies interested in circular and bioeconomy perspectives. In the next section, the identified sectors are discussed and their roles in promoting circular economy practices.



Figure 2. Company point density heatmap



Figure 3. Mapped Company Points



Figure 4. Distribution of company sectors per municipality.

Figure 5 provides an overview of the number of companies operating across seven sectors in Kanta- and Päijät-Häme municipalities. The Primary Production sector has the highest number of profiles with 7,060, followed by Real Estate with 4,785.

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	Primary Production	Manufac- turing	Infras- tructure	Real Estate	Waste Management	Energy	Services	
KANTA-HÄME								
Forssa	315	119	69	203	9	5	130	850
Hattula	233	48	46	156	2	1	65	551
Hausjärvi	218	45	31	112	2	1	51	460
Humppila	93	23	12	43	1	1	29	202
Hämeenlinna	1173	286	235	764	9	10	550	3,027
Janakkala	374	108	78	221	2	3	146	932
Jokioinen	187	44	15	94	1	1	41	383
Loppi	292	48	55	185	2	0	59	641
Riihimäki	283	141	73	299	14	1	183	994
Tammela	310	63	42	119	2	0	54	590
Ypäjä	141	17	5	40	2	0	21	226
litti	0	3	2	2	0	0	1	8
PÄIJÄT-HÄME								
Asikkala	261	60	41	131	3	0	84	580
Hartola	179	23	20	44	0	1	34	301
Hollola	487	155	76	333	6	4	166	1,227
Heinola	457	108	67	215	2	2	163	1,014
Kärkölä	117	21	21	73	1	0	45	278
Lahti	1057	512	333	1,326	14	13	799	4054
Orimattila	471	109	66	323	6	5	128	1,108
Padasjoki	162	29	15	44	0	1	22	273
Sysmä	250	28	23	58	0	1	37	397
	7,060	1,990	1,325	4,785	78	50	2,808	18,096
	39.01%	11.00%	7.32%	26.44%	0.43%	0.28%	15.52%	

2.1 Kanta- and Päijät-Häme Identified Sectors





Infrastructure





Waste Management



Energy





Primary Production



Primary production is the process of creating, cultivating, or growing primary products from natural resources. It includes activities such as harvesting crops, milking animals, and raising livestock, as well as using fields, forests and waters for food, fiber, and fuel. The data indicates a significant number of Primary Production companies in the region at 7,060 companies, which is 39% of company data collected, with the highest concentration located in the municipality of Hämeenlinna. This sector includes businesses in forest, fishing industry, crop cultivation, domestic animals, mining, and water.

This sector is relevant for the circular economy report because it involves the efficient and sustainable use of finite and renewable resources. Additionally, raw materials obtained from natural resources play a key role as a cost factor in the manufacturing industry. Further, this sector plays a crucial role in both the food supply chain and the management of biowaste since these industries generate significant amounts of biowaste such as crop residues, animal waste, and wood by-products. The primary production sector can contribute to a circular economy by implementing sustainable practices that reduce waste, such as composting or using by-products as feedstock for bioenergy production.

Manufacturing



Manufacturing sector comprises

establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products. The region comprises approximately 11% manufacturing companies, with a distribution map of 1,990 manufacturing companies indicating a high concentration in Lahti, followed by Hämeenlinna. This sector includes businesses in food and beverages, furniture and sawable wood products, chemicals, leather and paper, textile and clothing, metal and non-metallic minerals, electrical equipment, and other machines.

The manufacturing industry is a key player in the circular economy, as it converts raw materials into products that can be reused, repaired, remanufactured or recycled. One effective strategy to improve efficiency and reduce waste is the use of side streams for further production. Moreover, choosing recycled materials over virgin ones can also result in lower carbon emissions and potentially lead to economic gains, as some recycled products are cheaper.

Infrastructure



The infrastructure sector provides critical services such as power, water, transport, and data, through structures such as roads, airports, and technical networks, as well as greenspaces and landscaping. This sector encompasses businesses involved in construction, development, and maintenance.

Circular economy strategies such as using recycled construction materials and proper maintenance of infrastructure can increase lifespan and improve the lifecycle. Additionally, this sector presents an opportunity to support climate adaptation, with greenspaces improving the environment in densely built areas. Moreover, the sector contributes significantly to global greenhouse gas emissions and material use, making decarbonization and sustainability a priority.

