The perspective of SMEs on the challenges of the circular economy in the 21st century Hungary

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ABSTRACT

As the world is facing numerous global ecological issues at once, the question arises of what will help mitigate and solve contemporary matters related to resource management or climate change without devastating the economies. Fortunately, the widespread application of the circular economy would help countries worldwide simultaneously ensure economic growth without significant environmental deterioration, essentially decoupling the two factors. While Hungary's contribution to environmental problems is not significant in absolute terms, the economic sector's circular transition could help the country decrease its impact in relative terms and pave the path for a green economy. Nevertheless, companies, especially SMEs, tend to struggle the most with the initial phases of the shift thus it is crucial to assess the factors that prevent and support their transition.

KEYWORDS

circular economy, circular transition, circular business models, European Union, Hungary, sustainable development, barriers and enablers, SMEs, sustainable business transformation

INTRODUCTION

Contemporary trends of natural resource consumption since the first Industrial Revolution have had devastating effects on our environment. While issues around humanity's resource

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management did not appear in the 18th and 19th centuries, environmental scientists have been indicating that the current consumption trends are unsustainable since the second half of the 20th century. While the ‘rational action’ of humanity has been determined by economic criteria thus far, people will need to start taking actions based on how to best avoid ecological risks and how to make environmental profits. Spaargaren and Van Vliet (2000) underline that we need to “reconsider all the distinct lifestyle segments or sectors from an environmental management perspective” (57) in order to develop a more sustainable lifestyle. Dasgupta and Ehrlich (2013) also underline that contemporary consumption behavior has dire externalities, for example, in the form of climate change. In spite of environmental scientists and scholars constantly calling for people’s changes in their consumption, the current state of ecological destruction demonstrates that these warnings have been mostly ignored.

The Club of Rome has been determined to highlight the convergence of environmental degradation and economic growth since the publication of *Limits to Growth* (Meadows et al., 1972). While the book was written almost half a century ago, its core messages still stand today: the contemporary population growth and the present rate of economics are not sustainable much beyond 2100. The debunking of the environmental Kuznets curve verified that environmental degradation is deeply embedded in economic growth, making these two variables inseparable (Stern et al., 1996). What makes the current global consumer trends even more worrying is that the “material use in a group of major emerging economies. . . has grown at an accelerated pace in the twenty-first century” (Krausman et al., 2017, 658); this further stipulates that the more developed a country wants to become, the more materials they use under contemporary methods. It also means that consumption will keep exponentially growing as more countries aim to escape poverty and hunger.

The current system is characterized by the qualities of a linear economic system. In the linear economy (LE), raw materials are taken out of Earth’s natural resources to manufacture products that consumers use and eventually throw away. This is the so-called take-make-waste economy, where the finite amount of natural resources is not considered and environmental degradation is regarded as a negative externality. Essentially, economic growth directly influences ecological destruction thus the level of economic development partly depends on natural resource input and loss of biodiversity, which consequently leads to the ever-increasing level of greenhouse gas (GHG) emissions and worsening climate change. In the current LE system, the more the economy grows, the higher pressure is put on the environment (Sariatli, 2017; Jørgensen and Pedersen, 2018; Sørensen, 2018).

As opposed to the LE, the principles of the circular economy (CE) could help humanity reach eco-environmental decoupling thus separating economic growth from ecological destruction. Even though there have been over 100 definitions of the CE, they universally fall into two groups: definitions on the use of raw materials, and definitions on system change (EMF, 2020). The former, generally speaking, follows the *reduce, reuse, and recycle*, the so-called 3-R approach as 1) to *reduce* the use of Earth’s finite materials, resources; 2) to *reuse* products through extending their life-cycles by activities such as repair, refurbish, remanufacture, etc.; and 3) to *recycle* the raw materials. Regarding focus on system change, the Ellen Macarthur Foundation defines the CE by three steps: the approach seeks to 1) “design out waste and pollution” by 2) “keeping materials and products in use” in order 3) to “regenerate natural systems” (EMF, 2020).

In a CE, the life cycle of materials and products keeps getting extended through restorative means instead of their disposal. The CE would thereby help the Anthropocene restore balance in our natural resource use and biodiversity, as well as alleviate the effects of climate change as a result of practicing less energy-intensive activities. Eventually, this would mean that economies would be able to grow without further environmental destruction, essentially decoupling the human-induced pressure on the environment from economic activities.

Overall, the global environmental problem is that when the rules of capitalism were established, the economic allocation mechanism that prevails in the world today and has gradually developed from the 18th century onwards, the total stock of natural resources was abundant. Thereby, the rules of capitalism did not have to formulate sub-rules for the scarcity of natural resources, because a relatively small amount of natural resources were consumed. However, this relationship changed in the second half of the 20th century, since when humanity have started consuming more and more with ever-growing people inhabiting the Earth. While the consumption of natural resources was a marginality before, it has become more and more evident that the quantity consumed per year per person has been growing and is unsustainable.

The foremost challenge is to overcome initial obstacles that often deter businesses, especially small and medium enterprises (SMEs). Even though SMEs make up over 90% of business and comprise more than 50% of workforce worldwide ([World Bank, 2020](#)), they are in a difficult position when it comes to implementing the principles of the CE. First, SMEs do not have the much-needed financial capital to tackle upfront costs that multinational corporations (MNCs) have, allowing MNCs the opportunity to control local-value chains thus making it even more difficult for SMEs to keep up. As a result of less capital, SMEs also have fewer capacities to spend on research and development (R&D), which leads to the second point. Considering that even designers in the field of the CE tend to find it difficult to fully grasp the holistic system of the CE, SMEs often lack technical capacities. SMEs operating on surviving levels are forced to refrain from additional costs other than what is required to keep themselves afloat. It is especially difficult to convince small business when they assume that investing in pollution prevention, waste management, and energy-efficient practices do not return the upfront costs ([Singh et al., 2018](#)). Since our world is currently less than 9% circular ([Circle Economy, 2021](#)), each country has a lot of work to do towards the CE. Especially Hungary, where a decline in resource productivity took place between 2010 and 2018 ([Bartus, 2020](#)). Within this, SMEs are particularly noteworthy as a key segment of the economy, which is why they are the main focus of the present study.

The matter of Hungarian SMEs related to the CE have been studied by others ([Tóthné et al., 2017](#); [Kis-Orloczki, 2019](#)), but neither studies reflect on the factors that could possibly prevent or accelerate firms' circular transition. Besides these studies, [Uvarova et al. \(2020\)](#) include Western Transdanubia¹ of Hungary in their research to compare SMEs' transition between six EU countries, but the research focuses on rural, agricultural SMEs in the country's most western area. The methodology of the case study involves various stakeholders (SME representatives, policymakers, researchers, and business associations), and does not specify the ratio of subject groups. Thereby, it is uncertain how much one stakeholder group influences the overall conclusions of the study. Nevertheless, [Uvarova et al. \(2020\)](#) find that Hungarian rural SMEs from

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Western Transdanubia face the lack of innovation culture and the lack of overall support (coordination and consulting; introduction of innovation and new circular models; inconsistency of support programmes). Upon discovering this research gap, this novel study seeks to find out what barriers Hungarian SMEs need to face and what drivers could support their transition towards the CE.

Accordingly, the paper is organized as follows: the next section seeks to give an overview of the existing literature on SMEs' circular transition to understand general trends. The third section describes the methodological approach, the sample and data of the research explored within this paper, as well as the limitations of the study. The fourth section provides the results and gives possible interpretations of performance differences. An overview of the main conclusions and recommendations is discussed in the fifth section.

LITERATURE REVIEW

In order to have a solid overview of SMEs' circular transition, the literature review findings are grouped into three segments: macro-, meso-, and micro-level barriers and enablers. For macro-level elements, the regulatory environment, market forces, the social and cultural atmosphere in which SMEs operate are considered. In case of the meso-level, the supply chain is found to have either a positive or negative impact on firms' circular transition. Last but not least, beneficial or disadvantageous factors towards the CE on firm-level are considered as micro-level elements. Thereby, the sections of the chapter are divided with this theoretical framework to illustrate the findings transparently.

Macro-level barriers

Obstructing laws and regulations can cause a chain reaction of problems for the proper implementation of circular activities. The experience of Australian SMEs demonstrates that tight legislation, advice of selecting adequate tools and approaches for the transition, or stringency of regulations limit firms' innovation (Caldera et al., 2019). The unaccommodating role of public policies in the Netherlands hinders food processing SME managers to rethink their business models, because ambiguous circumstances also result in technological and market barriers (Jochems, 2018). Roosendaal (2018) and Rizos et al. (2016) argue that obstructing laws and regulations enforce all other challenges altogether, thereby hindering the creation of an enabling environment.

Ormazabal et al. (2018) point out inadequate support from public institutions as one of the most influential barriers. The assessment of a Danish municipal waste management company collecting and managing household waste reveals that the current regulation of the waste sector does not sufficiently support a transition to the CE (Zacho et al., 2018). Similarly, Ruggieri et al. (2016) find that fragmented regulation hampers the circular transition. The overarching barrier for rural SMEs in the EU is the lack of an appropriate environment to introduce circular business models (CBMs) (Uvarova et al., 2020).

