Springer Proceedings in Business and Economics

Karolina Daszyńska-Żygadło
Agnieszka Bem · Bożena Ryszawska
Erika Jáki · Taťána Hajdíková *Editors*

Finance and Sustainability

Proceedings from the 2nd Finance and Sustainability Conference, Wroclaw 2018

Springer

Springer Proceedings in Business and Economics

Springer Proceedings in Business and Economics brings the most current research presented at conferences and workshops to a global readership. The series features volumes (in electronic and print formats) of selected contributions from conferences in all areas of economics, business, management, and finance. In addition to an overall evaluation by the publisher of the topical interest, scientific quality, and timeliness of each volume, each contribution is refereed to standards comparable to those of leading journals, resulting in authoritative contributions to the respective fields. Springer's production and distribution infrastructure ensures rapid publication and wide circulation of the latest developments in the most compelling and promising areas of research today.

The editorial development of volumes may be managed using Springer's innovative Online Conference Service (OCS), a proven online manuscript management and review system. This system is designed to ensure an efficient timeline for your publication, making Springer Proceedings in Business and Economics the premier series to publish your workshop or conference volume.

More information about this series at http://www.springer.com/series/11960

Karolina Daszyńska-Żygadło • Agnieszka Bem •
Bożena Ryszawska • Erika Jáki •
Taťána Hajdíková
Editors

Finance and Sustainability

Proceedings from the 2nd Finance and Sustainability Conference, Wroclaw 2018

Springer

Editors
Karolina Daszyńska-Żygadło
Department of Corporate
and Public Finance
Wrocław University of Economics
and Business
Wrocław, Poland

Agnieszka Bem
Department of Corporate
and Public Finance
Wrocław University of Economics
and Business
Wrocław, Poland

Bożena Ryszawska
Department of Corporate
and Public Finance
Wrocław University of Economics
and Business
Wrocław, Poland

Erika Jáki
Development of Enterprises
Corvinus University of Budapest
Budapest, Hungary

Taťána Hajdíková
Department of Management
University of Economics in Prague
Jindřichův Hradec, Czech Republic

ISSN 2198-7246 ISSN 2198-7254 (electronic)
Springer Proceedings in Business and Economics
ISBN 978-3-030-34400-9 ISBN 978-3-030-34401-6 (eBook)
https://doi.org/10.1007/978-3-030-34401-6

Preface

The "Finance and Sustainability Conference" hosted by the Department of Corporate and Public Finance at the Wroclaw University of Economics and Business was organized for the second time in December 2018. The conference was organized by the Wroclaw University of Economics and Business, in cooperation with the Corvinus University of Budapest and the University of Economics in Prague and patronized by the Koalicja Klimatyczna and the Climate Reality Project Europe. The keynote speaker Richard Barker from the Climate Reality Leadership Corps, London, opened the conference with his exciting presentation of "How investors look at climate finance?." The speech highlighted the main focus of the conference: the sustainable finance supporting mitigation and adaptation to climate change and green energy transition.

The conference has become a part of public debate about climate and renewable energy issues in Poland and globally. The conference allowed European researchers to discuss a variety of problems and questions related to recent financial topics which were grouped into four sessions: sustainable development, corporate finance and capital, corporate sustainability, and public finance.

This book contains a selection of papers presented at the conference and covers a variety of topics and researches related to recent financial problems. It reflects the diversity and richness of research areas in these fields.

Polish researchers discuss general local topics in seven different papers. The paper entitled "Public organizations seeking a path for sustainability" provides a framework to explain how to drive public organizations toward sustainability. The paper entitled "Debt management of urban gminas on the example of the Silesian Voivodeship" discusses the issues of local government debt to bring theoretical fundamentals of debt management in local government closer to the reader. "The impact of limiting tax costs for expenditure on the purchase of intangible services from related entities on the level of tax charges" assesses the impact of the limit to include expenses on specific intangible services in tax costs. The study titled "Environmental aspects in Polish public procurement system" introduces the role

of green public procurements. The paper titled "Local development as a function of budgetary policy and entrepreneurship" describes the group of factors that influence local development, and the paper addressing "Can we own the energy transition? From policy to practice within the framework of psychological ownership theory" is a case study discussing the story of the biggest distributed solar power plant in Poland and provides some insightful recommendations on how to establish psychological ownership related to energy transition issues successfully. There is a study about the "Influence of deregulation on sustainable development of sector of professional financial and accounting services in Poland" investigating the influence of changes in legal regulations concerning professional accounting services in Poland to evaluate the attitude and consequences of deregulation from the perspective of accounting offices. The paper "Fostering eco-innovation through smart specialization strategies and support of EU funds" analyzes and assesses the role of smart specialization strategies and EU funds in fostering eco-innovation in Poland.

An additional six papers concentrate on specific industries in Poland. The study "Divestment from coal sector in response to higher risk assessment by insurance companies. Poland case study" investigates the changes in the approach of insurance companies to risk assessment related to climate change. The paper titled "Sustainable management of commercial real estate in the context of investment performance" confronts the income from a commercial real estate with actual cash flows and verifies whether the investment in the real estate is profitable for a potential investor while complying with the aspect of sustainable development. The essay "Financial aspects of agricultural policy for environmental sustainability of Polish agriculture" characterizes the implementation of financial instruments for environmental sustainability in Polish agriculture within the framework of the Common Agricultural Policy. The study "Transition to a green economy—programming for a low-carbon economy at the voivodeship level" presents the development strategies of the 16 voivodeships of Poland, considering the issue of the transition to a low-carbon economy. The paper entitled "Financial Problems Associated with Investing in Renewable Energy Sources in Poland" determines the system composition for financing investments in renewable energy sources in Poland. The research "Do Polish hospitals perform well? Selected aspects of financial performance" presents and assesses the financial condition of public hospitals in Poland in the years of 2007–2015.

Three papers of the conference cover topics from the Slovak local business and financial environment. The paper entitled "Special Aspects of the Loan Agreement in the Conditions of the Slovak Republic" focuses on the legislative aspects of the loan agreement, which has found its full potential in banking activities and provides answers to application problems. The essay "Legislative aspects of custody of securities in the conditions of the Slovak Republic" identifies individual securities contractual types. The paper "Bill of exchange and its application problems in Slovak Republic" identifies and examines a bill of exchange from a legal point of view in the Slovak Republic.

