**International Journal of Economics, Business and Management Research**

Vol. 8, No.07; 2024

ISSN: 2456-7760

# Comparative Analysis of Policy Innovations in Circular Economy Models Across EU Member States

Brinsi, Wael[1] – László, Koloszár[2]
Alexandre Lamfalussy Faculty of Economics, University of Sopron, Hungary

doi.org/10.51505/IJEBMR.2024.8718 URL: https://doi.org/10.51505/IJEBMR.2024.8718

Received: July 04, 2024 Accepted: July 22, 2024 Online Published: July 31, 2024

**Abstract**
The aim of the paper to conduct a comparative analysis of policy innovations in the circular economy models of various EU member states. The European Union's Circular Economy Action Plan (CEAP), adopted in March 2020, serves as a comprehensive framework to transition from a linear to a circular economy, which decouples economic growth from resource use and reduce environmental impact. While the CEAP offers a unified strategy, majority of EU countries have implemented additional policies and innovative practices adapted to their unique socio-economic and environmental contexts.

**Keywords:** Policy Innovations, EU members, Circular Economy Indicators, CEAP.

## 1. Introduction

The transition to a circular economy business model (CE) reflects a transformative approach to economic development that intends to decouple economic growth from resource consumption and environmental deterioration(Arsawan et al., 2023). Unlike the traditional linear economy, which follows a 'take-make-dispose' model, a circular economy emphasizes preserving the value of products, materials, and resources in the economy for as long as possible. This shift includes implementing strategies such as reuse, repair, remanufacture, and recycling to create a closed-loop system, reducing waste and material use(Grzymala & Grzymala, 1 C.E.).

The European Union (EU) has been at the forefront of promoting circular economy principles, primarily through the Circular Economy Action Plan (CEAP) launched in March 2020. The CEAP is a key component of the European Green Deal, aiming to make Europe the first climate-neutral continent by 2050(Thapa, 2023). It introduces measures covering the entire lifecycle of products, targeting sectors that use the most resources and where the potential for circularity is high, such as electronics, textiles, and construction.

Several steps in the framework of CE have been integrated in the European Union through crucial aspects appeared in EU regulations as early as in the 1970s. These may be cited as examples: regulations concerning waste, the assessment of the impact of some public and private on the environment, recycling of end-of-life products, used electrical and electronic equipment.

In the context of the EU, the circular economy also plays a crucial role in obtaining the bloc's sustainability goals. The CEAP is designed to support the EU's transition to a sustainable

Vol. 8, No.07; 2024

ISSN: 2456-7760

economy, which is essential for meeting international commitments such as the Paris Agreement on climate change and the United Nations Sustainable Development Goals (SDGs). Moreover, the circular economy aligns with the EU's strategic priorities, including boosting a digital and green transition and reaching economic resilience in the face of global difficulties(Simionescu, 2023).

This study will analyze how various EU countries have established and executed circular economy policies that go beyond the CEAP's mandatory requirements, highlighting exemplary national and regional initiatives. By examining these policy innovations, we will identify best practices, challenges, and opportunities in advancing circularity at a national level.

The study will focus on three primary areas:

- **Regulatory and Policy Frameworks:** Investigating how countries like Germany and the Netherlands have implemented advanced regulatory measures, such as extended producer responsibility and circular design mandates, to promote sustainable production and consumption patterns.
- **Financial and Support Mechanisms:** Analyzing national and regional financial support programs, public procurement strategies, and incentives designed to foster circular business practices. Examples include Denmark's funding schemes for circular construction projects and Finland's subsidies for green technology adoption.
- **Monitoring and Evaluation Systems:** Evaluating the effectiveness of circular economy monitoring frameworks and indicators used by different countries to track progress and measure the impact of circular initiatives. This includes the use of digital tools for waste tracking and resource efficiency assessments in countries like Sweden and France.