Roosendaal (2018) argues that entities face the issue of cultural barriers, namely the **lacking consumer interest** in circular products. However, this is mostly due to the higher prices of sustainable products (Ormazabal et al., 2018). Cantú et al. (2021) report the same finding from Mexico, where consumer behavior is one of the main barriers standing in the way of SMEs'

circular transformation. Piciu (2019) also puts forward that attraction factors, such as consumer demand, is a make-or-break element. Rizos et al. (2016) suggest that SMEs need to create a business case to financially incentivize customers opting out of unsustainable products. In line with earlier studies reporting on customer resistance, market barriers are considered important obstacles for Dutch CBMs (Vermunt et al., 2019).

Garrido-Prada et al. (2021) and García-Quevedo et al. (2020) contend that **administrative burden** decreases EU SMEs' likelihood of implementing circular activities. Romanian SMEs also face difficulties to comply with industry regulations and standards and complex administrative legal procedures (Ghenta and Matei, 2018). Italian managers consider the complex bureaucratic burden on firms in terms of applying sustainability regulations as a deterrent behind their efforts (Mura et al., 2020). In terms of the enterprises already involved in circular activities, complex administrative and legal procedures are found to be the main barrier for almost one-third of them (Garcés-Ayerbe et al., 2019).

Meso-level barriers

SMEs located in upstream of the supply chain facing **technological challenges** are a reoccurring theme in the literature. Vermunt et al. (2019) assert that supply chain barriers are deemed to be significant for Dutch CBMs with the exception of product-as-a-service business models. Italian and UK-based SMEs in the textile industry reveal that enterprises in the reverse supply chain (RSC) have to overcome uncertainties in regard to supply and resource (Garcia Martin, 2016; Ballie and Woods, 2018). Rizos et al. (2016) report that over half of the surveyed SMEs find the lack of support from the supply and demand network as the main barrier. Additionally, competitor resistance due to invested interest to retain the linear production model is another significant finding (Vermunt et al., 2019).

Hernandez (2019) finds that Colombian SMEs in the manufacturing industry face issues in regard to **having to make difficult agreements** with their clients and suppliers. His finding is confirmed by a case study on Finnish firms revealing the main barrier behind the transition is the difficulty to establish cooperation and dialogue with other key actors in the value supply chain (D'Amato et al., 2020). Patricio et al. (2018) also report lack of trust as an obstacle to engage in industrial symbiosis (IS) partnerships.

Micro-level barriers

Binek and Al-Muhannadi (2020) find that the main barrier comes from the very definition of SMEs: their **limited budgets and resources** entail a risk-averse behavior. Garrido-Prada et al. (2021) find that firms tend to invest in the CE principles after having received government grants, bank loans, and green loans as opposed to firms that did not receive funds. In another case, lack of financial capital, time, and short-term vision further discourage businesses from prioritizing circular solutions (Ormazabal et al., 2018). Nevertheless, this may be explained by the assumption that SMEs' lack of resources makes them unaware of the possible benefits of applying circularity to their activities (Ormazabal et al., 2016). Even if the CE technology advancements are feasible, economic and market barriers may limit the actual implementation and expansion of circular practices (de Jesus and Mendonça, 2018). Simultaneously, Vermunt et al. (2019) find that product-as-a-service CBMs mostly encountered internal barriers due to the retention of ownership over the product(s), which entails high upfront costs. de Jesus Pacheco

et al. (2019) argue that the primary deterrent for manufacturing SMEs' transition is the lack of financial resources.

Companies already involved in circular activities tend to face the cost of meeting regulations and standards, according to Garcés-Ayerbe et al. (2019). Other overarching survey analyses on EU SMEs further stipulate the financial difficulties many enterprises face (Ghisetti and Montresor, 2020). Rizos et al. (2016) highlight that firms often find the unaccommodating role of bank funding, making it difficult to attract external investment into their activities. Demirel and Danisman (2019) find that an exceptionally high investment cost deters SMEs from transition of their activities.

Moving from supranational to national findings, Oncioiu et al. (2018) contend that most Romanian managers face financial problems, labor shortages, as well as legal barriers, in spite of making an honest effort towards circularity. Almost half the interviewees from a Finnish case study also regard the lack of financial resources as a barrier (D'Amato et al., 2020). When asked to name their five biggest barriers in transitioning their activities from linear to circular, Roosendaal (2018) finds that the high costs for producing/selling circular products are the main barrier for Dutch SMEs in the textile industry. Elsewhere, the lack of financial resources poses the main barrier behind Australian SMEs' transition (Caldera et al., 2019). This study is supported by Kaufman et al. (2020), who argue that SMEs primarily have to face economic barriers; thereby, they have neither the capacity to explore nor the capital for investments.

Inadequate monetary capital is worsened by the **lack of internal competencies** to support the transition from the LE to the CE (de Jesus Pacheco et al., 2019). The managerial mindset of a Danish municipal waste management company needs to change to overcome the inadequate institutional environment (Zacho et al., 2018). In Navarra and the Basque Country, stakeholders doubt whether the CE can increase enterprises' profitability and improve competitiveness in the market (Ormazabal et al., 2018). Similarly, Indian, Italian, and EU SME managers treat the implementation of circular principles as a cost rather than an investment (Mura et al., 2020; Sharma et al., 2020; Piciu, 2019).

Another micro-level barrier is **incompetent skills and knowledge**. While MNCs have a vast amount of financial capital to invest in R&D, SMEs often have to rely on technologies that are available and accessible in the market (Guillard et al., 2018; Piciu, 2019; Vermunt et al., 2019). Technical barriers are a "major cause of a chain reaction" (40), which generates further issues; for example, the higher cost of circular products results in consumer dissatisfaction and disinterest (Roosendaal, 2018). Others also conclude that the lack of human resources and the lack of expertise in the implementation of circular economy activities represent a major challenge when seeking to identify and implement new circular business models (García-Quevedo et al., 2020; Ghența and Matei, 2018; Patricio et al., 2018). Behind the lack of technical knowledge, companies assert **time constraints** as another barrier (Patricio et al., 2018).

Macro-level enablers

In response to SMEs' inadequate internal capacities, Ormazabal et al. (2018) propose the implementation of **incentivizing policy instruments** that support and reward SMEs for implementing CE principles. As a result of SMEs being discouraged to invest their already limited resources, Binek and Al-Muhannadi (2020) also highlight that support from government

policies and powerful market players could assist entities to learn more about the market advantages the CE has to offer. [de Jesus and Mendonça \(2018\)](#) conclude that ‘soft’ factors are the primary drivers behind the transition towards CE; thereby, an overwhelming strategic roadmap is a must to prevent any kind of ambiguity in the transition process as highlighted by others ([Milios, 2021](#)).

[Zamfir et al. \(2017\)](#) suggest that the key predictor of whether SMEs have started applying CE practices is the country they are located in; Hungary, Slovakia, Romania, Bulgaria, and Poland, where the CE-uptake of the governments is low, have the lowest share of enterprises undertaking the implementation of the CE principles (60%). [Ghisetti and Montresor \(2020\)](#) argue that the obvious solution is to have stable funding behind their activities. In response to the high investment cost (over 10% of SMEs’ revenue) to have the circular transition producing economic growth, [Demirel and Danisman \(2019\)](#) propose policy interventions. [Katz-Gerro and López \(2019\)](#) also find the role of government policy as the main driver behind the transition. Government intervention acting as a catalyst behind entities engaging in IS is found as the second most important driver by [Prieto-Sandoval et al. \(2018\)](#).

Besides the above EU level survey analyses, specific country studies yield the crucial role of the government in assisting smaller firms. Considering that food processing SMEs in the Netherlands, [Jochems \(2018\)](#) concludes that adequate regulatory interventions could overcome barriers that have been nested. Austrian and Romanian SMEs reveal that policymakers can push enterprises through improved-performance analysis by creating the necessary environment to incentivize them towards resource efficiency, sustainability, and differentiation from other players in the market ([Holzer et al., 2021](#); [Ghanta and Matei, 2018](#); [Oncioiu et al., 2018](#)). Several other studies find that encouraging policies towards sustainability, especially having accessible financial resources, could incentivize entities to rethink and redesign their activities ([Mura et al., 2020](#); [Ormazabal et al., 2016](#); [Garcés-Ayerbe et al., 2019](#)).

In order to resolve the obstructive legislative environment, in which a Danish municipal waste management company operates, [Zacho et al. \(2018\)](#) put forward that a supportive institutional setting could incentivize the market players for the better management of materials and resources, because economic value creation potentials are low for circular activities. The case study on Finnish SMEs reveals that customer and regulation demands could be driving forces towards circularity because new solutions and more sustainable alternatives will be requested by these actors ([D’Amato et al., 2020](#)).

