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The Social Impact of Learning Communities in Circular Economy

Case BECOME project

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ABSTRACT:
Ilmastonmuutoksen vaikutukset ja niiden vähentäminen edellyttävät innovatiivisia ratkaisuja. Kiertotalous on transformatiivinen kestävän kehityksen strategia, ja kiertotalousratkaisut voivat olla avainasemassa ilmastonmuutoksen vaikutusten vähentämisessä. Tässä tutkimuksessa tarkastellaan, miten BECOME-projektin oppimisympäristöt vaikuttavat kiertotalouden toteutumiseen ja millaisia sosiaalisia vaikutuksia niillä on.

Tutkimus perustuu laadulliseen tutkimukseen ja teoreettisena viitekehyksenä toimii kiertotalousteoria, joka käsittelee nykyisen lineaarisen talousmallin korvaamista kiertotalousmallilla. Keskeisiä käsitteitä ovat kehdosta kehtoon, oppimisyhteisöt, sosiaaliset vaikutukset, aluekehitys, kestävyysopetus ja sosiaalinen kestävä kehitys. Tutkimuksen empiirinen aineisto kerättiin puolistrukturoiduilla haastatteluilla BECOME-projektin henkilöstöltä. Haastateltavat kertoivat omia kokemuksiaan oppimisyhteisöistä ja niiden sosiaalisista vaikutuksista.

Tutkimustulokset osoittavat, että kiertotalouden oppimisyhteisöt edistävät kiertotaloustaitoja muun muassa mahdollistamalla tehokkaan tiedon jakamisen. Lisäksi kiertotalouden oppimisympäristöt edistävät sosiaalista kestävää kehitystä lisäämällä verkostoitumismahdollisuuksia, yhteistyötä ja edistämällä osallistujien työllistymismahdollisuuksia. Haasteita projektissa ovat muun muassa eri kiertotalousosaamisen tasot, kielelliset tasoerot sekä eri tavat tehdä yhteistyötä.

Tutkimuksen johtopäätöksenä voidaan todeta, että sosiaalisten vaikutusten arviointiin tarvitaan paremmin saatavilla olevia indikaattoreita. Lisäksi projektin sosiaalisia vaikutuksia tulee tutkia tarkemmin projektin päätyttyä. Tämä tutkimus ehdottaa projektin sosiaalisten vaikutusten arviointiin SIA viitekehystä, jonka perusteella vaikutuksia tulisi arvioida. Tulokset tarjoavat puitteet tulevaisuuden sosiaalisten vaikutusten arvioinnille ja antavat arvokasta tietoa projekteille, jotka haluavat mitata omia sosiaalisia vaikutuksiaan.

KEYWORDS: Circular Economy, Cradle-to-Cradle, Learning Communities, Social Impact, Regional Development, Sustainability Education, Social Sustainability

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Abbreviations

CE	Circular Economy
CEAP	Circular Economy Action Plan
CMUR	Circular Material Use Rate
HEI	Higher Education Institute
HU	Utrecht University of Applied Sciences
IDEC	Bled School of Management
LC	Learning Community
ROCMN	Roc Midden Nederland
SIA	Social Impact Assessment
TUAS	Turku University of Applied Sciences
UGM	University of Mining and Geology
VET	Vocational Education and Training

1 Introduction

Climate change is one of the most critical issues influencing the well-being of our planet and its people. The Intergovernmental Panel on Climate Change (IPCC) has estimated that global warming will likely reach 1,5°C in the near future, if measures are not taken to significantly reduce greenhouse gas emissions (2023, p. 12). The effects of climate change, such as extreme weather events, species loss and food insecurities, are already visible around the world and will continue to increase if drastic measures are not taken (IPCC, pp. 5-6).

Circular economy (CE) is a transformative sustainable development strategy that aims to respond to these challenges. While the contemporary linear economy model relies on continuous consumption, the circular economy emphasises resource efficiency and sustainable consumption. According to the Ellen MacArthur Foundation (2013, p. 26), the circular economy is an economic model designed to eliminate waste by keeping products and materials in circulation for as long as possible. The Ellen MacArthur Foundation (2013, pp. 82-92) argues that the CE approach will create new economic opportunities and lower manufacturing costs, increase social capital, and reduce the environmental impacts of the current linear economy model.

The Ellen MacArthur Foundation (2013, p. 78) argues that transitioning to a circular economy requires behavioural change and educational reform. Bourdin (2025, p. 389) illustrates that consumers tend to be wary of new solutions due to peer behaviours and social norms. However, mindset transformation changes people's perceptions on ownership, value and responsibility (Rogers, 2021), cited in (2025, p. 390). A mindset focused on sufficiency and stewardship improves the sense of behavioural control and creates trust in services, making repair, reuse and sharing seem valuable to consumers (Singh & Giacosa, 2019; Hobson et al., 2021), cited in Bourdin (2025, p. 390).

Bourdin (2025, pp. 390-391) notes that education serves as an important tool in this behavioural change, as it aids in developing new hands-on skills and changes perceptions

on circularity. Higher Education Institutes (HEIs) are vital in the transition toward a more circular economy, as according to Nunes et al. 2018, cited in Serrano-Bedia and Perez-Perez (2022, p. 83), they facilitate application of CE practices locally and regionally. For instance, HEIs can incorporate CE-related content into their courses and curricula. Furthermore, as Serrano-Bedia and Perez-Perez (2022, p. 88) note, HEIs can introduce CE-related initiatives outside of courses and lectures to engage students and spark their interest.

The BECOME (Boosting Circular Economy Expertise through Learning Communities) project fosters collaborative learning communities that promote CE principles (BECOME, n.d.), and in this way, contributes to the behavioural change needed for a more sustainable future. The project promotes European circular economy expertise through partnerships between HEIs, Vocational Education and Training (VET) providers, and labour market actors in Finland, the Netherlands, Bulgaria, and Slovenia. The aim of the project is to foster effective collaboration between different stakeholders and that their learning communities (LCs) will promote CE knowledge and sustainable innovation in the respective regions (BECOME, n.d.).

The European Green Deal sets the strategy for sustainability transition in the EU. The European Green Deal makes suggestions to reduce waste, accelerate the transition toward a more sustainable industry and facilitate sustainable economic growth. The BECOME project (2023, p. 4) aims to accelerate the sustainable industry transition outlined in the European Green Deal by increasing multi-stakeholder collaboration. The European Commission's Circular Economy Action Plan (CEAP), an integral part of the European Green Deal, outlines the legislative measures for achieving a circular economy in the EU. These legislative measures include further investments in CE education and circular innovations.

According to the EU Agenda for Higher Education, cited in BECOME project (2023, p. 4), education is essential in producing skilled professionals for the labour market. However, the BECOME project has identified severe green skills gaps between these future professionals. The project is aiming to address the green skills gaps to ensure that professionals have the green sills required in the transition toward a more circular economy (BECOME project, 2023, p. 4).

By examining the social impacts of the project's LCs, this study seeks to clarify how LCs affect the communities around them, and what can be done to increase the positive effects. Additionally, the study seeks to explore the role of learning communities in circular economy and identify what LCs can do to help achieve CE. The findings may offer guidance for policymakers, educators, and project coordinators seeking to implement similar initiatives in the future.

The BECOME project was selected as a case study for several reasons. First, the project seeks to respond to the policy aims and skills gaps mentioned above, making it an interesting case for observing how EU-level goals are implemented in practice. Second, CE initiatives often receive attention in their environmental and economic aspects, but the social dimension of these projects often remains underresearched. This study aims to address that gap. Third, the learning communities offer a unique perspective through which to study the way circular skills and behavioural change are cultivated in future professionals. The researcher's prior interest in the circular economy and EU-funded projects further supported the choice of case.

1.1 Research Objectives

The goal of this research is to explore the social impact of the BECOME project's learning communities, the role of CE in social sustainability and how LCs contribute to CE. The project's learning communities are newly established, meaning that they have not been the subject of prior research and present a unique opportunity for investigating their

potential in shaping sustainable mindsets, behaviours, and social structures. Understanding their social impact is essential for developing future strategies for enhancing the societal influence of similar projects, and for understanding the future social impacts of this project.

The academic literature on CE has been expanding significantly in recent years, but literature that specifically emphasises the perspective of HEIs remains rare (Renfors, 2024; Serrano-Bedia & Perez-Perez, 2022) cited in Angelis and Ianulardo (2023, p. 3307). There is a lack of academic literature that integrates CE into higher education, even though literature on education on sustainable development has increased (Whalen et al., 2018) cited in Angelis and Ianulardo (2023, p. 3308). This means that there is a clear gap on research related to integration between CE and higher education, that this study will aim to bridge.

Additionally, currently there is a gap between current CE strategies and initiatives, and their practical applications. The Global Circularity Gap Report (2025) illustrates that the global economy is becoming less circular, from 9.1 % circularity in 2018 to 6.9 % circularity in 2025. The BECOME project identifies this as a gap between the recognised potential of circular business models and their execution in the labour market (BECOME, 2023, p. 5). To bridge this gap, the BECOME project argues for a reinforcement on cooperation between educational institutions and labour market actors (BECOME, 2023, p. 5).

BECOME (2023, p. 4) identifies two important knowledge gaps, skills gap in the green skills of future professionals and lack of cooperation between stakeholders. According to BECOME (2023, p. 4), circular economy activities are not being implemented in practice and have become a popular tool of show rather than a tool for implementation. The BECOME project aims to decrease these skill gaps by facilitating communication between education institutes and companies.

Furthermore, BECOME (2023, p. 4) notes that skilled labour market actors are in high demand, but the knowledge of these actors is lagging behind and not transferring into the business sector. The project aims to address this by facilitating cooperation between education institutions and different stakeholders and create channels for ongoing cooperation. The broader aim of the circular economy learning communities is to bridge these knowledge gaps with fostering multi-stakeholder collaboration.

The four interconnected themes of this thesis are social sustainability, social impact, learning communities and behavioural change through education. These themes provide a foundation for analysing how learning communities can influence social behaviours and drive systemic change.

This thesis aims to assess the role of the circular economy in social sustainability and explore the potential of learning communities in promoting circular economy principles. Additionally, the goal is to provide the BECOME project with a framework to measure the social impact of these communities, with the aim of providing concrete recommendations for lasting social impact.

The research seeks to answer the following questions:

RQ1: What is the role of the circular economy in social sustainability?

RQ2: How can learning communities contribute to promoting circular economy principles?

RQ3: How can one improve the social impact of the learning communities?

This study is based on a case study approach and utilises a combination of relevant academic literature and semi-structured interviews with staff members involved in the BECOME project. The BECOME project is an Erasmus+ funded project that is subject to the quality controls set by the European Commission. Thus, the research findings are not only applicable to this one project, but to other similar projects too.

1.2 Structure of the Thesis

The thesis is organised into six chapters and begins with a chapter that introduces the background and motivation of the study, research objectives, questions, and structure of the thesis.

The second chapter introduces the theoretical framework that guides this thesis, namely the circular economy theory. It provides an overview of CE and defines the Cradle-to-Cradle concept and its implications for CE. It investigates how CE initiatives work across three industries: fashion, electronics and architecture and construction. Additionally, the second chapter provides an overview of CE policies in the EU and in the BECOME countries. The chapter introduces other theories guiding this thesis, namely social impact and learning communities. This chapter provides the basis for understanding the concept of circular economy and its implications in the context of the BECOME project.

The third chapter presents background information on the BECOME project and examines the role of learning communities in advancing CE principles. The chapter combines insights from relevant literature and semi-structured interviews to analyse the relationship between LCs and CE. The chapter provides an overview of the BECOME project's different learning communities and introduces a comparative analysis of the LCs. Together with the theoretical framework, the chapter aims to respond to research questions one and two.

The fourth chapter gives an overview of the research methods and materials that were utilised in this thesis. It describes and provides a justification for the methods utilised in data collection and analysis. It describes the qualitative nature of the study and examines its theoretical framework. Additionally, it explores the semi-structured interviews conducted for this thesis. Finally, the chapter discusses the credibility of the study.

The fifth chapter investigates the social impact of learning communities through the empirical study. This chapter provides a framework on how social impact could be measured drawing from the theoretical framework of SIA. The chapter aims to respond to the third research question.

Finally, the sixth chapter summarises the key findings based on the three research questions. It acknowledges the limitations and ethical considerations and suggests areas for future research.

2 Circular Economy and Learning Communities

Kirchherr et al. (2017, p. 221) note that CE has been a subject of extensive research, and this has resulted in multiple definitions. Additionally, Kirchherr et al. (2017, pp. 221-222) interpret that CE is often rooted in the principles of sustainable development. Kara et al. (2022, p. 505) state that CE often has a foundation on various disciplines and semi-scientific concepts. These concepts include, for instance, the cradle-to-cradle theory, eco-efficiency, and the concept of zero emissions Korhonen et al. (2018, p. 39). The core principle of CE is that it challenges the current linear economic model (Figure 1), (Korhonen et al. 2018, p. 37).

Figure 1. Linear economy model (adapted from Korhonen et al., 2018)

Korhonen et al. (2018, p. 39) explain that the linear model operates on an extract-produce-use-dump framework. This model is illustrated in figure 1. Within this model, the manufacturer makes a product that the consumer buys and uses, and finally disposes of it. Ness (2008, p. 290) argues that the model's foundation lies is growth and throughput. The linear mode relies on continuous production and consumption cycles that enable a culture of single-use items, short production lifespans, and waste creation. The Ellen MacArthur Foundation (2013, p. 7) argues that the linear model is reaching a limit due to increased costs, environmental issues, resource scarcity and food insecurity. The linear model is usually considered inherently unsustainable (Frosch & Gallopolus, 1989) cited in Korhonen et al. (2018, p. 37).

