

Knowledge sharing & Organizational Learning shape SMEs' attitudes towards a circular economy

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ABSTRACT: SMEs, as main stakeholder in the triple helix academia-industry-government, are central stakeholders in the knowledge-based economy. As such they stand to gain competitive advantages from accessing up-to-date research results and being aware of good-practice in knowledge sharing and dissemination. The paper in hand attempts to identify processes and methods that improve knowledge sharing between academia and industry in the context of using this exchange to promote principles of the circular economy (CE): It does so by looking at how knowledge management and knowledge sharing affect predictors of organizational learning (OL) and consequently shape SMEs' attitudes towards a CE and its underlying business models. This literature review looks at knowledge sharing (KS) frameworks supporting OL both for academics who research the circular economy and its underlying business models and practitioners who manage sustainable SMEs who wish to integrate economically viable principles of the circular economy in their business practices. This paper is limited to identifying knowledge sharing enabling processes and frameworks in heavily knowledge-based environments and can serve as basis for further analysis of other business areas or industrial sectors.

Keywords: circular economy, knowledge-based economy, SMEs, organizational learning, knowledge management

1. INTRODUCTION

To date KM issues surrounding the spread of CE principles among SMEs have received little attention. This is in part due to the fact that the circular economy is a rather recent and evolving phenomenon that responds to an environmental crisis caused by side effects of the traditional line economy in terms of global resource management. And it is also due to the fact that the principles of how value is created and defined in a CE context with focus on sustainability differs to value creation in the traditional line economy.

The triple helix academia-industry-government is a framework within which we assess economic activity and change patterns. It can be used to examine the degree to which innovation has become systemic. Innovation and innovation system patterns are subject to permanent change as the system in which they operate are also in constant flux due to the evolving integrating and differentiating forces (Leydesdorff et al. 2006; Leydesdorff et al. 2012).

This mechanism hold especially true in a knowledge-based economy. While it is rooted in the traditional line economy, the knowledge-based economy can be viewed as a framework and enabler for the overall transition from a linear to a circular economy. Knowledge-based economy, the economy of a 'knowledge society', relies on knowledge as a fundamental economic resource – a resource that is quite unlike any other resource we base economic activity on. Knowledge is a constantly growing resource rather than one that can be depleted. The OECD, the Organization for Economic Cooperation and Development defines knowledge-based economy as "directly based on the production, distribution, and use of knowledge and information" (OECD 1996). This type of economy is valued according to economic indicators such as "creation and diffusion of knowledge". It regards knowledge-based transactions as the main sources of growth and wealth creation. Zhang and Gao (2011) note that "In the society of knowledge-based economy, economic development depends increasingly on the intellectual

capitalization...university regards knowledge innovation and social development acceleration as its social missions...As an independent and equal main body, the university, industry, and government act as the elements of innovation” (Zhang and Gao 2011, p.61).

Leydesdorff (2006) also argues that a knowledge-based economy — as opposed to a traditional, political economy — results from the development of an industry-oriented economy towards one that institutionalizes science and technology and focuses on knowledge as a good that yields a competitive edge. Therefore, knowledge sharing between the three agents of the triple helix is recognized as a key driving force of the economy and its continuous development, notably its development from a line economy toward a circular economy (CE) (Cramer 2020), thus a sustainable economy.

The economic paradigm, as described by Sillanpää et al. (2019), that is driven by the exploitation of natural resources for the production of consumer goods that are destined to end in landfills has come under criticism and spurs the onset of a counter-movement – the circular economy, where value is no longer created through producing and consuming as extensively as possible. CE has made its way into public awareness as a ‘reliable alternative economic concept able to cope with the imminent global sustainability issues, created by the current unidirectional economic model, Linear Economy (LE)’ (Sillanpää 2019, p.1).