On the other side of the Atlantic, [Torres-Guevara et al. \(2021\)](#) claim that a fertile ecosystem is a must for implementing circularity in the construction sector in Colombia. [Hernandez \(2019\)](#) argues that design policies and taxes could also start pushing Colombian SMEs towards the application of CE principles. [Fernández-Viñé et al. \(2010\)](#) find that government intervention in the form of economic taxes and legal requirements could drive Venezuelan SMEs to commence practicing eco-efficient behavior. [Cantú et al. \(2021\)](#) assert that legislation could boost the external environment around SMEs’ transition to push consumers towards choosing sustainable products.

[Li and Zeng \(2018\)](#) put forward that the application of CE legislation and policies on the federal level is expected to act as a lever to promote the greening of Chinese SMEs. In accordance with the previous study, [Min et al. \(2021\)](#) contend that companies could only start their transition in an environment where government policies boost enterprises. In Taiwan, [Wu et al. \(2021\)](#) pronounce institutional support as one of the drivers of the transition. Considering that

the adoption of the CE can solve the matters of running out of space to store its waste and the risk for health and environment entailed by waste incineration, [Yolin \(2015\)](#) concludes that governmental backing is the main driver behind the country's transition.

In order to convince small businesses that circular practices return the upfront costs, [Singh et al. \(2018\)](#) suggest the government should encourage businesses by involving them in green initiatives to build strong environmental consciousness. Accordingly, [Sharma et al. \(2020\)](#) recommend the urgent implementation of incentivizing domestic policies to convince Indian SMEs managers.

In regard to Indonesian SMEs, [Susanty et al. \(2020\)](#) argue that the government and policymakers should promote environmental-oriented supply chain cooperation practices for companies to uptake the CE principles. [Moktadir et al. \(2018\)](#) find that government support and legislation influence Bangladeshi SMEs more than they do large-scale companies, because smaller entities need more aid from the government for the adequate implementation of circular practices. Challenging the government to help the firm with financial support to move towards the 3-R model paid off for a North African manufacturing firm ([Mishra et al., 2019](#)).

Reflecting on the absence of domestic support, [Uvarova et al. \(2020\)](#) assert that **strategic EU objectives and EU structural funds** could catalyze rural SMEs from six countries to redesign their business models towards circularity. Similarly, [Binek and Al-Muhannadi \(2020\)](#) propose that SMEs should try to access EU funds and support, in case the domestic government does not offer beneficial solutions.

Concerning the overwhelming administrative complexities SMEs need to comply with if they seek to make their activities more circular, [García-Quevedo et al. \(2020\)](#) suggest that **decreasing the administrative burden and complexities** on SMEs may aid their transition.

Customers' demand for sustainable products and services is found to be an important driver behind EU SMEs' transition to motivate firms to redesign their line of production ([Rizos et al., 2016](#)). [Susanty et al. \(2020\)](#) find the internal green supply of materials with customer collaboration is considered the most effective way to overcome barriers to transition entities' practices. Due to the absence of internal driving forces in developed countries, [Fernández-Viñe et al. \(2010\)](#) suggest that market pressure is an enabler for SME's adoption of eco-efficient practices.

A case study from Finland illustrates how beneficial **multi-stakeholder engagement** could be. [Yli-Suvanto \(2020\)](#) finds that engaging with knowledge actors and participating on networking platforms have positively affected the activities of Naava Group Oy, a company constructing smart green walls. An interviewee from another Finnish case study argues that the creation of a practical platform to initiate the early stages of the transition would support the concretization of the circular bioeconomy network ([D'Amato et al., 2020](#)). In the absence of supportive government, [Ruggieri et al. \(2016\)](#) find that a third party shall organize the exchange of materials between entities to move towards IS. [Barón et al. \(2020\)](#) suggest that the supply chain as a whole entity should shift towards circularity. [Cantú et al. \(2021\)](#) also find that multi-stakeholder collaboration with different actors could help Mexican SMEs resolve issues around the difficulties of transitioning their activities.

Informal meetings can contribute to firms coming together to form IS partnerships or the realization of market gaps that SMEs can try to quickly fill in ([Wu et al. 2021](#)). [Ormazabal et al. \(2016\)](#) contend that industry associations could be a driving force for SMEs to close their loops through compatible value chains. Similarly, SMEs report that supply chain interactions is one of the key drivers behind their transition ([Rizos et al., 2016](#)). In line with the former studies, [Mura](#)

et al. (2020) assert that an enabler behind Italian SMEs' transition towards circularity is a collaboration with local institutions, organizations, and associations. In the study of Garcia Martin (2016), interviewees suggest that the supply chain should be redesigned with stakeholder meetings because every actor of the supply chain needs to share their difficulties to have an encompassing solution.

Business model innovation could enable entities to **collaborate with MNCs** for smaller enterprises benefitting from shared knowledge and technology, gates to new markets, and improved business chains. Thereby, Min et al. (2021) propose that innovation is the major enabling factor for Chinese SMEs to adjust their business models. Similarly, Estonian SMEs owned by foreign capital and being a subsidiary of an MNC are an advantage to local SMEs because of being members of bigger groups or consortiums. Singh et al. (2018) suggest that larger corporations should educate the smaller firms in the supply chain about the practices to reduce waste and the after-use treatment of industrial waste. Mishra et al. (2019) assert that multi-stakeholder collaboration with MNCs and government is essential for North African SMEs to survive.

Meso-level enablers

Once stakeholders come together to discuss potential obstacles standing in the way of making their activities circular, they would have a better understanding of what needs to be done. Thereby, Susanty et al. (2020) claim that customer collaboration with an internal **green supply chain** is an effective combination for Indonesian SMEs to drive their circular transition. In China, Li and Zeng (2018) consider that the core practical approaches of realizing CE in Chinese SMEs are cleaner production and waste recycling in the supply chain. Similarly, Austrian SME representatives consider the procurement of resources as the key driver to transition their activities towards circularity (Holzer et al., 2021). Caldera et al. (2019) contend that the barriers hampering the transition of Australian SMEs can be addressed by the collaboration of stakeholders in their respective supply chain.

Micro-level enablers

Once the main decision-makers of the entity are aware of the company's overall situation, as well as barriers and enablers of the transition towards circularity, they can plan better to prepare for them. In this regard Prieto-Sandoval et al. (2018) find that **managerial mindset** change could enable SMEs to make their activities circular. Rizos et al. (2016) put forward that company environmental culture can ease SMEs' transition. Moric et al. (2020) contend that SME managers in the EU need to create an internal environment within firms that support the uptake of CE and smooth the transition. Ormazabal et al. (2016) conclude that Basque enterprises' environmental management maturity positively correlates with their willingness towards circularity. In another study, Ormazabal et al. (2020) claim that once the company evaluates the risks and costs in regards to implementing circularity with the environmental business strategy, it realizes the benefits of making its activities sustainable. According to Del Río et al. (2016), an environmental plan of a company brings together resources, capacities, and capabilities with eco-innovation, which could boost the company's overall performance and give a competitive advantage in the market.

Sartal et al. (2020) report how well an SME has responded to the implementation of lean practices (5S). The case study of Alisea, an Italian office supply firm, illustrates how far a strong managerial vision can go when the entity is committed to doing something more profound than just doing business (Ünal et al., 2018). Another study on Italian SMEs reveals that the lack of monetary funds has been balanced by the personal motivations of the leadership (Garcia Martin, 2016). The assessment of Estonian SMEs demonstrates that companies owned by foreign capital are more likely to have a business strategy and strategic planning process to push the transition of their activities towards circularity (Vihma and Moora, 2020).

In Latin America, Torres-Guevara et al. (2021) find that top managers sharing environmental values and being concerned about the firm's impacts is another driver for transitioning towards circular practices. In addition, the case study of a Colombian SME in the construction industry supports the hypothesis that having more women in managerial leadership positions can increase managerial environmental consciousness of an enterprise (Graafland, 2020). A Mexican case study find that managerial mindset of creative and problem-solving thinking can act as a catalyst to find ways of resolving issues around the environmental sustainability of companies (Cantú et al., 2021). A Bangladeshi case study conclude that KCE is the most relevant driver behind companies' transition (Moktadir et al., 2018).

While Moric et al. (2020) argue that managerial willingness is required to initiate the transition towards circularity within SMEs, **tangible investment** is needed in order to implement sustainable practices, something that many SMEs cannot afford. In the absence of government support, the case study on the Finnish company constructing green walls reaffirms the significance of a growing company's need for financial support (Yli-Suvanto, 2020). Zamfir et al. (2017) report that SMEs with lower levels of turnover display lower willingness about the adoption of circularity. Bassi and Dias (2019) assert that firms' green behavior depends on the size, total turnover, percentage of turnover devoted to R&D, and type of activity of the entity.

Upon learning about the process of IS and the possible opportunities entailed with it, four mushroom producing SMEs in Sweden indicated their intention to invest in new opportunities to initiate engaging in circular procedures, mainly due to **potential economic savings** (Patricio et al., 2018). UK-based SMEs in the fashion and textile industry demonstrate that the design of products with the low cost entailed by applying CE principles could act as a catalyst to make their practices circular (Ballie and Woods, 2018).