Eight new studies investigate general financial topics. The paper "Risk management in innovative startups and the role of investors and business accelerators"

presents the importance of risk management in young innovative enterprises, particularly in startups. The paper "Overall assessment of corporate social responsibility—a map of responsibility" discusses a method of making a comprehensive assessment of corporate social responsibility based on the use of graphic form. The study "Selected errors made in economics, in research on global climate change" presents eight of the complex errors made in economics, in studies of global climate change. There are two systematic literature reviews. One of the studies summarizes the academic articles between 2000 and 2018 about governmental venture capital; the other presents the main literature about crowdfunding campaigns and successes. The paper "ESG awareness and perception in sustainable business decisions: Perspectives of Indian investment bankers vis-à-vis selected European financial counterpart" attempts to comprehend the level of ESG awareness and perception of investment bankers and the sustainability choices in the Indian market vis-à-vis the developed markets in Europe. The study "Eco-labeling as a tool to implement the concept of corporate social responsibility—the results of a pilot study" focuses on determining the role that eco-labeling can play in the process of implementing the concept of corporate social responsibility. The paper "Corporate social performance in construction industry—in the search for added value" identifies activities within sustainable construction along with their integration scope in corporate processes to develop a framework for measuring and monetizing the activities by construction companies.

Three papers investigate the European market regarding finance or sustainability. The paper entitled "Liquidity of the European indices: the developed versus the emerging markets" compares liquidity of indices on the European stock markets in a different stage of development. The paper entitled "Private insurance and unmet health needs" estimates the impact of private health insurance schemes on the level of unmet health needs. The paper titled "Corporate social responsibility activities and the firm's value: The case of containers and packaging industry sector" analyzes the influence of corporate social responsibility (CSR) initiatives on the firms' value.

The audience of these presentations and proceedings includes researchers at numerous universities; members of research institutions; various professionals in business, finance, and international economics from the private and public sector; and finally students.

Budapest, Hungary Erika Jáki

Contents

Driving Public Organisations Towards Sustainability

Mauro Romanelli and Patrizia Gazzola

1 Introduction

Even if a universally agreed definition is absent, sustainability as an evolving and promising concept [1] should be considered as a norm that helps to support the dynamics of an organisation operating within social and economic ecosystems in order to facilitate public value creation and as a principle that drives both strategy and action within organisations that aim to create value within society [2, 3]. Public organisations as sustainable institutions should drive responsible growth and promote the wealth of society [4, 5], ensuring sustainable financial performance [6], using information technologies [7], paying attention to managing human capital and resources to ensure innovation performances [8, 9], and considering the employees as stakeholders [10].

Thereby, a limited number of studies have investigated the contents of sustainability within public organisations [11]. While the features of sustainable organisations are well elucidated with regards to the private sector, public organisations should identify a pathway to achieve sustainability as a vision for change coping with a continuously dynamic and changing context where problems are complex, volatile and risky. Public organisations contribute to public value encouraging partnerships with civil society to shape strategy within ecosystems [12–14].

Thus, public organisations have not yet identified the sources that can support them for sustainability and have not yet tracked a satisfying pathway for

M. Romanelli (✉)
University of Naples Parthenope, Naples, Italy
e-mail: mauro.romanelli@uniparthenope.it

P. Gazzola
University of Insubria, Varese, Italy
e-mail: patrizia.gazzola@uninsubria.it

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_1

sustainability as a key element to drive public administration to behave as an actor which is increasingly more embedded within social and economic ecosystems [14].

The aim of this study is to identify a pathway that helps to explain how public organisations proceed in order to achieve sustainability as a source for change. Public organisations should consider the sustainability as a long-term goal [1] and vision that guides action and decision-making processes [15] and helps to facilitate public value creation, promote public trust and democratic life within communities in the long-term [3, 16–19].

Public organisations should rethink how to approach the issue of sustainability, following both an ecosystem perspective [14] and adopting a public value management view [20] to serve the public interest as a result of dialogue with citizens [21], thus strengthening long-term and multilateral relationships, enhancing multiple accountability systems [12, 16, 22]. Following a public value view, public organisations should consider the employees as people to be motivated so that public administration can strengthen them as human resources to support public value, develop financial communication and reporting, and also promote the potential that is offered by technology as a means that helps drive public administration as sustainability-oriented organisation that is rediscovering new ways of creating value within communities [20, 22].

The paper is organised as follows. After the introduction and methodological section, the literature review identifies the features of sustainable and public organisations. The fourth section explains how public organisations can achieve sustainability by rediscovering the organisational dimension as a source for sustaining financial, social and economic performances by enhancing communication and reporting to the stakeholders for public value creation, managing human resources and developing the potential of information technologies. In the fifth section, a framework of analysis is elucidated in order to drive public organisations as sustainable and responsible institutions that contribute to driving value creation. Finally, conclusions are outlined.

2 Methodological Section

The study is theoretical and relies on a literature review relating to sustainability as an emerging concept in the field of public service organisations that contribute to enabling value creation within ecosystems coping with a changing complex context. These organisations promote sustainable financial reporting by developing the potential of information technologies and designing human resources management practices. The selected contributions are drawn from *google scholar* and identified in order to elucidate that public organisations tend to embrace sustainability as a vision for managing *res publica* within communities [15, 19]. The contributions were selected by searching the articles that referred to sustainability, financial reporting and communication, information technology. Sustainability of organisations relies on people and human resources as the main axis that enables financial reporting and

the potential offered by technology. In particular, the selected contributions concerning financial, human resources and technologies dimensions are considered to define some propositions that contribute to identifying a framework that leads public organisations towards sustainability in order to enable public value creation by realising the public interest. The selected contributions are interpreted in a narrative synthesis in order to accommodate differences between the questions, research design and the context. They will also elucidate new perspectives and advance theoretical frameworks on emerging issues [23, 24].

3 Literature Review

Today, organisations should deal with sustainability as a condition that enables better functioning of organisations operating within ecosystems and provides new ways for communities oriented to value creation. Sustainable organisations create value by redesigning the business model and redefining strategy, structure, people, human resources management and information technologies in order to achieve performances coping with changing environments [2, 4, 6–9].

