**ENTREPRENEURSHIP AND
SUSTAINABILITY CENTER**

Publisher
http://jssidoi.org/esc/home

BARRIERS TO THE DEVELOPMENT OF THE CIRCULAR ECONOMY
IN SMALL AND MEDIUM-SIZED ENTERPRISES IN SLOVAKIA[*]

Michal Levický [1], Milan Fiľa [2], Milan Maroš [3], Marcela Korenková [4]

[1,2,3,4] *Constantine the Philosopher University in Nitra, Slovak Republic*

E-mails:[1] mlevicky@gmail.com; [2] mfila@ukf.sk; [3] mmaros@ukf.sk; [4] mkorenkova@ukf.sk

Abstract. The circular economy is the successor to the current model of the linear economy. Its basic principle is the environmentally acceptable use of resources. At present, it can be understood as an intensively developing megatrend of the business environment. It can be assumed that the competitiveness of companies in the future will be highly dependent on how companies will be able to implement the principles of the circular economy. The article is focused on the analysis of the use of activities of the circular economy in the conditions of small and medium enterprises in Slovakia and on the willingness to finance these activities from the turnover of the company. Based on the conducted questionnaire survey, it was confirmed that smaller companies implement activities of the circular economy more slowly and their willingness to finance these activities is lower compared to larger companies. It can also be stated that if smaller companies carry out activities of the circular economy, these are mostly cost-free or low-cost activities. As the size of the company increases, so does the level of company involvement in the circular economy. The results achieved are similar in several areas to those of the Eurobarometer 2016. It may therefore appear that, despite the various activities of economic policy makers, there has been no shift in this area. However, it should be taken into account that our questionnaire survey was conducted during the Covid 19 virus pandemic, which has a significant impact on the business environment, business decision-making processes.

1. Introduction

We are experiencing the civilizational transformation that humanity has experienced in its history, for example during the agricultural and industrial revolution. After the Industrial Revolution, humanity began to remain a non-renewable resource, and the results of this activity are waste that is largely not biodegenerable. Science and technology have so far focused on the production side. However, humanity is currently hitting the boundaries of the ecosystem, affecting climate change, irreversibly contaminating various parts of the environment, and the reserves of some natural resources are almost empty. As a solution to this problem, it offers a circular economy, which represents a new look at the current model of the linear economy. This is characterized by the high consumption of non-renewable resources. It is already clear that the principles of the circular economy will fundamentally affect the basic attributes of business in the future, and every business will have to adapt to the new model of the economy. At the same time, several studies have shown that large companies have greater opportunities to implement business models based on the circular economy. The application of the principles of the circular economy in small and medium-sized enterprises requires the overcoming of many barriers. The circular economy will become a megatrend in the global business environment that cannot be ignored. It will be important for the development of business competitiveness that this megatrend becomes an opportunity for businesses, otherwise, the effects of this change on businesses may, unfortunately, be very unfavorable.

2. Theoretical backround

The growth of industrial production, electricity and heat production, mining, agricultural activities associated with population growth and caused by increased demands on housing, transport, consumption, and related infrastructure, causes an increase in demands on natural resources, as well as an increasing impact on the quality of life environment. This influence no longer has the character of a local effect on the area around the place of its origin, but it is increasingly manifested in a global perspective. Since the beginning of the industrial revolution in the 19th century, environmental pollution has intensified and become a global problem. Mankind can see the consequences in the deterioration of the quality of water, air, soil but also various ecosystems. At the same time, environmental pollution is directly linked to human health and welfare (Guštafíková et al., 2019). This influence no longer has the character of a local effect on the area around the place of its origin, but it is increasingly manifested in a global perspective. The solution to this problem is the circular economy, the concept of which was first introduced by the British environmental economists David W. Pearce and Kerry R. Turner in 1989 (Pearce & Turner, 1990). The circular economy is the successor to the current model of a linear economy, dependent on the high consumption of non-renewable resources. The linear economy is economically, ecologically, and socially unsustainable in the long run (Goyal et al., 2018), does not meet the needs of today's society, and cannot sufficiently reflect the solution of the problems outlined above. The circular economy promotes more appropriate and environmentally sound use of resources (Kirchherr et al., 2017). Generally speaking, recirculation of resources in the circular economy comes from a cycle of taking, transforming, using, and returning. Industries take resources from the environment and transform them into services and products. These are then distributed and used by consumers or other businesses as part of other products. Despite the importance of the concept of circular economy, research in this area is insufficient and the effects of the circular economy on business and society need to be examined in more detail (Korhonen et al., 2018). As there is a presumption that future economic growth cannot be secured in an extensive way, it is essential to use resources in a much more sustainable and efficient way. Only in this case will we be able to talk about sustainable growth. In 2015, United Nations members adopted a document entitled Agenda 2030 for Sustainable Development. This document was a response to the efforts of the world community and economic policy makers to address these issues. The Agenda 2030 includes 17 targets, with an emphasis on sustainable consumption and production processes that alleviate the problems of scarcity of natural resources. In addition to the UN, in 2015 it adopted the European Union Action Plan for the Circular Economy in this area. Emphasis is placed on measures throughout the product life cycle. (Guštafíková et al., 2019).