Real Estate



In Finland, the built environment accounts for over one third of the greenhouse gas emissions and consumed energy (Vuorinen, 2021). The real-estate sector includes house and building construction and demolition of existing structures as well as repairing and renovation of structures. Most of the waste from this sector is mineral based, such as concrete, brick, asphalt, and other earth masses. The real estate sector makes up 26% of the region, with a total of 4,785 companies. The majority of these companies are located in Lahti, followed by Hämeenlinna. This sector includes businesses in maintenance, development, and construction.

This sector has a high potential for circularity, as buildings can be designed, constructed, operated, and decommissioned in ways that minimise resource consumption and maximise value creation. Further, integrating strategies such as recirculating demolition waste by using them as construction materials can minimize the need for extracting virgin materials from the environment. Additionally, building adaptive reuse can play a role in extending the life cycle of existing structures.

Waste Management



Waste management companies collect, transport and treat various types of waste, including bio-waste from households. By doing so, they enable the reuse, recycling and repurposing of materials as much as possible, which is a key factor in a circular economy. This sector includes businesses in collection, recycling, and processing.

Collaboration between waste management companies and other sectors is can significantly impact and improve the circulation of materials. For instance, plastic waste can be utilized by manufacturing companies as raw material for production, while biowaste can be utilized by energy companies to produce energy which could aid in reducing carbon emissions.

Energy



The energy sector has the potential to play a huge role in the development of a circular economy. For example, companies can use renewable energy sources and energy-efficient technologies to reduce their carbon footprint and improve their sustainability. For example, primary production and manufacturing companies can collaborate with energy companies to utilize their by-products or side streams for energy generation. By doing so, sectors can reduce their dependence on finite resources and use materials efficiently.

Services



The service sector involves companies that primarily earn revenue through providing intangible products and services. This sector includes businesses in the sharing economy, accommodation, and food and beverages.

With 15% of the region having service-related companies, the service sector is a diverse and significant part of the economy that has the potential to contribute greatly to the circular economy. Strategies such as maintenance, repair, reuse, sharing, and leasing of products can extend their useful life, reduce waste and pollution, and create new business opportunities. Digital platforms and technologies are constantly improving, making these strategies more accessible to a wider population. Furthermore, the services sector can support the circular economy by offering services that benefit different scales. For instance, shoe repair shops can help extend the life cycle of shoes and reduce waste. The cumulative impact of such small-scale efforts can facilitate a transition towards more sustainable modes of consumption and production.

3. Interview results

To gather information on factors affecting companies in the Kanta- and Päijät-Häme, interviews were conducted from March to April 2023 through phone calls or Microsoft Teams video calls. During the interview, six key discussion points were covered:

- What Circular Economy current practices and/or projects is the company currently implementing?
- What are the challenges and opportunities in adopting Circular Economy strategies?
- How does the company communicate with internal and external stakeholders about its sustainability targets?
- What are the company's future goals for sustainability and Circular Economy?
- In what ways can regional ELY centres assist or help promote Circular Economy principles in companies within the region?

The information of interviewed companies is listed in the next page.

Company	Interviewee	Details	Source
Purkupiha Oy	Kati Tuominen, Director of Marketing and Business Development	Established company that specializes in de- molition work	www.purkupiha.fi
Versowood Oy	Juhani Ala-Salmi , johtaja, puupakkaustoimiala Kuormalavat, laatikot, kaa- pelikelat ja kelanhallinta	Finland's largest private producer and pro- cessor of sawn timber	www.versowood.fi/fi
Hattulan Rakennus ja Kattotyö	Santtu Heinonen, CEO	A company specializing in roof painting, felt roofs, bituminous insulation, and other roo- fing works	www.rakennusmestarit.com
Salpamaa Oy	Antti Leiskallio, CEO	Salpamaa Oy, a subsidiary of Salpakierto Oy, deals with inorganic materials such as surplus soils and ashes, contaminated soils, and construction waste materials with a fo- cus on recycling and resource efficiency	<u>salpamaa.fi</u>
Jospak Oy	Petra Katajisto, Sustainability Specialist	Development, manufacturing, and marketing of packaging and packaging technology for domestic and international markets	jospak.com/jospak
Fazer Group	Anna Nicol, Director, Sustainability	Fazer operates through three Business Areas: Fazer Bakery, Fazer Confectionery, and Fazer Lifestyle Foods, which offers e.g. plant-based products like oat drinks, gurts, porridges, mueslis, cereals and xylitol for B2B customers.	www.fazergroup.com
Salpakierto Oy	Johanna Rusanen , CEO	Waste company owned by 9 municipalities tasked with performing municipal waste ma- nagement services in the region of the sha- reholder municipalities	salpakierto.fi/en
KIITO – Renewing bu- siness with cir- cular economy know-how	Henri Heikkilä, R&D expert	KIITO project promotes the creation of new circular economy business models and the growth of the digital skills required for them in Kanta and Päijät-Häme SMEs and their supply chains.	www.lab.fi/fi/projekti/kiito-kierto- talousosaamisella-uudistuvaa- liiketoimintaa
Loimua Oy	Maija Henell, Chief Operating Officer Karoliina Kärkäs, Operations manager	Energy production company that offers envi- ronmentally friendly and competitive heating and cooling solutions	www.loimua.fi
Muovipoli Oy	Sauli Eerola, CEO+	Development, research and material testing company specialized in plastics and plastic products	https://www.muovipoli.fi/briefly- english