Swedish SMEs in the mushroom producing industry imply **environmental benefits** as a motivating factor to engage in IS (Patricio et al., 2018); the same study investigating beer producing entities also demonstrated the intrinsic motivation of the leaderships to have their activities done in a sustainable manner. SMEs from the Italian agri-food industry emphasize the necessity to have an eco-centric approach towards the external environment of the companies (Fortunati et al., 2020).

METHODOLOGY

This research aims to explore and critically analyze the ordinary, day-to-day barriers Hungarian SMEs face in order to transition their activities towards the realm of the CE. Subsequently, this study also seeks to highlight the enabling factors for smaller businesses that could potentially ease the transition and push their activities towards circularity. Thereby, a qualitative research

method is adopted to gain a thorough understanding of their situations. The research embraces a multi-method design to address the aim and objectives of the study. In order to achieve consistency, businesses that employ less than 250 people and have annual net sales revenue of €50 million at most are considered SMEs in the study, as these qualities are the general characteristics of SMEs.

Interviews

The [Wallace Foundation \(2021\)](#) outlines the four stages of an in-depth interview, namely developing a sampling strategy, writing an in-depth interview guide, conducting the interviews, and analyzing the data. The first step entails deciding whose attitudes and beliefs matter the most to a study, and how to find these people. Given the scope of the present research, the three stakeholder groups are 1) the SME managers who have to implement the circular changes firsthand; 2) the government that should guide companies with policies and legislation; and 3) the scientific professionals studying, analyzing, and offering their expertise to the field. In the present research, this step is fulfilled with a representative group of study subjects (see section 3.3 for more detail). The further steps are also undertaken in the present study, as the questions were prepared in advance but questions were added and altered in real-time, enough respondents accepted the invitation to the interviews that have taken place, and an analysis made sense of the findings.

Considering the focus of the research, in-depth interviews are deemed to be an appropriate methodology for exploration. Following the analysis of the takeaways from the literature review, structured in-depth interviews were organized for three target groups: managers of Hungarian SMEs, Hungarian CE experts, and the responsible Hungarian ministry related to the CE to gather qualitative data and to understand the circular transition of Hungarian firms.

Data collection

It was deemed important to seek out the opinion of those who will have to face the challenges of the country's circular transition firsthand, the owners and/or managers of businesses. They are the ones who will have to implement the changes coming with the transformation of the traditional business models, especially now that the Hungarian government has officially announced that the country's economy will be fully circular and digital by 2030 ([Government of Hungary, 2021](#)). Hungarian SMEs have been facing numerous challenges ever since MNCs gaining ground in Hungary since the 2004 enlargement of the EU ([Hoványi, 2004](#)) and the expanding globalization ([Árva et al., 2018](#)). Thereby, businesses that are already occupied to stay afloat with the increasing competition and supply coming from across the border now have to transform their activities in accordance with the principles of the CE. Shifting their business models seems to add SMEs an additional burden, which is why it is significant to know and assess the difficulties that SMEs currently face and will face in the near future.

Two SME managers have been in the network of the researchers, and they were contacted via telephone and indicated their willingness to take part in the study upon learning about its aim and objectives. Once the first two interviews were conducted, the snowball sampling technique was adopted by asking the first two interviewees whether they could help identify further subjects from among their network base built through their work. Out of the six SMEs

contacted, five accepted the invitation to take part in the study. Out of the five SMEs involved in the research, four granted permission to record the interviews. Due to the improving COVID-19 situation in Hungary in May 2021, all interviews with the SME managers were conducted in-person at the sites of the companies while practicing COVID-19 precautionary measures. In order to ensure anonymity and confidentiality, the interviewed companies have been given pseudonyms. Table 1 below summarizes the most relevant information of the interviewed SMEs.

Second, following the literature review indicating the significant role of the government in assisting SMEs to transform their activities towards the CE, it was crucial to learn the position of the government in regards of the research aim and objectives. Therefore, an email was sent to the Hungarian Ministry for Innovation and Technology² (henceforth: “MIT”) to request an interview with a representative from the newly founded CE department within the ministry, the Cabinet of State Secretary for the Development of the Circular Economy, Energy, and Climate Policy³. MIT requested the interview questions to be sent via email and answered thereafter, thus the position of the government is also presented in the study.

Third, interviews were requested from three Hungarian CE experts via LinkedIn, email, and telephone. The researchers reached out to the three professionals after reading about the work they have done in regards of the CE; one of them indicated that he would not be able to add much thus declined the invitation for the interview, while the other two experts denoted their readiness to have a conversation about Hungarian SMEs’ circular transition. Upon providing details about the scope of the present research, two experts approved the exchanges to be audio recorded.

Overall, a total number of 10 potential interviewees were contacted via email, telephone, or LinkedIn, and eight of these provided a positive response in regards of their participation in the study. The aim and objectives of the study were explained to each interviewee beforehand, and consent forms were filled out. Out of the eight interviewees, seven approved the interview to be audio recorded. In order to ensure anonymity and confidentiality, the interviewees have also been given pseudonyms.

Table 1. Company information (Source: Own elaboration)

Name of the company	Number of employees (approximately)	Industry	Interviewed personnel from the company	Length of the interview
Company A	10	Clothing	Owner & CEO	1h30m
Company B	15	Plastic	Executive officer	1h15m
Company C	7	Clothing	Co-owner & marketing manager	1h
Company D	8	Plastic	Owner & CEO	1h40m
Company E	50	Plastic	Administrative Director	1h20m

²In Hungarian: Innovációs és Technológiai Minisztérium.

³In Hungarian: Körforgásos Gazdaság Fejlesztéséért, Energia- és Klímapolitikáért Felelős Államtitkári Kabinet.

FINDINGS

Company profiles

Company A. Company A is a business in the clothing industry. The company originally started its activities in the events industry but changed its business profile in the late '90s and began its current endeavor. The intuition to change the main focus of the company towards the design of clothing arose from the family of the head of the firm previously working in embroidery; in addition to embroidery, the company added screen printing to its portfolio, as well as the production of personalized labels. Due to the appearance of fashion conglomerates on the Hungarian market, Company A had to rethink its activities and find new markets for its expertise. The firm decided to apply its knowledge and experience to design logos for other companies' promotional products and workwear clothing from 2008 onwards. The past decade after the financial crisis went peacefully and brought a steady increase with a peak year in 2019 when the COVID-19 pandemic slashed its streak.

Company B. Company B specializes in the manufacture of plastic packaging for products, primarily cosmetics, pharmaceuticals, household chemicals, and food products. The company, as well as the whole plastic package manufacturing market, has gone through multiple ups and downs and significant transformations in the past three decades, especially around 2007. Until then, small firms like Company B used to create products for several MNCs; however, MNCs developed their own plastic packaging factories in the meantime. The loss of these large customers meant that the company had to restructure its activities and settle for a lot of smaller and less stable orders. Then things got more difficult during the financial crisis, which the company felt from the very first days directly. While they were able to stabilize themselves and get used to the new market conditions, constant fluctuations and unpredictable future make their activities much more challenging.

Company C. Company C is an enterprise in the textile industry which was built from the ashes of a company that the financial crisis of 2007–08 swept away. Since the owners of the previous company knew the ins and outs of the market, they decided to save whatever they can (this mostly meant their customer base and suppliers) and establish a new entity in the same sector in small steps; this has led to Company C recently celebrating its 10th birthday. The business is a wholesale for work and promotional clothing and works exclusively with resellers; thereby, they do not create additional competition in the market for themselves and for their clients by trying to undercut the prices of their potential competition to better reach end-users. Not mixing their customer base with competition was entirely an ethical decision to earn the trust of their clients and to have smooth operations in the supply chain.

Company D. Company D started as a family business in the 1980s in the form of a plastic processing company. Having owned a foil blowing extruder machine, Company D was exporting packaging material abroad but continued its business within the Hungarian borders

after having to work for the producer cooperative (in Hungarian: “termelőszövetkezet” or “TSZ”)⁴. The regime change in the Soviet Union meant the liquidation of many corporations similar to Company D, which is why the firm continued its business as a sole proprietor to build its own market and to work as a reseller. This went on until the mid-90s, when the incoming MNCs squeezed out Hungarian firms, thus Company D has been working for large businesses ever since then. The owner of Company D firmly believes the best marketing is to have their customers recommend their services to the next. Thereby, the firm always strives to have flawless goods completed on time and transparent and open communication with its customers.

Company E. Company E has started producing plastic granules in 1999, the raw material that finished product manufacturers can use. The company takes over the waste coming from various streams thereby the company relies on three sources: industry partners, public service providers, and private suppliers. The biggest market advantage of the company is that they can easily adapt to the processing of small series waste (30–50 tons). In contrast, some companies that have automated their equipment to process larger amounts of plastic material, allowing them to re-granulate at a much faster rate and with fewer people; however, if their products are not in demand, they can go bankrupt quickly. Overall, it is advisable to diversify a company’s activities, so that it can handle more types of materials and smaller quantities, which in turn is much more human-intensive.