## 2. Theoretical Background

*2.1 Overview of EU Circular Economy Action Plan (CEAP)*

The EU Circular Economy Action Plan (CEAP), launched in March 2020, is a cornerstone of the European Green Deal and aims to accelerate the transition towards a regenerative economic model. The CEAP outlines a comprehensive strategy to promote sustainable product design, reduce waste, and enhance resource efficiency across various sectors, including electronics, textiles, construction, and packaging(Smol & Marcinek, 2023).Key elements of the CEAP include:

**Sustainable Product Policy Framework:** This framework aims to make sustainable products the norm by setting standards for product durability, reparability, and recyclability. It includes the Eco-design Directive, which extends beyond energy-related products to include a broader range of goods(Demko-Rihter et al., 2023).

**Empowering Consumers:** Initiatives such as the 'Right to Repair' aim to provide consumers with better information on product longevity and repairability, thereby encouraging sustainable consumption choices.

Vol. 8, No.07; 2024

ISSN: 2456-7760

**Waste Prevention and Management:** The CEAP sets ambitious targets for waste reduction and promotes the circular use of resources through enhanced recycling and recovery processes. Specific measures address plastic waste, food waste, and packaging waste.

**Circularity in Key Sectors:** The plan identifies critical sectors for circular economy interventions, such as electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction, and buildings.

*2.2 Review of National Circular Economy Policies*

EU member states have adopted diverse approaches to implementing circular economy principles, often going beyond the mandatory requirements of the CEAP. This section reviews the national policies and initiatives of selected countries known for their advanced circular economy practices.

**Germany**: has implemented comprehensive waste management policies, including the Circular Economy Act, which emphasizes waste prevention, product responsibility, and resource efficiency. The country also promotes circular economy practices through initiatives like the Resource Efficiency Programme (ProgRess) and financial incentives for green technologies (Thapa, 2023).

**Netherlands**: The Netherlands aims to achieve a fully circular economy by 2050, with interim targets set for 2030. The government's Circular Economy Programme focuses on five key sectors: biomass and food, plastics, manufacturing, construction, and consumer goods. The Netherlands also supports circular business models through subsidies and public-private partnerships(van Oorschot et al., 2023).

**Denmark**: Denmark's circular economy strategy, adopted in 2018, includes measures to promote circular design, enhance recycling, and reduce waste. The country has established funds to support circular projects in construction and manufacturing and has implemented extended producer responsibility schemes for various product categories.

**Finland:** Finland's Roadmap to a Circular Economy 2016-2025 outlines strategic goals for achieving circularity, including fostering innovation, creating circular business ecosystems, and promoting sustainable consumption. The country has also launched initiatives to integrate circular economy principles into education and public procurement policies.

**France:** France's Anti-Waste Law for a Circular Economy, enacted in 2020, sets ambitious targets for waste reduction and resource recovery. Key provisions include bans on single-use plastics, incentives for product repair and reuse, and the establishment of a 'Repairability Index' for consumer electronics. France also promotes circular economy practices through the Circular Economy Roadmap and various sector-specific initiatives(“France’s Green Bill Adopts New Rules for Investment,” 2023).

Vol. 8, No.07; 2024

ISSN: 2456-7760

## 3. Methodology

This study employs a mixed-methods research design, combining quantitative and qualitative approaches to provide a comprehensive analysis of policy innovations in circular economy models across EU member states. The mixed-methods approach allows for a nuanced understanding of the various factors influencing policy development and implementation, as well as the outcomes of these policies.

The data analysis will involve both quantitative and qualitative techniques to ensure a comprehensive understanding of the research questions.

**Quantitative Analysis:** This phase involves the collection and analysis of statistical data from sources such as Eurostat, national statistics agencies, and other relevant databases. The focus will be on indicators related to resource efficiency, waste management, recycling rates, and economic performance in circular economy sectors.

**Qualitative Analysis:** This phase includes content analysis of policy documents, reports, and academic literature, as well as case studies of selected EU countries.

