

RESEARCH TRENDS AND KNOWLEDGE NETWORKS OF SME IN THE VISEGRÁD GROUP (V4) COUNTRIES: A BIBLIOMETRIC EXPLORATION

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Summary

The paper analyses V4 SME research and knowledge networks using bibliometrics. A study of 3383 Web of Science and Scopus data entries from 1990 to 2023 covers SME research trends, influential sources and organizations, top authors, and literary conceptual structure. Sustainability, Polish Journal of Management Studies, Journal of Thermal Analysis and Calorimetry, Journal of Competitiveness, and Science of the Total Environment publish the most papers. However, Jagiellonian University Poland, Tomas Bata University Zlin, University of Silesia in Katowice, and Agh University of Krakow in Poland are the most influential. The researcher also uses keyword maps, thematic maps, and conceptual structure maps to identify the research themes. This study is crucial for policy-makers, researchers, and practitioners who want to help V4 SMEs develop and innovate.

Keywords: SMEs, V4 countries, Industry 4.0, Digital transformation, Bibliometric Analysis

JEL: L25, 014,033, P24

RESEARCH TRENDS AND KNOWLEDGE NETWORKS OF SME IN THE VISEGRÁD GROUP (V4) COUNTRIES: A BIBLIOMETRIC EXPLORATION

Abstract

This paper provides a bibliometric study of the V4 countries' small and medium-sized enterprise (SME) research patterns and knowledge networks. Using data (n=3383) from the Web of Science and Scopus database between 1990 and 2023, researcher examines Key features of SME research, such as publishing trends, influential sources and institutions, well-known authors, and conceptual structure of the literature. The research shows that there has been an uptick in scholarly articles focusing on small and medium-sized enterprises (SMEs) in recent years, especially in 2019. The top three journals by number of articles published are sustainability, Polish Journal of Management Studies and Journal of Thermal Analysis and Calorimetry. On the other hand, the most influential institutions are Jagiellonian University of Poland, Tomas Bata University Zlin of Czech Republic, University of Silesia in Katowice of Poland, Furthermore, researcher employs keyword maps, thematic maps, and conceptual structure maps to uncover recurrent themes like impact of SMEs, SME finance, performance management, and gender inclusivity of SMEs. This study has important implications for policymakers, researchers, and practitioners who are interested in fostering the growth and innovation of small and medium-sized enterprises (SMEs) in the V4 countries.

Introduction

The role of small and medium-sized enterprises (SMEs) in driving global economic growth and development has been increasingly important in recent decades (Nyikos et al., 2020). SMEs promote economic resilience, increase consumer choice, and contribute to global economic stability. Moreover, SMEs play a critical role in fueling economic growth, innovation, and job creation within countries and regions (Breckova, 2017; Sebestova–Sroka, 2020). Additionally, Innovation is viewed as a key aspect in business strategy, with the potential to differentiate the organization from the competitors (Tomaskova–Kanovska, 2022). The small and medium-sized enterprises of the V4 countries (the Czech Republic, Hungary, Poland, and Slovakia) are highly valued for the contributions they are providing to the regional economy (Ivanova, 2017). To promote long-term economic growth, encourage entrepreneurship, and secure a diversified and prosperous global business environment, it is essential to invest in and stimulate the expansion of small and medium-sized enterprises (Ubreziova et al, 2008). Nevertheless, Expanding and innovative economies rely heavily on small and medium-sized enterprises (Civelek et al., 2021). They infuse the market with spirit and creativity, increasing competitiveness and opening it up to new ideas (Odei et al, 2021). Likewise, Small and medium-sized enterprises are frequently at the front of technical advances, developing novel products, services, and business models that fuel economic growth (Lesakova, 2019).

Small and medium-sized enterprises are vital to the growth of regional economies (Pissarides, 1999). They help to create jobs and boost economic activity in locations where big companies don't always have a significant presence. Furthermore, Small and medium-sized enterprises have an important role in supporting regional economic growth that is more evenly distributed (Pietrzak et al., 2017). Small and medium-sized enterprises have the potential to effect positive societal change and improve the standard of life. When it comes to fostering innovation and entrepreneurship, SMEs play a crucial role. They serve as role models and provide support to aspiring business owners, who are therefore more likely to launch their own companies and boost economic growth. Moreover, small and medium-sized enterprises contribute to an innovative ecosystem by working with academic institutions, large businesses, and government organizations (Tomaskova–Kanovska, 2022). Businesses of all sizes, especially small and medium-sized enterprises, contribute to a secure economy. The economy is more resilient to shocks and downturns because of their presence, which lessens reliance on a few huge businesses (Korcsmaros–Simova, 2018). There is a strong correlation between the resilience of SMEs and their ability to aid in economic recovery (Zygmunt, 2017). In addition, SMEs help boost exports and commerce, which in turn helps countries trade more effectively globally. For the V4 countries, it is the small and medium sized enterprises that are the driving forces behind economic growth, innovation, and job creation (Lobos, Malatek–Szewczyk, 2020). Research on small and medium-sized enterprises (SMEs) in these nations is evolving at a rapid pace, and understanding these trends and dynamics can offer insight on the knowledge networks, theme foci, and collaborative patterns that form this essential sector.

The purpose of this paper is to conduct an extensive bibliometric study of SME research patterns and knowledge networks across the V4 nations. Using bibliometric methods, researcher hope to give a comprehensive overview of the current literature, pinpoint developing areas of study, and draw attention to key figures and seminal works. Understanding the current situation of SME research in the V4 countries is important for policymakers, researchers, and practitioners, and this type of analysis can help with that. Here are some of the exact goals of this study-

1. Identify and analyze trends and growth patterns in SME research publication across the V4 nations.
2. To identify the leading institutes and publishing houses in the V4 nations that conduct SME research.
3. Using tree maps, thematic maps, and a conceptual structure map, analyze the conceptual structure of the SME literature.

This article is organized as follows. The research materials and methods are described in Section 2, followed by the results and discussion in Section 3, and finally the implications and recommendations in Section 4.

Material and method

The author used bibliometric analysis and a systematic literature review to gain a deeper understanding of the academic study of SMEs in the Visegrad Group. The bibliometric data utilized in this study was compiled using the Web of Science and Scopus database. All documents published on the Web of Science (WoS) and Scopus between January 1, 1990, and December 31, 2023, were retrieved from the database. Figure 1 is a flowchart depicting the search procedure. The researcher conducted numerous iterations of keyword searches before arriving on the final list. It is widely acknowledged that bibliometric analysis is a scientifically sound approach to researching and assessing scholarly works. This approach is recommended since it enhances the subject's overall logic, collaboration patterns, research trends, and individual components (Donthu et al., 2021). Biblioshiny in R studio was used for addressing the research objectives. The Bibliometrix software used for this analysis was created by (Cuccurullo et al., 2016), Scholars from a variety of fields are becoming increasingly interested in Bibliometrix as a means of performing descriptive analysis beginning with bibliographic databases (Linnenluecke et al., 2019). The analysis in this study was performed using Biblioshiny and other features of the bibliometrics package in RStudio.