While the features of sustainable organisations are well elucidated with regards to the private sector, research is still in its infancy in identifying a pathway for driving sustainability as a strategic vision that helps to facilitate public value creation and support the wealth of community within society [14, 15, 19].

Promoting sustainable capacity building helps to improve performance and development of the public sector within society [25]. Public organisations should keep the responsibility to achieve better sustainability than private companies with regards to an increasing attention to performance evaluation, societal and environmental purposes [26]. Public organisations should conceive sustainability as a long-term goal, a key source for effectiveness within ecosystems and governance networks to face a changing context. Sustainability as a vision for change addresses decision-making processes, facilitates public value creation, and contributes to promoting public trust and democratic life within communities [1, 3, 15–20].

Sustainability as a condition that enables strategy and action within organisations helps both the development and effectiveness of public service organisations [14]. Public organisations should develop sources in order to promote and implement sustainability and accountability within strategy and action [11]. Sustainability implies that public organisations should achieve long-terms issues in order to provide benefits for future generations and to create public value within ecosystems [3, 14, 18]. Advancing sustainable management practices help to drive social and economic growth and leads public organisations and companies to create sustainable value within society and ensure a high quality of life and well-being for people [27–29]. Post-bureaucratic organisations should be citizen-centred institutions, change-driven and results-oriented accountable organisations that promote collective action, participative decision-making involving stakeholders and civil society [30]. Within a plural and pluralist state where values and meanings are negotiated in networks and

relationships, public organisations should position their role within social and institutional environment [31] and learn how to be successfully accountable and more effective in achieving goals as responsive institutions [32]. Sustainable public organisations should contribute to creating value within ecosystems by involving the public and meeting the needs of citizens and other stakeholders, facilitating how citizens use public services [33], relying on management accounting for driving change [34], and using accounting to translate sustainability in action and change [35], promoting the human capital of organisation [7], redesigning trust-based relationships [17] and strengthening development and social exchange for governance [36]. Public organisations should consider the role of civil society and governance networks embracing a citizen-driven view to reinforce social ties [37]. Information and communication technologies (ICTs) help public institutions to involve citizens in policy-making, promote public values, foster social equity and economic development, and advance public sector reform [36, 38, 39] in order to improve democratic life, promote integrity and fairness, and support public trust [18]. Public organisations should adopt a public value management view [20] that relies on strengthening long-term, multilateral and accountable relationships [12, 16, 22].

4 How Public Organisations Proceed Towards Sustainability

In this section, some propositions are identified in order to design a framework that helps public organisations to proceed towards sustainability. Ensuring financial sustainability by communication and reporting relies on strategically managing human resources and developing human capital. The use of ICTs helps public organisations to be open, transparent and accountable institutions in front of citizens and stakeholders within the community.

4.1 Ensuring Financial Sustainability by Communication and Reporting

With the advent of New public management (Npm) doctrines, great emphasis has been placed on achieving government financial sustainability doing more with less, contributing to decentralising services delivery system and development of implementation plans, providing choices for citizens [40]. Thereby, this weakens the accountability to citizens as users of public services [41]. Instead, there is an increasing attention to considering sustainability accounting and accountability as emerging agenda for driving the evolving development of public organisations [35]. Moreover, paying attention to sustainability reporting helps organisations to

develop a positive impact of operations discharging the responsibilities of stakeholders [42]. As following a public value management perspective, public organisations should support multiple accountability systems looking at citizens as overseers of government and funders [22]. Hence, while the role of financial management in the Npm model is to search for potential revenues and the least-cost method of service delivery, the primary role of financial management in the governance model is to secure financing in order to keep the organisational and network coalitions maintaining multilateral relations intact [12]. Public organisations are still slow in providing sustainable reporting using disclosure only to inform internal stakeholders [43]. They should preserve public finance, design reporting systems and represent financial accounts in order to achieve economic and financial sustainability which promotes public value creation. Public organisations should provide adequate, effective and convincing reporting to promote transparency and accountability in order to justify managerial, policy and strategic choices and policies. While seeking sustainability, organisations tend to report more information than is included in traditional financial accounting, thus identifying a need for extensive qualitative information [44]. While following a path for financial sustainability, public organisations should pay attention to reporting as a coherent method for sustainability [45] as accountable institutions that tend to develop sustainability narratives in an informed way [14].

Proposition 1 Sustainable public organisations preserve public finance designing reporting systems as open and responsive institutions that represent financial accounts and reports in an appropriate way.

4.2 Managing Human Resources

People are the most important resource that helps public organisations to serve the public interest. Public organisations should pay attention to human resource management and the social environment. Public management reforms have driven public administration to develop human resources management practices and policies in order to support the commitment and job satisfaction of employees [46]. A human resource strategy should be integrated into the organisational strategy to drive employees to be committed to the goals and objectives of the organisation [47]. Sustaining successful change within public organisations relies on training employees to learn new behaviours. The nature of public service demands a sense of loyalty on the part of public employees who tend to manifest higher attention to services than private employees. The importance of the organisational mission may increase employee work motivation in the public sector. Consequently, public organisations should support the motivational power of public services and create an environment in which employees feel that they can contribute both to the public goal and to an organisation performing valuable services [48]. Human resources practices contribute to achieving high performances in public sector organisations and to

communicate to employees the extent to which organisations trust employees [49]. Human resources management policies help public organisations to attract the necessary people and competencies able to perform the functions of government and deliver public services demanded by citizens [47].

Proposition 2 Sustainable public organisations rely on the quality of people as public servants and employees and develop human resource management policies and practices as strategic sources driving public value creation and promoting the public interest among the citizens.

4.3 Developing the Potential of Information and Communication Technology

ICTs are changing the way by which public organisations rediscover the public function and redefine the relationships with citizens and businesses. Thereby, information technologies contribute to designing a socio-technical network concerning individuals, structure and the context [50]. They are driving public organisations to support democratic processes and citizen participation [51], engendering public trust and enforcing impartiality, equity, honesty and fairness of government [52]. As institutions embracing ICTs, public organisations ensure inclusiveness in government processes, citizenship and collaboration in government affairs. Information technologies help public organisations to develop a citizen-centred view proceeding along a *continuum* between transparency and accountability [39, 53], enabling them to promote public values, fostering citizens' engagement in policy making and social equity [36, 38].