It is already clear that the principles of the circular economy will fundamentally affect the basic attributes of business in the future, and every business will have to adapt to the new model of economic functioning. Several studies state that large companies have more opportunities to implement business models based on the circular economy (Araujo Galvão et al., 2018). On the contrary, the application of the principles of the circular economy in small and medium-sized enterprises requires the overcoming of many obstacles (Cassells & Lewis, 2011). Most studies suggest that SMEs do not adopt and implement circular economy principles due to high capital costs (Urbinati et al., 2017), long payback periods, or high resource efficiency costs (Álvarez Jaramillo et al., 2019; Ormazabal et al., 2018). SMEs tend to have difficulty solving environmental problems because they see only economic costs and do not perceive the relationship between environmental practices and profits (Biondi et al., 2002). According to the European Commission, up to a third of SMEs say they struggle with complex administrative and legal procedures when seeking to use resources more efficiently. As awareness of climate risks and other environmental issues and consumer preferences change, this transformation towards sustainable business practices is a key aspect for the continued competitiveness and growth of small and medium-sized enterprises (European commission, 2020). Businesses need to consider how to implement the principles of circularity in their operation and what business model strategies to use if they want to move to a circular economy model (Bocken et al., 2016; Silva et al., 2019). To this end, companies need to find new partners for cooperation and rethink the value they offer to stakeholders. For companies to solve this problem, it is necessary to use innovative tools and processes that will help companies on their way to new business models (Antikainen et al., 2017; Liu, 2018; Lüdeke-Freund et al., 2019). Eco-innovation strategies are therefore important for the development of a company's business model, and the company should be able to invest in innovation in products, processes, and organizational structures (Barbieri & Santos, 2020). Circular economics or circular business models can solve this problem and provide an economic response to environmental practices by helping companies create value through value-added logic designed to increase resource efficiency. The integration of the system of the circular economy into business activities thus brings several benefits associated with new business models, marketing, corporate culture. From a marketing point of view, the circular economy is considered a new business model that should lead to more sustainable development and a harmonious society (Ch'ng et al., 2021). Companies cannot cope with barriers in implementing the principles of the circular economy (Pacheco et al., 2017). Therefore, how macro-level support will be provided, especially to SMEs, will play a key role in overcoming these obstacles (Heyes et al., 2018). In addition to encouraging SMEs to become involved in environmental practices, environmental legislation also plays an important role (Hoogendoorn et al., 2015). At the same time, it is essential that legislative and support initiatives are coordinated at the European Union level (Bassi & Dias, 2019).

3. Research objective and methodology

The main goal of the article is to estimate the current status of implementation of the circular economy in small and medium-sized enterprises in Slovakia and to identify the extent to which small and medium-sized enterprises finance the activities of the circular economy from their turnover. We obtained the necessary data from primary and secondary sources. The basis of the research was mainly the scientific literature. Current secondary data will allow us to theoretically define and practically formulate the initial state of the researched issues. We obtained primary data through a questionnaire survey. After compiling the first design of the questionnaire, we carried out pilot testing on a sample of 6 companies. Based on the achieved results, we slightly modified the final form of the questionnaire. The questionnaire survey was conducted in Slovakia from January to March 2021 in electronic form. The respondents, in this case, were small and medium-sized enterprises. The questions of the questionnaire were focused on various areas of business, while one part also dealt with circular economics. After completing the questionnaire survey, we checked the data obtained. We did not use data from incorrectly and incompletely completed questionnaires. Finally, we used data for 169 companies. The basic characteristic based on which we

will segment companies will be their size. Size categorization is based on the European Commission Recommendation 2003/361/EC (Commission, 2020), which divides companies by size into micro, small, medium, and large. The division in our case was made only based on the number of employees of the company. Table 1 below shows the representation of individual types of enterprises in the sample.