The key points were analysed using the PESTEL framework to identify external factors that impact the circular economy practices in the region. Furthermore, a SWOT analysis was conducted to determine the opportunities that can be capitalized on strengths, areas that require improvement, and potential threats that need to be addressed to promote the advancement of circular economy practices in the region.



PESTEL

Political factors

Promoting the circular economy has become a key strategy for achieving sustainability goals in various regions in Finland. For example, the Kanta- and Päijät-Häme regions have developed regional road maps to outline concrete aims and actions toward circular economy transition at the regional level. In addition, various municipalities have developed their road maps toward a circular economy, such as Lahti, Forssa, and Riihimäki. These road maps take a systemic perspective and identify interventions that span the different roles a city can play in the circular economy. Political decisions at the municipal level can also significantly influence the adoption of circular economy practices. For instance, the municipality of Lahti's bid to become Europe's Green Capital for 2021 which further drove its efforts toward reaching sustainability targets.

At the national level, the Finnish government has also shown support for circular economy initiatives through programs such as funding businesses that work towards sustainable practices. For example, Muovipoli Oy, a development, research and material testing company specialized in plastics and plastic products, is involved in multiple projects aimed at promoting the circular economy of plastics in Finland. One project, funded by the EU and Finnish Environment Institute (SYKE), aims to realize the Plastics Roadmap for Finland 2.0, which aims for a breakthrough in the circular economy of plastics by 2030. Another project, called PlastLIFE, is a large national cooperation project to promote a sustainable circular economy of plastics in Finland by 2035. The company is also involved in regional experiments that aim to put the concept of "all plastic circulates" into practice. In addition, the company has collaborated with Ramboll funded by the Ministry of Environment in a project to recycle plastic waste from the construction sector, with a focus on three different waste streams - plastic packaging films, pipe waste, and insulation EPS streams - all of which are suitable for recycling as a product. Lastly, the company is collaborating with LAB University in the regranulation process of film waste to manufacture new products. This examples highlights the increasing political support for circular economy initiatives at all levels of scale in Finland.

Economic factors

The economic viability and success of circular economy initiatives depend heavily on factors such as pricing structures that accurately reflect the advantages of utilizing recycled materials and their positive environmental impact in reducing the need for raw material extraction.

Purkupiha Oy, a company specializing in demolition, understands the significance of discovering innovative uses for demolition waste and refining it to ensure economic prosperity while contributing to a sustainable future. Nevertheless, consumer inclination towards certain virgin materials like gravel and crushed stone is driven by their affordability. Furthermore, another company noted that the end-use of materials in infrastructure construction is often overlooked, which could result in lower-quality products sufficing.

In the manufacturing sector, Fazer has a long history of using side streams, such as in their Pätkis product since the 1920s. The company recognizes the economic advantages of utilising side streams, which not only help avoid loss of labor but also maximise expenses incurred in acquiring raw materials. In terms of prioritizing the use of side streams, Fazer places emphasis on finding the most valuable use case for materials within the food industry for human consumption. Further use of side streams can be as animal feed, or as an energy source. Ultimately, having no waste is economical, and Fazer recognizes that reducing food waste and reusing side streams can have economic benefits that work hand in hand with sustainability and profitability.