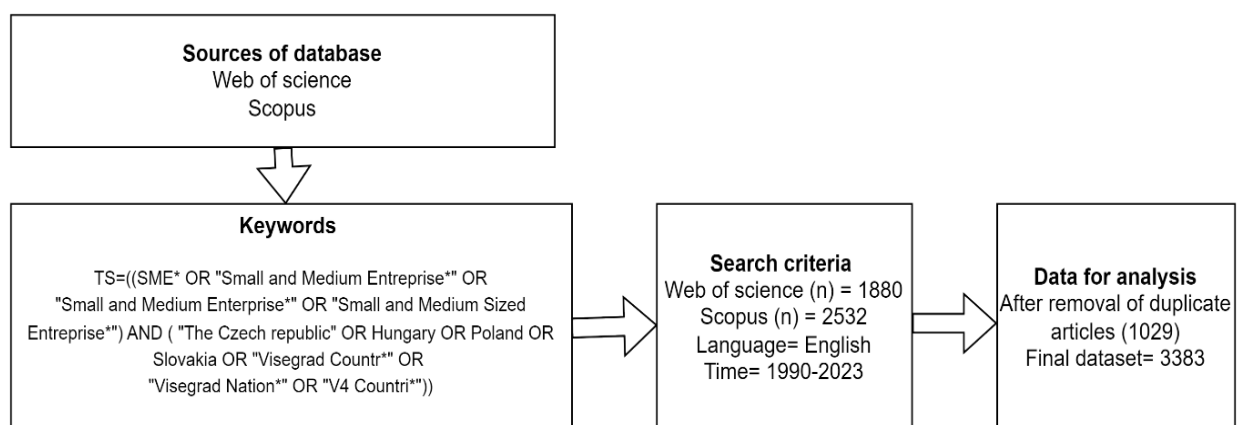


Figure 1: Data retrieval process from WoS and Scopus database

Source: Author own elaboration

Results, Analysis and Discussion

General Features of Bibliometrics Analysis

Table 1 provides a brief overview of the articles reviewed while conducting research on "SMEs in the Visegrád Group (V4) Countries." A total of 8141 writers contributed to the articles, which were published in 1422 different sources between 1990 and 2023. In total, 3383 publications about small and medium-sized enterprises (SMEs) in the Visegrád Group (V4) countries have been gathered for this study.

Table 1. Main information about the bibliography data

Timespan	1990:2023
Sources (Journal articles, conference papers, book chapter etc.)	1422
Documents	3383
Annual Growth Rate %	14.73
Authors	8141
Single-authored docs	621
Co-Authors per Doc	3.68
International co-authorships %	14.99

Source: Biblioshiny

The researcher divided the entire study period into two distinct time frames based on the production of the article. The initial period encompasses the years 1990-2009, while the subsequent period spans the years 2010-2023. Figure 2 shows the annual production in works published from 1990 to 2009. This trend shows that there is growing interest in the study of SMEs among academics. At this point, we're at the start, often known as the "introduction" stage.

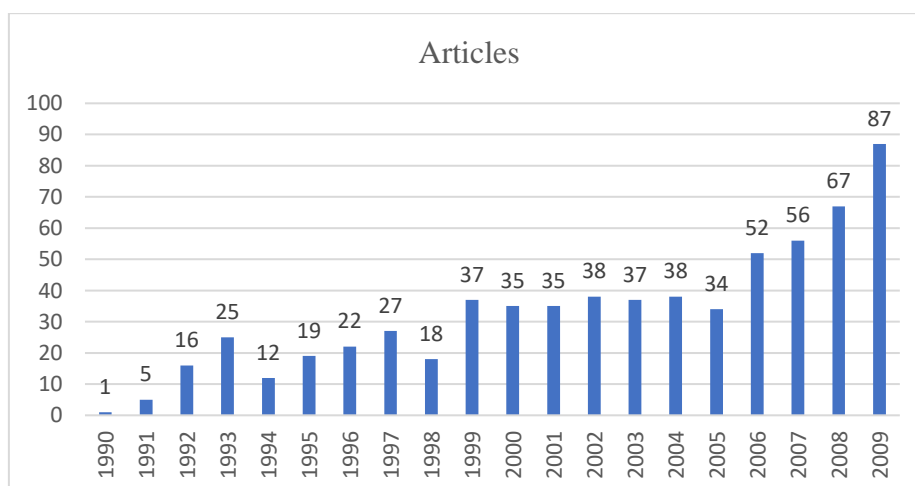


Figure. 2 Annual publication from 1990 to 2009

Source: Biblioshiny (Author own elaboration)

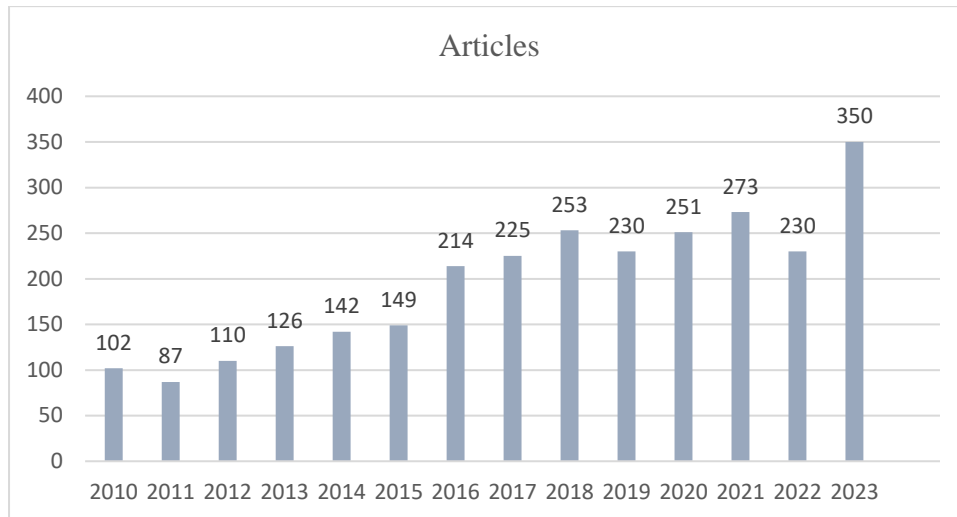


Figure. 3 Annual publication from 2010 to 2023

Source: Biblioshiny (Author own elaboration)

From the year 2009 to the year 2023, the rate of change is moderate, and almost more than 100 articles are published each year. A new era in which research on small and medium-sized enterprises (SMEs) is prioritized has begun. The number of publications published about SMEs increased significantly between 2018 and 2023, as seen in Figure 3. In fact, 2023 set a record for the number of papers published in a single year (350). Research in this area is said to be flourishing now.

