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Center of Excellence CE.Hub.NRW

Driving the transformation into a sustainable and circular economy

Sabine Büttner, Wolfgang Irrek, Uwe Handmann

Circular economy is a central building block in the transition to a sustainable economy. The practice-oriented research project "Prosperkolleg" shows that although SMEs are open to developing their business models in this direction, they need the push and tools to put this concept into practice. Other stakeholders are also looking for support for circular value creation. A Center of Excellence as the proposed CE.Hub.NRW can develop innovation in this field and open up potential in the job market. This article is an updated and expanded version of the RETHINK article "Competence Center Circular Economy NRW".

Circular Economy and SMEs

In 2015, the EU Commission published the first circular economy package, titled "Closing the loop - An EU action plan for the circular economy", which explains different strategies and measures to promote the circular economy. The topic has since gained traction in the political agendas of different countries at national and regional levels. The new version of the action plan as part of the "Green Deal" continued along this path in 2020 with a new focus.

Circular economy is a system that seeks to close production cycles in order to ensure the sustainable use of resources, from product design to production, purchasing, and recycling. Key strategies include the efficient use of raw materials, extended product use, and the return and recycling of products, components and materials.

SMEs play an important role in Germany's manufacturing industry, and are crucial to the implementation of circular strategies. Pressure from large companies on their supply chains and political regulation are expected to continue growing. However, there are still economic opportunities for SMEs in transitioning. Their dependence on raw material suppliers, supply bottlenecks, and fluctuations in raw material prices will be reduced; their position in the supply chain can be reinforced and new business models developed. Sustainability-oriented SMEs will also become more attractive as employers for skilled and junior staff.

Prosperkolleg: Testing the transformation process

Research shows that SMEs often find it difficult to transfer the initially abstract-sounding strategies of the circular economy to their own practice.

This is where the *Prosperkolleg* research project comes in (duration June 2019 - March 2023). Following a practice-oriented approach, the Prosperkolleg analyzes, develops, tests, and evaluates strategies and tools that support SMEs in transitioning towards a circular economy. The regional focus of the project is on the Emscher-Lippe region in the northern Ruhr area and beyond in NRW. The project partners are the Ruhr West University of Applied Sciences (Bottrop campus), the Efficiency Agency NRW, the regional and municipal business development agencies (WiN Emscher-Lippe GmbH, City of Bottrop) and the Prosperkolleg e.V. association.

Procedure and Tools

In order to find out what SMEs have a need for circular measures, the project team contacted over 800 SMEs in NRW via direct telephone contact, emails, networking events, and web seminars. These contacts resulted in 45 introductory discussions and 34 workshops (by the end of 2022), in which individual circular approaches for the respective companies were discussed and developed with different focal points.

Four fields of action were identified as the most important transition points for circular economy: 1. circular product development, 2. supply chains and purchasing of recyclable materials, 3. resource-efficient production, and 4. recovery and remanufacturing & product-service-systems.

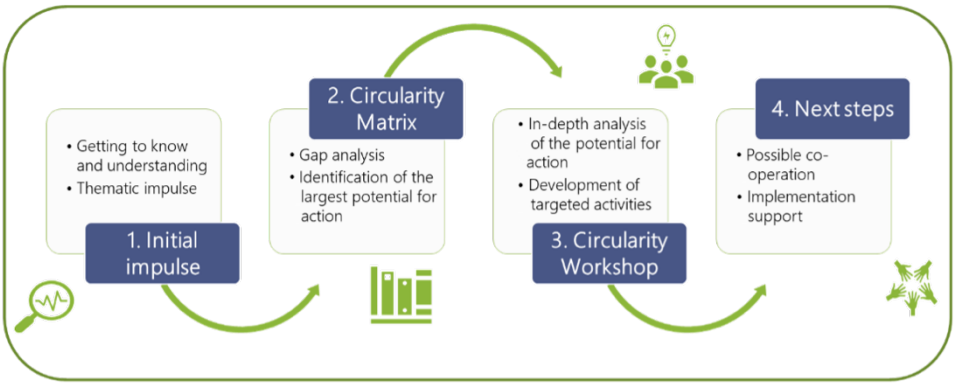

Figure 1 Four-step "Circular Economy Potential Check" from the Prosperkolleg project

Based on what was found, the team developed a four-step "Circular Economy Potential Check" (Fig. 1). It focuses on identifying the company's circular economy potential with the help of a "circularity matrix" and creates measures in prioritized fields of action in a half-day workshop.