In the energy sector, Loimua Oy, an energy provider that uses by-products from forestry and the wood processing industry (wood-based fuels) as well as waste and surplus heat from its partners in energy production. One of Loimua Oy's challenges is the availability of wood, which sometimes necessitates the use of peat. Further, the company is exploring to increase the percentage of acquired waste heat from industries however, there are limited sources to expand. The success and expansion of circular products and services can be influenced by market demand, with more consumers and developers opting for ecofriendly materials and processes. Adequate funding is also crucial in supporting the growth of such initiatives in a circular economy. Overall, economic factors such as pricing structures, resource availability and costs, market demand, and access to finance and funding are crucial in promoting the viability and success of circular economy initiatives.

Social factors

In the manufacturing sector, Fazer emphasizes the importance of cooperation to achieve a circular economy. This involves collaborating with local and smaller companies, as well as with universities, and research institutions to find new materials and methods. Fazer's communication strategy involves validating data using a science-based approach and publishes an annual board report that discusses their commitment to SBTi targets, initiatives such as the "Grain Vision", and certified sourcing of raw materials such as cocoa. This supports their communication strategy to ensure commitment to a common vision.

In the interview with an educational and research institution, it is worth mentioning that LAB University has collaborated with several companies to assist in developing their business incubator projects. Presently, over half (63%) of AMK students have shown enthusiasm toward entrepreneurship and interest to work alongside local businesses. The university acknowledges the importance of collaborating with companies to make progress in implementing circular economy practices. Although student ideas have shown promise, more effective implementation strategies are necessary. Facilitating cooperation among local stakeholders and supporting students' innovative concepts is crucial for realizing the potential of a circular economy, as evidenced by successful initiatives at Midas-expo's circular economy section. KIITO initiative, a collaboration project between HAMK, LAB, and TE office, strives to update businesses' knowledge about circular economies; one aspect involves arranging visits for students to observe companies in action. By teaming up with larger corporations, there are opportunities to test pilot programs that promote sustainable solutions within a circular economic framework.





In the infrastructure and real estate sector Salpamaa Oy, Purkupiha Oy, and Hattulan Rakennus ja Kattotyö recognize various challenges and opportunities in implementing CE within the current social norms. One company notes that although there has been talk of change, actual practices have not shifted significantly, and the company seeks to lead by example and challenge stakeholders, including city group operators, to do the same. Purkupiha Oy mentions that sharing knowledge and informing stakeholders about newly approved sustainable materials can be useful. Disseminating information about new products can be promoted and facilitated through communications by ELY centers in the region. Further, Hattulan Rakennus ja Kattoty's marketing efforts are made to highlight the durability and environmentally friendly nature of the company's products, which are also designed to be recyclable. In addition, the company promotes maintenance services to extend the life cycle of roofs for decades.

In the waste management sector, Salpakierto Oy highlights the need for better communication and cooperation between authorities and businesses. Annual meetings between officers and businesses can facilitate networking and knowledge creation, discussing new solutions and challenges faced. Building trust through better communication is also important for easier cooperation between businesses and authorities.

In the energy sector, Loimua Oy's communication involves negotiating with other industries and suppliers while also publishing its mission, achievements, and future goals. Customers are also interested in knowing about the type of fuels being used and the sustainability-related practices. As for internal communication, since Loimua is a small company, it holds information meetings with personnel to communicate future projects.

Overall, there are several social factors that can affect sustainable practices. Environmental awareness, education and skills, collaboration and networking, and government support can facilitate the development of circular business ecosystems and innovation clusters and enhance public perception of sustainable practices. Professional trainings and seminars within and outside companies can help individuals, workers, and consumers gain a better understanding of circular economy principles.

Technological factors

Innovations in production technologies enable more efficient and sustainable use of resources. For instance, Fazer has made significant efforts to reduce food waste, achieving an 8% reduction compared to their 2020 baseline in 2022. They minimize wastage by rationalizing production, reusing raw materials, and donating food. Fazer cafés have also joined the fight against food waste by selling surplus food through apps like ResQ and KARMA. Despite their best efforts, excess food still occurs, and Fazer collaborates with food aid charities in several countries to ensure it is not wasted. In Finland, Fazer partners with organizations like Ruokapankki, Helsinki Missio, and Hurstin Apu, while in Sweden, they donate bread to Stadsmissionens own retail Matmissionen. Moreover, the company has a Foodtech group, consisting of medical experts, Ph.D. scholars as well as partnerships with universities to explore new techniques and creative approaches for maximizing side streams in the food industry effectively.