Most Relevant Sources

There were 3383 documents published between 1990 and 2023. Based on the total number of articles published, the top ten journals in each subject were as follows: The Journal Sustainability; Polish Journal of Management Studies; Journal of Thermal Analysis and Calorimetry; Journal of Competitiveness etc. Table 2 shows the top ten journals, their ranks, and the total number of papers published in each. The Journal Sustainability ranked first with 46 articles, followed by Polish Journal of Management Studies with 43 articles.

Table 2. Most Relevant Sources

Rank	Name of the journals	Articles
1	Sustainability	46
2	Polish Journal of Management Studies	43
3	Journal of Thermal Analysis and Calorimetry	30
4	Journal of Competitiveness	29
5	Science of the Total Environment	29
6	Clays and Clay Minerals	27
7	Environmental Science and Pollution Research	27
8	Oeconomia Copernicana	25
9	Acta Universitatis Agriculturae Et Silviculturae Mendelianae Brunensis	24
10	Serbian Journal of Management	24

Source: Biblioshiny (Author own elaboration)

Most important authors affiliation

Table 3 shows the top 10 academic organizations that have contributed significantly to the study of small and medium-sized enterprises. From 1990 through 2023, to be precise. Jagiellonian University, Poland has the most published works (89), followed by Tomas Bata University Zlin (82) and University of Silesia in Katowice in Poland. Moreover, Polish universities make up four of the top ten research institutions in this domain; the Czech Republic has three, Slovakia has two, and Hungary has one.

Table 3. Most important authors affiliation

Affiliation	Country	Articles
Jagiellonian University	Poland	89
Tomas Bata University Zlin	Czech Republic	82
University of Silesia in Katowice	Poland	65
Agh University of Krakow	Poland	62
University of Warsaw	Poland	62
Charles University Prague	Czech Republic	49
Pan-European University	Slovakia	48
University of Zilina	Slovakia	45
Hungarian Academy of Sciences	Hungary	43
Mendel University in Brno	Czech Republic	38

Source: Biblioshiny (Author own elaboration)

Most influential articles

Learning about the seminal works on SMEs in the V4 region gives a good groundwork for more studies. So that researcher may compare the influence of the article regardless of its publication year, the researcher designed Table 4 to rank the most-cited papers with major findings. For example, Martina Musteen et al. (2014), found that strong and diverse international network improve the performance of SMEs. The article by Francesca Passaride (1999), found that credit constraints pose a substantial impediment to the expansion of small and medium-sized enterprises (SMEs) in Central and Eastern Europe. Additionally, the paper by Tommi Laukkanen et al., (2013) was third most important when using average citations per year as a measure of work influence. The research uncovered that entrepreneurial, market, and brand orientations have a positive impact on the development of small and medium-sized enterprises (SMEs) in Hungary and Finland by enhancing brand and market performance.

Table 4. Ten most influential article based on total citation (TC)

Journals	TC	Title	Author/s (publication year)	Main findings
Entrepreneurship Theory and Practice	152	Do International Networks and Foreign Market Knowledge Facilitate SME Internationalization? Evidence from the Czech Republic	Martina Musteen et al. (2014)	Strong and diverse international networks improve the performance of SMEs by assisting managers in learning about foreign markets.
Journal of Business Venturing	128	Is lack of funds the main obstacle to growth? ebrd's experience with small- and medium-sized businesses in central and eastern Europe	Francesca Passarides (1999)	The main findings indicate that credit constraints pose a substantial impediment to the expansion of small and medium-sized enterprises (SMEs) in Central and Eastern Europe. Consequently, the European Bank for Reconstruction and Development (EBRD) has prioritized the financing of SMEs through local financial intermediaries and the cultivation of the local financial system. There has been a substantial increase in the geographic reach and SME financing activities of the EBRD, which has yielded promising results.
International Marketing Review	100	The effect of strategic orientations on business performance in SMEs: A multigroup analysis comparing Hungary and Finland	Tommi Laukkanen et al. (2013)	The research uncovered that entrepreneurial, market, and brand orientations have a positive impact on the development of small and medium-sized enterprises (SMEs) in Hungary and Finland by enhancing brand and market performance. Conversely, learning orientations exhibited a weaker effect, which was restricted to Hungary. However, the findings also indicated that the impact of strategic orientations on business performance is moderated by the context of the country.
Journal of International Management	87	Internationalization of small and medium sized enterprises in the Baltic Sea Region	Hans Jansson and Susanne Sandberg (2008)	The research revealed that small and medium-sized enterprises (SMEs) in Southern Sweden that are entering emerging markets rely significantly on direct relationships or intermediaries such as distributors, with limited use of subsidiaries and low FDI involvement.

				Nevertheless, these low-cost entry modes facilitate initial market access, but they impede deeper market learning and broader regional internationalization.
Business Administration and Management	66	The Business Environment of Small And Medium-Sized Enterprises in Selected Regions of the Czech Republic and Slovakia	Jaroslav Belás et al. (2015)	The research revealed that Czech entrepreneurs in the Production and Transport sectors regard the business environment as appropriate for the establishment of a business, whereas both Slovak and Czech entrepreneurs have a significant disagreement regarding its suitability for ongoing operations. Furthermore, the Transport sector in both countries acknowledged development in business conditions over the past five years, while Slovakia's Production sector maintained neutral views.
Entrepreneurship and Sustainability Issues	63	Entrepreneurial environment at regional level: the case of Polish path towards sustainable socio-economic development	Pietrzak, M. B et al. (2017)	The research revealed that, despite the fact that entrepreneurial conditions have improved in the majority of Polish NUTS 2 regions, there are still substantial disparities between regions, particularly between central and peripheral areas. However, the dominance of central regions continues to impede sustainable socioeconomic growth and balanced regional convergence, despite the positive progress that some underdeveloped regions have made.
The International Journal of Human Resource Management	58	Employability and the psychological contract in European ICT sector SMEs	Dora Scholarios et al. (2008)	The research found that the majority of small and medium-sized enterprises (SMEs) in Europe employ an ad hoc approach to managing the employability of information and communication technology (ICT) professionals, with the primary objective of ensuring that their skills are in accordance with the demands of the business. Nevertheless, SMEs in more developed northern European markets, such as the UK, exhibit a greater sensitivity to the advantages of career management, including career planning and mentoring, which