A case study with four companies tested the process model with the use of other tools and was able to confirm the central assumption that individual support is helpful and necessary for companies to identify and tap into existing possibilities.

Two results from the study found that circular economic potential and implementation strategies differ based on the initial state of the company, the position in the supply chain, and the objectives. In one case, the focus was on purchasing recyclable materials through cooperation with later stages of the supply chain. Here, specific areas in production were identified and precedent for cooperation with suppliers were noted and tested. Additionally, a database was set up to record the recycled materials and inform stakeholders on what was recycled and for what. In another company, the focus was on circular product development using the principles of eco-design. Here, documents and recycling processes were analyzed in order to identify potential for optimization in product design.

SMEs don't just need support, but also tools for assessment and decision making in the transition to a circular economy. The evaluation matrix for sustainable food packaging developed in the Prosperkolleg project and already field tested is one of these tools. The matrix compares standard food packaging in retail and packaging alternatives based on 32 indicators relating to product protection, circularity, the environment, plant utilization, and communication. By January 2022, 14 companies had already put this tool to use.

Additionally, it is important for companies to continue developing circular strategies through training courses and qualified consultants. The "train-the-trainer" concept of the Prosperkolleg project aims to impart the necessary skills in "microlearning" and workshops.

SMEs also learn from other companies in the Prosperkolleg project's corporate network. "Good practice" examples encourage people to explore what is possible in their own company.

SMEs need continued support in the development of innovative solutions and for problems in areas needing specific circular expertise.

As an example, the Prosperkolleg project Circular Digital Economy Lab (CDEL) has developed a robotized and AI-supported e-waste recycling program using the lab's information and process engineering expertise. Successful collaborations between the CDEL and SMEs prove this to be a viable approach.

The combination of project partner's expertise, research and case studies into the various key areas, regional knowledge, existing network, and stakeholder networking has so far proven to be significant factors to success for the development of a circular economy.

Support for the "first steps"

The experiences of the Prosperkolleg project confirm the findings of the accompanying literature research that without prior knowledge of the concept of circular value creation, SMEs need support in implementing it. A "transformative design competence" (Wuppertal Institute) is needed, along with facilitators to make it happen. The project was able to identify the following recommendations and success factors:

Communicating the concept: Many SMEs are not familiar with the concept of circular economy, with only vague ideas of it, or equating it with recycling, which means important factors are overlooked for the first steps of implementation. Here, it is important to reach out to a wide range of companies on a wide range of different channels, platforms, and networks in different starting positions, to achieve a common understanding.

Low-threshold introductory offers: Because the added value of circular economy is not clear and does not have political, financial, or regulatory incentives, low- threshold offers are needed for the first introduction into the topic. Short, easily accessible informational meetings like web seminars have proven to be successful in this. The connection to already discussed topics (e.g. CO2 savings, supply bottlenecks, shortage of skilled workers) eases the step into these discussions and provides common interest points.

Concretization: The transfer of theoretical concepts and strategies can be difficult for companies when applied to their own supply chains. Examples and good practices, preferable in their own industry, help establish connections and develop ideas. Designated learning locations and application-oriented pilot projects support on-site understanding.

Identification of potential: Due to transitional challenges and the width of the field, eventually the question of "Where do I start?" comes up. The Prosperkolleg's four-step process model (potential check) along with the collaboration with companies has proven successful in identifying fields of action and potential in order to come up with the transition process.

Personal contact: The project has also shown, in spite of restrictions from the pandemic: the personal contact and the trusting relationship built out of it are the base for the successful collaboration with companies. These relationships could, in the case of the Prosperkolleg, build upon the existing relationships for the Prosperkolleg partners, a real plus.

Regional networking of stakeholders: Finally, another success-factor is the exchange between different companies in the region, from the chambers (HWK, IHK) to universities and research institutes to other initiatives and projects in the field of circular economy, that also discussed the joint offers between companies.

Center of Excellence CE.Hub.NRW – a Roadmap

If policymakers want to push for the circular economy as a solution for climate and resource problems, they must invest in better communication, networking, training, and low-threshold support for companies in the start-up phase, especially for SMEs. Companies need trustworthy contacts in the region that promise continuous support.

However, the transition to a circular economy does not just require support for companies; it is a task for society as a whole. Production and consumption patterns, working methods, and lifestyles will have to change in equal measure. Solutions for this issue can be developed through the collaboration between various stakeholders in open innovation processes.

