

Exploring the Challenges and Opportunities of SMEs' Transition to Circular Economy: Case Study

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Abstract— The principles of reduce, reuse, and recycling form the basis of the Circular Economy (CE) framework. Organizations can gain a competitive edge by adopting CE, which is in line with the growing demand from stakeholders for more sustainable business practices. SMEs face several challenges to adapt CE for their business models. This paper presents the findings of a case study that examined an Australian SME's successful adoption of CE principles. The study outlines the challenges and opportunities involved in a CE transition by analyzing the data gathered through semi-structured interviews. The transition of CE is impeded by several significant challenges, including ambiguous governmental policies, customers indifference, high start-up costs, and technological barriers. However, SMEs have the potential to reap benefits by embracing the adoption of CE practices, provided they successfully navigate the challenges associated with it. By doing so, they can effectively bolster the brand image, foster more interaction with stakeholders, mitigate glasshouse gas (GHG) emissions, and distinguish the market offerings.

Index Terms— Case Study, Circular Economy, Medical Waste, Recycle, SMEs, Waste Management.

I. INTRODUCTION

The central theme of Circular Economy (CE) as an economic paradigm lies in the concepts of balancing economic development with environmental sustainability. CE has gained traction in several disciplines of study because of the promising outcomes that differ from the usual linear economic approach of take-make and dispose. Various case study methodologies have been used to explore the practical implications of implementing CE principles. Although there are different ways of defining what CE is, the basic ideas rooted in the 3R principles of “reduce, reuse, and recycle” [1] are most prevalent. The Ellen MacArthur Foundation [2] has also done some pioneering work in the CE field.

Adapting existing business models to align with CE principles is a challenging task and many companies do not have internal resources and external support to be able to make such a transition. CE-related activities may be seen as difficult to implement because their execution requires additional resources and incurs greater expenses for businesses [3]. Additional research proved that implementing the core principles of CE necessitates strong technical know-how as well as excellent product and service offerings [4]. The capacity of a company to develop and adapt old business models to more environmentally friendly alternatives such as CE necessitates changes at the infrastructural, human, and financial levels [5].

For most organisation, including Small and Medium Enterprises (SMEs) sticking to the usual linear approach of taking, making, and disposing of products is an easier alternative to the more challenging CE based ideas. In developing countries, SMEs mostly operate in the unorganized sector, and face challenges related to waste management, technical know-how and access to funds when it comes to implementing CE [6]. In developed countries like Australia, ambiguous government policies and lack of support and knowledge sharing from relevant trade associations, is a major hurdle [7]. It is no surprise therefore, that management of SMEs is largely focused on ensuring short-term economic gains over capital and resource intensive approaches like CE [8].

Challenges aside, CE principles can lead to long-term gains that can help organizations achieve competitive advantage. Reference [9] posits that economic performance is linked to better environmental performance. Further, it has been found that adoption of CE practices could lead to a drop in emissions by as much as 83% by 2050 [10]. When SMEs focus on reducing their carbon footprint by adopting CE, they can realize benefits like improved brand image, better return on investment and enhanced productivity due to a more engaged workforce [11].

The exploratory nature of Circular Economy (CE), its analysis and implementation from theory to practice calls for a Case Study approach [12]. Case studies have helped draw insights from various industries, socio-economic settings, geographical locations and get varied stakeholders' perspectives [12]. This study thus uses case study methodology and semi-structured interview to collect and analyze data. An SME in Australia, that has adopted CE principles was identified. During the interview, challenges and opportunities from the literature were discussed and further insights solicited from the respondent. The findings from the literature and case study are presented in the following sections. The outputs of the research help to fill the current gap in the limited understanding of practical implications of a CE transition and subsequent

waste management for an SME.