How companies operate in accordance with the 3-R principle

Before discussing which barriers and enablers the interviewees regard as the most important factors for Hungarian SMEs to transition from the LE to the CE, the interviewed companies’ current activities are observed through circular lenses as well as their technical concerns on how to achieve better natural resource management. This allows the researchers and the reader to learn how some of the activities of these firms are already in line with the principles of the CE, even though some of the SME managers do not know what the CE is.

Keeping the waste generated at the companies’ factories at the minimum

Company B generates a minimal amount of waste that occurs when mixing different substances. They insert various polymers into their machinery to make products, but it is difficult, if not impossible, to get all the raw material out of the machines from previous production lines. For example, the company uses PE to make one product but has to use PP to make another in the same machine. It is not possible to completely use up the earlier material from the machine and for the materials to not encounter one another. They, however, do not throw away the generated plastic waste, because there are plastic waste processing businesses, for example, Company E, specifically looking for these kinds of plastic scraps to generate plastic regrgranulates, in which the mixed polymers do not cause quality problems, because the plastic granules do not necessarily need to be pure. This IS partnership between Company B and plastic processing businesses

⁴After the Second World War, collectivization in Hungary was carried out in several waves, following the Soviet model; it aimed to dismantle the large landed estate system and to reorganize agricultural production in the framework of agricultural cooperatives and producer cooperative groups (in common parlance, TSz or TSZCS), or state-owned farming organizations, state farms.

organically formed a long time ago because of the win-win scenario: the plastic processing corporations help Company B to take care of the unintentionally created waste while obtaining the needed material at a lower price or for free.

Even though it was not an entirely environmentally conscious decision from the SME managers, economic reasons pushed Company B and other plastic processing enterprises to engage in IS. The excess waste that one firm cannot handle anymore further becomes the raw material of another, essentially reducing both companies' impact on natural resources. At this point, it does not necessarily matter whether there were environmental or economic motives behind initiating the collaboration between these entities; both sides' reduction of natural resource use is what should be noteworthy from this relationship that is mutually beneficial for everyone.

A constant waste stream of Company A originates from the application of digital printing the desired image on a special foil (the carrier), which is cropped after a preset shape, and then applied on the clothing item by hot pressing. This carrier is called vetex, which is a thin, synthetic, non-elastic white stiffening material that gives the garment a stronger hold with adhesive on one side. Screen printing is the same methodology with the difference that the (leftover) carrier material is paper instead of plastic. Nevertheless, the used-up foils end up in trash in both instances. The leftover foils could possibly be collected by the producer(s) if it were organized, however, they are not interested in reusing and reprocessing the leftover material. They are unsure whether investing their time into collecting, arranging, and reusing these materials is actually worth the time to do rather than spending their time on the regular activities of the production line.

In regard to Company C, the enterprise creates the least amount of waste out of the interviewed firms, because it simply transmits the products to the next actors, the resellers, in the supply chain. Once the products get to Hungary, they need to sort out the products to send them to their customers, but Company C uses the same cardboard boxes and plastic packaging that the clothes arrive to them in the first place for two reasons: environmental protection and economic factors. The company does not want to create excess waste by throwing away usable packaging due to its environmentally conscious behavior, but it also does not want to spend extra money on unnecessary wrapping materials due to its intention to cut costs wherever possible.

Overall, waste generation is neither a goal nor a good thing for a company. In doing so, everyone strives to reduce waste. This section reveals that it is not in the interest of companies to dump all their garbage as communal waste for two reasons: 1) they can receive money for it (for example, Company E buys waste from another company for money); and 2) it is better for the company to turn their waste into money. The representative of Company B emphasizes this point by stating that "waste production is the lowest among manufacturers in this business. This is a hard-economic interest." Indeed, manufacturers do not need to be motivated to reduce waste generation by environmental conscious behavior, because it is out of entrepreneurs' pockets if waste is produced unnecessarily. It is always their primary consideration to produce the least amount of waste and scrap, because that would be wasted money. As economic organizations, firms have always made sure to keep their waste production at the lowest level possible. Even though the reduction of waste is not necessarily because of an environmental conscious directive, SMEs do everything they can to keep the waste generated during manufacture at the lowest level possible.

How companies are reusing materials during the manufacturing processes

Company A usually purchases the water-based printing paste, one of its suppliers for manufacture, in bulks of 30 kg barrels, which used to be recollected by their supplier. These hermetically sealed barrels were always retrieved from Company A thus they did not have to worry about the barrels' cleaning and storing procedures. However, when a new owner took over the company, this scheme changed. The printing paste supplier redesigned its supply from the 30 kg barrels to 20 kg buckets; both of these containers are made out of plastic, but the barrels were difficult and uncomfortable to transport. In addition, the 20 kg buckets were also more user-friendly, because the employees of Company A were easily able to squeeze out all the paste material from the bottom of the buckets rather than being covered in paint up to the neck. However, the supplier did not take back the 20 kg buckets because it was not worth for the company due to having the buckets designed for single use only; the bucket walls were thin thereby they were easily damaged and not intended for continuous reuse. After some time, the company actually switched back to the allocation of 30 kg barrels, because it was more work and time for them to fill up the 20 kg buckets. Furthermore, they saved more money on having the 30 kg barrels collected, cleaned, and reused rather than having the 20 kg buckets designed for single use. Last but not least, continuously passing on the extra fee of the buckets onto the buyers might have cost the company losing some of its customers, which is why they are back to collecting and reusing the barrels.

While the owner of Company D is unaware of what the CE is, there are circular aspects in his firm's operation. For example, when plastic rolls are sold to other businesses, plastic is rolled up on wooden cylinders varying in their width, length, and weight. Initially, customers threw away the wooden cylinders, but once Company D began its deposit-refund system (DFS) for 800 Ft⁵/kg of the shapes, every cylinder has been returned since then. The owner of Company D considers that this type of scheme can work on its own by having people becoming economic stakeholders, stating that "if it is not worth it, nobody bothers to change their habits. . . people will not change until they see the financial implications."

Concerns around reaching the circular supply chain

Currently, plastic recycling essentially faces the issue of "golden oldies": the purity challenge of this high-volume recyclates. Additionally, a linear lock-in phenomenon characterizes the supply chain in which Company B is currently situated. The representative of Company B says that the end-of-life treatment responsibility of the plastic products should fall onto their buyers, because they buy the products from them, consequently the ownership and the responsibility for plastic. Company B feels squeezed between the big players to experiment with sustainability. On the one side, there are conglomerates creating plastic granulates, the price of which depends on the price of oil and other resources; on the other side, the buyer wants to have top-quality plastic packages at the lowest cost possible.

Regarding making the supply chain of plastic products circular, for example, by reusing plastic bottles, interviewees indicated that they are worried that many people may refuse to purchase a bottle that was used by several others beforehand due to their overestimated hygienic

⁵800 Ft is approximately €2.19.

expectations and scepticism about the cleaning procedure. In addition, the cleaning of plastic bottles may impact the environment in a more harmful manner through excessive water and chemical use than simply having them floating in our oceans and breaking down into micro-plastic.

In terms of reusing thrown away textile materials and making the supply chain circular, the main issue is that the production and the sale happen at two distinct points of the world, the Far East and Europe, respectively. The interviewee from Company C agrees that it would indeed be great if the wasted fabric from Europe could go back to the Far East and be remanufactured or reused for other products. As a result of the diverging locations of production and waste generation, this entails such a high logistic cost as of right now thus it is not worth for anyone to bother with this procedure.

DISCUSSION

In the section below, the main factors influencing SMEs circular transition are presented and discussed. From the interviews, it seems that a factor mentioned by any of the interviewees is perceived both as a barrier and an enabler. In other words, the presence of a barrier can be best tackled with the improvement of the very same element.

The head of Company A considers that holding onto old habits deters them and others from reaching out for public assistance. Instead of public officials being helpful, they rather sound threatening when it comes to implementing governmental procedures. The marketing manager of Company C indicates that financial support from the government would help the company acquire their own site instead of renting it. Similarly, the interviewee from Company D remarks the role of the government in helping firms reduce, reuse, or recycle their material use, as he believes that public officials should implement monetary policies to incentivize companies by underlining his point that “many people can achieve anything for money. . . must be worth it for everyone, because everyone is motivated by the material cost of things.” The manager of Company B argues that the state is inevitable on this issue, adding that “policymakers can determine extra fees that are not production or commercial-related costs. Now, there are environmental product taxes, waste recycling fees. . . which could protect the environment. The application, implementation, and execution of these should be a matter for the state with the obvious involvement of experts.”

In accordance with his words, the two interviewed CE experts also emphasize that the rules of the game need to change in order to have a serious conversation about environmental protection and resource management. If the scarcity of natural resources was systematically built into the economic systems and the price of externality appeared from natural resource extraction, then the supply chain would automatically change regardless of whether the respective company is at the beginning, middle, or end of the supply chain, because the pay for fixing externalities would affect every player in the supply chain. General economic norms, incentives, different types of taxes, or cost-incorporating solutions would be suitable, because the scarcity of natural resources is reflected in the prices. Therefore, everyone would be forced to adjust to the new relative price conditions in the supply chain at the same time.