Proposition 3 Sustainable public organisations embrace and use the potential of information technologies as a means to strengthen the relationships with citizens, civil society and other stakeholders within the community, promote accountability and design citizen-oriented services in the digital era.

5 Towards Sustainable Public Organisations: A Framework of Analysis

Public organisations should identify a pathway that helps public value creation within ecosystems and governance networks, encouraging partnerships, promoting multilateral relationships by shaping strategy and involving the civil society to face a continuous, dynamic and complex changing context [12–14].

As shown in Fig. 1, public organisations identify a pathway for sustainability as a vision for change that pays attention to financial management by enhancing communication and reporting, strengthening human resource management, and

Fig. 1 Towards sustainable public organisations for value creation

developing information and communication technologies for value creation. In transitioning from stable to changing contexts, public organisations should move from ensuring efficient services to following a public value view to develop democratic and shared processes, promoting partnerships and involving the civil society within ecosystems.

As institutions that provide adequate and viable financial and social reporting to internal and external stakeholders, public organisations should design a triangle for sustainability which values both the role of people and human resource management practices, and embracing information technologies in order to strengthen the potential of ICTs to help restore the accountable relationship between public organisations, citizens, civil society and other stakeholders within the community [34]. As institutions providing transparent accounts rely on ensuring communication and reporting, public organisations should design appropriate human resource management practices and policies embracing information technologies to support public management reform and reinforce organisational competences and assets [39].

Public management reform is leading public organisations to evolve; they need to embrace strategic and cultural change by training employees to assume new behaviours and support administrative and managerial culture and values coherently alongside the creation of sustainable public and social value over time to benefit communities, social and business ecosystems and enhance the development of human society. Therefore, strategically managing human resources and leading people helps the sustainability of public administration in the service of citizens [54]. Sustainability relies both on using management accounting and ensuring financial viability and guaranteeing openness by providing transparent information about financial management within ecosystems, which occurs by developing the potential of information technologies [34, 39]. Sustainable public organisations should improve social and financial performances, thus meeting the need of citizens by rediscovering and strengthening the organisational dimension as a source for effectiveness, strategic choices and organisational action that relies on ensuring openness along a *continuum* between transparency and accountability [30, 53].

6 Conclusions

Sustainability enables public organisations to contribute to value creation and achieve social, financial, economic and democratic performances, ensuring the wealth of communities. The study intends to contribute to the debate on sustainability within public organisations and identifies a framework of analysis that helps to consider the trajectories of development within public organisations aiming at following a sustainability-oriented pathway. Public organisations should approach sustainability as a cultural value embedded in processes and behaviours of administrative action as oriented to develop dialogue with stakeholders within ecosystems. In this study, there are key theoretical, managerial and organisational implications. Public organisations should strategically integrate financial, organisational and technological perspectives in order to identify a pathway for sustainability as a vision that leads to strategy and action in order to provide and contribute to better solutions for policy design by involving civil society, citizens, associations and businesses within governance networks and multilateral relationships that contribute to engendering public value creation.

The contribution of this study is to identify a pathway that helps to drive sustainable public organisations as institutions that contribute to public value and serve the public interest. There are some limitations to this study. Any empirical research and case studies are provided in the analysis. Public organisations are still in their infancy in dealing with sustainability as a source that helps public organisations to serve the public interest and meet the changing needs of citizens, facilitate value creation and ensure high quality of life within communities. Further research perspectives and investigations will consider how some theoretical elements and the elucidated framework can be applied and implemented within the context of local government, autonomies and authorities in relation to the sustainability models designed.

References

1. Haugh HM, Talwar A (2010) How do corporations embed sustainability across the organization. Acad Manag Learn Edu 9:384–396
2. Hart SL, Milstein MB (2003) Creating sustainable value. Acad Manag Perspect 17:56–67
3. Moore MH (1995) Creating public value. Strategic management in government. Harvard University, Cambridge, MA
4. de Lange DBT, Delgado-Ceballos J (2012) Sustaining sustainability in organizations. J Bus Ethics 110:151–156
5. Gazzola P, Mella P (2012) From values to "value". From the creation of the value of firms to sustainable growth. Econ Aziendale Online 3:1–18
6. Epstein MJ (2018) Making sustainability work: best practices in managing and measuring corporate social, environmental and economic impacts. Routledge, London
7. Henry BC (2012) ICT for sustainable development. Sci Technol 2:142–145

8. Pfeffer J (2010) Building sustainable organizations: the human factor. Acad Manag Perspect 24:34–45
9. Jabbour CJC, Santos FCA (2008) The central role of human resource management in the search for sustainable organizations. Int J Hum Resour Manag 19:2133–2154
10. Colombo G, Gazzola P (2014) Aesthetics and ethics of the sustainable organizations. Eur Sci J 9:291–301
11. Larrinaga-Gonzélez C, Pèrez-Chamorro V (2008) Sustainability accounting and accountability in public water companies. Public Money Manag 28:337–342
12. Chan JL, Xiao X (2003) Changing roles of public financial management. In: Bovaird T, Löffler E (eds) Public management and governance. Routledge, London, pp 101–110
13. Hartley J (2005) Innovation in governance and public services: past and present. Public Money Manag 25:27–34
14. Dumay J, Guthrie J, Farneti F (2010) GRI Sustainability reporting guidelines for public and third sector organizations. A critical review. Public Manag Rev 12:531–548
15. Fiorino DJ (2010) Sustainability as a conceptual focus for public administration. Public Adm 70:S578–S588
16. Osborne SP, Radnor Z, Vidal I, Kinder T (2014) A sustainable business model for public service organizations. Public Manag Rev 16:165–172
17. Meynhardt T (2009) Public value inside: what is public value creation? Int J Public Adm 32:192–219
18. Borgonovi E (2001) Il concetto di valore pubblico. Azienda Pubblica 14:185–188
19. Goodsell CT (2006) A new vision for public administration. Public Adm Rev 66:623–635
20. Stoker G (2006) Public value management. A new narrative for networked governance? Am Rev Public Adm 36:41–57
21. Denhardt RB, Denhardt JV (2000) The new public service: serving rather than steering. Public Adm Rev 60:549–559
22. O'Flynn J (2007) From new public management to public value: paradigmatic change and managerial implications. Aust J Public Adm 66:353–356
23. Denyer D, Tranfield D (2006) Using qualitative research synthesis to build an actionable knowledge base. Manag Decis 24:213–227
24. Dixon-Woods M, Agarwal S, Young B, Jones D, Sutton A (2004) Integrative approaches to qualitative and quantitative evidence. Health Development Agency, London
25. Grindle MS, Hildebrand ME (1995) Building sustainable capacity in the public sector: what can be done? Public Adm Dev 15:441–463
26. Adams A, Carol SM, Hoque Z (2014) Measurement of sustainability performance in the public sector. Sustain Acc Manag Policy J 5:46–67
27. Ball A, Bebbington J (2008) Accounting and reporting for sustainable development in public service organizations. Public Money Manag 28:323–326
28. Guthrie J, Ball A, Farneti F (2010) Advancing sustainable management of public and not for profit organizations. Public Manag Rev 12:449–459
29. Kowalska M, Ucieklak-Jeż P, Bem A, Siedlecki R (2018) Can local authorities shape the quality of life? In: Finance and sustainability. Springer, Cham, pp 97–106
30. Kernaghan K, Borins SF, Marson DB (2000) The new public organization, vol 24. Institute of Public Administration of Canada, Toronto
31. Osborne SP (2010) The new public governance? Emerging perspectives on the theory and practice of public governance. Routledge, New York
32. Bovens M, Schillemans T, Hart PT (2008) Does public accountability work? An assessment tool. Public Adm 86:225–242
33. Osborne S (2018) From public service-dominant logic to public service logic: are public service organizations capable of co-production and value co-creation? Public Manag Rev 20:225–231
34. Lapsley I, Pallot J (2000) Accounting, management and organizational change: a comparative study of local government. Manag Account Res 11:213–229