The sharing economy and circular business models can be enhanced with digital technologies. Purkupiha Oy's platform, called Purkutori, allows the sale of unused building materials from other businesses in the construction industry. Additionally, they are working on developing concrete waste for reuse in new projects to promote sustainability within the market. Nevertheless, further research is necessary to improve waste quality as it requires substantial processing to comply with regulations.

Innovative collaboration is being carried out between Salpakierto Oy and companies such as UrbanMill with the goal of developing a sustainable industrial chemical recycling method for plastic waste that cannot be mechanically recycled. In addition, Salpakierto Oy participates in the regional experiment "All Plastic Circulates" to determine optimal methods for recycling certain plastics. Alongside a partner company, Salpakierto also takes part in the Jätti project which involves reusing or recycling plastic furniture. Furthermore, together with Borealis, they are working on a pyrolysis project set to build a new plant in Kujala soon; this project aims to transform separated plastic waste mixed with biowaste into new plastic products through pyrolysis technology. A different approach to technology integration involves educational institutions like LAB University, which offers a circular economy lab that allows companies to participate in 3D printing using recycled materials and textile sorting. This collaborative initiative between businesses and students presents promising chances for innovation within the circular economy. On the other hand, Loimua Oy is have significantly reduced emissions by 69% in the last 5 years (2017-2022) by using more wood and renewing their boiler at the Vanaja power plant in Hämeenlinna. Additionally, the company is exploring the use of new gas condensers that can produce heat from steam from the company's own process, which accounts for about 20% of their whole production from the boiler.

A circular economy that prioritizes resource efficiency and waste reduction necessitates the introduction of novel technologies. Several companies are implementing sustainable practices to tackle issues such as food, construction, and plastic waste by embracing innovative business models alongside new technologies. Digital advancements have further enabled sharing economies and fostered fresh opportunities for circular enterprises. As these factors persist in shaping the market, sustainability-oriented businesses stand to benefit from their incorporation of innovation.

Environmental factors

In analyzing the environmental factors for the companies in Kanta- and Päijät-Häme, Versowood Oy stands as a good example for its commitment to a bio-circular economy by utilizing wood up to the last sawdust. The company's waste management practices prefer repairable and recyclable pallets and cable coils over plastic products. Once these items reach the end of their life cycle, metal components are separated and recycled, while wooden components are either harvested or crushed for thermal energy production. Additionally, the company's communication strategies include informing personnel about ongoing ISO 14001 audits and using LCA calculations and environmental data in marketing to customers.

Additionally, Hattulan Rakennus ja Kattotyö recognizes the impact of climate change and environmental regulations on its business. The company promotes and uses innovative materials like Icopal's Noxite coating, which has an air-purifying effect based on titanium dioxide, providing added value to their roofing installations. Advancements in material development have allowed for longer lasting and environmentally better roofing options, benefiting both the environment and customers. Another example is the Jospak Oy where prioritizes sustainability by moving to a new building that utilizes renewable energy and using fiber-based materials, such as carton and corrugated materials, for their production.

In the manufacturing sector, the plastic industry is shifting towards bio-based or waste-based feedstocks, and the circular ecosystem for plastic recycling and reuse is growing stronger in Finland and Europe. Muovipoli Oy is involved in discussions surrounding the life cycle of plastic products and packages, as well as end-of-life solutions. Producer responsibility systems for packaging materials are expanding, and the national government has recently established a "volunteer producer responsibility system" for agricultural plastic waste. In addition, there are volunteer green deal targets in various business sectors, with packaging companies and industries actively participating in these agreements. However, there are still challenges such as handling waste effectively to prevent environmental leakage. Further, only 10% of plastics produced globally are recycled, leaving a huge potential for improvement in recycling practices and business.

In analyzing environmental factors, it is clear that sustainable production and consumption patterns are crucial. Reduction of waste, pollution, and greenhouse gas emissions is necessary to comply with environmental protection policies and regulations. While GHG reduction is not yet a significant consideration in regulations and policies, private institutions can lower their emissions through initiatives or by responding to market demand. Additionally, increasing the use of renewable energy sources is critical to mitigate the impacts of climate change on natural resources and ecosystems.