Table 1. Characteristics of the sample

	Frequency	Valid Percent	Cumulative Percent
micro	92	54.40	54.40
small	51	30.20	84.60
medium	26	15.40	100.00
total	169	100,00	

Source: own processing based on questionnaire survey

Based on the stated goal of our article, we determined the dependence between the size of the company and the number of activities related to the circular economy that companies perform. The second test was aimed at examining the relationship between the size of the company and the willingness to finance activities related to the circular economy. All questions used were designed for comparison based on the Flash Eurobarometer 441: European SMEs and the Circular Economy (European Union, 2016). In the case of the question concerning the degree of involvement of companies in the circular economy, the representatives of companies indicated the selected activities that they carry out. These were the following activities

- Re-plan of the way water is used to minimise usage and maximise re-usage
- Use of renewable energy
- Re-plan energy usage to minimise consumption
- Minimise waste by recycling or reusing waste or selling it to another company
- Redesign products and services to minimise the use of materials or use recycled materials

Based on how many activities the companies identified, we divided the companies into 3 groups. The first group consisted of companies that did not carry out any of the above activities. The second group consisted of companies that carried out one or two activities. And the third group consisted of companies that implemented 3 to 5 of these activities. The second issue through which we conducted testing was related to the willingness of companies to finance activities related to the circular economy. We investigated how much of their turnover micro, small and medium-sized enterprises would be willing to finance the activities of the circular economy. We divided the companies into four groups. The first group consisted of companies that were not at all willing to finance activities related to the circular economy. Other groups of companies were divided into the range of 1% to 5% of turnover, 6% to 10% of turnover, and finally 11% and more of turnover. In the field of theoretical research, the obligatory method will be the reception of knowledge from available sources through content - causal analysis. The basis of the theoretical elaboration of the solved problem will be a critical analysis, comparison, summarization, and synthesis of the obtained opinions and findings. Using the induction and deduction of the basic terminological apparatus, we will contribute to the generalization of the acquired knowledge and formulate our own opinions. In the analysis of primary data, we will use selected mathematical-statistical methods related to the verification of hypotheses. In our case, we will examine the relationships between the two nominal variables. The dependence of two nominal variables is also called contingency and the basis for its determination is the chi-square test of independence (Řezanková, 2017). We assume that if the two characters are independent, then the distribution of frequencies in the PivotTable is proportional to the row and column marginal frequencies. These numbers are called expected. If we denote the relative abundance in the base set as π_{ij}, then we write the null

hypothesis of independence in the form H0: $\pi ij = \pi ij$, 0, where πij, 0 is the relative abundance expected in the case of independence, given by the relation πij, $0 = \pi i + \pi j$. We test this null hypothesis against the hypothesis H1: $\pi ij \neq \pi ij$, 0 for at least one pair i, j (i $\neq$ j). Pearson's chi-square statistic can be used as a test criterion, which is expressed as follows:

$$\chi_P^2 = \sum_{i=1}^{R} \sum_{j=1}^{S} \frac{(n_{ij} - m_{ij})^2}{m_{ij}}$$

The chi-square statistic takes values from the interval $\langle 0; n.(q-1)\rangle$ where $q = \min\{R, S\}$. Assuming the null hypothesis, this random variable has an approximate chi-square distribution with (R-1) (S-1) degrees of freedom, i.e, $\chi_P^2 \sim \chi^2[(R-1)(S-1)]$. Therefore, we compare the calculated value of the mentioned test criterion χ_P^2 with the quantile $\chi_{1-\alpha}^2[(R-1)(S-1)]$, where α is the selected level of significance. If $\chi_P^2 \sim \chi_{1-\alpha}^2[(R-1)(S-1)]$ so, we reject the null hypothesis of independence. Otherwise, this null hypothesis cannot be rejected. Rejection of the null hypothesis means that the difference between actual and expected frequencies is so large that it cannot be merely random, i.e., there is a relationship between nominal variables (Rimarčík, 2007). The use of this test presupposes that the expected abundances in the individual fields do not fall below 5 in at least 80% of the fields, and in the other fields at least 1 value (the literature differs in these requirements). If these assumptions are not met, we use exact tests (e.g., Fisher's exact test). To determine the degree of dependence between two qualitative features, the values of which are arranged in the contingency table r x s, the contingency coefficient C is used, which is defined as follows:

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}}$$

where χ^2 is Pearson's test statistic and $n = \sum_{i=1}^{r} \sum_{j=1}^{s} n_{ij}$,