35. Ball A, Grubnic S, Birchall J (2014) Sustainability accounting and accountability in the public sector. In: Sustainability accounting and accountability. Routledge, London, p 176
36. Larrson H, Grönlund Å (2014) Future-oriented eGovernance: the sustainability concept in egov research, and ways forward. Gov Inf Q 31:137–149
37. Bovaird T, Löffler E (2003) The changing context of public policy. In: Bovaird T, Löffler E (eds) Public management and governance. Routledge, London, pp 15–26
38. Larrson H, Grönlund Å (2016) Sustainable eGovernance? Practices, problems and beliefs about the future in Swedish eGov practice. Gov Inf Q 33:105–114
39. Cordella A, Bonina CM (2012) A public value perspective for ICT enabled public sector reforms: a theoretical reflection. Gov Inf Q 29:512–520
40. Debicki M, Debicka J (2008) Public management reforms: Poland. In: Bouckaert G, Nemec J, Nakrošis V, Hajnal G, Tõnnisson K (eds) Public management reforms in central and eastern Europe. NISPAcee, Bratislava, pp 245–267
41. Wojewnik-Filipkowska A (2017) Rationalisation of investment decisions in the sustainable management of urban development – is a new paradigm needed? Probl Sustain Dev 12:79–90
42. Adams S, Simnett R (2011) Integrated reporting: an opportunity for Australia's not-for-profit sector. Aust Account Rev 21:292–301
43. Farneti F, Guthrie J (2009) Sustainability reporting by Australian public sector organisations: why they report. Account Forum 33:89–98
44. Guthrie J, Farneti F (2008) GRU Sustainability reporting by Australian public sector organizations. Public Money Manag 28:361–366
45. Greiling D, Traxler AA, Stötzer S (2015) Sustainability reporting in the Austrian, German and Swiss public sector. Int J Public Sect Manag 28:404–428
46. Zientara P, Kuczynski G (2009) Human resources practices and work-related attitudes in polish public administration. East Eur Econ 47:42–60
47. Horton S (2003) Human resource management in the public sector. In: Bovaird T, Löffler E (eds) Public management and governance. Routledge, London, pp 121–134
48. Moynihan DP, Pandey SK (2007) The role of organizations in fostering public service motivation. Public Adm Rev 67:40–53
49. Gould-Williams J (2003) The importance of HR practices and workplace trust in achieving superior performance: a study of public-sector organizations. Int J Hum Resour Manag 14:28–54
50. Gil-Garcia JR, Luna-Reyes LF (2009) Fostering the information society through collaborative e-government: digital community centers and the e-learning program in Mexico. In: Meijer A et al (eds) ICTs, citizens and governance: after the hype! IOS Press, Amsterdam, pp 99–119
51. Bellamy C (2003) Managing ICTs in public sector organizations. In: Bovaird T, Löffler E (eds) Public management and governance. Routledge, London, pp 135–149
52. Tolbert C, Mossberger K (2006) The effects of e-government on trust and confidence in government. Public Adm Rev 66:354–369
53. Fox J (2007) The uncertain relationship between transparency and accountability. Dev Pract 17:663–671
54. Kimaro HC (2006) Strategies for developing human resource capacity to support sustainability of ICT based health information systems: a case study from Tanzania. Electron J Inf Syst Dev Countr 26:1–23

Debt Management of Urban Gminas on the Example of the Silesian Voivodeship

Justyna Łukomska-Szarek and Agnieszka Wójcik-Mazur

1 Introduction

Under conditions of limited financial resources, activities of local governments have required, since the moment of their reactivation in the 1990s, continuous increasing of their debt so that appropriate investment activities could be undertaken to meet public needs, especially those concerning the development and modernization of the municipal infrastructure. Dafflon and Beer-Tóth [1] stressed that debt has a positive impact on the modernization of local economies. However, in the face of the increasing level of debt, implementation of effective debt management policies is needed, resulting in financing the tasks which are not covered by the entity's revenues, minimizing the financial risk, losing financial liquidity, or reducing debt costs.

As argued by Bitner and Cichocki [2], effective debt management depends on many factors, which include many-year financial planning, organizational methods conducive to management efficiency (presence in the capital market, debt management strategy, rating) and tools supporting effective debt management (debt diversification or use of derivatives). As emphasized by Jastrzębska [3], debt management is a complex process, including planning debt levels, organizing debt processes (financial decisions), managing and continuous monitoring of the level and structure of debt, budget load analysis, and adjustment of debt level to current ratios.