Legal factors

Legal factors can significantly affect the operations of companies. One of the major challenges faced by companies, especially in the infrastructure, real estate, and waste management sectors, is the long legislative process required to change the status of recycled materials from "waste" to "product". This slows down the recirculation of recycled products back to the market, affecting the efficiency of operations. Additionally, since the permit process is lengthy, it can get expensive which can disproportionately affect small and medium-sized enterprises. Further, communication challenges may arise between independent operators since the separation of AVI and ELY which may have differing positions and responsibilities.

Moreover, companies in the construction sector emphasized the high regulatory requirements for recycled products. These suggest that more research and innovative solutions are needed to meet these standards, which currently limit the use of recycled construction materials to earth construction but not building construction.

Regulations such as the Single-Use Plastic Directive aim to reduce the impact of plastic products on the environment and promote circular economy by harmonizing product regulation in the EU internal market. Meeting these challenges requires new practices, technologies, materials, and ecosystems to move towards a more sustainable and circular future.

In terms of internationalization, Jospak Oy, a manufacturing company with clients in Europe and Asia, highlighted the variation in recycling and environmental requirements by country. This variance can create challenges for companies looking to expand into new markets and must navigate different regulatory frameworks.

Overall, the legal factors surrounding recycling and the reuse of waste materials can present both challenges and opportunities for businesses. A comprehensive review of legislation and regulations may be necessary to promote the development of recycled materials that meet high-quality standards, while businesses may need to navigate different regulatory frameworks when expanding into new markets.

SWOT Analysis

Strengths

Market demand: Clients and owners increasingly prioritize sustainable products and services, creating a growing market for circular economy solutions.

Industrial symbiosis: There are examples of companies collaborating to share resources, waste, and energy, promoting a more circular approach to production and consumption.

Research and development: The region have a strong tradition of innovation and R&D. For instance, universities and companies working on circular economy solutions and student initiatives in seeking collaboration with local businesses.

Municipal and regional commitment: The province has a strong political commitment to circular economy, with many municipalities developing their own goals and action plans to promote circularity.

High number of companies in the region offer great potential for the integration of circular economy principles. For example, Lahti has a higher concentration of real estate companies compared to primary production industries, making it an ideal location for circular economy initiatives in the construction industry.

Weaknesses

Lengthy legislation process: for updating the material status and obtaining permits for recycled products, which can discourage companies from engaging in circular practices.

Attitude towards recycled products: require a change in mindset and culture from individualistic to collaborative approaches.

Limited awareness and knowledge about funding and resources: may lack the capacity or expertise to identify and apply for funding opportunities.

Limited networks and partnerships: more engagement required to promote international collaboration and scaling up of circular initiatives across borders and sectors.

Opportunities

Increasing market demand for sustainable and circular products: trend towards sustainable and circular products leads to increased demand. For instance, Fazer Lifestyle Foods aims to become a top plant-based player in Northern Europe, by cre-ating products that combine great taste with sus-tainability.

Communication and knowledge sharing: increas-ing cooperation between universities and business-es can share knowledge and promote sustainability practices to customers and stakeholders.

Technology and digitalization: digital platforms facilitate exchange of recycled materials and prod-ucts and provide opportunities for collaboration and innovation in the circular economy. Sharing economy platforms and services can also thrive, such as sharing of equipment, waste management, and product repair/refurbishment.

Financial assistance from the public and other private institutions such as funding RDI and support low-carbon and circular economy solutions by procuring products, services, and contracts with smaller negative environmental impacts

Threats

Limited availability of professional knowledge and technical expertise in the field of circular economy, hindering the development and implementation of circular initiatives.

Cost of materials and developments: which can make recycling and circular processes less economically feasible. Slow improvements in legislation and licensing procedures: which can weaken companies' willingness to invest in circular initiatives and cause delays in implementation.



4. Glimpse on Circular Economy in the Built Environment

The Kanta- and Päijät-Häme region presents a promising opportunity for the integration of circular economy practices in the real estate sector due to the significant number of companies operating in the area. At national level, the construction and property industry in Finland accounts for over one-third of greenhouse gas emissions and consumed energy, while also covering 15% of the country's GDP and employing over 500,000 people (Vuorinen, 2021). Given that this industry is one of the major sources of carbon emissions (Huang *et al.*, 2018), this section discusses the current practices and trends for this sector in the Kanta- and Päijät-Häme region.