				have a positive impact on employee commitment and psychological contracts.
Economics and Sociology	57	Small Businesses in Rural Tourism and Agrotourism: Study from Slovakia	Ladislav Mura and Aleksandr (2018)	The research emphasizes the critical role of microbusinesses and small enterprises in the rural economy of Slovakia, notably in the development of regional economies through agrotourism and rural tourism. The results of empirical research conducted from 2012 to 2016 on 142 business entities suggest that rural tourism has a substantial impact on the success of businesses and the diversification of risks, thereby boosting economic activity in underutilized rural areas.
Journal of Family Business and Strategy	56	Are high performance work practices necessary in family SMEs? An analysis of the impact on employee retention	Daniel Pittino et al. (2016)	The study examines the influence of high-performance work practices (HPWPs) on employee retention and assesses the adoption of these practices in family and non-family firms in Austria and Hungary. A sample of 232 companies was considered. The results indicate that relational mechanisms derived from family social capital can serve as a substitute for formal HPWPs in the promotion of employee engagement and commitment. The efficacy of these mechanisms is contingent upon the extent of family involvement in business governance.
Oeconomia Copernicana	54	Effect of motivational tools on employee satisfaction in small and medium enterprises	Dominika Vlacsekova and Ladislav Mura (2017)	The paper investigates the critical role of small and medium-sized enterprises (SMEs) in Slovakia's economic development by examining employee motivation. Research indicates that employee motivation is highly individualised, with intrinsic factors being more influential than extrinsic ones. Nevertheless, managers must take both types of motivation into account to improve employee satisfaction.

Source: Biblioshiny (Author's own elaboration)

Tree maps

Figure 4 provides for the 20 most often employed words in studies of small and medium-sized enterprises (SMEs) in the countries of the Visegrád Group (V4). Performance (96) is clearly in the lead, followed by Management (66), Small and Medium-Sized Enterprises (65), Impact (63) and Innovation (44) etc. in this visual representation. It can be said that successful small and medium-sized enterprises rely on strong performance, capable management, significant effects, and innovative concepts. An SME's performance is a measure of how well it meets its objectives, maintains its financial health, and benefits its stakeholders. Small and medium-sized enterprises can benefit from effective management techniques by better allocating resources, making more prudent decisions, and responding to shifting market conditions (Steinerowska-Streb, 2022). Small and medium-sized enterprises have far-reaching consequences that go well beyond monetary measurements, including employment creation, economic expansion, and the development of communities (Belas et al., 2015). In addition, innovation is essential for SMEs to set themselves apart, launch new offerings, and maintain market share in a competitive, ever-evolving industry. Moreover, Small and medium-sized enterprises are particularly well-positioned to benefit from innovation since it has a significant impact on their ability to increase economic efficiency and performance (Lesakova, 2018). The basis for long-term success and sustainable growth may be laid by SMEs stressing performance, effective management, impactful initiatives, and continual innovation.

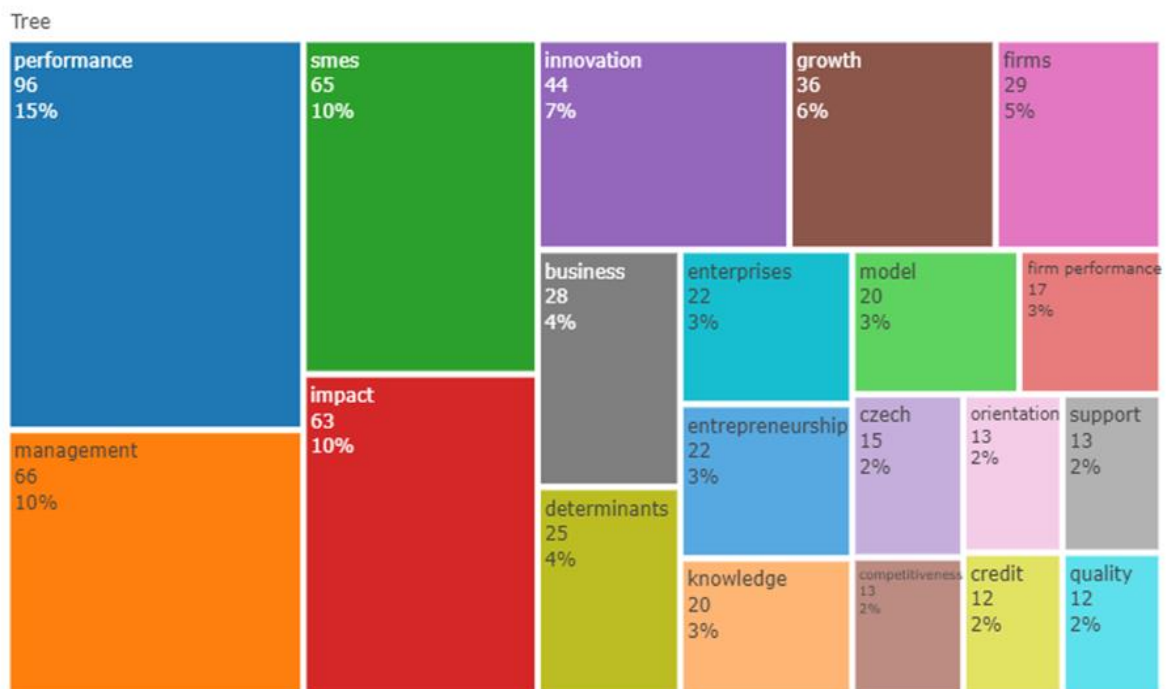


Figure 4. Tree maps of top 20 keywords
Source: Biblioshiny (Author own elaboration)

Thematic map

The biblioshiny software produces a Thematic Map (Fig. 5) with four quadrants, each of which indicates a different category: basic themes, driving themes, niche themes, and emerging or declining themes. The topics depicted on this map can be broken down further into revolving clusters based on their relative importance (Centrality) and depth of development (Density). The density of keywords inside a cluster is a better indicator of how cohesively they work together to form a theme (Forliano et al., 2021); centrality, on the other hand, assesses how well one topic is connected to others in each domain. The size of a cluster is a measure of how many terms belong to that cluster. The larger the cycle or cluster, the greater the number of keywords. Motor themes, which make up the top right quadrant, are marked by increased centrality and density. These themes are not only well-developed, but they also affect others.