Similar experiences and findings to those of the Prosperkolleg project have already been made in other regional projects in NRW and corresponding competencies have been built up locally.

Therefore, based on this experience and preliminary work, the development of a Center of Excellence CE.Hub.NRW in three dimensions is proposed:

1) Expansion of the developed structures and instruments. What is already offered in the region can be expanded and rolled out more broadly in cooperation with the right partners in the various NRW regions. Important areas to focus on include the expansion of qualification programs, particularly in

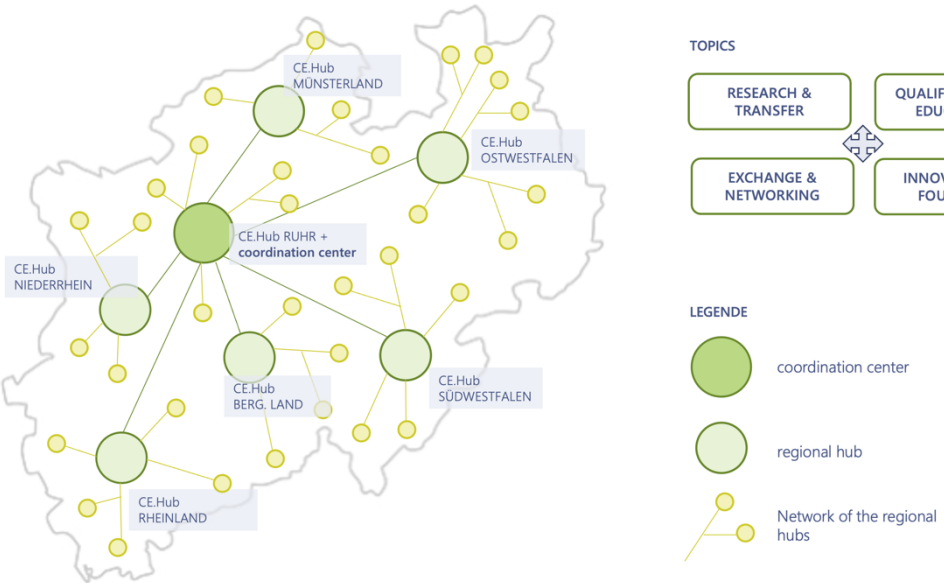

Figure 2 Possible structure and topics of a Center of Excellence CE.Hub.NRW

further training and train-the-trainer concepts, in order to meet the future demand for skilled workers in the field of circular economy, as well as the targeted identification and placement of experts for the specific consulting needs of SMEs. Additionally, digitalization should be more heavily focused on in regards to circular economic solutions and start-ups should be supported in their market entry.

2) Integration of other stakeholders. As the transition to a circular economy is a challenge that affects not only individual companies, but entire value creation networks, the integration of other stakeholders into the process is essential.

   A Center of Excellence CE.Hub.NRW should therefore involve the groups around the core target group of SMEs, including the regional skilled trades, start-ups and existing larger companies, chambers and associations, municipalities (with their administrative areas) and citizens, to initiate co-creative exchange processes between these groups.

   This can, for example, be found in the field of construction, where different stakeholders, including the urban planning department, municipals or private developers, manufacturers, trades and construction companies, and waste disposal, are affected by and involved in the implementation of circular economic strategies.

3) Institutional anchoring. The organizational structure for a Kompetenzzentrum CE.Hub.NRW would be a network of regional CE.Hubs with a central coordinating office, which achieves a broad coverage area through networked partners and a wide range of digitally mediated services (see Fig. 2). The main focus of the regional hubs should be as a point of contact and support for the transition of different companies. The central office, through tools and other content, would have a set of activities for support and coordination, that are planned in the competence fields of research and transfer, qualification and innovation development as well as networking.

   The "innovation" component can be supported by linking with technology and start-up centers in order to further strengthen the innovative power and development of technical solutions - and thus also create new jobs in the respective region. Research laboratories such as the Circular Digital Economy Lab (CDEL) of the Prosperkolleg project can be seen as a central point in this process.

Possible financing of the office could be through a state funding program, the regular acquisition of third-party funds or fee-based services (further training, commissioned research and studies, subscription model).

CE.Hub.NRW is the ideal addition to the existing number of competence centers in NRW and a building block for implementing the NRW innovation strategy.

Series

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Prosperkolleg e.V.
Gladbecker Straße 19b, 46236 Bottrop
Germany
info@prosperkolleg.ruhr

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