II. CE TRANSITION

A. CE Challenges

It is acknowledged that both Multi-National Corporations (MNCs) and Small and Medium Enterprises (SMEs) do not function in isolation. The success or failure of an organization is influenced by a combination of internal and external controls. This argument holds true in the context of implementing concepts of CE. External influences include government policies, consumer and industry trends, and SC networks, while internal forces are the company's resource strength, talent acquisition, and management commitment [13]. While internally an SMEs transition to CE could be a result of management's short-term profit driven outlook. Reference [3] are of the opinion that two sets of external barriers namely, lack of human and financial resources and complex regulatory environment pose a significant barrier for a CE transition by SMEs. Many MNCs have internal resources, Supply Chain (SC) connections and the political clout to make a smoother transition towards CE. When it comes to SMEs though they tend to have far limited resources at their disposal [14]. Several factors like unorganized labor force, lack of funds and resources, competition and unfavorable policies prove to be major challenges when it comes to SMEs adapting CE [15].

In their study, Reference [16] highlights the presence of cultural hurdles, including a lack of customer interest and understanding, as well as a reluctant organizational culture. These factors are identified as significant obstacles to the adoption of a CE. In addition, they demonstrate that these internal factors are exacerbated by market barriers, which in turn are caused by a lack of government intervention and support. Reference [17] investigated and analyzed the primary obstacles hindering the implementation of CE. These barriers were categorized into technological, policy and regulatory, financial, and economic, performance metrics, customer, and social categories. For example, [18] also found that the utilization of technology is crucial for the successful implementation of CE. Hence, the implementation of CE related programs may encounter challenges in achieving practical success due to constraints in technical and technological capacities and resources, management culture, unfavorable government policies, consumer perception amongst others (Table 1).

Table 1 CE Challenges

CE challenges	Description	Resources
High Initial Investment	In the short run, the initial expenses are substantial, encompassing activities such as machine retooling, factory relocation, establishment of new distribution and logistics systems, and personnel retraining.	[19]
Product design complexity	A product comprises many components that are interconnected in ways that render their disassembly laborious and time-consuming. Consequently, it appears more advantageous to manufacture a new product rather than recycle the materials.	[20]
Lack of technical inputs and knowhow	One of the challenges encountered in the field of life cycle assessment (LCA) of manufactured and remanufactured products is the absence of sufficient technical expertise to effectively monitor the quality of products throughout the LCA and ensure the quality of remanufactured goods.	[21]
Organization Culture	Organizational hierarchies impose limitations on the extent of innovation and adaptability. The strategies for CE adoption are influenced by factors like the priorities set by managers, their level of risk aversion, and their comfort with bottom-up decision-making.	[22]
Government policies	The absence of well-defined policies. The absence of subsidies and assistance in addressing initial expenses. The current environmental legislation exhibits inherent incompatibilities with organizational goals.	[23]
Consumer perception	Insufficient understanding or knowledge. There is a lack of clear branding and warranty information for items manufactured utilizing recycled materials. Consumers tend to regard newly manufactured things as of superior quality compared to those that have been recycled.	[24]

B. CE Opportunities

Adopting CE principles necessitates a significant shift in managerial attitude and stakeholder participation, which might persuade a) management of sustained competitive advantage and b) stakeholders of improved socioeconomic benefits. Many sectors currently rely on the exploitation of virgin resources to meet the growing demand for a variety of products. One of the most significant advantages of implementing CE is reduced reliance on and independence from depleting natural resources [25]. The linear model generates waste at the end of a product's life cycle and results in the loss of precious raw materials which still hold economic value. A more efficient use of these resources can result in lower manufacturing costs and less resources used per product [26]. In their research for adoption of CE practices by SMEs in the EU and the UK, [27] linked CE fields of actions¹ to positive impacts on the economic, environmental, and social performance of the firms. Interestingly, it was the growing demand by the end user to buy products from an environmentally conscious supplier that was a motivating factor for SMEs to incorporate CE practices. This helped them gain competitive advantage, attract ethical investment, and increase business revenue in the long run [27].