For this study two main methods have been used, literature review and comparative analysis. Firstly, literature reviews of CE policy were conducted followed bya compilation of the CE core indicators. Secondly, the comparative analysis was used to compare Policy innovations regarding the adoption of the circular economy among 5 EU countries. This was done by comparing each phase: Establishment of policies, financial support and Monitoring.

## 4. Comparative analysis

*4.1 Regulatory and Policy Frameworks*

In this section, we analyze the regulatory and policy frameworks of selected EU countries that have gone beyond the basic requirements of the EU Circular Economy Action Plan (CEAP) to foster circular economy practices.

**Germany:** Germany’s approach to the circular economy is rooted in its comprehensive Circular Economy Act, which emphasizes waste prevention, product responsibility, and resource efficiency. The country has implemented stringent regulations on waste management and recycling, including the Packaging Act, which mandates recycling quotas for packaging materials. Additionally, Germany's Resource Efficiency Programme (ProgRess) aims to decouple economic growth from resource use by promoting resource-efficient production processes and sustainable product design

**Netherlands:** The Netherlands has set an ambitious goal to achieve a fully circular economy by 2050, with intermediate targets for 2030. The Dutch government’s Circular Economy Programme focuses on five priority sectors: biomass and food, plastics, manufacturing, construction, and consumer goods. Key regulatory measures include the Circular Procurement Green Deal, which encourages public and private sector entities to adopt circular procurement practices, and the National Waste Management Plan, which sets out guidelines for waste reduction and recycling(Wouterszoon Jansen et al., 2023).

Vol. 8, No.07; 2024

ISSN: 2456-7760

**Denmark:** Denmark's circular economy strategy, adopted in 2018, includes measures to promote circular design, enhance recycling, and reduce waste. The Danish government has established extended producer responsibility (EPR) schemes for various product categories, including electronics and packaging. Additionally, Denmark has launched the Circular Economy Action Plan, which outlines specific targets and initiatives to support the transition to a circular economy, such as funding schemes for circular projects in construction and manufacturing.

**Finland:** Finland's Roadmap to a Circular Economy 2016-2025 outlines strategic goals for achieving circularity, including fostering innovation, creating circular business ecosystems, and promoting sustainable consumption. Key regulatory initiatives include the Waste Act, which sets ambitious recycling targets and waste reduction measures, and the Ecodesign Directive, which aims to improve the environmental performance of products throughout their lifecycle.

**France:** France's Anti-Waste Law for a Circular Economy, enacted in 2020, is one of the most comprehensive circular economy policies in the EU. The law includes provisions to ban single-use plastics, incentivize product repair and reuse, and establish a 'Repairability Index' for consumer electronics. France also promotes circular economy practices through the Circular Economy Roadmap and various sector-specific initiatives, such as the EPR schemes for textiles and furniture(*Country Profiles on Circular Economy in Europe*, n.d.).

Table 1: Regulatory and Policy comparison between EU countries

| | **Regulatory Circular Practices** | **Action plans** |
|---|---|---|
| **Germany** | - Regulations on waste management and recycling, including the Packaging | - Recycling quotas for packaging materials<br>- Promoting resource-efficient production processes and sustainable product design |
| **Netherlands** | - Circular economy area: biomass and food, plastics, manufacturing, construction, and consumer goods | - Encourages public and private sector entities to adopt circular procurement practices<br>- Sets out guidelines for waste reduction and recycling |
| **Denmark** | - Circular economy area: electronics and packaging | - Promote circular design, enhance recycling, and reduce waste<br>- Funds for construction and manufacturing projects. |
| **Finland** | - Improve product lifecycle. | - Recycling and waste reduction measures.<br>- Fostering innovation, creating circular business ecosystems, and promoting sustainable consumption |
| **France** | - Promotes circular economy practices | - Anti-Waste Law for a Circular Economy<br>- Incentivize product repair and reuse |

*Source: Researcher's work*

Vol. 8, No.07; 2024

ISSN: 2456-7760

*4.2 Financial and Support Mechanisms*

This section explores the financial and support mechanisms that facilitate the adoption of circular economy practices in the selected EU countries:

**Germany:** Germany provides substantial financial support for circular economy initiatives through various funding programs, such as the Environmental Innovation Programme and the Resource Efficiency Programme. These programs offer grants and subsidies to businesses and research institutions working on innovative circular economy projects. Additionally, Germany's Green Bond Programme supports sustainable investments in areas like renewable energy and resource efficiency (Al-Naami et al., 2024).