The interviewees from the plastic package producing firms reveal that regranelates are more expensive than natural, virgin granules on the polyethylene terephthalate (PET) line, because

they are worth more for the manufacturer to write on its product that the finished product is made of a certain percentage of recycled plastic. This illustrates well how skewed and disoriented the PET granule market has become, as the price of material (PET regranulate) increased, because it has recently become trendy, even though the use of it would help restore balance in our natural resources.

Currently, eco-products are more expensive because these items depict the true cost including the externalities. On the other hand, the price of non-eco-friendly products excludes the environmental impact entailed during the manufacture, and there are no external costs involved in their price. However, as soon as external costs would be included in the prices, customer habits would change immediately, because it would turn out that a more environmentally friendly solution is not the more expensive option. Regardless of involving or excluding the externality cost in the price, the interviewee from Company C asserts that regular customers should not be put in the position of choosing between the currently more expensive eco-friendly product and the cheaper but more harmful items to the environment.

In terms of **governmental programmes**, the interviewed companies are unaware of any. The only environmental tenders that these firms come across are renewable energy submissions to install solar panels. Some of the interviewed companies have been renting their factories and sites thereby the owner of the property should be the one applying for these opportunities. In other cases, even though the price of renewable energy production has been decreasing and energy-efficient machines would entail lowering the monthly electricity bill, the financially squeezed SMEs cannot allow themselves to direct their profit towards these practices when they are in a day-to-day struggle to stay afloat. Otherwise, firms are not financially motivated in investing to operate their machines on renewable energy, or buying energy-efficient and electric machines. Overall, return on investment takes too much time, which is why it is simply not worth it for anyone to go down on the renewable energy production path.

Looking into the future, one of the plastic packaging interviewees hopes that government will help them by *not interfering* in the market at all and have *laissez-faire* market. Governmental measures have been making it harder for Company B to keep up with the industry. The implementation of the Rural Development Program⁶ meant that by having based in Budapest, Company B falls out of most of the governmental development aid. The representative from Company B claims that “before the fall of the Soviet Union, a centralized supply-chain was preferred with Budapest being in the center, especially with the notable influence of Csepel Művek⁷... Now the government, probably understandably, wants to develop the previously underdeveloped areas of the country, thereby decentralizing the supply-chain of production.” Similarly, the other interviewed companies have not been getting much support from the government either, as financial support from the government in the area of Budapest and Pest country almost ceased in the past decade.

On the other hand, the perspective of SME managers collides with the stance of one of the CE experts on the matter of government aid. He finds that Hungary is a relatively large redistributive country, where there is a fairly strong political consensus behind the redistribution of taxpayers' money. The political competition and conversation are about who would spend the

⁶In Hungarian: Vidékfejlesztési Program.

⁷In English: Csepel Steelworks, the former center of Hungarian heavy industry.

redistributable amount for what, but no one questions the redistributable amount being reduced and whether there is a need for the state to redistribute half of the national income. Whatever investment is made in Hungary today, there is usually taxpayers' money tied to it, and people take that for granted.

Consequently, the state redistributing half of the national income is on everyone's mind. One of the CE experts adds that companies can say that they only do something if the state opens calls for environmental tenders. At the same time, the mindset of companies is understandable that they will not build new infrastructure without the government allocating taxpayers' money into the project(s). According to him, this leads to distorted economic thinking. It is a Hungarian problem that the economy must be state centered thus the development of the CE can only be imagined by many actors through governmental redistribution of taxpayers' money, although, economic rationality says that this should be solved by restructuring taxes and prices. For example, more taxes should be levied on the extraction of natural resources.

In contrast to his proposal, representative from the authorities reveals that the government seeks to assist SMEs with several waste management tenders instead of a new overarching tax scheme. According to the CE expert, the problem with tenders and grants is that they only work as long as the program is running, and they will only affect those who will be the winners of that particular competition and everyone else will not be affected. He adds that "taxing pollution is always more effective in solving an environmental problem than by supporting non-polluters. This is a basic truth in environmental economics."

Public service providers have been undergoing continuous transformation since the early-2010s. The organization and supervision of waste and waste management is frequently transferred to another place at the highest level in the government; a ministry was established to manage it, then the National Waste Management Agency⁸ was established and abolished, and now it has been with the MIT. Overall, the complete Hungarian waste management industry has been approached in three completely different systems in the last 10 years.

According to the interviewee from Company E, the improvement of public service providers' waste trash selection could help plastic waste processing companies avoid creating excess debris at their sites. In Hungary, waste selection takes place in either manual or automated manners. The latter is a technology in which the mixed selective waste is sorted by a machine into different material streams. The quality of this method is much better, but it costs more and is not yet widespread in Hungary (currently, there are two such sites in the country with the third one being built now in Budapest). Obviously, there are human shortcomings in the former approach, however, neither approach can work with 100% accuracy.

The government is aware of the unsustainable condition of public service providers and plans to improve the current system. The interviewee from the authorities asserts that the new model of the waste management system requires the development of infrastructure in the field of waste collection and management. As a result of the waste system improvement, MIT strives to introduce innovative and modern solutions wherever possible. In addition, the interviewee emphasizes the Recovery and Resilience Facility as a crucial monetary source from the EU to assist the progress of public service providers. Within the framework, it is expected to have EU

⁸In Hungarian: Országos Hulladékgazdálkodási Ügynökség (OHÜ).

resources available towards funding the country's transition to the CE, especially in the field of public waste management services.

The representative of Company B hopes that the government would support enterprises moving towards sustainable technological solutions; he would like to see the role of government positively pushing enterprises toward eco-friendly solutions. He adds that the company pays a relatively high, 54–60 forint (€0.15–0.16)/kg environmental protection tax upon their production, but neither sees nor knows where this money is funneled after it leaves the company's account. However, there is neither transparency nor communication from the side of the government.

The approach applied by the government when it comes to engaging with companies is echoed by another interviewed firm in the plastic industry. The interviewee from one of the plastic manufacturing companies asserts that prior to the concession procedure, the government held a consultation with companies like his firm. He adds that even though his company maintains close and good relations with advocacy bodies, the voice of these organizations is not considered by the state either. Discussing the matters of stakeholder engagement and government transparency are beyond the scope of the present study.

While the design phase of the production would be able to reduce much of the waste created, **customer demands** dictate how plastic products need to be manufactured. However, when attempting to move towards extending the life cycle of plastic through the inner loops of the CE, the maintenance of products through reuse or remanufacture tends to entail more harmful environmental effects than creating new plastic products and (not) having to deal with plastic waste. The reuse of plastic packages is also not up to Company B, because the ownership of plastic moves on to the buyers of Company B when they buy the products from them. Moving further out of the loops, one of the plastic manufacturing managers argues that even recycling is also tricky, because the price of recycled plastic granules is three times more expensive than virgin plastic granules due to the distorted plastic pellet market as well as the high cost of cleaning and processing procedures.

Even though the interviewed companies from the plastic industry reveal that demand for recycled materials has been around for more than a decade, it is difficult to achieve their widespread application due to quality issues. The manager from Company E recalls a story of a possible collaboration with an oil-company that wanted its engine-oil bottles produced from 100% regranalutes while retaining the original bright color of the product: the firm was concerned of potentially losing customers due to the “poor” design of the bottle given the inadequate purity of the regranalutes. However, the recyclates are black after the mixed color mixture produces a greenish gray hue coated with soot, and natural regranalutes (colorless, odorless) do not exist. There is a constant demand for natural, odorless, and colorless regranalutes, but there is no such thing. On the other hand, there are constant efforts to add recyclates to the manufacturing of products that are not color sensitive (e.g. compost bins or lawn mower wheel). In addition, some firms make a “class B” product in addition to their main product, which is made from recycled material.

When it comes to deciding which type of granules must be used to make the plastic packages, it is not even up to the interviewed SME managers, but rather the final player in the supply chain prior to reaching the end users. Thereby, the step towards circularity is through the persuasion of the buyers to extend the life cycle of plastic. In the end, it all comes down to customer demands whether a plastic bottle will be made out of recycled granules or not. Just because a

plastic bottle would not have perfect color purity, that does not mean the product it contains (e.g. hair or skin cosmetics) is degraded; however, most consumers are reluctant to purchase products that have less aesthetically pleasing packaging, according to the interviewed plastic SME managers.

In accordance with the findings from the plastic industry, both firms from the textile sector underline that the market is directed by the demand of the end users as well as the opportunities for the supply of goods. If there were a demand for more sustainable products, then Company C is always ready to provide and suggest products, because it feels responsible for spreading awareness and influencing the further actors in the supply chain. On the other hand, the interviewee from Company C finds it difficult for the company to initiate making the supply chain circular, because the company is positioned in the middle of it. At the end of the day, they do not have direct contact with the end users thus the only way they can generate demand for green products is by highlighting these products in their catalogues and on their website.