Similar research for the EEE² industry's attempt to incorporate CE in its supply chain showed several benefits at the environment, economic and social front [28]. Following CE principles of recycling meant extracting value from the waste and using secondary resources for making new products. This resulted in the environmental benefit of reduction in waste generated at the end of life. Combined with use of renewable energy sources, this meant an overall reduction in CO2 emissions to mitigate the impacts of climate change [28]. Economic benefits included reduction in costs due to use of recovered components that are 40-60% cheaper than new ones [29]. There are also opportunities in designing possible new streams of revenues from serviced models of repair and maintenance [24]. With rapidly changing legal and compliance requirements around environment, an SME following CE practices can ensure adherence to such laws and avoid litigation fees and hassles [28]. Table 2 summarizes the some of the opportunities of adopting CE principles.

Table 2. CE Opportunities

CE Opportunities	Description	Resources
Improved brand image	Consumers and investors are looking to be associated with organizations that take care of the environment. By having a positive impact on people and planet and not only profits, but companies can also improve their image and make their brands more recognizable and admired by stakeholders.	[22]
Reduction in production costs	Lean production techniques that save resource dependency. Innovative approaches to use alternate, cheaper and environment friendly methods of production. Using waste as a cheaper resource material to manufacture goods.	[32]
Growth of business	An increased opportunity to differentiate and get third party eco-certifications to be labelled as a responsible organization. This attracts a growing base of consumers, investors, and government subsidies.	[15]-[33]
Reduction of GHG emissions	Use of greener, renewable energy sources. Resource efficiency and reduced dependency on fossil fuels. Recycling to minimize the need to extract virgin resources and cleaner production targeting emissions related to material use.	[15]
Improved productivity	Satisfied employees, who feel a sense of pride working for a sustainable SME, tend to give their best at work. They feel motivated to ensure the organization does well and take personal and collective responsibility for it.	[15]-[16]
Social well being	Taking care of the local environment and having a positive impact on the health of the community results in social well-being and a sense of acceptance and appreciation for the company. This results in the growth of loyal customers.	[15]-[16]-[33]

III. RESEARCH METHOD

A. Case Study Approach

This research effort is based on a qualitative case study-based approach. Case studies are found to be appropriate for understudied issues that need extensive, exploratory research as they give an empirically rich description of a complicated

¹ Design, Procurement, Production, Distribution, Consumption and Recovery

² Electrical and Electronic Equipment (EEE)

phenomenon [30]. To gain insights into CE challenges and opportunities for SMEs, we must understand how SMEs and their management adopt CE principles and practices. This can be best analyzed by talking to and engaging in conversations with the people who deal with the challenges on a daily basis [30]. The study is also motivated by Ref [31] research, in which he proposes a CS strategy well suited for projects directed by truth and reality as perceived by the players living and experiencing it.

The data collection tool for this study was a semi-structured interview carried out with the owner/founder of an SME in Australia. The SME was selected from an online portal, Acehub³, which has a list of SMEs in Australia who have adapted their business models based on CE principles.

B. SME In Health Care Industry

The company is an Australian start up, that works with the healthcare industry to provide circular solutions to its single use plastic waste problem. Founded in 2021, it employs 10 people and sits under the umbrella of a bigger company that has various ventures ranging from construction to pharmaceuticals and provides several services-based solutions. The venture is the brainchild of its founder, who had earlier worked as a medical equipment supplier to the healthcare sector for more than 15 years. The growing pressure from customers to deal with the end-of-life disposal of the very equipment that they used to supply led to the idea of starting this company. According to a report published by HCWH, Europe⁴ [32], single-use plastic items like gloves, PPE, Wipes, IV bags etc., account for more than 50% of plastic items used in the NHS (National Health service) supply chain. The healthcare sector in the US produces tons of plastic waste and 91% of that is not recycled, ending up in landfills, causing a lot of environmental damage [33]. In Australia, the healthcare sectors' reliance on single use plastics was exposed during the Covid pandemic. A single large Hospital in Victoria alone saw its clinical waste go up by 40%, during Covid. The sector accounts for 7% of Australia's Total GHG emissions [34].