The closer the value of the coefficient C is to zero, the greater the degree of independence between the qualitative features. Another measure of the dependence between the qualitative features is the Cramer's V coefficient. If the results of the sample survey are arranged in a contingency table of type r x s, then Cramer's V is defined as follows:

$$V = \frac{\chi^2}{\min\{(r-1),(s-1)\}.n}$$

where χ^2 is Pearson's test statistic and $n = \sum_{i=1}^{r} \sum_{j=1}^{s} n_{ij}$,

The closer the value of the coefficient V approaches zero, the greater the degree of independence between the qualitative features. The degree of association between two binary variables can also be expressed through the Phi coefficient (Rimarčík, 2007). When interpreting the contingency coefficient in our research, the scale introduced by Cohen for the correlation coefficient can be used, according to which the correlation less than 0.1 is trivial, 0.1–0.3 small, 0.3–0.5 medium and above 0, 5 is large.

3. Results and discussion

To achieve the goal stated in the previous chapter, we divided the experimental chapter into two parts. In the first part, we present the characteristics of the economy of the Slovak Republic. This is necessary as we assume that the performance level of the economy, the state of the business environment, the support of innovation have an important impact on the implementation of the circular economy in companies. In the second part, we analyze the results of a questionnaire survey using basic scientific methods and selected mathematical and statistical methods, which we specified in more detail in the chapter materials and methods.

Realities of the Slovak economy concerning the transition to a circular economy

The biggest challenge of Slovakia's economic policy is solutions that align consolidation goals with the goals of growth, employment, and quality of life (Guštafíková & Lieskovská, 2016). The Slovak Republic is a small, highly open economy. Small and medium-sized enterprises employ almost 75% of the workforce and contribute more than 50% to gross output and value-added. However, the Slovak economy is dependent on the economic results of large multinational companies operating in export-oriented industries. In the long run, Slovakia is one of the industrialized countries with a strong production base. Industrial production is a key sector of the economy. The industry contributes the most to the creation of gross value added. The second most significant contributors to gross value added are the common wholesale and retail sector, motor vehicle repair, transport and storage, accommodation, and food services (Beresecká & Hudáková, 2018). About 15% together represent public administration, defense, compulsory social security, education, social services, and health. In recent years, the construction sector accounts for about 10% of total gross value added. The decline of agriculture is related to the liberalization of the domestic market in favor of foreign retail chains. In addition to the dominance of the industry, another characteristic feature of the Slovak economy is the high openness. Heavy industries also dominate the structure of exports. The commodity structure of exports and imports has a very similar composition, which indicates a high involvement in international trade and also a high share of intra-industry trade.

Among other tools (Gruenbichler et al., 2021), research, development, and innovation (Stacho & Stachová, 2016; Urbaníková et al., 2020) are keys to long-term sustainable economic growth but increasing competitiveness but the development of the circular economy. Slovakia lags far behind the EU average in terms of innovation performance and R&D funding (Sojková et al., 2015). The low quality and underestimated importance of the scientific base hinder the creation of a functioning research and innovation environment. Cooperation between academia, research, and business remains insufficient. Slovak small and medium-sized enterprises are characterized by the fact that they mostly use basic technologies that they buy from other companies, their own innovative activities are rare in these companies. On the contrary, large foreign corporations often carry out their own research and development, their innovative performance is at several times higher levels. As research and development departments are mostly retained by foreign companies in their home countries, these companies are important for Slovak small and medium-sized enterprises, especially in the transfer of technology and know-how (Hudáková et al., 2020). Businesses can only increase their productivity, profits, and market position by implementing innovations. The area of research, development, and innovation in Slovakia has long been insufficiently supported. The structure of expenditure on research and development is dominated by public resources.

Results of a questionnaire survey focused on selected issues of circular economy in SMEs

Following the set goal, in the second part of the experimental chapter, we focused on testing two assumptions. The first assumption is that for smaller companies, the transition to the conditions of the circular economy is slower. We investigated this by examining the relationship between the size of the company and the number of defined activities related to the transition to a circular economy (see the chapter on materials and methods).

Subsequently, we tested the validity of the second assumption, namely what part of their turnover they are willing to invest in the form of costs in activities related to the circular economy. Table 2 shows the results of testing the dependence of two nominal variables - the size of the enterprise and the intensity of involvement in the circular economy through defined activities. Using Fisher's exact test, we tested a null hypothesis that expresses the independence of variables. Thus, the null hypothesis assumes that the intensity of the transition of enterprises to the circular economy has no relation to the size categories of enterprises. Based on the test results, we reject the null hypothesis as the p-value is less than 0.01. We state that the size of the company has an impact on the intensity of the company's involvement in the circular economy. Based on the calculated values of the statistics in Table 3, it can also be stated that there is a moderate dependence between the variables.