Circular Economy Programs in the Real Estate and Building Sector

The Finnish government has implemented several national legislations pertaining to the Real Estate sector, one of which is the Building Act. Recently, on 1st March 2023, Parliament passed a new and improved version of this act that aims to establish an era of sustainable construction practices in the country. One of the key features of this act is its comprehensive measures that aim to combat climate change within the building industry. Not only does it prioritize environmental responsibility, but it also seeks to streamline and expedite construction processes while encouraging circular economy practices and digitalization. In addition, improved guality control measures have been put in place with hopes of raising standards across all facets related to building projects. The implementation date for these changes has been set for 1 January 2025; marking an important milestone towards creating more eco-friendly buildings without compromising on functionality or efficiency (Ministry of the Environment, 2023)

Additionally, the <u>Building Heritage Act</u> has been enacted to protect and preserve the diversity of the built cultural environment, promote its sustainable use, and safeguard its unique characteristics and features. The BHA covers structures, building groups, built areas, and individual buildings that hold historical, architectural, or environmental significance, or are connected to significant events. The protection may extend to parts of a building, fixed indoor structures, or areas created through construction or planting. To ensure compliance with the Act on the Protection of the Built Heritage, the Finnish Heritage Agency and the Centres for Economic Development, Transport and the Environment (ELY Centres) monitor and promote the preservation of the built heritage (Finnish Heritage Agency, n.d.)

Another program worth noting is the Ryhti Project which aims to improve the management of information related to the built environment. Currently, this information is dispersed, inconsistent, and difficult to access, creating challenges for stakeholders across the board. To address this, Ryhti project by the Ministry of the Environment is working to establish a national information management system for the built environment that is accessible, standardized, and user-friendly. This will involve developing agreedupon information structures, updating legislation, and consolidating relevant data into a centralized platform. The project, which began on 1 October 2020 and will continue through 31 December 2024 and beyond, aims to improve access to critical information for stakeholders across the built environment sector, from architects and planners to builders and residents.

RYHTT Built Environment Data

The new national built environment information system (Ryhti) gathers data related to construction and zoning. The system will have two data repositories: one for building data and one for land use data. The information system will be built as part of the Ministry of the Environment and the Finnish Environment Institute's Ryhti project. The authority responsible for the built environment information system is Syke. – Ministry of the Environment

Case Study: Mainiemi Project in Padasjoki Municipality

The municipality of Padasjoki has undertaken a building conservation project to transform a former thermal plant into a cultural and social hub. The thermal plant was built in 1880 and decommissioned in 1963. It has been used as a storage facility for about 60 years before the redevelopment started.

The project involves renovating multiple buildings on the site, with the wooden sawmill building being the first one to be completed in 2022, costing a total amount of 60,000€. The breakdown of estimated construction costs is as follows:

- 20,000 € for electrical installations
- 30,000 € for the yard area which includes the renovation of broken windows and wooden walls.
- 10,000 € for the concrete floor and new water pipes

The renovated sawmill building has hosted various events, such as Halloween parties and concerts, attracting visitors and locals alike.

Moreover, the next project is the repair of the roof and broken wall of the old steam power brick building, estimated cost of around $40,000-50,000 \in$. The municipality has been assigned a $7,500 \in$ grant from ELY to help fund the planning of the roof renovation, with support and guidance provided by experts from the ELY center and regional museums.

This project is a great example of how circular economy principles, such as conservation and restoration, can breathe new life into historical sites, creating value for the community in the process.



Case Study 2: Isku Center



Photo: Isku-Yhtymä Oy, Mukkulankatu 19, 15210 Lahti

One case study that illustrates the concept of circular economy is Isku Center. The Isku Center is a contemporary and adaptable business facility located on Mukkulankatu 19 in Mukkula, Lahti. It houses the production facilities and head office of Isku along with around ten other tenants including LAB University of Applied Sciences.

With a total area of 76,000 m2, this building was constructed in 1958 and has been used by Isku as a factory up until the present day. However, the factory building has undergone renovation to provide modern and eco-friendly solutions for businesses that prioritize sustainability such as LeaseGreen's smart energy solutions which reduce carbon footprint by 90%, providing modern levels of comfort and efficiency with lower CO2 emissions compared to other technologies used in similar buildings. With versatile production and office facilities, internal and external logistics are ready to go for responsible businesses seeking comfortable facilities (Isku, n.d.).

This case study demonstrates how the real estate and building sector can contribute to circular economy principles by offering efficient internal and external logistics solutions suitable for various types of operations.