Geissdoerfer et al. (2017, p. 764) argue that generally, CE is seen to focus on achieving a closed loop, with the goal of retaining materials and resources in the system. The CE model with its closed loop is illustrated in figure 2. According to Geng and Doberstein, 2008, p. 321) the Chinese definition of CE is that a closed loop of material flow is executed in the economic system. Camilleri (2018, p. 532) highlights that the closed-loop system focuses on the reduction of resources in the entire production and consumption process and aims to enable the continuous repurposing of raw materials throughout the process. This concept is often called turning "waste into wealth" (Lacy & Rutqvist, 2015). Implementing a closed loop system could advance the transition toward sustainable development for the economy, environment and society (Camilleri, 2017; Murray et al., 2017) cited in Camilleri (2018, p. 532). Geissdoerfer et al. (2017, p. 759) argue that a closed loop system can be achieved with "long-lasting design, maintenance, repair, reuse, remanufacturing and recycling".

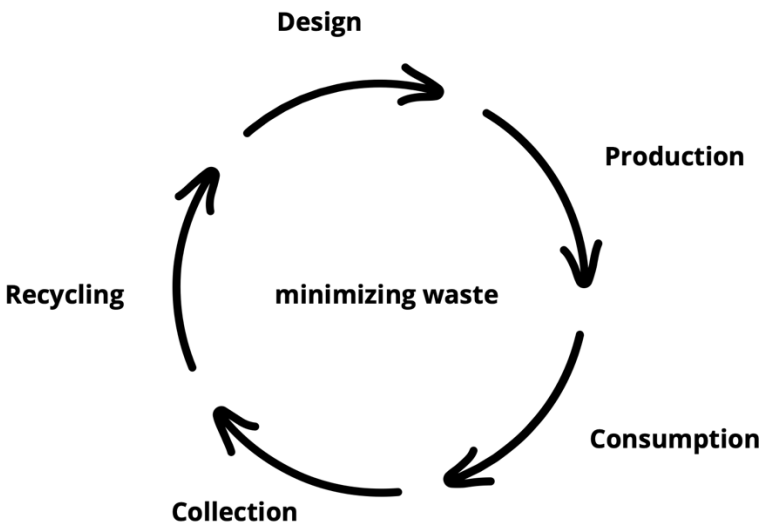

Figure 2. Circular economy model (adapted from Korhonen et. al, 2018).

Similarly, the Ellen MacArthur Foundation (2016, p. 26), defines CE as an industrial economy model designed for restoring. They state that the main principles of CE are to

eliminate waste, circulate materials at their highest value and to be intentionally regenerative (2016, p. 26). In CE, economic growth is driven by innovative approaches to resource use rather than endless extraction of new resources. The BECOME project aligns its definition of the circular economy with the Ellen MacArthur Foundation and emphasise waste minimisation and pollution reduction throughout a product's lifecycle while generating economic, natural, and social capital (BECOME, n.d.). This thesis follows the Ellen MacArthur foundation's definition of the circular economy.

The Ellen MacArthur Foundation describes the circular economy as:

> A system where materials never become waste and nature is regenerated. In a circular economy, products and materials circulate through maintenance, reuse, refurbishment, remanufacture, recycling, and composting. The circular economy tackles climate change and other global challenges, like biodiversity loss, waste, and pollution, by decoupling economic activity from the consumption of finite resources. (The Ellen MacArthur Foundation, n.d.).

It is important to recognise that CE has also faced criticism. Corvellec et al. (2022, p. 423), argue that it is practically impossible to close material loops and ensure that products are recycled indefinitely. Maintaining this system creates by-products and changes the quality of the product while requiring new materials and energy (Cullen, 2017) cited in Corvellec et al. (2022, p. 423). Additionally, Millar et al. (2019, p. 15) argue that the difference between the linear economic model and the circular model is that negative environmental impact takes longer to appear. The critique shows that it is difficult for CE to manifest solely through technical solutions, and as Millar et al. (2019, p. 17) note, lasting CE policies require collaboration between policymakers, government actors, and manufacturers.

2.1 The Cradle-to-Cradle Concept

The cradle-to-cradle concept was developed to oppose the current cradle-to-grave system. According to Braungart and McDonough (2002, p. 27), in the cradle-to-grave system resources are extracted, processed into products, consumed and discarded as waste.

This system mirrors the logic of the linear economy, in which products have short lifespans and are disposed of soon after purchase.

The cradle-to-cradle model provides a waste free model, where all materials remain in use in biological and technical cycles. While the concept was initially developed in the 1970s, it became well-known in the 2000s through the work of Braungart and McDonough (2002), who introduced the concept of "waste equals food". This concept emphasises that waste should be viewed as a useful input for new processes rather than the by-product of manufacturing. They argue that this way, the impacts on the environment are reduced while economic growth is safeguarded.

Braungart and McDonough (2002, p. 53) define the cradle-to-cradle system based on the distinction between eco-efficiency and eco-effectiveness. They define eco-effectiveness as “doing more with less” but state that it operates in an unsustainable framework. They argue that eco-efficiency only aims to improve the current system without creating a new, more sustainable one (2002, p. 62).

In contrast, they argue that the eco-effectiveness model functions on biological and technical nutrient cycles, in which biological nutrients biodegrade and return to the environment, and technical nutrients are non-biodegradable but designed to be continuously reused in industrial processes without losing quality (Braungart & McDonough, 2002, pp. 105-110). According to Braungart & McDonough (2008, pp. 110-115), when implemented properly, eco-effectiveness can provide these advantages:

1. it eliminates hazardous or useless waste by designing materials for safe reintegration into natural or industrial cycles.
2. it reduces dependency on raw material extraction and decreases pressure on finite resources.
3. It reduces long-term costs for manufacturers by extending product lifecycles and reducing waste.

The cradle-to-cradle model shows an approach to circular economy that prioritises both the economic and environmental pillars of sustainability by maximising the value of resources and minimising the reliance on raw materials.

2.2 Circular Economy and Social Sustainability

As shown by Kirchherr et al. (2017, p. 224), sustainable development is often seen as the main objective for CE. The most common definition for sustainable development is that of the United Nations (UN). The United Nations Our Common Future (1987) defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

Brown et al. (1987, p. 713), divide sustainability into three pillars: economic, environmental, and social. According to Brown et al. (1987, pp. 715-716), economic sustainability refers to economic activities that consider the needs of current and future generations, while environmental sustainability refers to protecting and preserving the natural ecosystems. They argue that social sustainability includes preserving human well-being, and it aims to address social challenges, such as poverty, inequality, and social exclusion (1987, pp. 717-718).

Moreover, the UN (2015) defines the goals for achieving sustainable development (SDGs) in the 2030 Agenda for Sustainable Development. The SDGs include environmental, economic, and social goals. The goals relating to social sustainability are: *Goal 1: No Poverty*, *Goal 2: Zero Hunger*, *Goal 3: Good Health and Well-being*, *Goal 4: Quality Education*, *Goal 5: Gender Equality*, *Goal 6: Clean Water and Sanitation*, *Goal 8: Decent Work and Economic Growth*, *Goal 10: Reduced Inequalities*, *Goal 11: Sustainable Cities and Communities*, *Goal 16: Peace, Justice and Strong Institutions* (United Nations, 2015, p. 14).

Nilsson et al. (2023, p. 5941) introduce four key pillars of social sustainability: equity, well-being, participation and influence, and social capital. Equity includes providing fair resources and possibilities to all members of community (McKenzie, 2004) cited in Nilsson et al. (2023, p. 5936). Additionally, well-being includes both the individual and societal satisfaction (Nilsson et al., 2023, p. 5937). They define participation and influence as active involvement of individuals in communities (2023, p. 5938). Finally, social capital is defined by mutual trust and reciprocity (Weingaertner and Moberg, 2014) cited in Nilsson et al. (2023, p. 5938).

Geissdoerfer et al. (2017, p. 767) argue that in academic literature, the relationship between circular economy and sustainability is often seen as a precondition, benefit, or a trade-off. Sewenet et al. (2026, p. 4), note that despite circular economy and sustainability being generally seen as interconnected concepts, they are usually treated as isolated fields. Regarding that, Sewenet et al. (2026, p. 7) argue that there is a need for a shared perspective on circularity, CE, and sustainability. Additionally, Mies and Gold (2021, p. 3), view that specifically social sustainability is often underrepresented in CE discussions.

Garcia-Saravia Ortiz-de-Montellano et al. (2023, p. 353) emphasise the interconnectedness of sustainability and CE. They note that CE strategies often address SDG goals relating to environmental sustainability, but only occasionally mention goals related to social sustainability (2023, p. 356). However, they demonstrate that Goal 1 and Goal 8 are among the goals sharing the strongest relationship with CE. Additionally, they suggest CE strategies often support Goal 3 and Goal 11 (2023, p. 357), but illustrate that Goals 4, 5, 10 and 16 are among the least addressed by CE strategies (2023, p. 356). They argue that CE strategies often overlook SDGs relating to social sustainability (2023, p. 356).

2.3 Circular Economy in Practice

This chapter examines the fashion, technology, and construction sectors, which are directly connected to the learning communities established under the BECOME project. Most of the learning communities are working together with a company specialising in at least one of these industries.

Khan et al. (2025, p. 950) argue that often challenges related to the implementation of CE practices are industry dependent. They emphasise that there is a lack of initiatives supporting CE transition in the fashion industry, which creates compliance issues (2025, p. 952), while the technology industry is battling with investment related issues (2025, p. 950). At the same time, the construction sector is struggling with the lack of multi-stakeholder cooperation (2025, p. 952).

2.3.1 Fashion Industry

The fashion industry is one of the most environmentally damaging industries globally. Niinimäki et al. (2020, p. 189) argue that the fashion industry's environmental and social costs are substantial and the industry produces 8-10% of global CO2 emissions. They note that the sector relies heavily on cheap manufacturing, excessive consumption, and the mass production of low-quality garments, resulting in continuing growth of the industry (2020, p. 189). The Pro Ethical Trade Finland (2026) notes that most Finnish clothing companies do not pay a living wage to their workers. Despite these challenges, the industry has seen a rise of successful circular economy initiatives that aim to reduce waste and promote sustainable consumption.

The second-hand market is one of fashion's oldest and most effective circular economy strategies. Persson and Hinton (2023, p. 4) note that in Sweden, there is growing demand for second-hand clothes, and second-hand clothing consumption has risen substantially in 2019. They state that through reuse, second hand consumption can extend product

lifespan (2023, p. 1). However, due to the rise of fast fashion, second-hand markets are faced with an increased number of low-quality garments being donated (Persson & Hinton, 2023, p. 5). They argue that these garments often end up in landfills, as they are more difficult to find buyers for (2023, p. 5).

Another key circular strategy in fashion is repair and maintenance. D'Itria and Aus (2023, p. 4) argue that an increasing number of brands offer repair services to their customers in order to extend the life of garments. They highlight Patagonia's "Worn Wear" initiative, which encourages consumers to repair and maintain their clothing by offering free repair services (2023, p. 4). They argue that in this way, Patagonia is aligning with CE principles by ensuring that products remain in use as long as possible (2023, p. 4).

Additionally, D'Itria and Aus (2023, p. 9) highlight utilising innovative materials to decrease environmental costs as another CE strategy. They underscore Vegea's innovative vegan leather fabricated from the by-products of the wine industry (2023, p. 9). They argue that this model decreases waste and contributes to CE practices by incorporating eco-efficiency (2023, p. 9).

However, it should be noted that these examples reflect practices reported by the brands themselves, and their actual environmental and social impact have been examined to varying degrees in the academic literature.

2.3.2 Technology Industry

Industrialisation, technological breakthroughs, economic growth, and increased demand for luxury items are increasing the use of technology (Rautela et al., 2021) cited in He et al. (2024, p. 2). The shortening lifespan of electronic products has caused a surge in electronic waste (e-waste), posing significant environmental risks (Sanito et al., 2021) cited in He et al., (2024, p. 2). Thus, often CE initiatives in this sector focus on reducing waste and extending product lifespan through recycling and refurbishment.

A Finnish startup, Swappie (2024, p. 4) states that their business model relies on circularity. They focus on selling refurbished iPhones, and express that their aim is to provide sustainable and affordable electronics. Additionally, refurbed (2024, p. 5) offers refurbished phones, home appliances and laptops, and base their business model on increasing product lifecycles. Expanding these initiatives to all devices could reduce the environmental impact of the entire sector. Furthermore, it needs to be noted that to truly decrease the environmental impact of the technology sector, demand for new products needs to decrease.

2.3.3 Architecture and construction

According to Akhimien et al. (2021, p. 1), demand for new buildings is increasing due to the growth of the world's population from 7.5 billion to 8.5 billion by 2030. This means that demand and costs for natural resources are increasing (Akhimien et al. (2021, p. 1). According to them, CE could help the sector balance the need for resources while safeguarding the economy. CE practices in architecture and construction often focus on reusing and recycling resources.

Akhimien et al. (2021, p. 7) argue that design for disassembly is an essential strategy in circular building. In design for disassembly building materials are easily dismountable and can be utilised for new products (2021, p. 7). Additionally, Akhimien et al. (2021, p. 7) emphasise that materiality can drive CE. Applying sustainable, efficient materials to building can decrease the environmental impact of the sector. Furthermore Akhimien et al. (2021, p. 8) argue that applying circular practices to the end-of-life stage of buildings is crucial. This way, the materials previously regarded as waste would be reintroduced as new building materials. However, they argue that there are few practical applications of circular strategies in construction.