Table 2. Results of testing the dependence of the size of the company and the number of activities of the circular economy

	Value	Exact Sig. (2-sided)
Pearson Chi-Square	24.922	.000
Likelihood Ratio	22.791	.000
Fisher's Exact Test	21.535	.000

Source: own processing

Table 3. Results of testing the strength of dependence between the examined variables

	Value	Approximate Significance	Exact Significance
Phi	.384	.000	.000
Cramer's V	.272	.000	.000
Contingency Coefficient	.358	.000	.000

Source: own processing

Figure 1 shows a graph that shows how the size categories of enterprises are involved in the circular economy, based on the number of selected activities related to the circular economy that enterprises carry out. It is clear from the graph that with the increasing size of the company, the representation of companies that carry out a larger number of activities of the circular economy also increases. Based on the number of activities of the circular economy, we can assess the extent to which companies have a circular economy implemented. It is interesting to note that up to 26% of micro-enterprises do not carry out any activities related to the circular economy. These companies also do not carry out basic activities such as waste separation or water and energy-saving measures. As many as 90% of all micro-enterprises implemented a maximum of 2 activities of the circular economy, while it is also important to find out that these are mostly cost-free or low-cost activities. The implementation of activities related to the circular economy was slightly higher for small businesses. Only about 11% of these companies did not carry out any of these activities. For medium-sized enterprises, a much higher level of involvement in the circular economy can be observed, as evidenced by the fact that up to 46.1% of these enterprises carry out 3 to 5 activities related to the circular economy.
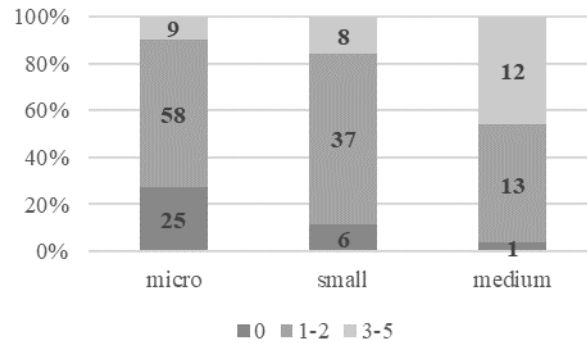
Figure 1. Numbers of circular economy activities in size categories of enterprises

Source: own processing

Second, we examined the relationship between the size of the company and the willingness to finance the activities of the circular economy through part of the company's turnover. Table 4 shows the results of testing the dependence of two nominal variables - the size of the company and the relative part of the turnover, through which companies are willing to finance the activities of the circular economy. Using Fisher's exact test, we tested a null hypothesis that expresses the independence of variables. Thus, the null hypothesis assumes that the willingness to finance the activities of the circular economy has no relation to the size categories of enterprises. Based on the test results, we reject the null hypothesis as the p-value is less than 0.01.

Table 4. Results of testing the dependence of the size of the company and the degree of financing of the activities of the circular economy from turnover

	Value	Exact Sig. (2-sided)
Pearson Chi-Square	25.223	.000
Likelihood Ratio	25.701	.000
Fisher's Exact Test	25.467	.000

Source: own processing

Table 5. Results of testing the strength of dependence between the examined variables

	Value	Approximate Significance	Exact Significance
Phi	.386	.000	.000
Cramer's V	.273	.000	.000
Contingency Coefficient	.360	.000	.000

Source: own processing

We state that the size of the company affects the willingness of the company to finance the activities of the circular economy through part of its turnover. Based on the calculated values of the statistics in Table 5, it can also be stated that there is a moderate dependence between the variables. The graph in Figure 2 documents how much of the turnover is the size categories of companies willing to finance the activities of the circular economy. From a quick look at the graph, it is clear that with the growing size of the company, the share of turnover with which companies are willing to finance the activities of the circular economy also increases. An important finding can be considered that up to 54.35% of micro-enterprises that were involved in our survey do not finance the