The SME realized the challenge, but also the gap that existed in the recycling of the enormous amount of medical waste being generated daily, exasperated further by the covid-19 pandemic. The pandemic resulted in excessive usage of single use plastic gloves, face masks and hand sanitizer bottles by the public. At the health care facilities, the plastic swabs, testing kits and PPE equipment generated additional waste that needed to be managed. The SMEs focus is to divert the plastic waste from landfills, by designing circular solutions that circulate the ingredients back into some reusable format based on CE concepts. As an Australian first to tackle the health care's single use plastic waste problem, the company does the research and development in identifying what types of plastics can be put through the recycling process. It works in partnership with various healthcare facilities like hospitals, pathology labs, nursing homes etc. to help them segregate waste which is then collected by the company. Involved with the reverse logistics part, it helps close the loop of the business operations of the health care providers.

The company focuses on designing customised solutions that allow for smooth disposal of waste without impeding patients' health and safety. Based on the four pillars of education, scientific research, Technology and managerial intent, the company has set up a circular ecosystem that lets its partners work in collaboration to find solutions to the plastic dispose problem. For example, the outer packaging that is used to cover the instruments needed to perform a surgery can be reclaimed and recycled to form fresh packaging. The SME thus acts as service solution provider, wherein it lets the organization focus on its core activities and not stress about handling its plastic waste. With the intent to divert medical plastic waste away from landfills the company currently, self-consumes the end products in the form of recyclable polymers. As of now, they are solely used for internal consumption by the parent company to act as raw material inputs for various industries that the company is involved in. But, as the director identified, Australia being a very small market they would need to expand globally to achieve economies of scale.

C. Challenges and Opportunities for the SME

The findings from the interview identify some major challenges that the SME faced in implementing the CE principles in its business model. In Australia the '*non-favourable government policies and laws*' [23], like the strict bio security and environmental laws, were found to complicate the problems for the SME. For example, when it comes to composting some of the healthcare waste, '*the prevention of soil quality*' and other such strict composting laws, prove a major deterrent in using composting as a sustainable alternative. According to the owner, "*lot of Australian standards impede adoption of CE principles like those related to composting and recycling.*" The government policies are non-supportive, and the laws and standards laid out in complex terminology, that are confusing and open to interpretations.

While designing a medical device, global standards like the ISO-10993⁵ (Biological evaluation of medical devices) assess the biological safety of the device and it requires that these standards be met all along the value chain of a company. With the manufacturing and remanufacturing of medical devices not done in Australia, it is very tough to ascertain such a compliance for recycled goods. From the SMEs experience, this is largely because the supply chain network of a typical SME in Australia maybe spread across the globe.

³ <https://acehub.org.au/>

⁴ Healthcare Without Harm. <https://noharm-europe.org/>

⁵ <https://www.iso.org/standard/68936.html>

'High start-up costs' [19] was another major deterrent, the SME faced. These costs typically relate to importing of machinery needed for recycling/remanufacturing; shipping costs; high labour costs, and training of employees to use related technologies. The SC partners who may not share the vision of the SME, are also not motivated to invest in transitioning to and adopting CE principles. Coupled with weak economic incentives [23], due to the lack of demand of recycled goods in the Australian market, the SME management was initially not very keen on diverting its limited resources to CE practices.

The SME admitted that CE adoption in Australia is a major challenge. However, having transitioned to CE and slowly building up the capacity to work with supply chain partners the SME was able to realise certain benefits. The reduction of GHG emissions [2], was highlighted as one of the most beneficial outcomes of adopting CE principles. This is largely because it helps the SME stay compliant with the legislative requirements around minimising GHG emissions. SMEs can thus, have a positive impact on the environment and at the same time, ensure they follow government regulations. Another benefit of implementing CE principles was the positive image that it created for the brand [21]. At the consumer end, generating social well-being [14]-[15] through CE practices was another way that the SME was able to attract a set of loyal customers. By diverting tons of medical plastic waste away from the landfills, the SME created an image of itself, as an organisation that is concerned about the health of the local environment and of the people of the community. It resulted in the company earning a social license to operate [35], a sense of acceptance and appreciation by the community. The combined result of an improved brand image and customer acceptance, saw an overall growth in business perspectives [36] for the SME.