Our economic reality is such that traditional business models still prevail. They focus on the bottom line – regardless of whether the business sells a product or service. Generating profit is an acceptable measure of business success. The legal and economic framework in which business operates in Austria today is designed to cater to linear economy principles, and the main challenge of the economy in transition is the move away from conventional measures of success and to find and define new criteria according to which businesses operate and are valued. Innovation hubs, incubators, funded projects and start-up centers act as knowledge sharing frameworks promote new approaches to doing business and support “*Organizations looking to operate in a sustainable manner*”...that “*aim to harmonize economic, social, and environmental outputs and outcomes and look at enabling a value creation that preserves and enhances financial, environmental, social, and human capital*” (Scipioni et al., 2021).

In a world in which value creation through extensive production and consumption is no longer viable, the transition to an alternative, sustainable circular economy, has begun to gain momentum. Proponents of CE are designing and realizing sustainable production-consumption systems. Policy-makers, scientists, and business people acknowledge CE as the alternative economic model to generate economic growth while solving global sustainable development issues and creating closed loops for value recovery.

Organizational learning capabilities have been identified as important factor for the acquisition, creation, storage, sharing and application of knowledge. Kordab et al. (2020) even outline the relationship between organizational learning and sustainable organizational performance. Organizational learning is a social process that involves the integration of new personal, professional and social competencies into one’s own professional reality and can be promoted and sustained by management processes that promote individual development within the framework of an organization’s strategy. Such learning can be positively enforced through transformational leadership, which emphasizes sense making and intellectual stimulation in teamwork and fosters collaborative relations among employees across all levels of an organization’s hierarchy (Begum et al. 2020).

SMEs and academic researchers are important stakeholders of the economy and stand to gain competitive advantages from accessing to up-to-date research results. “*Research on SMEs has shown that they are becoming increasingly aware of the benefits of improving resource efficiency even though... they do not often link them well to the concept of a circular economy. Saving material costs, creating competitive advantages, and new markets are among the main reasons for European SMEs to take action*” (Rizos et al. 2016). In their efforts to take action towards more sustainable business models, SMEs are often adversely affected by poor knowledge sharing frameworks established between academia and practitioners (Cramer 2020; Demestichas et al., 2020; Gera 2012; Ghenta et al. 2018).

The European Union has responded to this evolution in its ‘Strategic Innovation Agenda (SIA) 2021-2027’ (<https://eit.europa.eu/news-events/news/eit-strategy-2021-2027-agreed>) and dedicates research funds to innovation capacity building with the aim of setting up knowledge and innovation communities throughout the region and founding a pan-European innovation ecosystem.

Researchers have spotted a gap between the quality of research results and their impact on the economy, especially on SMEs and on organizational decision-making processes. The paper in hand tries to identify good practice processes and methods that promote knowledge sharing between academia and industry with the aim of making principles of the circular economy more widely known and asks how knowledge management and knowledge sharing affects predictors of organizational learning (OL) (e.g. team structures, shared vision, innovative powers) and thus shapes SMEs’ attitudes towards a CE and its underlying business models.

2. LITERATURE REVIEW

Cantù et al. (2021) list five external categories for both barriers and enablers of organizational change: (1) user behaviour, (2) regulatory bodies, (3) infrastructure, (4) economic aspects in existing markets, and (5) supply chain issues. They also identified organisation-based barriers and enablers on the way to a more sustainable and circular economy: (6) knowledge, (7) a company’s finances, (8) organizational structures and (9) characteristics related to a company’s product.

It can be argued, that in an economy in transition from a line economy to as sustainable circular economy, knowledge management (KM) and knowledge sharing (KT) frameworks such as innovation hubs, incubators, funded projects, and start-up centers support organizational learning (OL). They can act as drives and enablers of change because they can have an impact on user behaviour (mainstreaming more eco-friendly and sustainable behaviour), regulatory bodies (grass roots movements for better implementation of legal frameworks, fight against corruption, awareness programs for sustainability), infrastructure (establishing tech support and promoting waste management systems) existing markets (balancing competition for market shares and resources), and supply chains (increasing trust between partners, establishing collaborative processes).