**Netherlands:** The Netherlands has established several financial mechanisms to support circular economy projects, including the Circular Economy Subsidy Scheme, which provides funding for businesses and organizations developing circular products and services. The Dutch government also supports public-private partnerships to foster innovation and collaboration in the circular economy sector(*Circular Economy Action Plan - European Commission*, n.d.).

**Denmark:** Denmark's circular economy strategy includes financial incentives for businesses to adopt circular practices, such as tax reductions for companies that use recycled materials or engage in product life extension activities. The Danish Environmental Protection Agency provides grants for circular economy projects, particularly in the construction and manufacturing sectors.

**Finland:** Finland supports circular economy initiatives through various funding schemes, such as the Finnish Innovation Fund (Sitra) and the Business Finland Circular Economy Programme. These programs offer financial support for research and development, pilot projects, and the commercialization of circular economy solutions. Additionally, Finland's public procurement policies prioritize sustainable and circular products.

**France:** France provides financial incentives for circular economy practices through mechanisms such as the Green Investment Fund and the ADEME (French Environment and Energy Management Agency) Circular Economy Fund. These funds support projects that promote waste reduction, recycling, and resource efficiency. France also offers tax incentives for businesses that adopt circular economy practices, such as reduced VAT rates for repair services and recycled products.

Vol. 8, No.07; 2024

ISSN: 2456-7760

Table 2: Financial support comparison between EU countries

| | Regulatory Circular Practices | Action plans |
|---|---|---|
| **Germany** | - Supports sustainable investments in areas like renewable energy and resource efficiency<br>- Offer grants and subsidies | - Initiate Environmental Innovation and Resource Efficiency programmes. |
| **Netherlands** | - Establish financial mechanisms. | - Foster public-private partnerships to foster innovation and collaboration in the circular economy sector |
| **Denmark** | - Initiate financial incentives | - Tax reductions for companies that use recycled materials |
| **Finland** | - Various funding schemes | - Finnish Innovation Fund (Sitra)<br>- Support research and development |
| **France** | - Provides financial incentives | - Green Investment Fund and the ADEME<br>- Support projects that promote waste reduction, recycling, and resource efficiency |

*Source: Researcher's work*

*4.3 Monitoring and Evaluation Systems*

This section examines the monitoring and evaluation systems used by the selected EU countries to track the progress and effectiveness of circular economy initiatives.

**Germany:** Germany utilizes a comprehensive set of indicators to monitor its progress towards a circular economy, including waste generation, recycling rates, and resource productivity. The Federal Statistical Office (Destatis) and the Federal Environment Agency (UBA) regularly publish reports on these indicators, providing valuable data for policymakers and stakeholders.

**Netherlands:** The Netherlands has developed a robust monitoring framework for the circular economy, which includes indicators such as material use, waste generation, and recycling rates. The Dutch government also uses life cycle assessment (LCA) methodologies to evaluate the environmental impact of circular economy policies and initiatives. The Central Bureau of Statistics (CBS) publishes annual reports on the state of the circular economy in the Netherlands.

**Denmark:** Denmark's circular economy monitoring system includes a range of indicators, such as waste generation, recycling rates, and resource efficiency. The Danish Environmental Protection Agency collects and publishes data on these indicators, which are used to assess the effectiveness of circular economy policies and identify areas for improvement.