Photo: Mainiemi Project. Source: Maria Virtanen.

5. Recommendations

Companies are increasingly prioritizing the adoption of circular economy principles. The interviewed companies shared their own initiatives towards material circularity and have set sustainability goals as part of their long-term objectives. Further, educational institutions in Kanta- and Päijät-Häme have played a role by providing a wide range of experts and engaging students in active circular economy projects. The circular economy networks are extensive and involve all actors, including consumers, companies, educational institutions, and municipalities.



Recommendations for promoting Circular Economy principles based from company interviews

Keywords	Strategies
Coordination	Establish a management-level coordination to assess resource needs, monitor results, share best practices, and exchange information to imp- rove CE implementation.
Cooperation	Cooperation
Pilot projects	Implement pilot projects to showcase proof of concept for citizens, edu- cational institutions, and other businesses and encourage wider adop- tion of CE principles.
Resource sharing, digitali- zation, and platforms	Conduct follow-up investigations to explore untapped potential and operating models of the circular economy, such as sharing resources and services and utilizing digitalization and platforms to facilitate CE practices.
Economic assistance	Increase awareness of financing opportunities and encourage R&D ac- tivities for growing companies in industries to support the transition to a CE.
Streamline legislation pro- cesses	Simplify and streamline legislation processes to reduce barriers and support the implementation of CE practices.



ELY centers as multidisciplinary actors of the administration

The ELY Center in Häme plays an important role in promoting circular economy potential by supporting entrepreneurship and business opportunities through funding for development work. They also aim to improve the processes of local operators while protecting nature and increasing climate awareness. Their experts focus on promoting a low-carbon economy through circular economy solutions, climate adaptation, biodiversity conservation, sustainable urban development, and maintaining water conditions (Rosberg-Airaksinen, 2023).

Circular economy practices can help reduce waste and emissions while promoting sustainable economic growth. However, businesses face challenges in implementing circular economy projects. ELY centers can play a vital role in supporting these projects through expert consultations, project funding, and promoting circularity principles that prioritize the entire value chain process.

Finding the right partners and generating market demand for circular economy projects is important. To foster an environment of cooperation and support for circular economy practices, ELY can build a network of like-minded businesses through programs and other communication platforms. ELY centers can also play an important role in sharing knowledge and disseminating information about newly approved sustainable products through communication by ELY centre's various platforms. Eventually, better communication and trust-building can ease cooperation between businesses and authorities.

In summary, ELY center can play an important role in promoting circular economy practices by supporting circular economy projects, building networks, improving communication and trust, sharing knowledge, and addressing regulatory challenges. By doing so, ELY centers can help businesses transition to a more sustainable and circular economy, benefiting both the environment and the economy.

References

Finnish Heritage Agency (n.d.) Protection under the Act on the Protection of the Built Heritage, Museovirasto. Available at: <u>https://www.museovirasto.fi/en/cultural-environment/built-cultural-environment/protection-under-the-act-on-the-protection-of-the-built-heritage</u> (Accessed: 4 April 2023).

Huang, L. et al. (2018) 'Carbon emission of global construction sector', Renewable and Sustainable Energy Reviews, 81, pp. 1906–1916. Available at: <u>https://doi.org/10.1016/j.rser.2017.06.001</u>.

Kinnunen, R., Lehtonen, K. and Virolainen-Hynnä, A. (2019) Circular economy operators in Kanta-Häme - statement. Winto Better World Oy.

Ministry of the Environment (2023) Parliament adopted acts that will reduce emissions from building and promote digitalisation, Valtioneuvosto. Available at: https://valtioneuvosto.fi/en/-/1410903/parliament-adopted-acts-that-will-reduce-emissions-from-building-and-promote-digitalisation (Accessed: 4 April 2023).

Rosberg-Airaksinen, E. (2022) Häme ELY Center's climate report 2023. Available at: <u>https://www.sttinfo.fi/</u> tiedote/ilmastokertomus-kuvaa-hameen-ely-keskuksen-monipuolista-ilmastotyota?publisherId=69817876&rele aseld=69970861 (Accessed: 31 March 2023).

Vuorinen, P. (2021) Low-carbon roadmap for the Finnish construction industry, Climate 2035. Available at: <u>https://www.climate2035.fi/roadmaps/construction-industry</u> (Accessed: 2 April 2023).



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