The reasons for approving the deficit budgets by local government units can be linked to the difficulties in achieving revenues at the expected level and impossibility of reducing expenditures. Often, the only solution that can be used to allow for financing the tasks, especially investments, is to approve budget deficit and use returnable sources of financing (revenues). Management of budget deficits and debt

J. Łukomska-Szarek (✉) · A. Wójcik-Mazur
Faculty of Management, Czestochowa University of Technology, Częstochowa, Poland
e-mail: justyna.lukomska-szarek@wz.pcz.pl; agnieszka.wojcik-mazur@wz.pcz.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_2

in local government units is primarily influenced by legal conditions independent of local governments that determine debt thresholds. Also important are the conditions that have an effect on financial standing of the units, determining the economic threshold of debt in local governments [4].

For the purpose of the present study, the focus was mainly (among the above stages of debt management in local governments) on continuous monitoring of debt level and adjustment of debt level to current ratios. It should be noted that the level and structure of debt have been subject to certain legal restrictions over the years, which, since 1990, have been modified for many times. The obligation to reduce and monitor debt reduces the risk of insolvency in the entity or losing financial liquidity. Debt limitation may result, as indicated by Galiński [5], from four concepts: (1) dependence on market factors (e.g. the concepts used in Canada and the USA); (2) cooperation between local governments within a debt control system (Austria and Belgium); (3) the functioning of debt thresholds, which in practice forces the development of debt limitation systems in local governments based on debt ratios (used in many countries, including Poland), (4) administrative control (for example in the Republic of Ireland).

In the beginning of 2014, local government units had to face new conditions regarding the possibilities of financing tasks with debt instruments. A total departure was observed from the debt reduction system based on the general debt ratios (60%) and debt service (15%) and the transition to debt limitation based on the individual debt ratio (IDR) calculated for each local government unit individually, depending on the financial resources held by the unit (in the past). As before, this also represents a universal solution, independent of the type and size of the local government unit [6, 7].

Public debt in a unit of local self-government is a total of financial liabilities due to public expenditures which exceed the revenues which can be allocated to cover these expenditures. Local self-government public debt is inherent in the concept of budget deficit since it is used for, among other things, its financing. In the case of budget deficit, the necessity occurs to finance this part of tasks which are not covered by own revenues. In this case, the previously acquired budget reserves or surplus from previous years can be utilized (if available) or liabilities can be extended in particular financial institutions [8, 9].

It should be emphasized that legal regulations in Poland allowed, until Law on Public Finance as of 27 August 2009 [10] was introduced, for using two limits for debt in local self-government units, i.e. limit of total debt level at the end of financial year and total amount of instalments from credits and loans, potential repayment of amounts due to sureties and guaranties and purchase of bonds and the costs of debt servicing. According to the Law on Public Finance as of 30 June 2005 [11], total amount of debt in local self-government units at the end of financial year could not exceed 60% of the budget revenues, whereas during a financial year, at the end of a quarter, it could not exceed 60% of the revenues planned for the financial year in this entity. The level of debt servicing could not be higher than 15% of the planned budgetary revenues or 12% if state public debt in relation to GDP exceeded 55%.

Owsiak [12] indicated that these limitations have been often criticized both in the related literature and in local government environments. The set limits of debt ratios are the same in all local government units, without taking into account the financial potential of individual units [13].

The new act institutes individual debt ratio for local self-government units. According to new principles, the executive body in local self-government units cannot sign the budget if it causes that in the financial year and in each year following financial year, relation of total amount of debt to planned revenues in total exceeds arithmetic mean for relation (calculated for the last three years) of its current revenues, extended with revenues on selling the property and reduced with current expenditures to the revenues in total within the budget [13, 14].

Legal regulations oblige local government units (LGUs) only to comply with the statutory debt thresholds. However, these units should control debt levels and debt service payments to prevent from the debt trap, thus losing financial liquidity and ability to complete tasks [15]. It is important to maintain the adequate level of financial liquidity that guarantees credit standing of the local government unit, without the risk of debt trap. Such defined indebtedness allows local government units to estimate the level of possible investments and does not lead to overinvestment ([16], p. 27).

Therefore, the aim of this paper was to discuss problems related to the management of debt in gminas (gminas are principal units of territorial division in Poland), especially one of the stages of the debt management process i.e. changes in debt limitation by introducing the individual debt ratio (IDR) from 2014 and its monitoring in the following years. Based on the theoretical investigations regarding the basic aspects of debt management in gminas, the study analysed and evaluated the debt in urban gminas of the Silesian Voivodeship in 2014–2017.

2 Selected Problems of Debt Management in Urban Gminas

2.1 Methodology and Data

The main goal of this study was to identify the degree of debt of urban gminas on the example of the Silesian Voivodeship. The analysis of debt concerned in particular the level of individual debt ratio (IDR). The diagnosis of the level debt of Polish municipal can represent the basis for capturing of specific regularities which can contribute to the improvement in finance management in local government. A research methodology used in the study was the analysis of the acceptable theoretical concepts and financial analysis.

One of the most popular approaches to assess financial standing of local government units in the USA is the Financial Trend Monitoring System (FTMS) developed by the International City/County Management Association (ICMA) in 1980. This system operates based on around 35 indicators for the analysis of variables that have the greatest impact on the financial standing of LGUs [17]. A 10-point test was used

for small LGUs, with the results compared with the benchmark. The calculated ratios were compared with the ratios for other LGUs and they were assigned the appropriate numbers of points. However, one of the most recent approaches uses a method based on 11 ratios categorized into four groups of solvency ratios [18]. It is worth emphasizing that in the USA, different methods are used in different states to measure financial standing and use ratios which represent a combination of financial and demographic indices [19]. In Poland, the Ministry of Finance uses three groups of ratios: the first so-called budget ratios (including 7 types of ratios), indices calculated per inhabitants (3 types of measures), and the last group, containing ratios for liabilities by debtors (four ratios). For the purposes of this study, three ratios were chosen from the first group (share of own revenues in total revenues, self-financing ratio and share of capital expenditures in total expenditures), whereas four ratios were chosen from the last group (share of total liabilities in total revenues, debt service, share of own revenues in total liabilities, share of due liabilities in total liabilities). Furthermore, debt level, individual debt ratio, financial liquidity in cash basis, and operational and total development capability were computed.