Studies cited by Begum et al. (2020) suggest that OL plays a decisive role in organizational outcomes and effectiveness and that an organization’s readiness to learn correlates with an organization’s ability to adapt to new market conditions. These findings are expected to hold true for academics who research the circular economy and its underlying business models and practitioners who manage sustainable SMEs and who wish to integrate economically viable principles of the circular economy in their business practices. Rizo et al. (2016) specifically look at the challenges SMEs face and mention the close relation between the SMEs’ managers attitude towards the CE, risk aversion on the part of the managers, cost-benefits assessments and general resistance to change as some key barriers to adopting CE-principles. They further cite a lack of government support, lack of capital and “*lack of information about the benefits of the circular economy*” (Rizos et al. 2016, p. 4) as barriers to introducing circular business models.

Thus, promoting principles of a CE through knowledge management, and organisational learning could support SMEs on their quest for improved sustainability. Communication and dissemination practices referenced to the SECI-knowledge conversion model (Nonaka & Konna 1998; Nonaka 2001; Nonaka & Takeuchi 2012) designed to impact organizational learning between academics and practitioners find their practical application in innovation hubs, incubators, funded projects and start-up centers, why such frameworks merit particular attention. “*Specifically in Europe, CE is regulated via a top-down approach, with governments aligning or creating regional conditions that encourage the proliferation of CE initiatives across the country. In contrast, emerging economies are often characterized by corruption, the absence of strong legislation, and low monitoring and regulation compliance*” (Cantù et al. 2021, p.3).

When it comes to enablers for transformation, Rizos et al. (2016) found that company culture and the attitudes of managers and staff are the prime enablers for working with circular approaches. Here,

knowledge sharing (KS) frameworks such as innovation hubs, incubators, funded projects, and start-up centers can have a major impact in how young entrepreneurs decide to do business. *"SMEs state that the mindset and commitment of the staff is an important aspect to ease the transition to a circular economy model. It is mentioned that for newly founded start-up companies it is relatively easy to adopt circular economy principles, as their company culture develops from scratch, which can be easier than changing practices in existing firms"* (Rizos et al. 2016, p.11).

Cantú et al. (2021) furthermore looked at SME's learning from failure and success when implementing CE principles. In their article, they point out how the lack of institutionalized support promotes more bottom-up initiatives. In particular, they describe how bottom-up strategies for implementing processes that encourage a circular economy were spurred by a relative lack of resources. In particular, they refer to a framework named ReSOLVE, which *"takes the core principles of circularity and transforms them into six implementation action areas: Regenerate, Share, Optimize, Loop, Virtualize, and Exchange"* (Cantú et al. 2021, p.3). In this example, the above-mentioned triple helix model comes to mind: a weak administration does not simply hamper economic evolution: the balance and characteristics of integrating and differentiating forces shifts, not their existence.

Responsible research & innovation (RRI) is a concept that emerged from the discourse on ethics in research and innovation. In 2012, Rene von Schomberg first defined responsible innovation as *"a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products"* (von Schomberg 2012). Whilst von Schomberg's work was inspired by ethical considerations, it can be applied to research and innovation in the social sciences as well. At a point in time where global resources become scant, the question of how we can use them should be elevated to a question of utmost importance in regard to economic behaviour of humankind. According to Auer & Jarmai (2017), RRI tries to reconcile economic growth, competitive advantage, and the well-being of society. It is complementary to the sustainability movement in that it looks to unite societal well-being and innovative progress and views social and environmental considerations as source for economic success and new entrepreneurial activity and thus looks at promoting *socially responsible research and innovation*.