2.4 Policy Context for Circular Economy Transition

2.4.1 European Union Policy Framework

The European Union is committed to achieving climate neutrality by 2050, as stated by the European Green Deal. To support this goal, the EU has introduced the CEAP. The CEAP aims to advance the actions required by the Green Deal by promoting collaboration between economic actors, citizens, and organisations (European Commission, 2020, pp. 2-3). The priorities of the plan are to embrace circular production, to create circular value chains, to decrease waste, to create jobs in the circularity sector and to promote circular research, innovation and digitalisation (European Commission, 2020, p. 1). The CEAP highlights that circularity is crucial in achieving climate neutrality (European Commission, 2020, p. 16).

To illustrate the global progress toward a more circular economy, The Circularity Gap Report framework categorises countries into three groups: Shift, Grow and Build. According to the Circularity Gap Report (2024, p. 10), Shift countries are higher-income countries that generate most of the world's emissions through high consumption and production, and Grow countries are middle-income countries whose economies are growing while manufacturing goods for the rest of the world. Finally, Build countries are lower-income countries that contribute very little to the overall emissions and often struggle to meet basic societal needs.

The BECOME project (2023, p. 2) categorises Finland and the Netherlands as Shift countries and Bulgaria and Slovenia as Grow countries. BECOME (2023, p. 2) notes that by including countries with different profiles, they highlight different starting points in circular economy. According to the Circularity Gap Report (2024, p. 10), the higher-income Shift countries consume 25% of the world's raw materials, while hosting only 17% of the world's population. These countries also generate 43% of the world's emissions and their average per capita material footprint is 22.6 tonnes per year. The goal for these countries

should be to reduce consumption and decrease their impact on the planet (Circularity Gap Report, 2024, p. 10).

Grow countries produce goods mainly for others and account for 51% of the world's materials (Circularity Gap Report, 2024, p. 10). Grow countries account for 37% of the world's population and their average per capita material footprint is 17 tonnes per year. The Circularity Gap Report (2024, p. 10) suggests that Grow countries will need to continue focusing on improving quality of life and making sustainable changes for their industries.

2.4.2 Finland

Finland has positioned itself as a global leader in circular economy innovation. Despite this, its material footprint was around 43 tonnes per capita in 2024 (European Environment Agency (EEA), 2025). The EEA notes that Finland's circular material use rate (CMUR) is lower than the EU average (11.8 %), and has declined since 2012, from 12.2 % in 2012 to 2.4 % in 2023 (EEA, 2025). The descending CMUR contrasts with Finland's self-positioning as a leader in CE. It should be noted, however, that part of this decline may reflect methodological changes in measurement (particularly between 2012-2013 and 2020-2021) as well as structural shifts in the Finnish economy, such as decreased production of paper from recycled fibre (EEA, 2025).

However, the Finnish Government's Resolution on the Strategic Programme for a Circular Economy (2021, p. 1) sets a vision for the country to become a fully circular society by 2035. A key target of the program is to reduce the use of non-renewable natural resources, ensuring that consumption levels do not exceed those recorded in 2015. To achieve this, the Finnish government emphasises investing in circular economy initiatives and fostering innovation to develop sustainable business models.

The initiatives outlined in the BECOME project are an essential way of increasing the country's circularity and reach the government's circular goals. According to BECOME (n.d.), the Finnish learning community takes a holistic approach to circular economy. This means that the learning community takes into account all aspects of circular economy in educating participants and increases overall CE knowledge in participants.

The project could contribute to the goals set by the Finnish government. The vision in the Strategic Programme for a Circular Economy (2021, p. 4) is that circular economy has broken through with the help of different actors, such as companies and innovators, and that Finland will influence other countries and provide CE solutions for international markets. These are visions that the BECOME project can also facilitate. For instance, the project aims to create lasting cooperation between labour market actors and education institutes, and these connections could help create future initiatives that facilitate the breakthrough of the circular economy. Furthermore, the project directly contributes to the vision of Finland being an example in CE internationally. The Finnish learning environments and their actions can function as examples for other countries participating in the project and its best practices can be used as examples internationally after the project.

2.4.3 The Netherlands

The Netherlands has also positioned itself as a frontrunner in implementing circular economy principles. According to the EEA, the material footprint of the Netherlands was around 33 tonnes per capita in 2024, but its circular material use rate has been rising steadily from 25.50% in 2010 to 30.60% in 2023 and is one of the highest in the European Union (EEA, 2025). This combination of lower material consumption and high circularity is a stark contrast to Finland's profile.

The government's programme, *A Circular Economy in the Netherlands by 2050* (2016), first introduced the goal of achieving a fully circular economy by 2050. The National

Circular Economy Programme (NCEP) 2023-2030 outlines the actions needed for a fully circular economy by 2050. The NCEP states that in order to achieve a fully circular economy by 2050, the use of raw materials would stay within the planetary boundaries. For example, the NCEP (2023, p. 19) outlines that there is a need to reduce raw materials, substitute raw materials, extend product lifecycles, and process products with a higher grade.

The NCEP (2023, p. 48) notes that increasing circularity will affect value chains and thus, decrease emissions and contribute to achieving climate goals set by the government. Achieving climate goals in the short term focuses on front and back of value chains, as explained by the NCEP (2023, p. 48). This means that the measures include implementing policies that contribute to increased CE knowledge, green skills, and behavioural change (NCEP, 2023, p. 48).

The BECOME project can help facilitate this move towards a fully circular economy. Within the Dutch learning community, several already established network groups bring together multi-stakeholder cooperation. The LC focuses especially on materials and value. Increasing knowledge, encouraging innovation and analysing CE developments in this learning community directly contributes to the NCEP's goal of consumption within planetary boundaries. Knowledge and innovations are required to make informed decisions and concretely implement circularity into everyday practices that eventually increase the circularity percentage and move consumption towards a more circular model.

As the Netherlands has a high circularity percentage, and a rising circular material rate, much higher than that of Finland, it can be noted that the Netherlands is moving to a more circular economy relatively quickly. However, the Netherlands has a high material footprint and as the NCEP (2023, p. 21) notes, exports its environmental effects often to less affluent countries. That could also be an explanation for the opportunity of turning the economy more circular.

2.4.4 Bulgaria

Bulgaria's material footprint was around 22.7 tonnes per capita in 2024. However, it has increased rapidly in the last decades, it being around 13.6 tonnes in 2010. The circular material use rate was 4.90% in 2023 and has grown from 2.10% in 2010. The rate remains well below the EU average of 11.8% (EEA, 2025).

The National Development Programme 2030 (2020, p. 27) is a strategic framework document that establishes the development goals for all sectors. It sets the imperative for transitioning to a circular economy. The priority is to reduce the impact of Bulgaria's economy. The plan focuses on efficiency of materials and reduction in material use. The state aims to support companies to invest in sustainable innovation. The programme also aims to increase the sustainability of waste management in Bulgaria.

The Bulgarian learning community aligns closely with these national priorities, focusing on materials, society, culture, and water. The LC can contribute to enhancing Bulgaria's circularity rate by increasing knowledge among professionals and supporting the implementation of circularity initiatives.

2.4.5 Slovenia

According to the EEA, the material footprint of Slovenia was 14.5 tonnes per capita in 2024, and its circular material use rate was 8,8% in 2023, having grown from 5,9% in 2010. The rate is closer to the EU average than that of Bulgaria.

The Roadmap Towards the Circular Economy in Slovenia (2018) by Circular Change sets the directions for circular economy in Slovenia. It bases the roadmap on the "circular triangle", three elements that work together: Circular Economy, Circular Change and Circular Culture (Circular Change, 2018, p. 4). The roadmap emphasises Circular Culture,

bringing behavioural change and change of values. It seeks to establish the actions that make Slovenia the leader in CE transition in the region, involve different stakeholders in identifying circular practices, create recommendations to the Slovenian government and identify circular opportunities (Circular Change, 2018, p. 4).

The Slovenian learning community can facilitate the change required in the roadmap by increasing the circular economy knowledge of future professionals. The Slovenian learning community is focusing on the social and environmental responsibility of CE and working together with companies. By increasing CE knowledge of companies, the region may acquire new innovations, new circular businesses, and new inventions on circular economy. The roadmap emphasises that Slovenia should become the model country in the region. By obtaining inspiration from countries that are further along in circular practices through the BECOME project, this goal is also being addressed.

These country profiles show that LCs within BECOME operate in different starting points. The LCs in Finland and the Netherlands both operate within established CE policy frameworks with ambitious goals. However, among the Shift countries, these countries are hold different profiles. Finland has the EU's highest material footprint and one of the lowest circularity rates, while the Netherlands has a high material footprint, but one of the highest CMURs in the EU. Additionally, the Grow countries hold different profiles. Bulgaria's material footprint has grown rapidly and its CMUR is low, while Slovenia is closer to the EU average on both indicators. These differences highlight that there is no single starting point for circular transition, and that the social impact of learning communities must be examined against each country's specific economic structure, policy framework, and existing CE performance.

2.5 Learning Communities

As noted by West and Williams (2017, p. 1571) learning communities (LCs) are often broadly defined in academic literature, ranging from small cohorts to large groups of

people working together. West and Williams (2017, p. 1571) describe LCs as communities where individuals share "access, relationships, vision, or function." In their view, access refers to the opportunity for community members to engage with each other, either physically or virtually. According to them, relationships refer to what unifies the community; sense of belonging, interdependence, trust, and faith (2017, pp. 1573-1574). They view that relationships are essential in forming learning communities, as it is difficult for the LCs to manifest their actions if participants have no ties to each other. Additionally, vision involves having a shared commitment to common goals and a shared purpose. Finally, they state that LCs can be defined by their function, meaning that members of the LC participate in shared tasks or work (West & Williams, 2017, p. 1557).

These four principles provide a foundation for understanding that learning communities provide spaces where community members share a common goal or vision and collaborate to achieve it and exchange ideas on the topic. The BECOME project defines circular economy learning communities as "multi-stakeholder networks where companies, universities and policymakers cooperate to develop and implement circular economy solutions" (BECOME, n.d.). The LCs in the BECOME project can be defined through access, vision, and function. The members can engage with each other in these communities, and they share the vision and function of advancing CE practices.

According to BECOME (2023, p. 3), learning communities foster lasting cooperation between stakeholders and aim to have a significant role in CE transitions. Hariadi et al. (2025, pp. 20-21) note that an LC approach can enable behavioural change needed to advance CE practices. In their study of an LC in Indonesia, they found that an LC that employs an *Education, Empowerment* and *Entrepreneurship* approach facilitates a transition toward circular economy. Here, the LC first educates members on CE, then facilitates participatory decision-making and finally, fosters an entrepreneurial mindset (Hariadi et al., 2025, p. 21). The BECOME project (2023, p. 3) explains that learning communities can bridge green skills gaps in future professionals by redesigning curricula and fostering entrepreneurial mindsets.

2.6 Social Impact and Social Impact Assessment

Despite being widely used in academic literature, the concept of social impact remains poorly defined and is often vaguely applied in literature (Bacnik, Kazmierczak, Rojeck-Nowoslelska, Stefanska & Szumniak-Samolej, 2024; Toschi, Ughetto & Fronzetti Colladon, 2023; Yang, O'Leary & Tregidga, 2021) cited in Hurst & Johnston (2025, p. 1). Hurst & Johnston (2025, p. 1), argue that the term is frequently used in an overly broad manner, to the extent that it risks "lacking meaning".

According to Hurst & Johnston (2025, p. 1) one of the most commonly cited definitions for social impact originates from the Interorganisational Committee on Guidelines and Principles for Social Impact Assessment (ICGPSIA, 1994, p. 1), that defines social impact as the effects on humans caused by public or private actions that change the ways people live, work, interact, organise to meet their needs and adapt within society. Vanclay (2003, p. 8) defines that social impacts relate to people's way of living, their culture, community, political systems, environment, health and wellbeing, personal rights and fears and aspirations.

Building on the ICGPSIA's definition Hurst and Johnston (2025, p. 8) propose a more structured approach to defining social impact. They conceptualise social impact as consisting of several key dimensions: the magnitude and direction (positive or negative) of the impact, the affected stakeholders through changes in knowledge, behaviour, and collaboration over time. This definition is useful in the context of circular economy initiatives, where social impacts often emerge through changes in skills, collaboration, and local practices. Drawing on this framework, the present study defines social impact specifically in the context of the BECOME project as follows:

Positive or negative changes in knowledge, collaboration and behaviour among the people in the communities participating in the BECOME project.

Vanclay & Esteves (2024, p. 2) place the beginning of Social Impact Assessment (SIA) in the 1970s, when it was a tool for overseeing the approval process of projects. According to them, two documents by the International Association for Impact Assessment (IAIA): *the International Principles for Social Impact Assessment* (Vanclay, 2003) and *Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects* (Vanclay et al., 2015) often summarise SIA. They state that SIA is often seen as a project implementation tool in managing the social challenges of specific projects. Vanclay and Esteves (2024, p. 2) note that Vanclay (2003), has defined SIA as:

> Social Impact Assessment includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programmes, plans, projects) and any social chanhe processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment (Vanclay, 2003, p. 6 ; Vanclay & Esteves, 2024, p. 2.)