activities of the circular economy at all. At the same time, micro-enterprises make up almost 97% of all business entities in the Slovak economy. From the above, it is clear that if micro-enterprises carry out circular economy activities, they are probably activities that do not require any additional costs. Approximately 35.87% of micro-enterprises spend 1 to 5% of their turnover on circular activities. In the case of medium-sized enterprises, the share of enterprises that are not willing to finance the activities of the circular economy or are willing to finance them with a maximum of five percent of turnover is declining. On the contrary, there is a growing representation of companies that spend most of their turnover on the activities of the circular economy. In the case of medium-sized enterprises, the group of enterprises that is not at all willing to finance the activities of the circular economy is the smallest (26.92%).
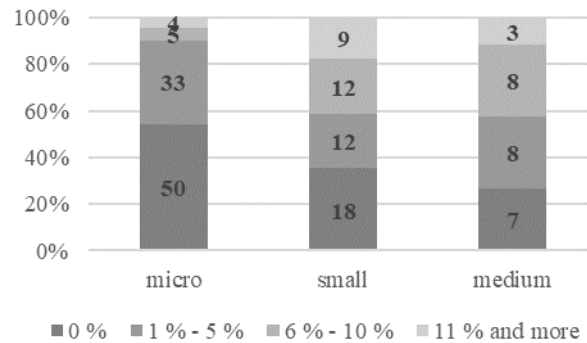

Figure 2. Percentage of turnover with which size groups of companies are willing to finance the activities of the circular economy

Source: own processing

Conclusions

Based on the achieved results, it can be stated that micro-enterprises, which are significantly predominant economic entities in the Slovak economy, are probably very little involved in the circular economy. If this group of companies carries out activities of the circular economy, these are mainly basic, cost-free, or low-cost activities. As the size of the company increases, so does the level of involvement in the circular economy. We found that almost half of the medium-sized companies involved in our survey carried out at least 3 activities of the circular economy. Based on the analysis of data obtained from the questionnaire survey, we found that 54.35% of micro-enterprises do not incur any costs for the activities of the circular economy. The achieved results are almost identical to the results of the Eurobarometer from 2016 (European Union, 2016), according to which 54% of micro-enterprises did not finance the activities of the circular economy at all. Based on the above, it may seem that, despite the various activities of economic policymakers, there has been no shift in this area. However, it is necessary to take into account that our questionnaire survey was conducted at the time of the Covid 19 virus pandemic, which has a significant impact on the business environment, business decision-making processes. Based on the performed analysis, we agree with the opinion that small and medium-sized enterprises usually have difficulty solving environmental problems, because they see only economic costs and do not perceive the relationship between environmental practices and profit (Biondi et al., 2002). Therefore, how macro-level support will be provided, especially for small and medium-sized enterprises, in overcoming the barriers to the implementation of the circular economy, will play a crucial role. In the case of Slovakia, the non-existence of a national strategy for the transformation of the Slovak economy into a circular economy, and thus uncoordinated action and the adoption of measures (Guštafíková et al., 2019) can be considered a problem in achieving this goal.

References

Álvarez Jaramillo, J., Zartha Sossa, J. W., & Orozco Mendoza, G. L. (2019). Barriers to sustainability for small and medium enterprises in the framework of sustainable development—Literature review. *Business Strategy and the Environment*, *28*(4), 512–524. https://doi.org/10.1002/bse.2261

Antikainen, M., Aminoff, A., Kettunen, O., Sundqvist-Andberg, H., & Paloheimo, H. (2017). Circular economy business model innovation process – Case study. *Smart Innovation, Systems and Technologies*, *68*, 546–555. https://doi.org/10.1007/978-3-319-57078-5_52

Araujo Galvão, G. D., De Nadae, J., Clemente, D. H., Chinen, G., & De Carvalho, M. M. (2018). Circular Economy: Overview of Barriers. *Procedia CIRP*, *73*, 79–85. https://doi.org/10.1016/j.procir.2018.04.011

Barbieri, R., & Santos, D. F. L. (2020). Sustainable business models and eco-innovation: A life cycle assessment. *Journal of Cleaner Production*, *266*, 121954. https://doi.org/10.1016/j.jclepro.2020.121954

Bassi, F., & Dias, J. G. (2019). The use of circular economy practices in SMEs across the EU. *Resources, Conservation and Recycling*, *146*, 523–533. https://doi.org/10.1016/j.resconrec.2019.03.019

Beresecká, J., & Hudáková, M. (2018). Identity of businesses in rural tourism. *21ST INTERNATIONAL COLLOQUIUM ON REGIONAL SCIENCES*, 573–580. https://doi.org/10.5817/CZ.MUNI.P210-8970-2018-75