This is where knowledge sharing between academia and the industry faces new challenges. Traditionally, academia and the industry ascribe to a different purpose, a purpose that clearly delineates their respective functions as two distinct triple helix stakeholders. While researchers focus on creating and disseminating research findings, often with limited access to or consideration of practitioners, the latter consecrate few resources to learn about, adopt and utilize current findings. While the paradigm shift from the linear to the circular economy is already well on the way in research & development, putting the principles of the circular economy into practice lags behind due to practical, economic and regulatory issues associated with enabling change in existing structures. Higher education institutes have a lot of catching up to do when it comes to organizing research that is closer to the economic realities of SMEs. And SMEs suffer from a lack of information regarding alternative approaches to engaging in business. Rizos et al (2016, p.4) cite a survey *"of 300 European firms conducted by the FUSION EU co-funded project that showed that most firms had either never heard of the term 'circular economy', or could not understand its meaning. On the positive side, when participants were given a simpler definition of circular economy, involving aspects such as the re-use and recovery of waste materials, the majority responded that they were actually already making efforts to recycle and repair. Companies also identified waste management as a sector that could unlock new business opportunities"*.

To improve collaboration between academics and practitioners, KT enablers, good practice examples and skills to tackle barriers in academia-industry relations promote SMEs' familiarity with circular economy principles. It puts business decision makers in a position to make more informed decisions when it comes to engaging in practices related to the circular economy. Such activity incites socio-economic innovation and change, furthers economic growth and contributes to companies' competitiveness. Such innovation often grows out of the production, dissemination and utilization of

knowledge. This knowledge is a commodity that is often rooted in the research activities carried out at institutions of higher education. Both the industry and the higher education institution thus stand to gain from professionalizing their collaboration and exchange on the way to establishing a sustainable, circular economy.

Kaufmann et al. (2006), point out that the mission, the technological field of activity, the resources and geographic location impact knowledge sharing between academia and the industry. They - like Rizos et al. (2016) – agree that organizational structure and management style are key components to a successful knowledge exchange ecosystem. Kaufmann et al. also list the size of R&D in the respective organizations, market structures and research performance need to be taken into account when analyzing a knowledge sharing framework.

Thus, it is conducive to knowledge sharing between academia and the industry to establish knowledge spaces in which the stakeholders can collaborate and foster the development towards a CE. Since communication plays a major role in successful knowledge sharing, ways need to be found to communicate knowledge in such a way that research findings are readily accessible and adoptable by SMEs. Knowledge accessibility becomes part of a knowledge creation and conversion process.

3. CONCLUSIONS

The long-term impact of knowledge sharing (KS) frameworks such as innovation hubs, incubators, funded projects, and start-up centers on the overall economy in terms of change agents in a transition towards more sustainability and even towards a full-fledged circular economy (CE) remain to be analysed. Research suggests that the extent to which KS frameworks such as innovation hubs, incubators, funded projects, and start-up centers enable newly founded companies to embrace sustainable or circular business models, but long-term effects need to be monitored.

The figures below are taken from Rizos et al. (2016, p.11), who analysed 52 business case studies that were published on the GreenEcoNet platform. Of the 52 case studies, 30 offered information regarding circular economy activities. The figures clearly show that company culture is the main driver for change. They also show, that networking and network-related support are of importance. This may be related to the fact that start-ups adopt principles of a circular economy more readily than established companies, because they grow out of a start-up ecosystem in which flat hierarchies, collaboration and networking are highly valued. Whether or not the importance of these aspects is related to certain industries remains to be seen.