SIA considers both positive and negative impacts of planned actions (Vanclay & Esteves, 2024, p. 19). They note that project-related SIA is usually done in advance with predicted information. Furthermore, for SIA to succeed, it requires recognition of the complex issues at hand, qualified professionals, socially conscious project personnel, and good governance practices (Vanclay & Esteves, 2024, p. 3). The ICGPSIA (1994, p. 11) defines that SIA includes identifying, analysing, and monitoring the consequences of planned actions. Vanclay (2003, p. 9), highlights that SIA includes a variety of methodological activities, such as stakeholder involvement in assessing social impacts, analysing alternatives and monitoring the planned interventions. Vanclay (2003, p. 6) notes that SIA can be applied to all kinds of projects.

3 About the BECOME Project and its Learning Communities

This chapter provides the background to the BECOME project and its learning communities. It analyses findings from both the literature and semi-structured interviews to explore the role of learning communities in advancing circular economy practices. The chapter analyses how learning communities advance circular economy practices in the BECOME countries and identifies opportunities for improving their effectiveness. Furthermore, this chapter aims to understand the different stages regions are at with their CE practices. This chapter aims to address the research question "How can learning communities be utilised to promote circular economy principles?".

Appendix 1 introduces the questions asked in the interviewees. The questions analysed in this chapter include how the project has contributed to implementing circular practices, how LCs have influenced CE knowledge, how they describe their regions' current state of CE initiatives, and who the primary target groups of the LCs are.

3.1 Case Description: BECOME project

The case project in this research is the Erasmus+ funded BECOME project, that aims to improve circular economy skills of current and future experts. The project aims to do this by establishing circular economy learning communities in their respective regions, in Finland, the Netherlands, Slovenia and Bulgaria and includes the expertise of two VETs, four HEIs and four labour market actors (BECOME, 2023. p. 3). The BECOME project (2023, p. 3), argues that cooperation between education institutes and labour market actors is required in order to equip future professionals with the green skills required in the transition toward a more circular economy. The project's duration is from 1 January 2024 to 31 December 2026.

The project is funded by Erasmus+ EU Solidarity Corps of the European Commission. The Erasmus+ programme is an education, training, youth, and sport EU programme for the time period of 2021-2027. The aim of the Erasmus+ programme is:

> to support, through lifelong learning, the educational, professional and personal development of people in education, training, youth and sport, in Europe and beyond thereby contributing to sustainable growth, quality jobs and social cohesion, to driving innovation, and to strengthening European identity and active citizenship. (European Commission, 2024, p. 6).

The partners include Turku University of Applied Science (Finland), Raseko (Finland), Lounais-Suomen Jätehuolto (Finland), Utrecht University of Applied Sciences (Netherlands), ROC Midden Nederland (Netherlands), Heijmans (Netherlands), University of Mining and Geology "St. Ivan Rilski" (Bulgaria), Dundee (Bulgaria), Bled School of Management (Slovenia) and Interzero (Slovenia). In addition to these, the project also includes associated partners: City of Turku (Finland), Regional Council of Southwest Finland, Turku Science Park Oy (Finland), Raisioaqua (Finland), Bouwend Nederland (Netherlands), EWUU Alliance Eindhoven University of Technology (Netherlands), Cleantech Bulgaria, Euro Perspectives Foundation (Bulgaria), UN Global Compact Network Bulgaria, American Chamber of Commerce in Bulgaria, German-Slovene Chamber of Commerce and Industry (Slovenia), Development Agency for Upper Gorenjska (Slovenia) and CEEMAN (Slovenia), (BECOME, 2023, p. 24).

3.1.1 Work Packages

To enhance the CE skills of current and future professionals, BECOME (2023, p. 3) pursues the following activities: Analysis of Regional CE Ecosystems and Learning Communities, Development of CE Learning Building Blocks, Fostering CE Skills for Professionals, Creation and Exploitation of Learning Communities on Circular Economy in Europe and Piloting, Monitoring and Evaluation of CE Learning Outcomes. The project pursues these activities through these seven work packages:

WP1 Project Management and Coordination

WP2 Analysis of Regional CE Ecosystems and Learning Communities

WP3 Development of CE Learning Building Blocks

WP4 Fostering CE skills for Professionals

WP5 Creation and Exploitation of Learning Communities on Circular Economy in Europe

WP6 Piloting, Monitoring and Evaluation of CE Learning

WP7 Impact and Dissemination

The WP1 includes project management and coordination tasks, and qualitative indicators in this package include evaluation based on surveys and interactions between partners, while quantitative indicators include lists of participants, meetings, and reports (BECOME, 2023, p. 11). Work package 2 is part of the analysis phase of the project. The main task of WP2 is the analysis of the CE ecosystem and learning communities. At the end of the project, this package aims to produce a gap analysis of the status quo in the circular economy ecosystem. HU oversees the WP2, while other partners provide feedback. The qualitative indicators include comprehending mismatch and evaluating how to solve mismatch. Quantitative indicators include how many surveys and interviews have been collected and analysis on skills gaps (BECOME, 2023, p. 11).

The work packages 3-5 are part of the development, training, and implementation phase of the project. The main task of WP3 is to develop building blocks for CE education. This package aims to produce a train-the-trainer manual for training the educators. TUAS, Raseko and HU oversee the WP3. The WP4 builds on the knowledge from WP3 and WP2. It aims to build the learning format for professionals developed from the educational building blocks developed in WP3. IEDC and ROCMN oversee this package. The educators evaluate the manual for qualitative and quantitative monitoring of the WP3 and WP4. Then, in WP5, the learning communities based on the knowledge from the previous work package will be formed in the partner countries. The learning communities will be monitored qualitatively with feedback and quantitatively with statistics on number of events and participants. TUAS leads this work package (BECOME, 2023, pp. 9-11).

Work packages 6-7 are part of the evaluating, dissemination, and exploitation phase. WP6 assesses the impacts of the learning communities and the impacts of the teaching materials. The impacts are assessed with feedback and number of participants. UMG leads this WP and TUAS assists. WP7 is then responsible for forwarding these experiences to other institutions in Europe and interacting with project partners. This WP includes communication, webinars and events. Raseko and ROCMN oversee this package BECOME, 2023, p. 11).

For this thesis, WP5 (Creation and Exploitation of Learning Communities on Circular Economy in Europe) and WP6 (Piloting, Monitoring and Evaluation of CE learning) are particularly relevant, as they focus on establishing learning communities and assessing their effectiveness.

3.2 Learning Communities in the BECOME Project

Within the BECOME project, learning communities are established as collaborative platforms that aim to advance circular economy practices through education and co-creation. The broader goal of these learning communities is to equip both current and future professionals with the knowledge and skills to implement circular economy solutions. The learning communities have been established in all partner countries. Some learning communities consist of multiple learning environments, and some consist of one. Additionally, in some countries learning communities have been established the project directly in mind, while in some learning communities have been built on existing environments.

According to BECOME (n.d.), these learning communities build on existing regional networks and contribute to local societal development. Additionally, they aim to influence broader European perspectives of the circular economy by demonstrating the power of education-driven innovation and cross-sectoral collaboration. The project's goal is to promote a more sustainable society through learning environments and partnerships.

The project partners in Finland and The Netherlands include a vocational school, a higher education institute, and a labour market actor. These partners have established one or more learning environments that form the learning community. The Bulgarian and Slovenian partners include a higher education institute and a labour market actor. The learning communities foster region and institution-specific responses to circular economy.

3.2.1 Finland

In Finland, the project partners include the Turku University of Applied Sciences, Raseko, a vocational school and Lounais-Suomen Jätehuolto Oy, the municipal waste collector. Together, these partners collaborate to create sustainable solutions and enhance circular economy expertise among students and professionals. The LC focuses mostly on textiles and electronics sectors.

According to the BECOME project (n.d.), the Finnish learning community operates through distinct learning environments hosted by each partner. Raseko's Fab Lab is an open access innovation environment that supports knowledge sharing and hands-on experimentation (Raseko, n.d.). It offers facilities for 3D printing, scanning and embroidery. The Fab Lab is specifically designed to serve students, small and medium-sized enterprises and individuals interested in exploring circularity and digital fabrication tools (Raseko, n.d.). Additionally, the LC incudes the CE Lab by TUAS, that focuses on student projects related to circular business models, climate change, and waste management (BECOME, n.d.). Finally, the LC includes the learning environment by Lounais-Suomen Jätehuolto, that focuses on establishing CE solutions for businesses (BECOME, n.d.).

The main target groups of the Finnish learning communities are higher education students and professionals in regional companies (Holmblom, interview, 13.3.2025). These groups were chosen because they represent both future experts and current decision-

makers and strengthening their skills is essential for advancing regional circular economy ecosystems (Holmblom, interview, 13.3.2025).

Holmblom (interview, 13.3.2025) highlighte*d* that the learning communities have already influenced circular economy knowledge in the region by providing platforms for knowledge exchange between academia, regional businesses, and public actors. Holmblom note*d* that especially the expert lectures by Sitra and the Finnish Association for Environmental Education have been shared within the learning community and have increased awareness on circular economy practices. *Additionally, she explained* that the learning community has expanded circular economy knowledge with student projects, alumni meetings and Topinpuisto days that have supported networking and sharing of circular economy practices Holmblom (interview, 13.3.2025).

The circular economy ecosystem in the Turku region is well developed. Holmblom (interview, 13.3.2025) illustrated that the city already invests heavily in sustainable solutions and benefits from a strong regional ecosystem that includes the city of Turku, Business Turku, Turku Science Park and several higher education institutes (TUAS, the University of Turku, Åbo Akademi and Novia). The city and HEIs cooperate with large companies such as Valmet and Bayer as well as small and medium-sized enterprises to support innovation. Holmblom (interview, 13.3.2025) highlighted that TUAS plays a central role in integrating circular economy knowledge into both education and business development through the activities of the learning environments.

3.2.2 The Netherlands

In the Netherlands, the project partners are Utrecht University of Applied Sciences (HU), vocational school ROC Midden Nederland (ROCMN) and Heijmans, a large construction company. The LC fosters new ways of thinking and aims to address the green skills gaps

by maintaining a broad approach to circular economy (BECOME, n.d.). The LC focuses on multiple sectors, namely construction and electronics.

Van der Lugt (interview, 4.7.2025) indicated that the Dutch learning communities build on existing learning environments and new structures have not been established for the project. According to him, approximately seven existing circular economy networks collaborate with the project partners. These networks include Utrecht Circular, Energy Network Utrecht, Learning for Tomorrow, GeLUK, Heijmans – Het kan samen, Leren voor Morgen and SPARK Campus (BECOME, n.d.). These networks have already been in place to support the transition toward circular economy before the implementation of the BECOME project.

Van der Lugt (interview, 4.7.2025), explained that as the project utilises existing network groups, the focus groups were also already in place. Participation is not limited to students or staff of the partner organisations. For example, Utrecht Circular operates at the provincial level and involves a wide range of stakeholders. Van der Lugt (interview, 4.7.2025) highlighted that the primary goal of the Dutch network groups is to provide education on circular economy for professionals, companies and students around the entire region. Keetels (interview, 31.7.2025), highlighted that in the future, there will be a specific learning network focusing on the employees of Heijmans.

Van der Lugt (interview, 4.7.2025) noted that the Dutch region is aiming to spread knowledge with a two-step approach. The first phase involved training-the-trainers, targeting teachers at partner institutions. This phase finished in May 2025. In March 2026, the learning community begun the second phase of this approach, which is training the professionals working for companies in the Utrecht area. The final goal of this two-step approach is that the knowledge on circularity is spread from the teachers and professionals to students and other professionals (van der Lugt, interview, 4.7.2025).

Through implementing the training-the-trainer materials in the courses at HU, circular practices have been integrated into education (Lanting, interview, 26.8.2025). This means that CE knowledge will be increased in the future through these courses. Lanting (interview, 26.8.2025) expected to grow the audience of CE initiatives in Utrecht, and to continue increasing CE awareness in the future after the project has finished. Keetels (interview, 31.7.2025), highlighted that he expects the outcome of the BECOME project to have concrete effects on the company. He explained that the project will give employees knowledge on how to design more circular products and how to use materials more effectively. Van der Lugt (interview, 4.7.2025) explained that the current state of circular economy initiatives is good in the region and there are many existing initiatives, some of them that have been utilised in the project. Keetels (interview, 31.7.2025) noted that Heijmans has integrated some circular economy initiatives, but scaling up initiatives is difficult.

Van der Lugt (interview, 4.7.2025) suggested that the Netherlands and Finland are among the leading countries in circularity, whereas Bulgaria and Slovenia are still developing their approaches. He explained that one of the project's main objectives is to raise the level of circular economy in all regions, enabling mutual learning and creating a "win-win" situation for all partners.

3.2.3 Bulgaria

The project partners in Bulgaria include the University of Mining and Geology "St. Ivan Rilski" and the mining company Dundee (BECOME, n.d.). Bulgaria has an established tradition in plastic recycling, but the recycling of construction waste remains limited (BECOME, n.d.). The Bulgarian LC aims to enhance societal awareness regarding the potential of recycling and to highlight the environmental and economic benefits of improved resource recovery (BECOME, n.d.).

Petrova (interview, 19.9.2025), explained that the learning community is organised as the Association of Sustainability Specialists and its ESG Academy, which functions as a tool for knowledge transfer and capacity-building. According to Petrova (interview, 19.9.2025), the target group of the Association of Sustainability Specialists includes professionals from the mining and raw materials industry, academia and public administration. This also includes students and young professionals. Petrova (interview, 19.9.2025) highlighted that this multi-stakeholder target group was chosen to ensure that CE principles are distributed to both decision-makers and to future experts.