Other prospects examined in the literature were also discussed during the interview, however they were less perceived as achievable or regarded as a direct consequence of embracing the concepts of CE. The feasibility of achieving the "reduction in production costs" [37] was hindered by the substantial expenses associated with transitioning to environmentally friendly and sustainable energy sources. Additionally, due to Australia's limited market size for the recycled polymers produced by the SME, it was found that cost reduction is not feasible without the attainment of economies of scale, through the exploration of bigger external markets. Similarly, it was observed that the motivation of employees and suppliers was not found to be associated with the SMEs adoption of CE. The incentives for performance were primarily tied to monetary gains and the prevailing organisational culture.

IV. DISCUSSION AND CONCLUSION

Case studies serve as a valuable tool for comprehending and empirically examining the insights derived from literature within real-life contexts. With this case study approach, we were able to examine and explore the challenges and opportunities for CE transition from literature, in line with the findings from an SME in Australia. Our study shows that governmental policy issues, such as the absence of a comprehensive taxation policy, limited availability of grants and subsidies, and the presence of rigorous compliance related regulations serve as obstacles to the widespread adoption of CE practices and deter long-term investments in this area. Initial investments linked to adopting new technology and equipment, training of staff, and getting licenses and approvals, are also being grouped as other barriers for SMEs. Moreover, it is hard to establish a direct link between CE transition and economic benefits. Currently, in many economies in developed countries, such as Australia there is lack of awareness and guarantee of the quality of recycled/refurbished goods. As such, there is less demand, as compared to brand new products. On the benefits side, it can be summarized that companies can gain competitive advantage, better stakeholder engagement, and attract ethical investments, by managing their waste and adapting business models to more sustainable alternatives like CE. By contributing to a greener environment and healthier communities, SMEs can grow brand image and reputation. They may not be able to adopt all CE principles and create demand for recycled goods, however they can leverage the positive image to sell other goods and services that the SME has to offer.

REFERENCES

- [1] Farooque, M., Zhang, A., Thurer, M., Qu, T. & Huisingh, D. (2019). Circular supply chain management: A definition and structured literature review. *Journal of Cleaner Production*, 228, 882–900. <https://doi.org/10.1016/j.jclepro.2019.04.303>
- [2] MacArthur, E., Zumwinkel, K., & Stuchtey, M. R. (2015). Growth within a circular economy vision for a competitive Europe. Ellen MacArthur Foundation.
- [3] Garcia-Quevedo, J., Jove-Llopis, E., & Martinez-Ros, E. (2020). Barriers to the circular economy in European small and medium-sized firms. *Business Strategy and the Environment*, 1–15. <https://doi.org/10.1002/bse.2513>
- [4] Sharma, Y. K., Mangla, S. K., Patil, P. P., & Liu, S. (2019). When challenges impede the process: For circular economy-driven sustainability practices in food supply chain. *Management Decision*, 57(4), 995–1017. <https://doi.org/10.1108/MD-09-2018-1056>
- [5] Aranda-Uson, A., Portillo-Tarragona, P., Scarpellini, S., & LlenaMacarulla, F. (2020). The progressive adoption of a circular economy by businesses for cleaner production: An approach from a regional study in Spain. *Journal of Cleaner Production*, 247 (119648). <https://doi.org/10.1016/j.jclepro.2019.119648>