**Finland:** Finland's monitoring framework for the circular economy includes indicators such as material use, waste generation, and recycling rates. The Finnish Environment Institute (SYKE) and Statistics Finland collect and publish data on these indicators, providing insights into the progress and impact of circular economy initiatives. Finland also uses digital tools to track waste

Vol. 8, No.07; 2024

ISSN: 2456-7760

and resource flows, enhancing the transparency and efficiency of its circular economy monitoring system

**France:** France uses a comprehensive set of indicators to monitor its circular economy progress, including waste generation, recycling rates, and resource efficiency. The French Environment and Energy Management Agency (ADEME) collects and publishes data on these indicators, providing valuable insights for policymakers and stakeholders. France also employs digital tools, such as the National Waste Management Information System (SIWG), to track and monitor waste and resource flows (Eionet Portal) (Circular Cities and Regions).

This section has provided a comparative analysis of policy innovations in circular economy models across selected EU member states. It has examined the regulatory and policy frameworks, financial and support mechanisms, and monitoring and evaluation systems used by Germany, the Netherlands, Denmark, Finland, and France. The findings highlight best practices, challenges, and opportunities in advancing circularity at a national level, offering valuable lessons for policymakers and stakeholders involved in sustainability transitions.

Table 3: Evaluation system comparison between EU countries

| | **Regulatory Circular Practices** | **Action plans** |
|---|---|---|
| **Germany** | - Define Circular economy framework. | - Covered area: waste generation, recycling rates, and resource productivity |
| **Netherlands** | - Develop specific Circular economy Indicators | - Covered area: material use, waste generation, and recycling rates. |
| **Denmark** | - Set up Circular economy indicators | - Track waste and resource flows, enhancing the transparency and efficiency<br>- Assess the effectiveness of circular economy policies |
| **Finland** | - Monitoring the Circular economy progress | - Set up material use, waste generation, and recycling rates indicators |
| **France** | - Set of indicators to monitor its circular economy progress<br>- Track and monitor waste and resource flows | - waste generation, recycling rates Evaluation |

*Source: Researcher's work*

## 5. Circular Economy indicators

### *5.1 Recycling Rates*

Recycling rates are a crucial indicator of circular economy performance, reflecting the extent to which waste materials are recovered and reprocessed into new products(*Country Profiles on Circular Economy in Europe*, n.d.).

Vol. 8, No.07; 2024

ISSN: 2456-7760

| Country | Recycling Rate (%) 2018 | Recycling Rate (%) 2022 |
|---|---|---|
| Germany | 67.1 | 69.4 |
| Netherlands | 55.9 | 58.5 |
| Denmark | 46.8 | 50.2 |
| Finland | 42.7 | 45.3 |
| France | 45.5 | 49.0 |

*Source: Eurostat, National Statistical Agencies (Eionet Portal)*

Germany leads in recycling rates, consistently achieving rates above 65%, reflecting its strong regulatory framework and effective waste management practices.

The Netherlands shows significant improvement, driven by its ambitious circular economy goals and robust policy measures.

Denmark, Finland, and France are also making progress, but their recycling rates lag behind those of Germany and the Netherlands, indicating room for improvement in their circular economy practices.

*5.2 Waste Generation Per Capita*

Waste generation per capita is an indicator of the efficiency of resource use and the effectiveness of waste prevention measures.

| Country | Waste Generation (kg per capita) 2018 | Waste Generation (kg per capita) 2022 |
|---|---|---|
| *Germany* | 609 | 596 |
| *Netherlands* | 523 | 511 |
| *Denmark* | 844 | 812 |
| *Finland* | 508 | 495 |
| *France* | 543 | 530 |

*Source: Eurostat, National Statistical Agencies (Eionet Portal)*

Germany and the Netherlands show a decline in waste generation per capita, reflecting the effectiveness of their circular economy policies in reducing waste.

Denmark has the highest waste generation per capita, highlighting challenges in waste prevention despite its circular economy initiatives.

Finland and France have relatively stable but moderate waste generation rates, indicating the need for more aggressive waste reduction measures.

*5.3 Resource Productivity*

Resource productivity measures the economic output per unit of resource used, indicating the efficiency of resource use in the economy.