According to Petrova (interview, 19.9.2025), the ESG Academy's training modules have increased circular economy awareness among professionals, students, and public administrators. The Academy has informed the participants of material flow analysis, circular maturity assessment and green business models and created possibilities for including circular economy practices in resource-intensive industries. Petrova (interview, 19.9.2025) explained that the broader aim of the Bulgarian LC is to strengthen the Association of Sustainability Specialists to an effective circle for dialogue and cooperation. To achieve this, she explains, that the ESG Academy needs to be expanded from knowledge-sharing to concrete industry-specific training.

Petrova (interview 19.9.2025) observed that CE initiatives are still at an early stage in Bulgaria, and largely driven by EU policies such as the Circular Economy Action Plan and the Fit for 55 package. However, she noted that there's progress in recycled packaging, waste management and energy efficiency, but industrial CE applications remain limited. She explained that the Association and the ESG Academy are bridging this gap by offering targeted education.

3.2.4 Slovenia

The partners in Slovenia include the IEDC Bled School of Management and Interzero, a zero-waste recycling company focusing on sustainable resource management. The

Slovenian LC takes a broad approach to CE and focuses on the reducing and recycling part of CE. The Slovenian LC focuses broadly on recycling materials and includes all aforementioned sectors, technology, fashion and construction (BECOME, n.d.).

The primary focus group of the Slovenian learning community is companies. Schmitz, (interview, 2.7.2025) explains that companies were chosen because of their crucial role in changing and running the economy. Matesic (interview, 3.7.2025) noted that businesses have the possibility to redesign their products to be circular. However, Matesic explained that the LC's webinars are open for everyone to also ensure consumers' participation.

The broader aim for the future of the Slovenian learning community is, according to Schmitz (interview, 2.7.2025) that the region's companies find ways they can change their business models to more sustainable ones. Schmitz, (interview, 2.7.2025) observed that while companies are generally aware of recycling and reuse strategies, they often lack a comprehensive understanding of circular economy principles.

Schmitz (interview, 2.7.2025), highlighted that the Slovenian LC currently focuses more on knowledge sharing than collaborative learning. The community organises events and webinars for participating companies (Schmitz, interview 2.7.2025). While this has increased awareness, the long-term goal is to move towards a deeper collaboration rather than purely networking.

Schmitz, (interview, 2.7.2025) highlighted challenges in maintaining companies interested in circular economy and sustainability. She observed that ongoing crises such as the war in Ukraine and economic instability have diverted attention from sustainability initiatives. She expressed that regulatory uncertainty, such as potential rollbacks of Corporate Sustainability Reporting Directive (CSRD) requirements complicate company engagement further. Nevertheless, she hopes that companies will recognise sustainability as part of the solution rather than a burden.

3.3 Comparative analysis

This section provides a comparative analysis on the learning communities in the BECOME project. It explains that some LCs are further in CE education than others and describes how they contribute to advancing CE practices. In addition, this chapter provides an overview on how LCs are expected to advance circular practices in the future.

3.3.1 Current Status of Learning Communities

Appendix 2 illustrates that the current stage of the LCs varies from country to country. In Finland and the Netherlands, the LCs have active stakeholder engagement, well-established networks, and circular economy practices have been integrated into educational practices. As mentioned before, in the Netherlands, learning networks build on existing regional ecosystems that have well-established cross-sectoral collaboration. In Finland, CE hubs build on the existing multi-stakeholder cooperation of the Turku region. Around the region, there is prior experience in cross-sector collaboration, and TUAS has been one of the key collaborators. However, these LCs are still in the knowledge-sharing phase and have not shown many concrete outcomes.

Additionally, appendix 2 illustrates that Bulgaria and Slovenia are at earlier stages of CE development. Their learning communities are newly established and have been built on little existing cooperation. LCs in Bulgaria and Slovenia have established some knowledge-sharing activities and stakeholder engagement. In Slovenia, the LC has organised webinars to increase CE knowledge, and LCs are expected to increase their knowledge-sharing activities in the future. In Bulgaria, the project has influenced university curricula, and is in this way expected to enhance CE knowledge among future professionals. As can be seen on table 1, in Bulgaria and Slovenia, the primary focus is on building CE awareness, strengthening networks and establishing sustainable business models.

Comparing the current state of the LCs shows that the level of existing CE ecosystems and the degree of established multi-stakeholder collaboration influences LCs actions. The SPARK campus (n.d.) in the Netherlands teaches its participants concrete skills in sustainable construction, and the Raseko fab lab (n.d.) facilitates circular innovation by teaching different DIY techniques. At the same time, the Bulgarian and Slovenian LCs are focusing on increasing knowledge about the concept of CE. Regional context affects the way learning communities can develop. Bulgaria and Slovenia require more effort in raising awareness on CE, while Finland and the Netherlands are already more familiar with the topic and can facilitate a more practical CE approach.

3.3.2 Contributions to CE

The interviewees identify that the BECOME project has so far facilitated a platform for sharing knowledge. Holmblom (interview, 13.3.2025), observed that the project has been mapping gaps in knowledge, created learning materials and introduced them in university curricula with the aim of increasing circular awareness. Similarly, van der Lugt (interview, 4.7.2025), explained that the LCs are utilised for knowledge sharing, and Lanting (interview, 26.8.2025), stated that the Dutch LC is developing CE courses. Additionally, Matesic (interview, 3.7.2025), explained that currently, the Slovenian LC is developing CE-related curricula. Conversely, Schmitz (interview, 2.7.2025) emphasises that, while the Slovenian LC has shared CE knowledge, it is unclear if the knowledge has been retained. Petrova (interview, 19.9.2025) noted that the project has increased CE knowledge in professionals through training modules.

3.4 Future CE actions

Appendix 2 illustrates, that beyond spreading CE knowledge, the interviewees want the LCs to contribute to increased concrete actions in the regions. Keetels, Schmitz and

Petrova explained that they expect the project will foster concrete circular actions in the future. Schmitz argues for more concrete actions from companies. She says that:

> We want them to also move beyond their current business models and rethinking their business idea even, or the foundation of their businesses. (Schmitz, interview, 2.7.2025)

Additionally, Keetels (interview, 31.7.2025), expects that the project will increase the knowledge on material use, and that in the future, Heijmans will have their own LC for increasing practical knowledge. Many interviewees hoped that the project's effects will continue in the future after the project's duration is over. Lanting (interview, 26.8.2025), emphasised that the project is an excellent method for continuing working on the topic and it sets the way for future projects by creating a foundation with the CE trainings. Holmblom (interview, 13.3.2025) echoed this by noting that the Finnish LC aims to create a permanent LC to last beyond the lifecycle of the project. Matesic (interview, 3.7.2025) highlighted that in Slovenia, there is an interest in expanding the project to Croatia.

Moreover, the findings indicate that learning communities progress in different speeds depending on local conditions from raising awareness to implementation of concrete measures. However, based on the interview responses, all regions shared the challenge of translating knowledge into practical CE actions.

In Slovenia and Bulgaria, the LCs have successfully increased awareness and enabled knowledge-sharing among participants. However, the implementation of concrete CE initiatives has been limited. Increasing awareness is a necessary first step in the transition towards a more circular economy, but stronger mechanisms for supporting companies and industry to apply circular practices are needed. These stronger mechanisms could be stronger policy mechanisms, changes in technology and finally, fostering lasting behavioural change.

The Netherlands and Finland prove to be more mature LC models with well-established networks and educational structures that enable the transition from knowledge-sharing to practical application of CE practices. For instance, the SPARK Lab (sparkcampus.nl, n.d.), hosts a course on Bio-based Circular Construction on practical skills in circular building. This allows participants to translate theoretical knowledge into practical skills and gives participants the tools for advancing circular transition. In Finland, the Raseko Fab Lab teaches concrete skills on circular design (raseko, n.d.). These LCs prove that learning communities can function as forums for both discussions and innovation. However, these LCs are faced with the challenge of integrating the skills learned in LCs to practice.

4 Methods and Materials

This chapter describes the methodological foundation and provides the rationale for the choices made in collecting and analysing the data. The study employs a qualitative case study approach, in which the BECOME project serves as the case study. The chapter first situates the research within its methodological framework and links the chosen methods to the three research questions guiding this thesis. It then describes the data collection process and the data analysis. Then, it provides the foundation for the theoretical framework of this thesis. The chapter concludes by discussing the credibility of the study.

4.1 Research Approach and Design

This study employs a qualitative research approach, often utilised for researching complex social phenomena. Puusa and Juuti, (2020, chapter 4) state that qualitative research enables the examination of meanings, experiences, and interpretations of the research subjects. According to them, qualitative research is particularly appropriate for researching phenomena that have their foundations on awareness and interaction of people. Thus, a qualitative approach is well suited for investigating learning communities and their perceived social impacts.

Within the framework for qualitative research, this study follows a case-study approach. Flyvbjerg (2006, p. 223) argues that social sciences lack context-independent theory, and case study research produces context-dependent knowledge crucial for understanding social phenomena. He argues that unlike analytical theory, the case-study approach allows researching bounded phenomena in real-life situations (2006, p. 222). The BECOME project is a bounded initiative, in which learning communities operate in their distinct national contexts. Examining the project as a case study provides a perspective on the broader phenomenon of multi-stakeholder circular economy learning communities.

The methodological choices directly respond to the three research questions presented in Chapter 1. The review of existing academic literature addresses what the role of CE is in social sustainability (RQ1), while the document analysis and thematic analysis combined with the SIA framework address how LCs can contribute to increasing CE (RQ2) and how the social impact of the LCs can be improved in the future (RQ3).

4.2 Data collection

This section describes the data collection methods utilised in this study: the analysis of project and policy documents and the semi-structured interviews conducted with project staff. Together, these sources of data support the case study design mentioned above and enable the analysis of findings across different sources of data.

4.2.1 Document Analysis

A document analysis was conducted to establish the policy context of the BECOME project and to explore the structure, objectives, and activities of the four learning communities. The documents included the BECOME project's grant application (BECOME, 2023) and the project website (BECOME, n.d.), as well as policy documents from the European Commission, namely the European Green Deal, the Circular Economy Action Plan (CEAP), and the Erasmus+ programme guide.

National-level documents were reviewed to compare the current state of CE policies in the four countries: in Finland, the Strategic Programme for a Circular Economy (2021); in the Netherlands, A Circular Economy in the Netherlands by 2050 (2016) and the National Circular Economy Programme 2023-2030; in Bulgaria the National Development Programme 2030 (2020) and in Slovenia, the Roadmap Towards the Circular Economy in Slovenia (Circular Change, 2018). Statistical data on circular material use rates and

material footprints were drawn from the European Environment Agency's Europe's Environment 2025 report.

4.2.2 Semi-structured interviews

Semi-structured interviews were used as the primary method of data collection for exploring the role of LCs in CE and their social impact. Puusa and Juuti (2020, chapter 6) explain that interviews are well-used in qualitative research and suit especially well for researching abstract phenomena, as the interviewer can follow up on questions based on the interviewees' answers. Puusa and Juuti (2020, chapter 6) characterise interviews based on the level of structure and formality. They divide interviews into structured interviews, semi-structured interviews, thematic interviews, open interviews, and in-depth interviews. In semi-structured interview, the researcher introduces questions based on a predetermined topic, and the interviewees answer based on their own experiences (Puusa & Juuti (2020, Chapter 6). This interview method was chosen, as it provided enough structure to ensure comparable data across interviewees, while allowing the interviewees to answer questions in their own words.

Seven interviews were conducted between March 2025 and September 2025. One was conducted in person in Turku, Finland, in March 2025 and five interviews were conducted online via Microsoft Teams between June and August 2025. One interview was conducted by email, as the interviewee did not have time for a video interview. The on-site interview was conducted in Finnish, as both the participant and the researcher were native Finnish speakers. The remaining interviews were conducted in English, which all participants were comfortable using in their professional work. The interviews lasted between 16 minutes and 43 minutes, with an average duration of 25 minutes.

The interview questions and data protection form were sent to participants prior to the interviews. Each interview began with a brief introduction by the researcher, who explained the goal of the study and requested permission to record the conversation. The

in-person interview was recorded using a mobile phone, and the online interviews were recorded using both a mobile phone and the Microsoft Teams application. The recordings were transcribed soon after the interviews ensure accuracy. The transcription was initially done with Microsoft Teams's transcribing function, but it proved unreliable, and the final transcripts were therefore produced manually. The Finnish interview was translated into English after transcription but before thematic analysis, with particular attention paid to preserving the nuances and original meanings of the data.

The participants' names and titles have not been anonymised, as they are important for the nature of this research, and the individuals working for the project are publicly listed on the websites of their institutions. The participants were aware of this, as they were sent the data protection form prior to the interviews, which explained that the data will be analysed utilising direct identifiers.

The interview participants were selected with the help of Annika Holmblom, Principal Lecturer and Research Group Leader from the Turku University of Applied Sciences. Holmblom was interviewed first, in March 2025, and in June 2025 she informed about the other possible interviewees and sent preliminary interview requests to the interviewee candidates. Initially, the question to be interviewed was sent to eleven people and six of those agreed to be interviewed.