The choice of this group of indicators was considered appropriate to verify the research hypotheses:

- The introduction of new legal regulations in the field of limiting the debt level led to a slowdown in the investment activity of urban gminas in the Silesian Voivodeship in 2014.
- Limiting the level of indebtedness of local government units in Poland determined a high level of self-financing of urban gminas in the *Silesian* Voivodeship.
- The policy of indebted urban gminas in the Silesian Voivodeship contributed to the stabilization of the level of financial liquidity.

The problems covered by the research included the assessment of the level of indebtedness based on the reports on the implementation of the budget of urban gminas of the Silesian Voivodeship using the ex-post analysis in dynamic terms. The research period was the years 2014–2017 in order to identify the trends and pace of changes of individual ratios.

The study covered municipalities of one of the most dynamically developing regions in Poland with a high degree of urbanization, industrialization and population density. The Silesian Voivodship, based on Statistic Poland data, covers 3.9% of the country's area, is inhabited by over 4.5 million people, which represents 11.8% of Poland population, with 369 people per 1 km^2. GDP per capita in 2017 exceeded 0.50 million zlotys per capita, with the 0.48 million zlotys average for Poland. Silesian Voivodship is the first in the ranking of 16 provinces in terms of the number of roads and railway lines, and the second in terms of the number of employed people. The municipalities of the Silesian Voivodeship have been chosen to examination on the basis of their willingness to assess the possibility of issue debt, after introduction of the new legal regulations and their impact on the investment policy of an exemplary group of entities. This is a pilot test, further research will be conducted on a larger scale in different regions of Poland and in other types of local government units.

Table 1 The level of debt and liquidity ratio on cash basis of urban gminas in the Silesian Voivodeship in 2014–2017

	2014	2015	2016	2017
The amount of debt [in million PLN]	581.5	623.5	542.1	602.2
Credits. loans and issue of securities [in million PLN]	105.3	98.3	59.9	71.0
Repayment of loan installments. loans and redemption of securities [in million PLN]	77.8	82.7	80.5	76.3
Liquidity ratio on cash basis	1.09	1.09	1.11	1.09

Source: Own study based on data from the Ministry of Finance

It should be emphasized that 2478 gminas are present in Poland, including 302 urban gminas, including 66 cities with powiat status (powiats are principal units of territorial division in Poland of the second level), 628 combined urban and rural gminas and 1548 rural gminas. There are 167 gminas in the Silesian Voivodeship, 49 urban gminas (including 19 cities with powiat status, which accounts for 28.79% of the population of all entities of this type, and 30 urban gminas, i.e. 12.71% of the population). Only urban gminas excluding cities with powiat status were selected for the study. Overall, the study sample included 30 urban gminas located in the Silesian Voivodeship. The analysis was performed using a comparative approach, comparing the computed measures to urban gminas in Poland in total.

2.2 Results and Discussion

The main objective of the research was to assess one of the stages of debt management in local government units i.e. analysis and evaluation of debt ratios of selected local governments in gminas. In this respect, debt level and financial liquidity were first evaluated based on the financial ratio analysis, with detailed data presented in Table 1. Analysis of the data leads to the conclusion that the total debt of the 30 urban gminas in 2014 was 581.5 million zlotys. In 2015, it increased by 7.2% to 633.5 million zlotys, and then it declined by 13.1% in 2016 to 542.1 million zlotys. In 2017, a further rise of ca. 11.1% to 302.2 million zlotys was observed. The highest level of loans generated as part of the returnable budget revenues, credits, borrowings and issued securities was recorded during the period of the year 2014 (105.3 million zlotys). In 2015–2016, a regression (by 7.7% and 29%, respectively) of the examined indicator could be observed (to 59.9 million zlotys in 2016), while in 2017, an increase by 18.5% compared to the previous year was recorded (71 million zlotys). The repayment of credits and loans and the purchase of securities ranged between 76.3 million and 82.7 million zlotys, with the lowest level recorded in 2017, and the highest—in 2015.

Urban gminas of the Silesian Voivodeship were also characterized by low financial liquidity, although it should be emphasized that the incomes and budgetary

revenues allowed for full coverage of budgetary expenditures since financial liquidity in cash terms in all the years represented a value above unity. The average liquidity ratio on the cash basis was shaped for communes in Poland on the level between 1.05 and 1.07, and for urban gminas of the Silesian Voivodeship at 1.09–1.11 in the years 2014–2017. Furthermore, it can be noted that except for 2016, when the indicator was 1.11, it amounted to 1.09 on average in the remaining years. It can therefore be concluded that the introduction of new legal regulations in the field of debt in local governments has led to the stabilization of the financial liquidity ratio in urban gminas in the Silesian Voivodeship. Amplitudes of fluctuations in the examined measure were small in the analysed period of time.

Next, the individual debt ratio (IDR) was evaluated. Table 2 and Fig. 1 present a comparison of the computed measures. The research indicated that since 2014 (which was the first year of obligatory monitoring of the IDR ratio), urban gminas in total, similar to all types of local government units in Poland, have been characterized by upward tendencies for the examined measure. In the case of urban gminas in total, this value ranged from 8.97 to 10.67%, in powiats—from 6 to 7.7% and in voivodeships—from 9.1 to 12.47%. Therefore, it can be concluded that voivodeship governments had the highest capability of incurring and repaying liabilities during the period studied, whereas powiats showed the lowest capability. Compared to gminas in total, urban gminas in the Silesian Voivodeship showed higher values of the examined indicator in each analysed period. The ratio was characterized by a progression from 9.43 to 10.95%.

Analysis of all the urban gminas revealed no negative values of the indicator over the adopted period of study. In 2014, the IDR ratio of 0–5% was generated only in 5 in 30 urban gminas (Poręba 1.84%, Wojkowice 3.29%, Pyskowice 3.86%, Mikołów 4.4%, Szczyrk 4.68%). In 2015, this was the case in two gminas (Mikołów 2.93%, Będzin 3.36%), whereas in 2016—only in one (Mikołów 4.4%). In 2017, all the units had much higher IDR values, with only one urban gmina of Knurów exceeding 23.7%. High values of individual debt ratio were also found for the gminas of Lubliniec (17.24%) and Imielin (18.8%). It can also be noted that the ratio over 10% was found in 15 urban gminas in 2016, and in 14 urban gminas in 2017. This demonstrates greater opportunities of the entities studied to use foreign capital to finance development activities.