Similar to Company C, the other interviewed enterprise in the textile industry is bounded by the market. When it comes to purchasing their clothing material, Company A gets their resources from multiple wholesale businesses that respond to market demands when they place their orders at the Far Eastern manufacturing factories. Company A's suppliers have begun to move down the sustainability path due to a layer in their demand network, who do not mind spending more money on eco-friendly products. Thereby, a growing number of businesses have started their eco product lines, in which 65% of the final product is from organic cotton, while the remaining 35% is from recycled plastic. This kind of product has been available for a long time, but has been recently labelled as 'eco' due to a growing new layer in their consumer base.

An important takeaway of the study is that SME managers believe in the **driving force of the economy** more than they believe in creating a collective environmental consciousness. They consider that if this new circular transition will be motivated by economic interest, then it will be self-organizing for every stakeholder group in the economy. Once people know that they are throwing value in the trash, they will automatically learn to collect and sell their garbage. In the case of plastic package manufacturing companies, this could be encouraged by having plastic material *representing value*; thus, the customers are either incentivized to return empty packages or discouraged from purchasing products with plastic packaging at the first place due to the increased price. The same goes for companies: if the collection and treatment of various waste streams will be motivated by economic motives, then sooner or later businesses will find the adequate technology for the proper treatment of their waste. Overall, the SME managers consider financial motives as one of the most crucial factors behind both the barriers and enablers to apply the 3-R approach. First and foremost, investing into sustainable practices must be worth for companies without having to confront surcharges as part of implementing the new mode(s) of production. From then on, firms are willing to engage in any program the public officials set the country on.

Besides being worth it to invest in sustainable practices, interviewees would like to **avoid having an additional burden** created by applying these methods. The overbearing administrative burden seems to be making SMEs' lives more difficult rather than simpler and more sustainable. The manager of Company A believes that everyone has intentions towards sustainability, but bureaucratic and administrative obstacles deter many economic players for many reasons ranging from lack of time and short-term vision to lack of personnel and financial capacities. While MNCs have the capacity to hire additional personnel to design a company's

waste stream to practice the 3-R principle, small entities do not have enough financial capacity to spend on paying someone else to upgrade the company's waste stream nor enough time to figure it out for themselves. The interviewee from Company B reaffirms the points stressed above. He asserts that his company can obviously always use all kinds of help, but his "greatest wish... would be that it should not be tied to conditions that would put an additional burden on [the company]." Thereby, firms are willing to utilize all kinds of support towards environmental protection, but they should not be tied to conditions that would disrupt their current operations.

According to the two CE experts, SMEs could also start their circular transition with a **bottom-up approach**. They can demand the purchase of renewable raw materials, more sustainable manufacture, less waste to be produced or to be reused, and so on from their supplier(s). Everyone is a subordinate in the supply chain, but everyone can influence their subordinate simultaneously. Thereby, it is possible to achieve results and successes in an autonomous way with circular implementation at the company level. On the other hand, it is indeed valid that in many situations, SMEs cannot influence the other actors in the supply chain. Nevertheless, one of the CE experts asserts that there are new, youthful ownership or management teams, who are interested in implementing matters not only around environmental protection and sustainability but the CE principles as well. In addition to SMEs influencing their own supply chains, the experts add that large corporations can and should be allied. They have great lobbying power and economic weight, which can also be offered to give smaller firms the opportunity to increase their businesses. Thereby, SMEs are not automatically doomed, as they can transform their business to remain one of the market leaders in that segment, they just have to do their activities differently.

One of the CE experts emphasizes that a meaningful breakthrough towards the CE can only be achieved if **top-down and bottom-up processes meet**. In environmental matters, sometimes there is either this or that, but the two approaches rarely come hand in hand. He contends that the business community have the potential in both directions: they can influence politicians on the one hand, and encourage consumers through social messages on the other, which could also guide their consumers' thinking about the use of natural resources. If large companies make decisions that many elements of the CE need to be implemented, they can demand that Hungarian SMEs transform their supplier activities in line with the CE. From this perspective, the business sector has the potential to influence top-down and bottom-up thinking.

Both CE experts consider that **education is key** to enable the public to properly access and implement the various sides and benefits of the CE. According to them, this could be best addressed through transforming people's attitude around environmental protection and resource management. This, however, is not just about teaching primary school students what the CE is, but it should flow from the media until this topic is entrenched in people. In addition, capacity building and awareness raising should be at all levels of education, most importantly in higher education, especially in engineering, science, or economics courses to internalize the natural resources rather than to view them as externalities. Nevertheless, consciousness transformation should not be a substitute for incentivizing government policies. Even though some people may know that an eco-friendly product is better for the environment, even a proportion of eco-conscious people do not make this commitment to pay more for an environmentally friendly if it is not competitive in the market at the first place. Price conditions need to be shaped in a way that even an ill-informed person decides to buy the cheaper product without knowing that it is also the environmentally friendly option.

Eco-confusion amongst SMEs

In terms of approaching the design question of products with a circular perspective, material purity is essential. Circular designs in the upstream should ensure 100% product purity thus remanufacturing and other regenerative manners are possible once a product can no longer be used in its original form. However, it is a much more complicated question in the case of the textile industry. Clothes made out of 100% cotton are the most comfortable to wear, but they are not durable and shrink after one wash, which is why cotton is often mixed with other materials (for example, 5–10% elastane) in the first place. In order to resolve product durability, cotton is mixed with polyester to make the final product durable after multiple washes and to keep its shape and colors well. On the other hand, the higher the polyester content of a cloth, the more uncomfortable it becomes because of restricted ventilation and inadequate binding of moisture. One of Company C's partnership illustrates the issue around product purity well. As mentioned above, the company distributes workwear clothes to other firms, for example, to laundries who provide the clothing to manufacturing companies. The used, dirty, and often oily clothes are collected by the laundries and go through heavy washing procedures at high temperature thus the clothes have to be suitable for industrial washing. Otherwise, the products can stretch or widen and lose their color, and become unusable after one use and wash.

Nowadays, clothes made out of 100% PET bottles, 50–50% organic cotton and PET bottles, 65–35% cotton and polyester, 50–50% PET bottles and polyester, and so on (these proportions vary and depend on the specific purpose of the products and the market demands) are all available in the market. As opposed to the 65–35 polycotton products, clothes made out of 100% recycled plastic is a circular design, in which worn out clothes and materials can easily be given a new life cycle. Since these items are entirely made out of upcycled plastic, they are reusable and can be included in the remanufacturing of new products. In this way, waste is reduced and the consumption of raw material becomes circular. Even though polycotton products may do more harm than good, clothes fully made out of man-made, synthetic fibers are a good example of extending the cycle of products. On the other hand, one of the interviewees from the clothing industry underlines that even though it seems the supply chain could have all the required PET material in the form of thrown away bottles to create green products, the mechanism to produce these merchandises is more expensive than the regular fabrication methods. In addition, the collection, arrangement, cleaning, and grinding of the PET bottles often entail a higher carbon and ecological footprint than the regular procedure.

The same observation goes for the plastic industry. Besides ensuring adequate funding to public service providers for capacity building as per discussed in detail above, “plastic waste could be reduced more effectively if manufacturers were required to ensure that the high-density polyethylene (HDPE) bottle does not have a propylene cap and a polyvinyl chloride label. Or do not put propylene foil on a PET bottle,” according to the representative of Company E. Sorting people do not have the necessary capacities to distinguish between the different types of plastics; thus, the different plastic materials are mixed together, which makes it harder for companies like Company E to reduce and process existing waste. Therefore, product design should consider whether and how the generated waste can be recycled. Unfortunately, product designers do not consider the reusability or recyclability of items and materials; even if it is considered, it is usually one of the last aspects.

CONCLUSION

The literature review and the interviews indicate that Hungarian SMEs are in a similar position to most SMEs throughout the globe when it comes to transitioning from the LE to the CE. To better categorize obstructing and enabling factors and to ease navigating between them, they are to be broken up into three segments, macro-, meso-, and micro-level factors, respectively.

Despite one of the CE experts indicating that SMEs tend to rely on state support too much and wait for the signal of public officials prior to engaging in new areas, the interviews are in line with the literature that the government is responsible for creating a fertile ecosystem, where SMEs have the necessary capacities and environment to transform their business models towards circularity. In regard to what exact capacities they need, both the literature and interviews provide diverse points: most SMEs would like to see incentivizing programmes and tenders that encourage businesses to restructure their activities; some believe that knowledge-building conferences and/or awareness-raising meetings could assist them to redesign their supply chains; others consider that general state support is crucial for SMEs, so they do not get stuck during their circular transition. Regardless of financial and non-financial motivators, the interviewed CE experts find that the implementation of green taxes and changing the rules of capitalism, where environmental destruction would not just count as externalities but would be calculated in the total cost of products and manufacture, are essential prior to having a serious conversation about a meaningful circular transition. These last points are especially important, because they impact macro-, meso-, and micro-level factors as discussed below.