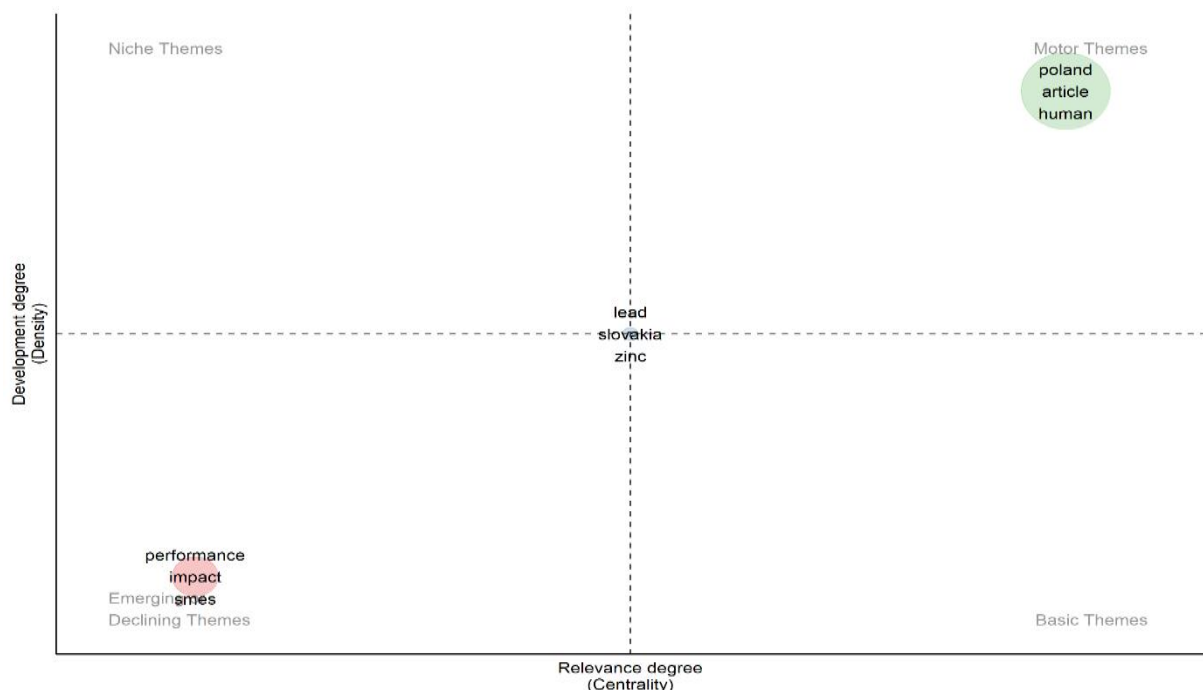


Figure 5. Thematic map (1990-2009)

Source: Biblioshiny (Author own elaboration)

The study's first phase spans from 1990 to 2009. Most of the studies conducted during this period were from Poland, and the primary topics of the study were the human aspects of SMEs. The "emerging or declining themes" in the bottom left quadrant are not very central or dense. Either extensive research has been done on them, or they are just now attracting attention. The words "performance", "impact" and "SMEs" belong here. The performance of small and medium-sized enterprises has a substantial impact on their competitiveness and contribution to economic growth. Improved management techniques can have a positive impact on sustainability and long-term profitability.

In the second phase of SMEs research (Figure 6) the motor theme includes keywords SMEs, environmental monitoring, performance and impact of SMEs. Environmental monitoring is essential for enhancing the performance of SMEs, ensuring compliance with sustainability criteria. Integrating such approaches amplifies the influence of SMEs on environmental sustainability and economic development. "Basic themes" are in the lower right corner and are characterized by their

density but lack of centrality. Although they are fully formed, they have little external capacity to influence other topics. Innovation, growth and entrepreneurship all these terms are crucial in the context of our study of SMEs. Entrepreneurship is stimulated by innovation, which contributes to the expansion of new enterprises and ventures. Entrepreneurs can enhance their competitiveness and economic development by encouraging innovation and novel solutions. Emerging theme includes the keywords gender, economics, industry and environment. The economic outcomes of SMEs are significantly influenced by gender dynamics, notably in a variety of industries. In today's competitive economic environment, SMEs can foster a more innovative environment by promoting gender inclusivity, which in turn leads to sustainable development and enhanced performance. Understanding the nuances and strategic considerations of the SME sector can be aided by delving into these concepts. The niche theme includes the keywords competition, sustainable development and information management. Efficient information management is essential for SMEs to keep a competitive advantage while promoting sustainable development objectives. By utilizing precise data and optimized processes, SMEs may improve decision-making, minimize resource inefficiencies, and strategically position themselves in more competitive markets.