The interviewees that responded to the preliminary email were contacted later in June via email. The focus group for the qualitative interviews for this thesis was the people who work with the learning communities in all for participating countries. It was made sure, that interviewees consisted of people from HEIs, VETs and labour market actors to broaden the perspectives of the analysis. The interviewees from the Netherlands were Anton van der Lugt, the Account manager at TechCampus ROC Midden Nederland, Yvette Lanting, a Project Manager in the University of Applied Sciences Utrecht and Sjoerd Keetels, a Senior Sustainability Advisor at Heijmans. The interviewees from Slovenia were Marina Schmitz, Researcher and Lecturer at the Bled School of Management and

Dr. Mirjana Matešić, an Expert on Sustainability at the Bled School of Management and director of the Croatian Business Council for Sustainable Development. From Bulgaria, Dr. Vessela Petrova, Associate Professor at the University of Mining and Geology was interviewed via email.

4.3 Data analysis

This section provides an overview of the thematic analysis method of the interview data. The thematic analysis was utilised to analyse the current state of the learning communities and their perceived social impact.

4.3.1 Thematic analysis

The interview data was analysed thematically, drawing on Braun and Clarke's (2006, p. 87) six-phase approach to thematic analysis. The first phase of thematic analysis included familiarisation with the data, which took place during the transcription process. This enabled a thorough understanding of the data and the possibility to identify recurring topics. The second phase involved generating initial codes, which meant that the data was grouped in a spreadsheet, and the interview questions were utilised to group the responses by topic. In the third phase, open coding was utilised to identify keywords and phrases across the responses. The fourth and fifth phases included reviewing and naming the themes identified during the open coding. The final phase consisted of producing the analysis reported in the findings chapters of this thesis.

4.4 Review of Existing Academic Literature

The theoretical framework of this study is built through a review of existing academic literature. The literature is used to establish the conceptual foundation for the empirical

case study, rather than to conduct a systematic literature review as a primary research method. Following Salminen's classification of literature review types into narrative, systematic, and meta-analysis, the approach taken in this study is closest to a narrative review, which, according to Salminen (2011, p. 6) is well-suited for providing a broad overview of the subject without harsh methodological constraints.

While reviewing the literature for this thesis, a wide range of academic articles, reports and books were utilised to understand the concepts of circular economy, learning community and social impact. This review revealed the multifaceted nature of the circular economy, and highlighted the importance of the closed-loop-system in which resources are reused, reduced, and recycled (Geissdoerfer et al., 2017, p. 761). The analysis discovered that circular economy can be identified in multiple ways across the literature, highlighting the evolving nature of the concept (Kirchherr et al., 2017, pp. 221-222; Kara et al., 2022, p. 505).

The concepts of social impact and learning community emerged as similarly multifaceted and often loosely defined. Social impact is widely discussed in both academic literature and business practice, but the field lacks a general definition of the concept. The concept is generally rooted in social sustainability, which Nilsson et al. (2023, p. 5941) define with four key pillars: equity, well-being, participation and influence, and social capital. Social impact itself can be understood as the positive or negative effects of a specific project or initiative on the surrounding community. Hurst and Johnston (2025, p. 8) provide a more structured conceptualisation by identifying its key dimensions of magnitude, direction, affected stakeholders, and changes in knowledge, behaviour, and collaboration over time.

The literature also indicated that social impact is closely accompanied with the practice of Social Impact Assessment, which provides the tools for evaluating social impacts. Learning communities, in turn, are defined in various ways across disciplines, but are commonly understood as networks or collaborations in which participants share a vision

and develop their knowledge together. The literature provided insights on how learning communities advance circular economy. According to the BECOME project (2023. p. 4) LCs can serve as effective tools for increasing CE knowledge among future professionals and for reducing green skills gaps, thereby helping to ensure that these professionals integrate CE principles into their future workplaces. The empirical analysis builds on this framework through semi-structured interviews with the BECOME project's personnel.

4.4.1 Data Collection

The key articles for this research were searched through ScienceDirect, Google scholar and Finna (Tritonia library, the University of Vaasa) platforms. Keywords such as circular economy, sustainable development, cradle-to-cradle, closed-loop, and social impact were used to refine the search. The articles were filtered with options such as newest and most cited to identify the most relevant literature. Additionally, legal and policy documents were retrieved from the website of the European Union and from the websites of the governments of Finland, the Netherlands, Slovenia, and Bulgaria. Project-specific information was gathered from the grant application and the webpage of the BECOME project.

4.5 Credibility of the Thesis

Puusa and Juuti (2020, chapter 12) state that the key factor shaping the credibility of qualitative research is the detailed understanding the researched phenomenon. They explain that by understanding and aiming to research the phenomenon as thoroughly as possible, the researcher strengthens the reliability of the study. In qualitative research, the researcher is required to thoroughly describe the used data and the data analysis. The credibility of qualitative research can be assessed by how reliable the conclusions and interpretations of the data are based on the descriptions of the data (2020, chapter 12).

Additionally, they state that in qualitative research, the researcher is required to choose the definition of terms that supports the interpretation of the topic as best as possible and justify their choices. Furthermore, they argue that the researcher is required strive for truthfulness, reliable interpretation, and valid reasoning in their analysis. However, they argue that in qualitative research, the characteristics of the researcher usually influence the results of the study. This is why the researcher is required to identify and acknowledge their position, motives, and the choices they have made throughout the research. In conclusion, the researcher is required to describe the methods, analysis, and the phases of research thoroughly throughout the research to ensure the credibility of the study (2020, chapter 12).

This thesis is conducted for TUAS and adheres to its guidelines on data confidentiality. Additionally, it follows the ethical standards for scientific research in Finland. To ensure adherence to the principles of ethical research, ethical considerations have been integrated throughout the research process: in designing and conducting the research, in data collection, in the thematic analysis and in analysing the relevant literature. After the completion of the research, the recordings and transcriptions will be deleted.

5 The Social Impact of Learning Communities

Learning communities are collaborative, multi-stakeholder platforms that enable knowledge-sharing, innovation, and capacity-building to advance the transition to circular economy (BECOME, n.d.). Within the BECOME project, these communities have been established with diverse approaches in Finland, the Netherlands, Bulgaria, and Slovenia. This chapter examines the empirical data collected from the semi-structured interviews and examines the social impact generated by the learning communities in their respective regions. This chapter provides the framework for enhancing social impact as the central outcome of this thesis. Appendix 1 lists the questions asked in the interviews. The interviewees were asked which social benefits they have identified, how the LCs have affected community engagement, have they used any indicators to measure social impact and what kinds of challenges and cultural differences the project has encountered.

The project partners in Finland include TUAS, Raseko, and Lounais-Suomen jätehuolto Oy, and the learning community consists of the different circular hubs of each partner. The approach to CE is holistic. The project partners in the Netherlands are HU, ROCMN and Heijmans. The learning community includes multiple circular hubs that are built on existing partnerships. The approach to CE is broad and focus is on technical and biological materials. The project partners in Bulgaria are UMG and Dundee, and the LC functions as the Sustainability Specialists Association, established for the BECOME project. The approach to CE is general and focus on materials, society, culture and water. The Slovenian partners are IEDC and Interzero, and the LC has been established for the BECOME project. The approach to CE is general, and focus is on environmental responsibility.

5.1 Social Impact

For this study, social impact was defined as positive or negative changes in knowledge, collaboration, and behaviour of the people in the communities participating in the

BECOME project. BECOME (2023, p. 26), highlights that the project is expected to benefit students in improving their working life skills, skills in CE and sense of initiative and entrepreneurship. Teachers will benefit from the project as they will gain new teaching tools and increase their international skills. Additionally, the project will aid companies in fostering new circular business models and the VETs will be equipped with a co-created learning portfolio that encourages the implementation of CE practices.

Additionally, BECOME (2023, p. 27) emphasizes that in the short term, it seeks to address the green skills gaps of future professionals and in the medium term, the project aims to increase European cooperation and expand the project to other Member States. In the long term, BECOME aspires to expand the impact of the LCs and build innovative ecosystems by offering strategies that enhance communication between sectors and to establish new areas of integrative co-invention, research and development.

Appendix 3 illustrates the social impacts identified by the interviewees. Common patterns are visible, although LCs are structured differently, and countries are at different stages of CE implementation. The findings indicate that social benefits focus on strengthened networks, increased trust, enhanced collaboration, and improved CE knowledge. The findings suggest that LCs positively affect participants' attitudes towards CE and sustainability.

5.1.1 Cooperation, Networking and Trust

The findings indicate that social benefits are mostly linked to cooperation, networking, and improved CE knowledge. Holmblom specifically stated that cooperation is one of the social benefits of the LCs. Holmblom (interview, 13.3.2025), explained that the project has increased collaboration between stakeholders. Additionally, Keetels (interview, 31.7.2025) explained that common activities facilitate collaboration between stakeholders. Networking has been mentioned by Keetels, Schmitz and Holmblom as a central social benefit. Keetels (interview, 31.7.2026), noted that initiatives will, especially in the

future, accelerate collaboration and peer-learning. Schmitz (interview, 2.7.2025) observed that increased networking is one of the key social benefits of the LCs. Networking can both increase circular economy knowledge and positive social impact, such as increasing a sense of belonging. Additionally, well-established cooperation can create networks that enhance the well-being of LC participants. Holmblom (interview, 13.3.2025) had perceived increased well-being of students participating in learning communities.

Petrova (interview, 19.9.2025) highlighted that the Bulgarian LC has created stronger dialogue and trust between the region's stakeholders. Schmitz (interview, 2.7.2026) noticed that the Slovenian learning community has created spontaneous collaboration, such as stakeholders getting in touch with each other outside of the project's activities. Stronger stakeholder cooperation can increase a sense of belonging between all actors. Holmblom (interview, 13.3.2025) explained that the Finnish LC has strengthened connections between students, educators and regional actors and have increased a sense of belonging among participants. Matesic (interview, 3.7.2025) analysed that social benefits cannot be seen yet, as the project is still in the beginning, and the state of circular economy knowledge in Slovenia is elementary. However, Schmitz (interview, 2.7.2025), noted that collaboration between stakeholders has increased.

However, the durability of the learning communities is still unknown. The trust and collaboration described by the interviewees have emerged within a project framework with funding, scheduled meetings, and formal LC structures. It is not yet possible to assess whether these networks will continue once the project's formal structures end in December 2026.

5.1.2 Knowledge, Awareness and Skills

The interviewees grouped increased knowledge, awareness and skills into the social impact gained from the LCs. Specifically, Lanting, Matesic and Petrova highlighted this as

positive social impact. Petrova (interview, 19.9.2025), explained that the dialogue organised by the LC has increased knowledge on CE and sustainability. She stated that:

> Participants report that the trainings give them confidence to promote sustainability within their organisations. Students and young professionals benefit from exposure to real-world practices, which strengthens their employability (Petrova, interview, 19.9.2025).

This shows that increased CE knowledge can contribute positively to the participants lives by enhancing their employability, and thus creating positive social impact. Additionally, Lanting (interview, 26.8.2025), discovered that teachers' understanding of CE had increased as a result of their ability to engage in peer learning. She especially highlighted that the LCs activities have created a group of teachers interested in CE. In the future, this could translate to increased CE knowledge in the students as well, as the teachers have been equipped with the knowledge required for CE actions.

Matesic (interview, 3.7.2025) highlighted that the LCs activities had not had any concrete social impacts on the community yet. However, she perceived that circularity knowledge is expected to increase, and as a result the economy will eventually get more circular. She analysed that this increase of knowledge and the enhanced circularity will make the environment more pleasant to live in with less waste, and it will enhance the circular use of resources. Building on the responses of Petrova, Lanting and Matesic, CE knowledge, awareness and skills can be classified as a social benefit. This knowledge, awareness and increased skills can contribute to the participants' future competencies, can create lasting transferrable knowledge and can contribute to making their living area more sustainable, directly contributing to their well-being and happiness.

However, it should be noted that the interviewees' assessment of increased CE knowledge is based primarily on their own observations of project activities, not on measurements of participants' learning outcomes. Whether the awareness-raising activities have translated into deeper understanding or behavioural change among students and professionals cannot be confirmed from the present data.

5.1.3 Community engagement and attitudes

The findings indicate that the project has increased community engagement. The interviewees reported signs that attitudes towards CE had changed to more positive. Van der Lugt (interview, 4.7.2025), explained that effects on the community are likely to arise more towards the end of the project. Keetels (interview, 31.7.2025) observed that a positive impact of the LCs is that people come together, learn from one another, and share their expertise with each other.

Holmblom (interview, 13.3.2025), observed that the project had sparked interest on CE around the region. She especially highlighted that the alumni academy has brought people together and has engaged people in the region. Schmitz, (interview, 2.7.2025) noted that sustainable development awareness has increased in the region, and participants keep coming back to the LCs sustainability events. However, she highlighted that the people participating are often already interested in sustainability and CE, and more action needs to be taken to reach the people in the broader community. She highlighted that generally, attitudes toward CE have been positive and inspired in LC actions. Lanting (interview, 26.8.2025) had noticed that the project has increased interaction between different stakeholders, and stakeholders are increasingly aware of each other's CE related initiatives.

Community engagement and positive attitudes toward sustainable development and CE contribute directly toward establishing more circular practices. The communities may take their knowledge to the labour market and increase the circular skills of the people around them. Overall, the findings show that the way learning communities generate social impact is through connecting people, building trust, and facilitating knowledge-exchange. While some impacts are already visible especially in LCs with well-established collaboration, some impacts are expected to rise as activities expand.

5.2 Factors Influencing Social Impact

The interviewees identified multiple factors and challenges affecting social impact. These challenges were largely related to project administration and differences in culture.