- [6] Garcés-Ayerbe, C., Rivera-Torres, P., Suárez-Perales, I. & Hiz, D. I. L. la. (2019). Is It Possible to Change from a Linear to a Circular Economy? An Overview of Opportunities and Barriers for European Small and Medium-Sized Enterprise Companies. *International Journal of Environmental Research and Public Health*, 16(5), 851. <https://doi.org/10.3390/ijerph16050851>
- [7] Sohal, A. & Vass, T. D. (2022). Australian SME's experience in transitioning to circular economy. *Journal of Business Research*, 142, 594–604. <https://doi.org/10.1016/j.jbusres.2021.12.070>
- [8] Cassells, S. & Lewis, K. (2011). SMEs and environmental responsibility: do actions reflect attitudes? *Corporate Social Responsibility and Environmental Management*, 18(3), 186–199. <https://doi.org/10.1002/csr.269>
- [9] Dixon-Fowler, H. R., Slater, D. J., Johnson, J. L., Ellstrand, A. E. & Romi, A. M. (2013). Beyond “Does it Pay to be Green?” A Meta-Analysis of Moderators of the CEP–CFP Relationship. *Journal of Business Ethics*, 112(2), 353–366. <https://doi.org/10.1007/s10551-012-1268-8>
- [10] Ellen MacArthur Foundation (EMF), 2015a. Towards the Circular Economy: Economic and Business Rationale for an Accelerated Transition. https://www.ellenmacarthurfoundation.org/assets/downloads/TCE_Ellen-MacArthurFoundation_9-Dec-2015.pdf
- [11] Prieto-Sandoval, V., Jaca, C., Santos, J., Baumgartner, R. J. & Ormazabal, M. (2019). Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises. *Corporate Social Responsibility and Environmental Management*, 26(6), 1473–1484. <https://doi.org/10.1002/csr.1761>
- [12] Crowe, S., Cresswell, K., Robertson, A., Huby, G., Avery, A. & Sheikh, A. (2011). The case study approach. *BMC Medical Research Methodology*, 11(1), 100. <https://doi.org/10.1186/1471-2288-11-100>
- [13] Prieto-Sandoval, V., Ormazabal, M., Jaca, C. & Viles, E. (2018). Key elements in assessing circular economy implementation in small and medium-sized enterprises. *Business Strategy and the Environment*, 27(8), 1525–1534. <https://doi.org/10.1002/bse.2210>
- [14] Dey, P. K., Malesios, C., De, D., Chowdhury, S. & Abdelaziz, F. B. (2019). Could lean practices and process innovation enhance supply chain sustainability of small and medium-sized enterprises? *Business Strategy and the Environment*, 28(4), 582–598. <https://doi.org/10.1002/bse.2266>
- [15] Dey, P. K., Malesios, C., De, D., Budhwar, P., Chowdhury, S. & Cheffi, W. (2020). Circular economy to enhance sustainability of small and medium-sized enterprises. *Business Strategy and the Environment*, 29(6), 2145–2169. <https://doi.org/10.1002/bse.2492>
- [16] Kirchherr, J., Reike, D. & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, 127, 221–232. <https://doi.org/10.1016/j.resconrec.2017.09.005>
- [17] Galvão, G. D. A., de Nadea, J., Clemente, D. H., Chinen, G., & de Carvalho, M. M. (2018). Circular economy: Overview of barriers. *Procedia CIRP*, 73, 79–85
- [18] Agyemang, M., Kusi-Sarpong, S., Khan, S. A., Mani, V., Rehman, S. T., & Kusi-Sarpong, H. (2019). Drivers and barriers to circular economy implementation. *Management Decision*, 57(4), 971–994.
- [19] Preston, F. (n.d.). A Global Redesign? Shaping the Circular Economy. https://www.chathamhouse.org/sites/default/files/public/Research/Energy%20and%20Environment%20and%20Development/bp0312_preston.pdf
- [20] Jaeger, B. & Upadhyay, A. (2020). Understanding barriers to circular economy: cases from the manufacturing industry. *Journal of Enterprise Information Management*, 33(4), 729–745. <https://doi.org/10.1108/jeim-02-2019-0047>
- [21] Rizos, V., Behrens, A., Gaast, W. van der, Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M. & Topi, C. (2016). Implementation of Circular Economy Business Models by Small and Medium-Sized Enterprises (SMEs): Barriers and Enablers. *Sustainability*, 8(11), 1212. <https://doi.org/10.3390/su8111212>
- [22] Chowdhury, S., Dey, P. K., Rodríguez-Espíndola, O., Parkes, G., Tuyet, N. T. A., Long, D. D. & Ha, T. P. (2022). Impact of Organisational Factors on the Circular Economy Practices and Sustainable Performance of Small and Medium-sized Enterprises in Vietnam. *Journal of Business Research*, 147, 362–378. <https://doi.org/10.1016/j.jbusres.2022.03.077>
- [23] Su, B., Heshmati, A., Geng, Y. & Yu, X. (2013). A review of the circular economy in China: moving from rhetoric to implementation. *Journal of Cleaner Production*, 42, 215–227. <https://doi.org/10.1016/j.jclepro.2012.11.020>
- [24] Lieder, M. & Rashid, A. (2016). Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, 115, 36–51. <https://doi.org/10.1016/j.jclepro.2015.12.042>
- [25] Stahel, W. R. (2016). The circular economy. *Nature*, 531(7595), 435–438. <https://doi.org/10.1038/531435a>
- [26] Bocken, N., Short, S., Rana, P. & Evans, S. (2013). A value mapping tool for sustainable business modelling. *Corporate Governance*, 13(5), 482–497. <https://doi.org/10.1108/cg-06-2013-0078>
- [27] Dey, P. K., Malesios, C., Chowdhury, S., Saha, K., Budhwar, P. & De, D. (2022). Adoption of circular economy practices in small and medium-sized enterprises: Evidence from Europe. *International Journal of Production Economics*, 248, 108496. <https://doi.org/10.1016/j.ijpe.2022.108496>
- [28] Bressanelli, G., Pigosso, D. C. A., Saccani, N. & Perona, M. (2021). Enablers, levers and benefits of Circular Economy in the Electrical and Electronic Equipment supply chain: a literature review. *Journal of Cleaner Production*, 298, 126819. <https://doi.org/10.1016/j.jclepro.2021.126819>