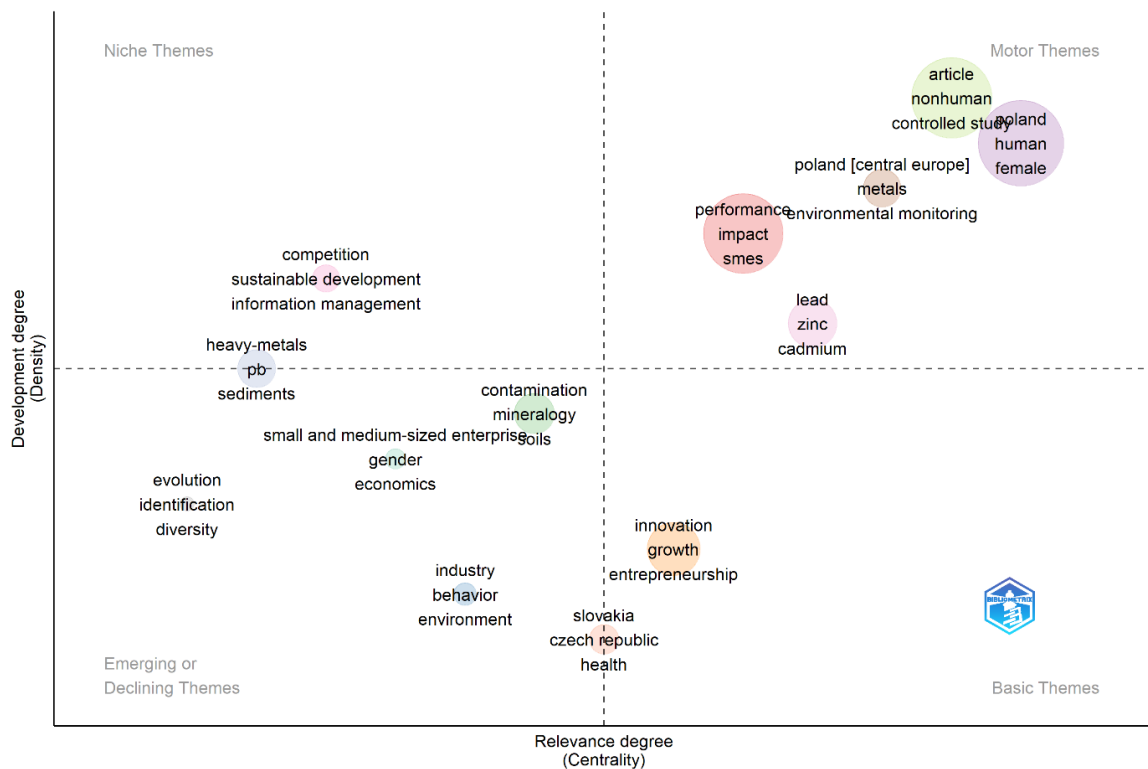


Figure 6. Thematic map (2010-2023)

Source: Biblioshiny (Author own elaboration)

Conceptual Structure Map of High frequency Keywords (MCA)

Having completed a comprehensive visual and descriptive mapping, researcher then used the factorial technique to characterize the conceptual structure of SME-related scientific output in the Visegrád Group (V4) countries that is indexed on the Web of Science. Analyses have been conducted based on the keywords plus. The factorial method essentially allows for the reduction of a huge number of variables to latent components or factors, or the representation of the data in a lower dimensional space. Correspondence Analysis (CA), Multiple Correspondence Analysis

(MCA), and Multidimensional Scaling (MDS) were all taken into account as variants of the factorial technique (Cuccurullo et al., 2016; Aria–Cuccurullo, 2017). This research employed the MCA factorial method since researcher was interested in a wide range of qualitative factors based on keyword plus document analysis, with the following findings regarding the conceptual structure map as a result. It is important to remember that proximity between words corresponds to a shared communality indicates a sense of community when deciphering the conceptual structure map. The proximity of two related keywords on the conceptual structure map (areas or clusters of terms in blue and red) indicates that they appear frequently in the same context in published works. On the other hand, these terms are not close to each other if they are only used together in a small number of articles. Thus, the conceptual structure map displays the appearance of two sizable clusters of clearly distinguished keywords, with the x-axis providing the most explanatory power (18.41%), and the y-axis providing less explanatory power (15.7%). A blue cluster can be seen on the upper right side of the map, while a red cluster can be seen on the lower left side.

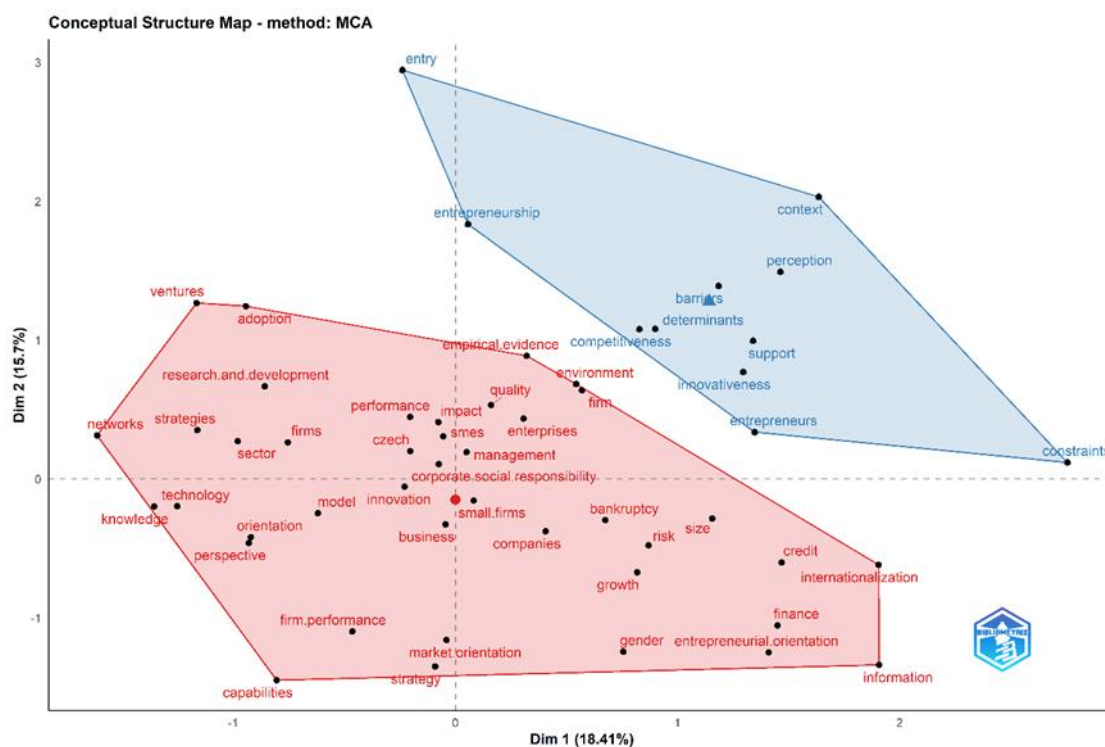


Figure 8. Conceptual Structure Map of High frequency Keywords

Source: Biblioshiny (Author own elaboration)

There are more than 40 different terms that make up the first cluster (red), and they all have some connection to the adoption, financing, performance, influence, research, and innovation of various technological developments. It is a reasonable assumption that the center of the research field, as well as the median position of all column profiles, can be found around the origins of the x- and y-axes ($x=0$ and $y=0$), respectively. As a result, we can observe that the red cluster is located on coordinates closer to both the sources with terms like "innovation," "business model," "bankruptcy," "risk," "credit," and "etc." in dimension 1, and terms like "CSR," "management," "quality," "impact," and "performance," etc., in dimension 2. To be more specific, all these keywords plus may be regarded as pertinent themes often addressed in the scientific publications examined.

Meanwhile, the blue cluster in the top right of the map has 11 keywords plus that are far from the origin of dimension 1 and, on the other hand, contain more keywords plus that are close to the origin of dimension 2. This grouping includes the policies and supports that help small and medium-sized businesses succeed. Since this cluster is solely explicable in terms of a second dimension, it is clearly less significant than the blue cluster.

Implications and recommendations

This bibliometric analysis of the literature on small and medium-sized enterprises in the Visegrád Group (V4) countries presents a detailed picture of academic disciplines and draws researchers' attention to specific areas where new findings and insights might be added. Bibliometric analysis was used to review the relevant literature, considering such factors as the articles' main characteristics, publishing trends, most important sources, most influential articles, keywords map, thematic map analysis, and conceptual structure map.