5.2.1 Organisational and Resource Challenges

The interviewees had encountered some organisational and resource-related challenges that influence the social impact of LCs. Holmblom and van der Lugt highlighted challenges that the project administration itself faces. Holmblom (interview, 13.3.2025) underscored the financial issues the project faced, especially in the beginning of the project. According to her, the approval of budgets has slowed down the implementation of initiatives. Van der Lugt (interview, 4.7.2025) highlighted that the project has battled with issues regarding slow international cooperation. Additionally, Lanting (interview, 26.8.2025) emphasised that as the Dutch LC did not establish new LCs specifically for the project, they are dependent on the wider network, and that can create challenges.

Some interviewees had observed issues regarding resources of the learning communities. Van der Lugt (interview, 4.7.2025) highlighted that participants have different levels of circular economy knowledge and that slows down the learning communities' activities. Similarly, Petrova (interview, 19.9.2025) noted that some participants have limited prior knowledge on sustainability. Varying circular economy and sustainability knowledge can slow down the activities of the learning communities, and it can be difficult to improve and develop the activities.

Keetels (interview, 31.7.2025) noted that it is challenging to combine the education and business sectors as the project moves along. He highlighted that:

> For us, it is difficult to understand the education world, what is going on and how the project is developing. Us companies are constantly searching for

> where we should help and what is our value. It is quite difficult to get that clear. (Keetels, interview 31.7.2025).

It is important to note that project partners may be struggling with issues that have not been addressed in the interviews, such as challenges among specific colleagues. These factors can slow down the implementation of the LCs activities and contribute to negative social impacts internally.

5.2.2 Cultural differences

The interviewees had observed mostly similar cultural differences during the BECOME project. Holmblom, van der Lugt, Keetels, and Schmitz all observed that language can sometimes create problems in the project. It may be difficult to talk about complex terms relating to the project because of missing common language. Additionally, Van der Lugt observed that differences in language skills can slow down the project's activities. He also noted that sometimes differences in communication culture, such as the Dutch directness or the Finnish shyness, affect effectiveness and communication within the project. Holmblom (interview, 13.3.2025) observed that project partners have different approaches to communication, collaboration and working practices, and that can sometimes negatively influence the efficiency of the project.

Some interviewees observed cultural challenges related to their specific LCs. Petrova (interview, 19.9.2025) noted that hierarchical company structures in the Bulgaria sometimes affect the way mid-level professionals can implement new knowledge. Additionally, Lanting (interview, 26.8.2025) observed that there are differences in interaction between the VET school and the university. She noted that this means that it is more difficult for the VET school to implement the outputs introduced by the project. However, it is important to note that Schmitz (interview, 2.7.2025) finds that cultural differences are an advantage rather than a limitation. Multicultural cooperation and exposure to different ideas can boost creativity and enhance innovation.

5.3 Measuring Social Impact

Vanclay (2006, p. 6), explains that Social Impact Assessment (SIA) is utilised for understanding the effects different planned actions, such as projects, have on communities. It observes the social changes that the project may cause and aims to increase the social benefits of these actions (Vanclay, 2006, p. 6). According to Esteves et al. (2012, p. 35) a social impact assessment usually involves creating processes for participation, where participants themselves can shape decisions affecting them. They express that SIA includes mapping and analysing the communities affected by the project and identifying the needs of the community (2012, p. 35).

Moreover, SIA includes identifying key social issues affecting the community and collecting baseline data on the community before beginning the project. SIA includes predicting social challenges that will affect the community and determining which impacts matter most. It includes examining alternatives to the project, reducing harms and improving benefits, developing a plan for monitoring impacts, establishing formal negotiations between communities and developers, and finally, establishing a Social Impact Management Plan (Esteves et al. 2012, p.35).

Generally, participants seemed to be unaware of any potential indicators or metrics used for measuring social impact. Holmblom, Lanting, Keetels, van der Lugt and Matesic specifically stated that they were not aware of social impact indicators. However, Petrova, (interview, 19.9.2025), noted that the Bulgarian learning community has indicators to measure demographic factors such as the number of participants and diversity of stakeholders, and they gather feedback. Holmblom and van der Lugt noted that they had established demographic indicators, to for instance measure the number of men and women participating in the learning communities' activities. Van der Lugt noted that as the project is a part of the European Commission's Erasmus+ framework, it is subject to the Erasmus+ quality controls. Additionally, Matesic emphasised that metrics for measuring impact are planned for future actions. Schmitz stressed that in her opinion, the project was not doing enough to address the general impacts.

Based on the interviewees' answers, it appears that the project is subject to indicators concerning mostly demographic factors. However, BECOME (2023, p. 27), notes that the short-term impact of the project, addressing skills gaps, will be measured in the following way:

> Qualitative indicators (short-term): Impact on diversity of portfolio in pedagogical methods and content; Improved quality of cooperation with local businesses.
>
> Quantitative indicators (short-term): Number of members engaged in active adaptation and application of tools and methods (survey among members and trainees); Number of cooperation efforts (BECOME, 2023, p. 27.)

However, interviewees were not aware of these indicators concerning the short-term impacts of the project. After the interview, Schmitz provided the information that as an Erasmus+ funded project, BECOME has to update its *KA2 Impact Assessment* for the Alliances for innovation. This is, according to the European Commission, (p. 356) to assess the performance of the project against its objectives and implementation plans. The KA2 Impact Assessment states that the project must respond to these questions:

- Does the project contribute to any of the EU Commission political priorities?
- What are the cooperation agreements with stakeholders?
- Do you consider that your organization/institutions have developed high-quality practices as a result of the participation in this project?
- What is the impact on higher education sector?

Although these indicators measure the overall impact of the project, they at the same time address the project's social dimensions by measuring the effects on the community. For instance, discovering if the quality of cooperation with local businesses has increased corresponds to the social impact of the project, as strong cooperation between stakeholders increases social capital and trust among the community members. Additionally,

measuring the number of members engaged and number of cooperation provides a perspective on how widely the community has been reached. However, to measure the full social impact, the quality and durability of the collaboration needs to be measured. For instance, measuring the skills the members have acquired, and tracking which members are staying within the community, could provide more insights for the social impact.

Additionally, the questions provided by the Alliances of Innovation adhere to social impact as well. According to the European Commission (2024), its political priorities are:

> *A new plan for Europe's sustainable prosperity and competitiveness, a new era for European defence and security, supporting people, strengthening our societies and our social model, sustaining our quality of life: food security, water and nature, protecting our democracy, upholding our values, a global Europe: leveraging our power and partnerships, and delivering together and preparing our union for the future.*

If the project has contributed to these priorities, it has improved its social impact, as most of these priorities focus on people and their environments. Furthermore, the impact of the initiative for the higher education sector could assess the social impact as well, particularly if the impacts relate to enhanced collaboration or improved student engagement.

5.4 Framework for Enhancing Future Social Impact

The findings from the interviews indicate that the social impact of LCs is not directly measured, or there seems to be lack of knowledge if it is. BECOME (2023) does not specifically mention assessing its social impact in the grant agreement, but assessing the overall impact of the project is referenced. According to BECOME (2023, p. 27), the long-term impact of the project is measured with number of new projects, co-creation projects, students and professionals utilising tools and materials after the project, and number of CE learning community members and increase of cross-country cooperation

within the project. Cooperation and lasting future impacts could be classified as social impacts, as they affect the communities around them.

Based on the SIA practices, in order to enhance social impact, the current impact needs to be assessed. This could be done with adapting the framework by Esteves et al. (2012, p. 35) to the needs of the BECOME project. This need would be to discover what the positive or negative changes in knowledge, collaboration, and behaviour of the people in the communities participating in the BECOME project are.

First, the project should aim to create participatory processes. This could include letting the LCs shape the decisions around them, for instance by asking participants where they want to engage. Secondly, the SIA should include mapping and analysing the affected communities. BECOME (2023, p. 26), has identified that the project will impact students, teachers, VET providers, and companies, and that there are green skills gaps between professionals (BECOME, 2023, p. 3). Further analysis of the affected communities is nevertheless needed. For instance, more should be known about the kinds of businesses operating in each region, their CE related needs, and how these intersect with the needs of students and teachers.

The third step in BECOME's SIA would be to identify the social issues affecting the communities, and the possible social benefits the project could bring. The findings indicate that the project has enhanced collaboration and networking, and increased CE knowledge, or is about to do so, in the partner regions. However, a systematic assessment of the issues facing the communities is also required. Interviewees mentioned challenges affecting the operations of the LCs, such as differences in baseline CE knowledge across countries, but a more detailed overview of these issues remains to be produced. A similarly detailed overview of the social changes predicted to occur is currently lacking. The interviewees have anticipated that the project will increase CE knowledge and cooperation in the regions, but a more systematic assessment of these

projections would strengthen the analysis. For instance, it should be estimated whether the project could shift local cultures towards more circular practices.

Additionally, it should be determined which impacts matter most, and how long impacts last. The findings indicate that the interviewees are hoping to see lasting CE change and the BECOME project's aim is to expand their practices to other countries. It should be determined whether, for example, the cooperation continues after the project's formal structures are over. Moreover, alternatives to the project should be examined. As the different LCs illustrate, what makes sense in the Netherlands, does not make sense in Slovenia. The project should establish whether the LC approach works in all countries, and whether it should be changed.

Moreover, the project should find ways to reduce harms and improve benefits. For instance, once the project has established what the benefits are, such as increased cooperation and knowledge, the project can find ways to improve these benefits, such as with ensuring that cooperation continues when the project is over. Finally, an impact monitoring plan should be established to oversee whether predictions were accurate or whether benefits are emerging, or if the project is facing unforeseen problems.

To support this assessment, the project should conduct surveys with the LCs that include questions specific to each stage of the SIA. The following question framework suggests questions for each stage:

Creating participatory processes

1. What do you want the LC to do?

Mapping and analysing communities

1. What kind of students/teachers does the LC consist of?
2. Which skills are the students/teachers missing?
3. What are the needs of the students/teachers?

4. What kind of businesses are in the regions?
5. What are the needs of the businesses?
6. What is the employment rate of the regions and what is the labour market lacking?

What social issues are affecting the community?

1. Are there issues with equality?
2. Are there economic issues, such as unemployment?
3. Are there environmental issues in the regions?

What social benefits could the project bring?

1. Are there more benefits than enhanced collaboration, networking, increase of skills etc?
2. Can the project affect the structure of the region?

What impacts matter most and are impacts long-term?

1. What is the most important social impact and why?
2. What is done to ensure CE knowledge is retained in the region?

Are there alternatives to the project?

1. Are the LCs functioning everywhere?
2. Are there more region-specific indicators that should be considered?
3. Should the approach be changed in some regions?

Reducing harm and improving benefits

1. Does the project cause any harm in the regions?
2. How is cooperation, networking, increase of CE skills improved?
3. How to ensure benefits are lasting?

Impact monitoring plan

1. Were predictions accurate?
2. Are there new benefits?
3. Are there unforeseen problems?

With this framework, the BECOME project should be able to conduct a preliminary SIA to establish what the social impacts are now, what they will be in the future, and how they can be improved.

6 Conclusions

This chapter addresses the research questions and assesses the limitations and ethical considerations of this thesis. The chapter concludes with suggestions for future research.

6.1 Research findings

This thesis studied circular economy learning communities utilising the BECOME project as a case study. The study aimed to address what the role of CE is in managing social sustainability, how LCs contribute to promoting CE principles, and how the social impact of LCs can be improved. To answer these research questions, both the empirical and the theoretical part of the thesis need to be considered.

RQ1: What is the role of the circular economy in managing social sustainability?

In the theoretical framework, circular economy was defined utilising the Ellen MacArthur Foundation's definition as an economic model designed to eliminate waste by keeping products and materials in circulation for as long as possible. Sustainable development in turn, was defined based on the United Nations' definition as development that considers the needs of both current and future generations. It was established that sustainability is often divided into three dimensions, environmental, economic, and social sustainability.

As defined by Nilsson et al. (2023, p. 5941) social sustainability includes the following dimensions: equity, well-being, participation and influence and social capital. The theoretical framework of this study indicated that sustainability is often seen as a precondition to CE (Geissdoerfer et al. (2017, p. 767) and found out that specifically social sustainability is frequently overlooked in CE discussions (Mies and Gold (2021, p. 3). However, the theoretical framework indicated that CE could contribute to achieving the SDGs introduced by the UN. The theoretical study explained that CE strategies specifically

address Goal 1 (No poverty) and Goal 8 (Decent Work and Economic Growth). Additionally, Goal 3 (Good Health and Well-being) and Goal 11 (Sustainable Cities and Communities) were also often supported by CE strategies.

By operating a system where resources stay in circulation for as long as possible, CE can create jobs in newly established CE sectors, such as sectors designed for creating new material from what has previously been regarded as waste. This creates jobs and sustainable economic growth and contributes to achieving Goal 8. CE addresses Goal 1 by offering consumers products that do not require replacing as often as products created within the linear economic model. This way, consumers spend less money on products designed to break. Furthermore, CE addresses Goal and Goal 11 3 by focusing on utilising fewer natural resources and on decreasing CO2 emissions. This would mean that people can live in cleaner, less polluted neighbourhoods that have less impacts on their health. It is important to note that all SDGs focus on improving the lives of current and future generations, and when CE strategies address any SDG goal, they manage also social sustainability. By addressing environmental or economic issues, CE contributes to improving the well-being of people as well.

RQ2: How can learning communities contribute to promoting circular economy principles?