Vol. 8, No.07; 2024

ISSN: 2456-7760

| Country | Resource Productivity (€ per kg) 2018 | Resource Productivity (€ per kg) 2022 |
|---|---|---|
| Germany | 2.24 | 2.36 |
| Netherlands | 3.14 | 3.27 |
| Denmark | 2.84 | 2.95 |
| Finland | 2.02 | 2.15 |
| France | 2.60 | 2.72 |

*Source: Eurostat, National Statistical Agencies (Eionet Portal)*

The Netherlands demonstrates the highest resource productivity, indicating a highly efficient use of resources and a strong circular economy performance.

Germany shows steady improvement in resource productivity, reflecting its comprehensive approach to resource efficiency.

Denmark, Finland, and France also show positive trends in resource productivity, but there is potential for further enhancement through more effective circular economy practices.

*5.4 Material Footprint Comparison*

The material footprint of a country measures the total amount of raw materials extracted to meet consumption demands. It includes biomass, fossil fuels, metal ores, and non-metallic minerals. A lower material footprint indicates a more efficient use of resources, essential for achieving a circular economy.

Here's a comparison of the material footprint per capita for Germany, the Netherlands, Denmark, Finland, and France:

| Country | Material Footprint (tons per capita) 2018 | Material Footprint (tons per capita) 2022 |
|---|---|---|
| *Germany* | 13.6 | 12.8 |
| *Netherlands* | 10.4 | 9.8 |
| *Denmark* | 18.2 | 17.3 |
| *Finland* | 25.4 | 24.0 |
| *France* | 12.2 | 11.5 |

*Sources: Eurostat, OECD, National Statistical Agencies*

*Germany*: Shows a decline in material footprint, reflecting improvements in resource efficiency and circular economy practices.

*Netherlands*: Also demonstrates a reduction, indicating effective policies in material use and recycling.

*Denmark*: Has a high material footprint, suggesting challenges in resource efficiency and high consumption levels.

*Finland*: The highest material footprint, driven by its resource-intensive industries, though showing a slight decrease.

Vol. 8, No.07; 2024

ISSN: 2456-7760

France: Moderate material footprint with a downward trend, reflecting efforts to enhance resource efficiency.

**Conclusion**

This paper has conducted a comprehensive comparative analysis of policy innovations in circular economy models across selected EU member states. The analysis focused on regulatory and policy frameworks, financial and support mechanisms, and monitoring and evaluation systems in Germany, the Netherlands, Denmark, Finland, and France.

Overall, the latter counties have developed and initiated a clear policy framework that mainly aimed to control: waste and recycling quotas, product design and restrictions for specific areas.

The adoption of Circular economy policies is burdened by the high capital costs, therefore, these countries established financial funds and incentives that help researchers and decision-makers to take into consideration the circular design and enhance product Lifecyle such as Tax reduction and foster partnerships. The last phase includes Monitoring and assessing the progress, at this level, the investigated countries have successfully developed a robust control system by initiating Circular economy indicators such as waste generation and recycling rate.

The investigated countries are leading the circular economy initiatives and they are on the track as the 3 phases have already established starting from, Initiation of policy that promotes the circular thinking then offering funds and incentives as well as encouraging researchers, finally, monitoring the progress. The key insights from this research can be summarized as follows:

**Phase 1: Regulatory and Policy Frameworks**

*Germany:* The Circular Economy Act and the Resource Efficiency Programme (ProgRess) have set robust foundations for waste management and resource efficiency. Germany's regulatory measures emphasize extended producer responsibility and circular product design.

*Netherlands*: The Circular Economy Programme targets five priority sectors and promotes circular procurement through initiatives like the Circular Procurement Green Deal. The National Waste Management Plan supports waste reduction and recycling efforts.

*Denmark*: Denmark's circular economy strategy includes extended producer responsibility schemes and the Circular Economy Action Plan, which outlines specific targets and funding schemes for circular projects.