In conclusion, it can be said that there is a considerable vacuum between the publication of the first paper on small and medium-sized enterprises in 1990 and the emergence of a flourishing research community in the field of SMEs in the nations of the Visegrád Group (V4) only in 2016. There was a total of 3383 publications published on this topic between 1990 and 2023, spread over 1422 journals. The top five journals in this field, ranked by total article count, were as follows: Sustainability; Polish Journal of Management Studies; Journal of Thermal Analysis and Calorimetry; Journal of Competitiveness; Science of the Total Environment.

The most works have been released by Polish universities and followed by Czech Republic universities. When looking at the SME landscape in Poland, Hungary, the Czech Republic, and Slovakia through the lens of keyword maps, thematic maps, and conceptual structure maps, a few recurring themes become apparent. SME performance measures how productive and efficient a company. Moreover, innovation is significantly influenced by the performance and management of SMEs, which in turn significantly affects their operational efficacy and competitive advantage. While optimizing resource utilization, robust managerial practices also establish an environment that facilitates the development of innovative processes. Consequently, the development, sustainability, and long-term success of SMEs within the broader economic landscape are significantly influenced by this dynamic interaction.

In the end, Researcher examines the gender inclusivity in SMEs. Gender dynamics affect leadership diversity and decision-making processes, hence influencing innovation and competitiveness. Economic conditions and industry-specific factors dictate resource allocation and market prospects, while environmental issues progressively influence regulatory frameworks and sustainable business practices, affecting the long-term viability of SMEs.

The study's results can provide light on the state of SME research and the V4 countries' SME knowledge networks. Policymakers may use this data to develop plans and policies that help the SME sector innovate, become more competitive, and grow sustainably. Knowledge gained from this study can be used to better promote digitization, increase access to financing, boost business model innovation, and strengthen knowledge transfer systems, among other areas. Governments and funding organizations can use the findings to better allocate funds. Policymakers can better allocate resources to R&D projects that address the unique requirements and challenges of SMEs

in the V4 nations if they have a clear picture of the growing research themes and knowledge networks. This can help pave the way for an atmosphere where small and medium-sized enterprises can flourish, increase their ability to innovate, and gain a competitive edge.

This study presents a wide-ranging review of SME research throughout the V4 nations. Bibliographic research and analysis can help scholars locate knowledge gaps, fresh research opportunities, and promising avenues for cooperation. Evidence-based decision making, and policy formation are aided by the findings, which can direct future research efforts and help to the expansion of knowledge in the field of small and medium-sized enterprises.

Policymakers can develop inclusive and supportive policies for SMEs by considering gender dynamics, economic conditions, industry-specific challenges, and environmental sustainability. Economic and industry-targeted interventions enhance competitiveness, while gender-sensitive policies foster leadership diversity. In addition to promoting long-term growth and resilience, environmental regulations also ensure that small and medium-sized enterprises (SMEs) implement sustainable practices.

In general, the findings of this study have important significance for policymakers, governments, and academics because of their potential to guide future policy decisions, resource allocations, and study designs. Stakeholders may work to empower SMEs, stimulate innovation, and create sustainable economic development by gaining an awareness of research trends and knowledge networks in SMEs across the V4 countries.

The scope of this study is limited in some ways. One limitation is that the authors only used the web of science database. Second, quantitative keywords are used in the study. Since the search criteria were limited to small and medium-sized enterprises in the countries comprising the Visegrád Group (V4), the researcher hypothesize that this may have affected our results. Research is restricted to reviewing only English-language articles in the subjects of business, management, and economics. It would be worthwhile to confirm these findings with a qualitative content analysis of relevant publications. The findings have inspired a novel set of conceptually and practically realistic possible future research areas that have the potential to greatly advance the state of the art in SMEs development in these regions. The findings point to many potential pathways for the flourishing of SMEs: (1) Analyzing the development of small and medium-sized enterprises (SMEs) throughout the V4 nations via the lens of a longitudinal study of research patterns and knowledge networks. (2) To better understand the drivers, obstacles, and solutions of SMEs, researchers, and policymakers in the V4 countries, qualitative research entails conducting in-depth interviews or case studies. (3) The SME research landscape can be better understood by a comparative analysis, which involves comparing research trends and knowledge networks across the V4 nations to discover country-specific characteristics, policy approaches, and institutional environments. (4) Assessing the usefulness and relevance of research findings for policymakers, industrial practices, and the growth of the SME sector in the V4 countries is known as impact assessment. (5) To better comprehend the complexities of the problems encountered by SMEs and to create complete solutions, it is important to encourage interdisciplinary research collaboration between experts from different domains. Researcher thinks these findings will have a significant impact on future research into the development of SMEs within the nations of the Visegrad Group in the fields of business and management.