Learning communities were defined in the theoretical framework as communities where people share access, relationships, vision, or function (West & Williams, 2017, pp 1571). The BECOME project had defined learning communities as networks between companies, universities and policymakers designed for cooperation and developing and implementing CE solutions. The 3E framework in Hariadi et al. (2025, p. 24) explored that LCs can increase CE knowledge through education, empowerment, and entrepreneurship.

Learning communities educate on CE practices, which means that participants of the community increase their knowledge on CE and subsequently improve their circular skills.

The empirical findings suggested that LCs connect people interested in CE and increase their CE capabilities by teaching concrete skills, such as skills in circular building. By promoting CE practices, LCs can contribute to increased circularity in the community. LCs can develop networks for circular innovation and apply innovations to the communities in practice.

Through knowledge exchange and education, LCs can empower behavioural change. The behavioural change will emerge from exposure to CE ideas, innovations, and practices. Positive attitudes towards CE can aid the implementation of CE policies, as then the community might be more prepared for changes posed by these policies. Additionally, the change in behaviour can increase the overall circularity of the region if the behaviours are applied in practice.

Finally, learning communities can encourage entrepreneurship to advance CE practices. By encouraging creativity and collaboration participants will be more prepared for establishing their own circular initiatives. Additionally, promoting entrepreneurial mindsets can increase the participants' abilities to adapt to changes. This means that participants are more aware of the limits of the linear economic model and are equipped with the knowledge to develop initiatives that advance the adoption of the circular model. Furthermore, the empirical findings suggest that equipping teachers with CE knowledge has increased their interest in circularity and sustainability. By encouraging entrepreneurship, these interested teachers can also encourage students to innovate creative CE solutions.

However, the empirical findings indicated that it is difficult to know whether participants have retained the CE knowledge taught in the LCs. This is why it is important to teach concrete CE skills once the participants are equipped with enough theoretical knowledge. The four-country comparison revealed that LCs in the BECOME project operate according to their national context. The Finnish and Dutch LCs operate in countries with diverse circular policies and more established CE cooperation, while the Bulgarian and Slovenian

LCs are operating in countries with less established CE cooperation. It is necessary for the LC to be adapted towards the needs and background knowledge of the community for the LC to be able to concretely contribute to CE practices.

RQ3: How can one improve the social impact of the learning communities?

As defined by ICGPSIA, (1994, p. 1), social impact refers to the effects of actions on humans, that change the way people live, work, interact, meet their needs, and adapt within society. Hurst and Johnston (2025, p. 8) defined social impact building on this definition as the direction of the impact, as well as the stakeholders it affects through long-term shifts in cooperation, knowledge, and behaviour. For this research social impact was defined building on Hurst and Johnston's definition as:

Positive or negative changes in knowledge, collaboration, and behaviour of the people in the communities participating in the BECOME project.

The findings indicate that social impact of LCs is influenced by differences relating to the organisation of the project, differences in culture, and to different stages of CE knowledge. To improve the social impact of LCs these challenges need to be addressed. Organisational issues relating to project planning could be reduced with clearer communication between project partners and with a clear project framework from the organiser of the project. The findings indicated that some respondents experienced cultural differences as obstacles, whereas one respondent stated that cultural differences can be an advantage. It should be determined which cultural differences interfere with the LCs activities, and which improve them. Different stages in CE knowledge can be addressed by enhancing CE education in communities with lower stages of knowledge.

Additionally, participants identified that the LCs social impacts focus on increased networking, collaboration, knowledge sharing, skills, and trust. Nilsson et al. (2023, p. 5941) defined the foundational pillars of social sustainability as equity, well-being,

participation and influence, and social capital. The impacts identified by the participants are mostly concentrated in the pillars of participation and influence, and social capital. To improve the social impact of learning communities, impacts need to address the remaining pillars. Equity could be addressed by ensuring that all groups participating in the project are treated equally and receive the support needed. Additionally, it should be ensured that no LC creates negative impacts to surrounding communities. To address the pillar of well-being, LCs should ensure that their culture allows participants to rest and share their own ideas and that the community embraces interaction with all participants.

Several participants observed that no indicators for measuring social impact were in place, or at least they were not aware of them. Some participants emphasised that the project gathers demographic data on participants, data on the gender of participants. Additionally, as an Erasmus+ funded project, BECOME is subject to Erasmus+ quality controls set by the European Commission. One participant stressed that not enough measures were taken to measure the general impact of the project. They acknowledged that there are surveys after events, but that the project is interested in learning more about how businesses generate knowledge and what they do with it.

The theoretical framework and empirical findings indicated that a SIA should be conducted to improve the social impact of LCs. As one of the central outcomes of this thesis, a question framework for conducting such an assessment was developed building on the outline by Esteves et al. (2012, p. 35) and tailored to the specific context of CE learning communities. The framework was suggested to include creating participatory processes, mapping and analysing the communities, identifying the social issues affecting the communities, estimating social benefits, predicting social changes, determining which impacts matter most and how long they last, examining alternatives to the project, and establishing an impact monitoring plan. The framework and set of questions were the central practical outcomes of this thesis ad they integrated the theoretical SIA literature with the practical needs of CE learning communities. In the future, the framework can be applied to similar projects and initiatives.

6.2 Limitations and Ethical Considerations

There are several limitations that need to be discussed. Firstly, while the interviewee pool was diverse across partner countries, the number of interviewees was limited and may not have captured all perspectives within the BECOME project. With only one interviewee from Finland and Bulgaria, the case analysis relied substantially on a single perspective.

Secondly, the interviewees were aware of the use of direct identifiers, which meant that their responses may have been shaped by the awareness that their views would be reported under their own names. This is a recognised consequence of identifiable reporting in research and should be considered when reading the findings. Additionally, the use of different interview modes (in-person, online and email) may have influenced the depth of responses.

Thirdly, the data was collected multilingually, and it may introduce variations in interpretation. The Finnish interviewee was interviewed in her mother tongue, while the rest of the interviewees were interviewed in their second language. This may result in misunderstandings of terms. The researcher aimed to reduce language-related challenges by formulating the questions in a way that there would be no need for complex terms. In addition, the interviewees were able to ask clarifying questions if they did not understand the interview question.

Fourthly, the researcher's own position should be acknowledged. The thesis was conducted for TUAS and the access to interviewees was facilitated through the Finnish interviewee. These conditions may have shaped both the participant pool and the analytical perspective, as the interviewees were chosen for the researcher, and included mostly people working in HEIs.

Additionally, it should be acknowledged that the nature of this study stayed descriptive-exploratory. Both the effects of LCs in CE, and the social impact of LCs were identified and explained, but no causalities were explored. Additionally, if a SIA would have been conducted, the research would have been able to both distinguish the social impacts of the project and analyse them thoroughly.

Finally, it should be noted that Quillbot and ChatGPT (GPT-5.5) were utilised for checking the grammar and flow of this study. Quillbot's paraphraser tool was used to rewrite sentences to improve academic language and readability and ChatGPT was utilised for proofreading. The use of AI was done with the University of Vaasa's (2023) AI guidelines and the researcher was always responsible for the final version of the text. Therefore, it can be noted that utilising AI tools for proofreading parts of the study does not affect the credibility of the study.

6.3 Suggestions for Future Research

As the concepts studied in this research were all multifaceted and ambiguously defined in previous academic literature, a full review of the concepts is needed. Additionally, more research on the overlap of the concepts would prove useful in the context of circular economy learning communities.

Additionally, as the BECOME project is ending in December 2026, by then, the project's short-term impacts should be visible. The impacts could be measured utilising the proposed framework. This would let legislators, organisers and participants know the concrete impacts of the project. To measure the project's long-term impacts, the regions should be studied after the completion of the project. Measuring the impacts could be done with the proposed framework, but the following survey questions and quantitative indicators should be added to the analysis:

1. Have the learning communities from the BECOME project been maintained?

2. What are the networks doing?
3. What is the perceived state of CE knowledge?
4. How has the community changed after the project?
5. Number of CE initiatives before and after the project.
6. Number of participants staying in the CE field.

Finally, it should be noted that comparative research across multiple EU-funded CE learning initiatives would help distinguish whether the observations in BECOME are general characteristics of CE learning communities, or only specific to BECOME. These characteristics include the prioritisation of education over empowerment and entrepreneurship, the lack of social impact measurement and regional differences between Shift and Grow countries.

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Appendix 1: Interview questions

The Role of Learning Communities in the Circular Economy

1. How has the project contributed to implementing circular economy practices so far?
2. In what ways does the project plan to enhance the adoption of circular economy principles further?
3. Can you provide specific examples of how learning communities have influenced or are expected to influence circular economy knowledge in the regions involved?
4. How would you describe your region's current state of circular economy initiatives?
5. Who are the primary target groups for your learning community, and why were they chosen?

Social Impact of Learning Communities

1. What social benefits have emerged from the activities of the learning communities?
2. How has the project affected community engagement and attitudes towards sustainable development and circular economy in your region?
3. Have you used any indicators or metrics to measure the project's social impact? If so, which ones?
4. What challenges have you encountered during this project?
5. Have you observed any cultural differences that influence the effectiveness of the learning communities?
6. Could you provide some background on your learning community, including its history and current situation?

Appendix 2: Contributions to CE

Respondent	1. Contributions to CE practices so far.	2. Enhancing the adoption of CE in the future.	3. Effects on CE knowledge.	4. Current state of CE in LC.	5. Primary target group for LC.
Annika Holmblom (FIN)	Mapping current competences and gaps, learning materials, micro-credentials, awareness	Online courses, aim for permanent LCs beyond project.	Platforms for exchanging knowledge between academia, companies & public actors	Strong ecosystem supporting CE, active cooperation	HE students, professionals in regional companies
Anton van der Lugt (NL)	Sharing knowledge, training trainers	Spreading knowledge with trainings.	LCs used for spreading knowledge	The Netherlands ahead in CE activities	Existing LCs have their own established target groups
Sjoerd Keetels (NL)	Connecting initiatives around the region.	Guidelines, toolkits for teachers and companies. Practical understanding of material use.	More understanding and concrete change for the sector.	Heijmans local initiatives and best practices. Scaling up difficult.	Heijmans to form its own learning community for the company.
Yvette Lanting (NL)	Developed training material. Implementing in university courses. Cooperation.	Objective to cover bigger audiences. Paves the road for future projects.	New collaboration between organisations, brings together stakeholders.	Many small-scale initiatives around the region in companies. Education is behind.	Companies around the region, policymakers, network organisations.

Marina Schmitz (SLO)	Building communities, information sharing (passive reception or real knowledge?)	To have companies change their business models towards circular models.	Expecting to bring companies together to inspire by examples outside their industry.	Difficult to capture, early stages of CE understanding.	Companies.
Mirjana Matesic (SLO)	Developed building blocks for CE curriculum. Educating teachers and professionals.	Development of building blocks. Implementation to curricula. Increasing CE understanding. Possible expansion to Croatia.	Webinars. In the future, knowledge sharing and discussions on how theory can be implemented in practice.	Very low. Not much CE knowledge.	Businesses.
Vessela Petrova (BG)	Raised awareness among professional, students and public administrators. Introduced practical methodologies.	Strengthening its LC as a hub for cooperation and development, moving from knowledge to real application of CE practices	Influenced university curricula & professional development programs. Increased readiness for CE practices.	Early stages, driven by CEAP & Fit-for-55	Professionals from mining and raw materials industry

Appendix 3: Social Impact of LCs

Respondent	Social benefits from learning communities.	Effects on community engagement and attitudes.	Indicators or metrics.	Challenges during the project.	Cultural differences.
Annika Holmblom (FIN)	Wellbeing, cooperation and networking. Sense of belonging.	Collaboration. Awareness. CE learning approachable and concrete.	Not aware. Rate of men vs women.	Financial issues.	Hierarchies, Work culture, Confusion in common courses.
Van der Lugt (NL)	Awareness among teachers & companies. Broader community not yet reached.	Limited impacts now. Effects expected as training expands.	Not aware. Erasmus + quality controls (rate of men vs women etc).	Slow cooperation. Keeping up with schedule. Views of circular skills different. Financial issues.	Different English language skills. Different working cultures, (Finns shy, Dutch direct).
Sjoerd Keetels (NL)	Networking, collaboration, shared enthusiasm, new joint initiatives.	Bringing actors together, knowledge-sharing.	Not aware.	Difficulty aligning company and education sectors, unclear roles.	Language. Dutch directness weird for others.
Yvette Lanting (NL)	Students have better understanding of CE. Group of interested teachers emerging.	Enriched students More interaction between stakeholders.	Not yet.	Company engagement difficult. Dependent on wider network.	Differences in teaching methods between schools.
Marina Schmitz (SLO)	Companies reaching out to other	Awareness in the region is higher.	Event surveys, participation	Hesitation to reach out to others.	Language. Different cultures more of an

	stakeholders. Network grows.		levels, demographic data.	Limited availability. Need to do a lot of social engineering.	asset than a hurdle.
Mirjana Matesic (SLO)	Beginning, not a lot of benefits yet. Hoping project will bring CE understanding and knowledge.	Raised visibility and importance through webinars and stakeholder engagement.	Not yet defined but planned for later stages.	Lack of interest among businesses that see sustainability as reputational than strategic.	Each national team has different approach.
Vessela Petrova (BG)	Stronger dialogue and trust, trainings give participant confidence to promote sustainability, students benefit from exposure.	Increased willingness to collaborate, shifted attitudes towards sustainability.	Evaluation through ESG Academy. Number of participants, diversity of stakeholder groups, feedback.	Limited prior knowledge of CE, gap between policy and local capacity, time constraint, continuity of engagement.	Hierarchical company structures in Bulgaria.