Biondi, V., Iraldo, F., & Meredith, S. (2002). Achieving sustainability through environmental innovation: The role of SMEs. *International Journal of Technology Management*, *24*(5–6), 612–626. https://doi.org/10.1504/IJTM.2002.003074

Bocken, N. M. P., Pauw, I. de, Bakker, C., & Grinten, B. van der. (2016). Product design and business model strategies for a circular economy. https://doi.org/10.1080/21681015.2016.1172124

Cassells, S., & Lewis, K. (2011). SMEs and environmental responsibility: Do actions reflect attitudes? *Corporate Social Responsibility and Environmental Management*, *18*(3), 186–199. https://doi.org/10.1002/csr.269

Ch'ng, P. C., Cheah, J., & Amran, A. (2021). Eco-innovation practices and sustainable business performance: The moderating effect of market turbulence in the Malaysian technology industry. *Journal of Cleaner Production*, *283*. https://doi.org/10.1016/j.jclepro.2020.124556

Commission, E. (2020). *SME Definition User Guide*. European Union. https://doi.org/10.2873/677467

European Union. (2016). *European SMEs and the Circular Economy* (Issue April). http://ec.europa.eu/COMMFrontOffice/PublicOpinion

Európska komisia. (2020). *Stratégia pre MSP pre udržateľnú a digitálnu Európu (An SME strategy for a sustainable and digital Europe)*. https://eur-lex.europa.eu/legal-content/SK/TXT/HTML/?uri=CELEX:52020DC0103&from=EN

Goyal, S., Esposito, M., & Kapoor, A. (2018). Circular economy business models in developing economies: Lessons from India on reduce, recycle, and reuse paradigms. *Thunderbird International Business Review*, *60*(5), 729–740. https://doi.org/10.1002/tie.21883

Gruenbichler, R., Klucka, J., Haviernikova, K., & Strelcova, S. (2021). Business performance management in small and medium-sized enterprises in the Slovak Republic: An integrated three-phase-framework for implementation. *Journal of Competitiveness*, *13*(1), 42–58. https://doi.org/10.7441/JOC.2021.01.03

Guštafíková, T., Kostúriková, A., & Lieskovská, Z. (2019). *Circular economy - future of the development of Slovakia* https://circulareconomy.europa.eu/platform/en/knowledge/circular-economy-future-development-slovakia

Guštafíková, T., & Lieskovská, Z. (Eds.). (2016). *Slovak Republic towards green economy*. Ministry of Environment of the Slovak Republic.

Heyes, G., Sharmina, M., Mendoza, J. M. F., Gallego-Schmid, A., & Azapagic, A. (2018). Developing and implementing circular economy business models in service-oriented technology companies. *Journal of Cleaner Production*, *177*, 621–632. https://doi.org/10.1016/j.jclepro.2017.12.168

Hoogendoorn, B., Guerra, D., & van der Zwan, P. (2015). What drives environmental practices of SMEs? *Small Business Economics*,

44(4), 759–781. https://doi.org/10.1007/s11187-014-9618-9

Hudáková, J., Papcunová, V., Štubňová, M., & Urbaníková, M. (2020). Relationship of labour costs and labour productivity with Foreign Direct Investment In The V4 Countries. *Polish Journal of Management Studies*, *22*(2), 173–186. https://doi.org/10.17512/PJMS.2020.22.2.12

Kirchherr, J., Reike, D., & Hekkert, M. (2017). Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, Conservation and Recycling*, *127*, 221–232. Elsevier B.V. https://doi.org/10.1016/j.resconrec.2017.09.005

Korhonen, J., Honkasalo, A., & Seppälä, J. (2018). Circular Economy: The Concept and its Limitations. *Ecological Economics*, *143*, 37–46. https://doi.org/10.1016/j.ecolecon.2017.06.041

Liu, J. Y. (2018). An integrative conceptual framework for sustainable successions in family businesses: The case of Taiwan. *Sustainability (Switzerland)*, *10*(10). https://doi.org/10.3390/su10103656

Lüdeke-Freund, F., Gold, S., & Bocken, N. M. P. (2019). A Review and Typology of Circular Economy Business Model Patterns. In *Journal of Industrial Ecology*, *23*(1), 36–61. Blackwell Publishing. https://doi.org/10.1111/jiec.12763

Ormazabal, M., Prieto-Sandoval, V., Puga-Leal, R., & Jaca, C. (2018). Circular Economy in Spanish SMEs: Challenges and opportunities. *Journal of Cleaner Production*, *185*, 157–167. https://doi.org/10.1016/j.jclepro.2018.03.031

Pacheco, D. A. de J., ten Caten, C. S., Jung, C. F., Ribeiro, J. L. D., Navas, H. V. G., & Cruz-Machado, V. A. (2017). Eco-innovation determinants in manufacturing SMEs: Systematic review and research directions. *Journal of Cleaner Production*, 142, 2277–2287. Elsevier Ltd. https://doi.org/10.1016/j.jclepro.2016.11.049

Pearce, D. W. (David W., & Turner, R. K. (1990). *Economics of natural resources and the environment*. Johns Hopkins University Press.