References

- Aria, M. and Cuccurullo, C. (2017) 'bibliometrix: An R-tool for comprehensive science mapping analysis', *Journal of Informetrics*, 11(4), pp. 959–975. <https://doi.org/10.1016/J.JOI.2017.08.007>
- Belas, J. *et al.* (2015) 'The Business Environment of Small and Medium-Sized Enterprises in Selected Regions of the Czech Republic and Slovakia', *Business Administration and Management*, 18(1), pp. 95–110. <https://doi.org/10.15240/tul/001/2015-1-008>
- Breckova, P. (2017) 'SMES' Innovation Approach in the Czech Republic', *Marketing and Management of Innovations*, (3), pp. 304–313. <https://doi.org/10.21272/mmi.2017.3-28>
- Chadegani, A.A. *et al.* (2013) 'A Comparison between Two Main Academic Literature Collections: Web of Science and Scopus Databases', *Asian Social Science*, 9(5). <https://doi.org/10.5539/ass.v9n5p18>
- Civelek, M. *et al.* (2021) 'How innovativeness of family-owned SMEs differ depending on their characteristics?', *Equilibrium-Quarterly Journal of Economics and Economic Policy*, 16(2), pp. 413–428. <https://doi.org/10.24136/eq.2021.015>
- Cuccurullo, C., Aria, M. and Sarto, F. (2016) 'Foundations and trends in performance management. A twenty-five years bibliometric analysis in business and public administration domains', *Scientometrics*, 108(2), pp. 595–611. <https://doi.org/10.1007/S11192-016-1948-8>
- Donthu, N. *et al.* (2021) 'How to conduct a bibliometric analysis : An overview and guidelines', *Journal of Business Research*, 133(April), pp. 285–296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
- Forliano, C., De Bernardi, P. and Yahiaoui, D. (2021) 'Entrepreneurial universities: A bibliometric analysis within the business and management domains', *Technological Forecasting and Social Change*, 165. <https://doi.org/10.1016/j.techfore.2020.120522>
- Harzing, A.W. and Alakangas, S. (2016) 'Google Scholar, Scopus and the Web of Science: a longitudinal and cross-disciplinary comparison', *Scientometrics*, 106(2), pp. 787–804. <https://doi.org/10.1007/S11192-015-1798-9>
- Ivanova, E. (2017) 'Barriers to the development of SMEs in the Slovak Republic', *Oeconomia Copernicana*, 8(2), pp. 255–272. <https://doi.org/10.24136/oc.v8i2.16>
- Korcsmaros, E. and Simova, M. (2018) 'Factors affecting the business environment of SMEs in Nitra region in Slovakia', *Oeconomia Copernicana*, 9(2), pp. 309–331. <https://doi.org/10.24136/oc.2018.016>
- Kwarteng, M.A. *et al.* (2022) 'Extending the UTATU Model to Understand the Barriers Towards SME Digitalization', *Serbian Journal of Management*, 17(2), pp. 403–424. <https://doi.org/10.5937/sjm17-37629>
- Lesakova, L. (2018) 'The Critical View on Innovation Activity in SME's Sector in Slovakia', in A. Dias *et al.* (eds) *Modeling Innovation Sustainability and Technologies: Economic and Policy Perspectives*. Matej Bel Univ, Fac Econ, Dept Business Econ & Management, Banska Bystrica, Slovakia, pp. 137–147. https://doi.org/10.1007/978-3-319-67101-7_11
- Lesakova, L. (2019) 'Small and Medium Enterprises and Eco-Innovations: Empirical Study of Slovak Sme's', *Marketing and Management of Innovations*, (3), pp. 89–97. <https://doi.org/10.21272/mmi.2019.3-07>
- Linnenluecke, M.K., Marrone, M. and Singh, A.K. (2019) 'Conducting systematic literature reviews and bibliometric analyses', *Australian Journal of Management*, 45(2), pp. 175–194. <https://doi.org/10.1177/0312896219877678>

- Lobos, K., Malatek, V. and Szewczyk, M. (2020) 'Management Practices in Area of Human Resources and Monitoring Results as Determinants of SME's Success in Poland and the Czech Republic', *Business Administration and Management*, 23(2), pp. 114–125. <https://doi.org/10.15240/tul/001/2020-2-008>
- Nyikos, G. *et al.* (2020) 'Do financial instruments or grants have a bigger effect on SMEs' access to finance? Evidence from Hungary', *Journal of Entrepreneurship in Emerging Economies*, 12(5), pp. 667–685. <https://doi.org/10.1108/JEEE-09-2019-0139>
- Odei, S.A., Stejskal, J. and Prokop, V. (2021) 'Revisiting the Factors Driving Firms' Innovation Performances: the Case of Visegrad Countries', *Journal of the Knowledge Economy*, 12(3), pp. 1331–1344. <https://doi.org/10.1007/s13132-020-00669-7>
- Pietrzak, M.B. *et al.* (2017) 'Entrepreneurial Environment at Regional Level: The Case of Polish Path towards Sustainable Socio-Economic Development', *Entrepreneurship and Sustainability Issues*, 5(2), pp. 190–203. [https://doi.org/10.9770/jesi.2017.5.2\(2\)](https://doi.org/10.9770/jesi.2017.5.2(2))
- Pissarides, F. (1999) 'Is lack of funds the main obstacle to growth? EBRD's experience with small- and medium-sized businesses in central and eastern Europe', *Journal of Business Venturing*, 14(Conference on Entrepreneurship in the Transition Economies of Central and Eastern Europe), pp. 519–539. [https://doi.org/10.1016/S0883-9026\(98\)00027-5](https://doi.org/10.1016/S0883-9026(98)00027-5)
- Sebestova, J. and Sroka, W. (2020) 'Sustainable Development Goals and SME Decisions: The Czech Republic Vs. Poland', *Journal of Eastern European and Central Asian Research*, 7(1), pp. 40–51. <https://doi.org/10.15549/jeecar.v7i1.418>
- Sliwinski, P. and Wozniak, S. (2022) 'Disclosure requirements and their assessment by SMEs traded on alternative markets in Poland (NewConnect) and Germany (m:access)', *EKONOMIA I PRAWO-ECONOMICS AND LAW*, 21(1), pp. 255–270. <https://doi.org/10.12775/EiP.2022.014>
- Snieska, V. *et al.* (2020) 'Technical, Information and Innovation Risks of Industry 4.0 in Small And Medium-Sized Enterprises - Case Of Slovakia And Poland', *Journal of Business Economics and Management*, 21(5), pp. 1269–1284. <https://doi.org/10.3846/jbem.2020.12279>
- Steinerowska-Streb, I. (2022) 'Managers' Mindfulness Concerning Institutional Obstacles and The Survival of SMEs', *Journal of Business Economics and Management*, 23(3), pp. 569–585. <https://doi.org/10.3846/jbem.2022.16114>
- Steinerowska-Streb, I., Glod, G. and Steiner, A. (2022) 'What do we know about small and medium enterprises' survival in a post-global economic crisis context?', *Local Economy*, 37(4), pp. 259–278. <https://doi.org/10.1177/02690942221112042>
- Tick, A., Saary, R. and Karpati-Daroczi, J. (2022) 'Conscious or Indifferent - Concerns on Digitalisation and Sustainability among SMEs In Industry 4.0', *Serbian Journal of Management*, 17(1), pp. 145–160. <https://doi.org/10.5937/sjm17-36412>
- Tomaskova, E. and Kanovska, L. (2022) 'Impact of cooperation flexibility on innovation flexibility in SMEs', *Equilibrium-Quarterly Journal of Economics and Economic Policy*, 17(2), pp. 533–566.
- Ubreziova, I., Wach, K. and Horvathova, J. (2008) 'Entrepreneurship in small and medium-sized enterprises: Comparative study between Slovakia and Poland for the years 2001-2007', *Agricultural Economics-Zemedska Ekonomika*, 54(8), pp. 358–366. <https://doi.org/10.17221/299-AGRICECON>
- Zygmunt, A. (2017) 'Innovation activities of Polish firms. Multivariate analysis of the moderate innovator countries', *Oeconomia Copernicana*, 8(4), pp. 505–521. <https://doi.org/10.24136/oc.v8i4.31>

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