- [29] Kumar, S., & Putnam, V. (2008). Cradle to cradle: Reverse logistics strategies and opportunities across three industry sectors. *International Journal of Production Economics*, 115(2), 305-315.
- [30] Brydges, T. (2021). Closing the loop on take, make, waste: Investigating circular economy practices in the Swedish fashion industry. *Journal of Cleaner Production*, 293, 126245. <https://doi.org/10.1016/j.jclepro.2021.126245>
- [31] Stake, R. (1995). Data Gathering. In T. Oaks & C. Sage (Eds.), *The art of case study research* (pp. 49–68).
- [32] Zotinca, A. (2021). Towards plastic-free healthcare in Europe. <https://noharm-europe.org/towards-plastic-free-healthcare>
- [33] LaBeaud, N. J. and D. (n.d.). How Should US Health Care Lead Global Change in Plastic Waste Disposal? *AMA Journal of Ethics*.
- [34] Terzon, E. (n.d.). Australia’s healthcare system is generating tonnes of COVID waste. Doctors and nurses are trying to do something about it. <https://www.abc.net.au/news/2021-10-13/healthcare-waste-covid-plastic-recycling-reusing-hospitals/100533552>
- [35] Nelsen, J. L. (2006). Social license to operate. *International Journal of Mining, Reclamation and Environment*, 20(3), 161–162. <https://doi.org/10.1080/17480930600804182>
- [36] De, D., Chowdhury, S., Dey, P. K. & Ghosh, S. K. (2020). Impact of Lean and Sustainability Oriented Innovation on Sustainability Performance of Small and Medium Sized Enterprises: A Data Envelopment Analysis-based framework. *International Journal of Production Economics*, 219, 416–430. <https://doi.org/10.1016/j.ijpe.2018.07.003>
- [37] Ritzén, S. & Sandström, G. Ö. (2017). Barriers to the Circular Economy – Integration of Perspectives and Domains. *Procedia CIRP*, 64, 7–12. <https://doi.org/10.1016/j.procir.2017.03.005>