In addition to the new tax policies and including externalities in the total sum during production pushing SMEs to change their business models, these measures would automatically push customers to opt for more eco-friendly products. Sustainable items are currently more expensive than traditionally linear goods, because they entail the price for environmental pressure; thereby, only the environmentally dedicated people do not bat an eye over the noticeably steep price differences. However, people should not be presented with such an option to pay more for an environmentally friendly product, because it is usually people with higher incomes that can make this decision for themselves. Thereby, once the rules of capitalism would be changed, even the ill-informed people would automatically choose green products, because those would be the cheaper options.

Besides the presence of overall state support and the interest of the demand network, administrative burdens often deter businesses to even attempting to make their production sustainable. Instead of genuinely supporting and helping SMEs, some interviewees and the literature highlight that they perceive that the complex administrative procedures make businesses' lives even more difficult, when some of them are already in a day-to-day battle to stay afloat. In addition, there is research on this matter highlighting that SMEs already involved in making their manufacture circular perceive this factor even more serious than those businesses that are at the very beginning of their transition. Thereby, it is especially more urgent to address this issue, because more and more firms will have to adjust their business models as the world needs to get on the circular path forward.

Moving down the ladder, there is only one meso-level factor but it is another make or break element towards the realm of the CE, namely, the supply chain being stuck in linearity. This could be addressed by both bottom-up and top-down approaches; the best outcome would be achieved if these two procedures simultaneously started and met. Supply chains and businesses

have the means to initiate both approaches as they can advertise their products with positive social messages that have been becoming more and more popular and have become an important PR aspect in contemporary business models. Aside from potentially influencing customer demands, SMEs are ideally in touch with public officials in order to come up with solutions to pressing problems.

In addition to attempting to influence both the government and the lay people, putting a price on externalities would force the supply chain actors to restructure each segment of the manufacture. As soon as there was an increased price on the traditional raw natural resource extraction with the modified price depicting the actual, real cost that considers environmental deterioration, each player would automatically come up with options to cut their expenses. Of course, one of these solutions could be the application of the 3-R approach to keep materials and products in use by extending their life cycles, thereby hindering producing waste back into the environment.

Last but not least, the micro-level factors influencing SMEs' transition are mainly about the actions taken by businesses themselves. While the interviewed SMEs do not produce much waste during the manufacture of products since they are all interested in applying the 3-R mindset to cut costs wherever possible, even though most of them are not even familiar with the CE, the matter around the treatment of products at the end of their lives still remains a question, because none of the studied SMEs are the final actors in their supply chains prior to the products reaching customers. Essentially, extended producer responsibility is not applicable to any of the interviewed businesses, because they sell the products to at least one other business before customers receive the goods; thereby, the interviewed SMEs should not be held accountable, because firms sell the rights and responsibility over products as well.

Overall, the implementation of circular principles has to make economic sense to businesses. The firms are willing to implement whatever they are asked to do and are interested in cutting their costs further; however, many of them are already financially squeezed and unable to invest in new, green technologies due to their inadequate economic environments. Since environmental tenders would only affect the SMEs involved in the various programmes, incentivizing tax policies could best push corporations to collectively redesign their supply chains and activities, as well as customers to automatically choose the greener, more sustainable products. In addition, the increasing willingness of customers and businesses to choose products from a more sustainable manufacture process should be channeled by multi-stakeholder collaboration and communication to further advance the circular transition of the government, businesses, and customers alike.

RECOMMENDATIONS

Upon thorough analysis, the present study suggests adjustments to take place in three areas, namely on supranational, national, and firm levels, for Hungarian SMEs' proper circular transition. As discussed below in more detail, all three areas should modify their current functions simultaneously thus they can reinforce the transition of the other actors. Considering the current rate of ecological destruction, neither actor can wait nor can point fingers at the others to initiate change in order to prevent and reverse the ecological impact of the Anthropocene. Nevertheless, the overarching role of the EU must be emphasized, as it can and should act as a catalyst to smooth the continent's meaningful circular transition.

First of all, the EU has made good work of connecting the Recovery and Resilience Facility funds to the implementation and spread of the CE in Member States; its impact can be seen in igniting the efforts of the Hungarian government towards circularity. In addition to the Cohesion Policy support for the circular economy and Just Transition Fund, these monetary sources incentivize Member States to adopt the principles of the CE on national level without leaving stakeholders behind. However, the EU needs to make sure that a meaningful implementation takes place instead of governments misusing the funds either accidentally or deliberately. The matter of national governments misusing EU funds has become a concern in other areas, not just in the field of environment protection, and is beyond the scope of the present research; nevertheless, time is ticking to reverse the dire effects of climate change, and the application of the CE could be one of the most effective methods to do so. This should stimulate EU Commissioners to make sure that the funds are spent in a just and transparent manner.

In addition to making sure that the provided EU funds are managed correctly, what is even more important from the EU is to go beyond announcing environmental programmes and tenders to meet ever-more ambitious climate goals. These calls only affect those who end up getting their hands on these financial resources and will leave out most of the stakeholders; simultaneously, most of the climate objectives set by the EU are unmet. Instead of continuously rolling out environmental tenders and missing climate goals, the EU should plan the adoption of green taxes that would encourage economic stakeholders to redesign their supply chains in accordance with circular principles and to push them towards embracing CBMs. Of course, this would go against the serious lobbying interests of those who are concerned in retaining the current economic order with the contemporary method of production. Considering that the implementation of green taxes should be one of the main pillars of the actual realization of the CE, the EU somehow needs to make the leap forward over the powerful lobby groups that have been leading humanity towards an unsustainable and uncertain future. Further research shall focus on how bureaucrats could possibly implement such taxation policies and legislation on supranational level that overcomes the serious power of advocacy groups who are interested in maintaining the current linear economic model.

Once the green taxes that facilitate the transition towards CBMs are realized on supranational level, Member States will automatically have to come up with their own sets of regulations. In addition to enabling companies' circular transition, the green taxes would also push the end users, the consumers, to opt out from purchasing items that are less sustainable. With the application of the new green tax scheme, the price increase of the currently cheaper and more environmentally harmful products would economically convince lay people to choose the more sustainable products given that the new prices would entail the environmental externalities associated with the production.

Second, the Hungarian government should implement environmental policies and legislation similar to the EU. Currently, the government relies on a substantial amount of EU monetary sources to financially encourage domestic firms to redesign their business models towards circularity. However, the suggestion mentioned above in regards of the dilemma between financing environmental tenders and programmes as opposed to the implementation of overarching green taxes is applicable in domestic level policy making. The latter would influence each economic actor to redesign its activities in accordance with the principles of the CE, while the former would only reward a few firms from hundreds of thousands of companies. Needless to say, influencing all economic stakeholders is much more effective; thereby,

the urgent roll out of a taxation policy that considers externalities is recommended on the national level as well.

The present research demonstrates that environmental protection goes way beyond the tasks entailed by an environmental ministry, as the efforts of policymakers from other departments, such as economics or infrastructure, are also essential. These public officials would be up against strong lobbying interests who are concerned in preserving the currently unsustainable economic models. In addition, the obviously needed increase of public officers would also be urgently needed.

Last but not least, the research suggests that Hungarian SMEs can start adopting circular activities on their own, as some of the firms involved in the study have already done so even as they have been unaware of what the CE really is. Not only does this demonstrate that the CE is not a revolutionary economic model but it also depicts the cost-efficient side of the CE, which could incentive economic stakeholders to widely apply circular aspects to their business models. Hungarian firms are in a particular situation, as they can and should influence.

1. policymakers via stakeholder engagement meetings;
2. their partners and other actors in their supply chains; and
3. the end users by crafting environmental messages to achieve social change.

The first point entails the importance of government activation and consultative cooperation, while the second and third points could be taken care of with the introduction of green taxes that would automatically push economic actors to the table to reconsider the origin of their supplies; besides, the new prices, which would include the true externalities entailed during the production, would convince lay people to purchase items from circular supply chains. Nonetheless, the present study finds and claims that most SMEs are interested in environmental protection, because of some of its aspects connected to economic aspects such as cost-cutting as well as intrinsic motivation. Firm managers need to start igniting their circular transition on their own by relying on these two factors and redesign the supply chains with their partners, otherwise their businesses may be in trouble soon due to the depleting natural resources, more serious price fluctuations, unpredictable supply chains, and aggravating climate change.

LIMITATIONS

The five entities interviewed for this study are positioned differently in their respective supply chains. One of the textile companies is only associated with reselling products to other firms, while the other directly sells apparels to customers besides reselling. In case of the plastic package manufacturing companies, two of them exclusively make plastic packaging materials for other entities, while the third one purchases and processes plastic waste to produce plastic granules to be sold to other entities. None of the companies is exclusively the last player in their respective supply chain prior to reaching the final user, the consumer. However, a common feature between these five companies is that there is another business between themselves and the end-users. Overall, having five interviews with businesses from two sectors is more favorable than having conducted a single case study that lacks external validity. Therefore, the generalizability of the study was increased and the limitations were offset by having multiple structured, open-ended interviews conducted with various Hungarian SMEs.

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