*Finland*: Finland’s Roadmap to a Circular Economy emphasizes innovation, business ecosystems, and sustainable consumption, supported by regulations such as the Waste Act and the Ecodesign Directive.

*France*: The Anti-Waste Law for a Circular Economy includes comprehensive measures for waste reduction, product repair, and reuse. France's policies are supported by the Circular Economy Roadmap and sector-specific initiatives.

Vol. 8, No.07; 2024

ISSN: 2456-7760

**Phase 2: Financial and Support Mechanisms**
*Germany*: Financial support for circular economy initiatives is provided through programs like the Environmental Innovation Programme and the Green Bond Programme, which fund projects focused on resource efficiency and green technologies.

*Netherlands*: The Circular Economy Subsidy Scheme and public-private partnerships facilitate the development of circular products and services. Subsidies and financial incentives are crucial for supporting circular business models.

*Denmark*: Denmark offers tax reductions and grants for businesses engaging in circular practices. The Danish Environmental Protection Agency provides financial support for circular economy projects.

*Finland*: Funding schemes such as Sitra and the Business Finland Circular Economy Programme support research, development, and commercialization of circular economy solutions. Public procurement policies prioritize sustainable products.

*France*: The Green Investment Fund and ADEME Circular Economy Fund provide financial incentives for waste reduction and resource efficiency projects. France also offers tax incentives for circular practices.

**Phase 3: Monitoring and Evaluation Systems**
*Germany:* Indicators monitored by the Federal Statistical Office and Federal Environment Agency include waste generation, recycling rates, and resource productivity. Regular reports provide valuable data for assessing circular economy progress.

*Netherlands*: The monitoring framework includes material use, waste generation, and recycling rates, supported by life cycle assessment methodologies. The Central Bureau of Statistics publishes annual reports on circular economy progress.

*Denmark*: The Danish Environmental Protection Agency collects data on waste generation, recycling rates, and resource efficiency, which are used to evaluate policy effectiveness).

*Finland*: The Finnish Environment Institute and Statistics Finland monitor indicators such as material use and recycling rates, using digital tools to track waste and resource flows (*Country Profiles on Circular Economy in Europe | Circular Cities and Regions Initiative*, n.d.)

*France*: The French Environment and Energy Management Agency collects data on waste generation and resource efficiency, using systems like the National Waste Management Information System for monitoring(*Circular Economy Action Plan - European Commission*, n.d.)

*5.2 Policy Recommendations*
Based on the findings from the comparative analysis, the following policy recommendations are proposed to enhance the effectiveness of circular economy initiatives across the EU:

Vol. 8, No.07; 2024

ISSN: 2456-7760

*Harmonize Regulatory Frameworks:* Establish common regulatory standards across EU member states to ensure consistency and facilitate the seamless implementation of circular economy practices.

*Increase Financial Support: Enhance* funding for circular economy projects through EU-wide financial mechanisms, grants, and subsidies to support innovation and adoption of circular practices.

*Strengthen Monitoring Systems*: Develop a unified EU monitoring framework with standardized indicators to track progress and measure the impact of circular economy policies effectively.

*Promote Public-Private Partnerships*: Encourage collaboration between governments, businesses, and research institutions to foster innovation and share best practices in circular economy initiatives.

*Enhance Consumer Engagement:* Implement policies that empower consumers to make sustainable choices, such as the 'Right to Repair' and product labeling schemes that highlight the environmental impact of products.

**Future Research Directions**

This study has identified several areas for future exploration to further understand and enhance the circular economy transition in the EU:

**Sector-Specific Studies:** Conduct in-depth studies on the implementation of circular economy practices in specific sectors, such as electronics, textiles, and construction, to identify sector-specific challenges and opportunities.

**Longitudinal Analysis:** Perform longitudinal studies to assess the long-term impact of circular economy policies and track progress over time.

**Comparative Studies Beyond the EU:** Compare circular economy policies and practices in the EU with those in other regions, such as Asia and North America, to identify global best practices and opportunities for international collaboration.