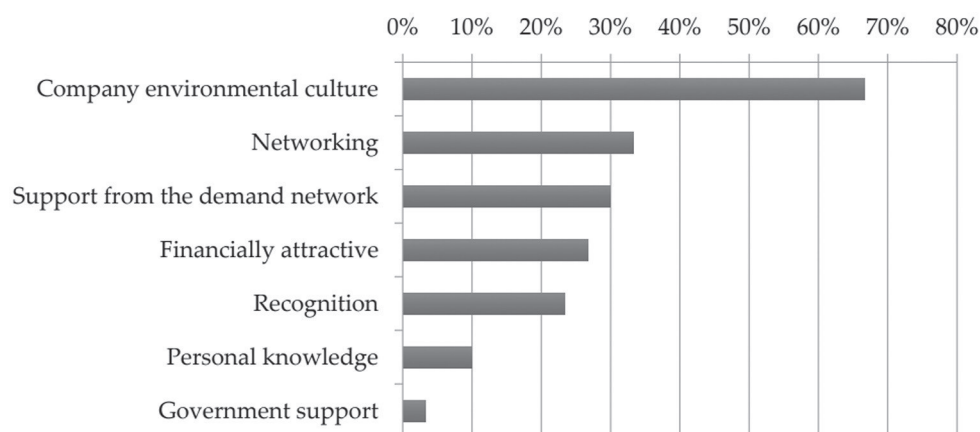


Fig. 1: Percentage of SMEs mentioning enablers for circular economy principles (taken from Rizos et al. 2016, p. 11)

The information regarding enablers for circular business activity can be compared to the perceived barriers in the very same study. The figure below indicates the obstacles for introducing principles of circular economy, as mentioned in the SME case studies published on the GreenEcoNet platform and analysed in Rizos' sample:

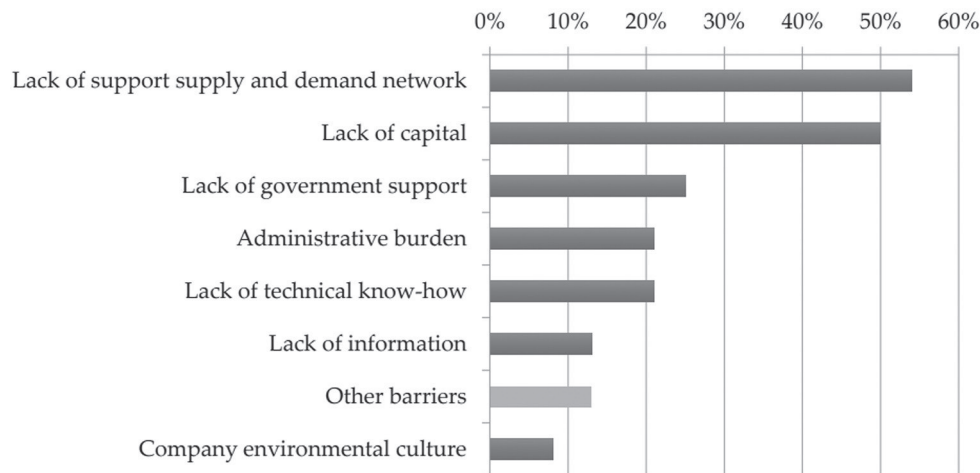


Fig. 2: Percentage of SMEs mentioning barriers for circular economy principles (taken from Rizos et al. 2016, p. 11)

Additionally, one of the core issues surrounding the transition from a linear to a sustainable circular economy is rarely touched upon: consumer behaviour. Many efforts to transform widely accepted economic practice focus on integrative approaches rather than disruptive approaches. At the core, there is a heavy emphasis on consumption as motor and as gauge for economic performance in developed and developing societies alike. One core challenge – consumer behaviour – is rarely addressed. The majority of research focuses on economic transition and transformation rather than a larger transition and transformation in society.

In his work “Sustainability: A History”, Caradonna estimates that “the practices inspired by the concept of sustainability could give rise to the world’s third major socio-economic transformation, after the Agricultural Revolution...and the Industrial Revolution.” He goes on to describe sustainability as ‘a corrective, a counterbalance’ to the ‘unsustainable ecological assault on the planet that was triggered 250 years ago with the onset of industrialization’ (Caradonna 2014, p.3).

It can be argued that the transition from the agricultural society to the industrialized society was accompanied by major sociological transformations. The roles of people in the system have changed and thus allowed and carried the economic transformation. The industrial revolution revolutionized more than just the way people earned a living, it revolutionized the way people live. It transformed the economy, administration and education.

With this in mind, one should probe the role of innovation hubs, incubators, funded projects and start-up centers in the currently ongoing socio-economic transformation and question what role they play in it and how they can contribute to an all-encompassing, possibly disruptive and measurable change.

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