Řezanková, H. (2017). *Analýza dat z dotazníkových šetření (Analysis of data from questionnaire surveys)*. Professional Publishing.

Rimarčík, M. (2007). *Štatistika pre prax (Statistics for practice)*, 200p. ISBN 978-80-969813-1-1

Silva, F. C., Shibao, F. Y., Kruglianskas, I., Barbieri, J. C., & Sinisgalli, P. A. A. (2019). Circular economy: analysis of the implementation of practices in the Brazilian network. *Revista de Gestão*, *26*(1), 39–60. https://doi.org/10.1108/rege-03-2018-0044

Sojková, Z., Čitaryova, E., & Palkovič, J. (2015). Competitiveness of regions based on comparative advantage. *Proceedings From Ix. International Conference On Applied Business Research (ICABR 2014)*, 1055–1063.

Stacho, Z., & Stachová, K. (2016). The orientation on innovation is a challange for organisations operating in Slovakia. *Proceedings of the 13Th International Conference Efficiency and Responsibility in Education*, 518–525.

Urbaníková, M., Štubňová, M., Papcunová, V., & Hudáková, J. (2020). Analysis of Innovation Activities of Slovak Small and Medium-Sized Family Businesses. *Administrative Sciences, 10*(4), 80. https://doi.org/10.3390/ADMSCI10040080

Urbinati, A., Chiaroni, D., & Chiesa, V. (2017). Towards a new taxonomy of circular economy business models. *Journal of Cleaner Production*, *168*, 487–498. https://doi.org/10.1016/j.jclepro.2017.09.047

Data Availability Statement: More information and data can be found in the repository on Zenodo: https://doi.org/10.5281/zenodo.5833639

Author Contributions: Conceptualization: Michal Levický, Milan Fiľa; methodology: Michal Levický, Milan Fiľa; data analysis: Michal Levický, Milan Fiľa, writing—original draft preparation: Milan Maroš, Michal Levický, writing; review and editing: Milan Maroš, Marcela Korenková; visualization: Milan Maroš, Marcela Korenková. All authors have read and agreed to the published version of the manuscript.

Michal LEVICKÝ is a university lecturer and researcher at the Constantine the Philosopher University in Nitra (Slovakia). He graduated from the Faculty of Economics and Management of the Slovak Agricultural University in Nitra (2010). In 2013 he received a PhD degree at the same school in the field of cross-cutting and sectoral economics.
Researcher ID: E-9880-2019
ORCID ID: 0000-0002-5297-1664

Milan FIĽA he works as an associate professor at a public university - the Constantine the Philosopher University in Nitra (Slovakia) in Nitra at the Institute of Economics and Management and has at the same time many years of work experience in the Slovak Business Agency, which is a key and oldest specialized institution in terms of support for small and medium-sized enterprises in the Slovak Republic. He has been dealing with science for many years and professional evaluation of the business environment.
Researcher ID: J-4108-2017
ORCID ID: 0000-0001-7655-1229

Marcela KORENKOVÁ graduated from the Constantine the Philosopher University in Nitra (Slovakia) and currently works as an assistant professor at the Institute of Economics and Management of the University of Constantine the Philosopher in Nitra. He is interested in the field of business and human resources in companies, marketing activities implemented in companies and also the didactic side of these areas.
Researcher ID: AAC-1931-2020
ORCID ID: 0000-0001-5811-0876

Milan MAROŠ works as an assistant professor at the Institute of Economics and Management of the Constantine the Philosopher University in Nitra (Slovakia). At the university, he teaches subjects with the application of mathematics in economics, such as economic mathematics and economic statistics, but also the basics of economics, where he specializes in externalities. The mentioned topics are also areas of his research focus.
Researcher ID: AAE-3398-2020
ORCID ID: 0000-0002-3818-2132

Make your research more visible, join the Twitter account of ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES: @Entrepr69728810