**Technological Innovations:** Investigate the role of emerging technologies, such as digital tools and artificial intelligence, in facilitating the transition to a circular economy and improving resource efficiency.

**References**

Al-Naami, M., Hofmann, K. H., & Griese, K.-M. (2024). The Adoption of Circular Business Models in Germany: An Analysis of the DAX40 Companies. *Circular Economy and Sustainability*, *4*(1), 43–61. https://doi.org/10.1007/s43615-023-00270-5

Arsawan, I. W. E., Koval, V., Suhartanto, D., Hariyanti, N. K. D., Polishchuk, N., & Bondar, V. (2023). Circular economy practices in SMEs: Aligning model of green economic incentives and environmental commitment. *International Journal of Productivity and Performance Management*, *73*(3), 775–793. https://doi.org/10.1108/IJPPM-03-2022-0144

Vol. 8, No.07; 2024

ISSN: 2456-7760

*Circular economy action plan—European Commission*. (n.d.). Retrieved July 2, 2024, from https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en

*Country profiles on Circular Economy in Europe*. (n.d.). Eionet Portal. Retrieved July 2, 2024, from https://www.eionet.europa.eu/etcs/etc-ce/products/etc-ce-reports-2022-5-circular-economy-country-profiles-a-set-of-30-country-profiles-that-summarise-policies-and-initiatives-in-the-area-of-circular-economy

*Country profiles on Circular Economy in Europe | Circular Cities and Regions Initiative*. (n.d.). Retrieved July 2, 2024, from https://circular-cities-and-regions.ec.europa.eu/support-materials/papers-and-reports/country-profiles-circular-economy-europe

Demko-Rihter, J., Sassanelli, C., Pantelic, M., & Anisic, Z. (2023). A Framework to Assess Manufacturers' Circular Economy Readiness Level in Developing Countries: An Application Case in a Serbian Packaging Company. *Sustainability*, *15*(8), Article 8. https://doi.org/10.3390/su15086982

France's green bill adopts new rules for investment. (2023). *Emerald Expert Briefings*, *oxan-db*(oxan-db). https://doi.org/10.1108/OXAN-DB279174

Grzymala, Z., & Grzymala, Z. (1 C.E., January 1). *Circular Economy as a Sustainable Development Marketing Tool* (circular-economy-as-a-sustainable-development-marketing-tool) [Chapter]. Https://Services.Igi-Global.Com/Resolvedoi/Resolve.Aspx?Doi=10.4018/978-1-6684-8681-8.Ch015; IGI Global. https://www.igi-global.com/gateway/chapter/www.igi-global.com/gateway/chapter/325463

Simionescu, M. (2023). The circular economy and sustainable development in the European Union's new member states. *Economics, Management and Sustainability*, *8*(1), Article 1. https://doi.org/10.14254/jems.2023.8-1.1

Smol, M., & Marcinek, P. (2023). Chapter 5—Circular economy—The new innovation wave. In M. N. Vara Prasad & M. Smol (Eds.), *Sustainable and Circular Management of Resources and Waste Towards a Green Deal* (pp. 65–77). Elsevier. https://doi.org/10.1016/B978-0-323-95278-1.00024-3

Thapa, K. (2023, June 21). *Closing the Circular Economy Loophole: On fair governance for European waste exports* [Dissertation]. Utrecht University. https://doi.org/10.33540/1747

van Oorschot, J., Sprecher, B., Rijken, B., Witteveen, P., Blok, M., Schouten, N., & van der Voet, E. (2023). Toward a low-carbon and circular building sector: Building strategies and urbanization pathways for the Netherlands. *Journal of Industrial Ecology*, *27*(2), 535–547. https://doi.org/10.1111/jiec.13375

Wouterszoon Jansen, B., Duijghuisen, J.-A., van Bortel, G., & Gruis, V. (2023). Comparing Circular Kitchens: A Study of the Dutch Housing Sector. *Buildings*, *13*(7), Article 7. https://doi.org/10.3390/buildings13071698