A deeper analysis of the IDR ratio is provided by referring to four ratios illustrated in Table 3. It should be noted that the first two ratios represent previous obligatory thresholds of indebtedness, which had to be respected by local government units as part of their debt policies. The share of total liabilities in total revenues, which were not allowed to exceed 60% by the end of 2013, showed a constant decline in the analysed urban gminas of the Silesian Voivodeship. From 26.1% in 2014, this value decreased to 19.1% in 2017.

Slightly higher average valueswere generated in urban gminas in total, although they were also characterized by a downward tendency, decreasing from 32.1 to 22.7%. The burden of revenues with debt service expenditures for urban gminas in total decreased from 5 to 3.6%, whereas for gminas of this type in the Silesian Voivodeship, this value declined from 4.4 to 3.1% in 2014–2017. However, it

Table 2 The level of individual debt ratio (IDR) of urban gminas

	2014	2015	2016	2017
IDR voivodeship total [%]	9.1	9.7	11.1	12.47
IDR poviat (polish counties) total [%]	6	6.23	6.77	7.7
IDR gminas total [%]	9.11	9.78	10.3	10.45
IDR urban gminas total [%]	8.97	9.7	10.4	10.67
IDR urban gminas in the Silesian Voivodeship total [%]	9.43	10.04	10.85	10.95
BĘDZIN	5.09	3.36	5.31	6.84
CZELADŹ	6.75	7.67	8.91	9.57
WOJKOWICE	3.29	5.18	6.61	6.47
SŁAWKÓW	9.73	9.17	10.26	6.87
SZCZYRK	4.68	6.99	13.84	13.87
CIESZYN	7	6.07	6.08	6.74
USTROŃ	14.13	13.44	13.09	12.9
WISŁA	10.19	10.72	11.66	11.9
KNURÓW	14.05	21.82	22.9	23.74
PYSKOWICE	3.86	5.17	6.75	7.94
LUBLINIEC	15.08	16.6	17.12	17.24
ŁAZISKA GÓRNE	9.47	10	9.92	9.07
MIKOŁÓW	4.4	2.93	4.45	5.57
ORZESZE	5.23	6.6	8.94	9.2
MYSZKÓW	8.74	9.29	10.75	10.97
RACIBÓRZ	12.11	12.26	12.61	11.5
KALETY	17.37	16.45	15.76	13.97
MIASTECZKO ŚLĄSKIE	11	12.13	11.47	11.27
RADZIONKÓW	16.42	13.6	13.57	13.04
TARNOWSKIE GÓRY	7.41	9.31	10.1	10.17
BIERUŃ	8.75	8.9	10.99	14.64
IMIELIN	14.31	15.06	17.63	18.8
LĘDZINY	15.15	16.77	13.07	13.87
PSZÓW	10.51	9.8	12.61	10.2
RADLIN	13.64	10.6	8.18	6.3
RYDUŁTOWY	9.49	9.02	6.41	9.97
WODZISŁAW ŚLĄSKI	7.9	9.36	11.05	10.4
PORĘBA	1.84	5.38	7.41	7.1
ZAWIERCIE	8.66	8.88	8.82	9.24
ŻYWIEC	6.68	8.83	9.12	9.14

Source: Own study based on data from the Ministry of Finance

should be emphasized that in the first three years, this ratio showed no significant changes, since the amplitude of fluctuations did not exceed 0.1%. In conclusion, the introduction of new legal regulations in the area of debt thresholds resulted in the reduction of previous obligatory indicators, with the largest decrease recorded in 2017.

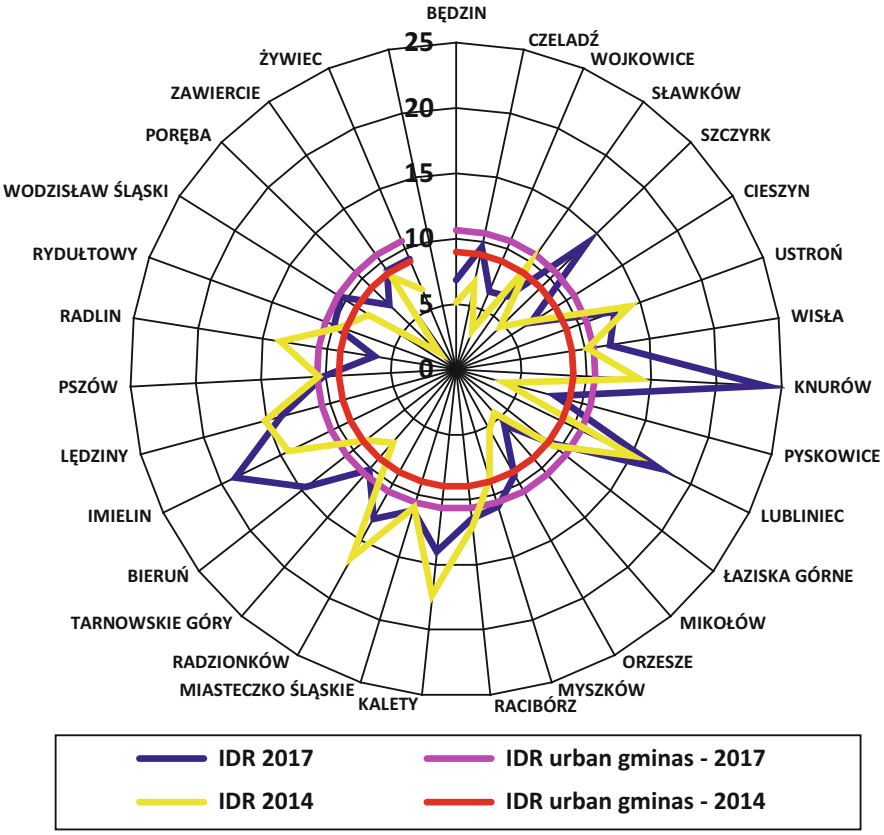


Fig. 1 Individual debt ratio of urban gminas in Silesian Voivodeship and urban gminas total. Source: Own study based on data from the Ministry of Finance

Table 3 The level of debt ratio of urban gminas in 2014–2017

		2014	2015	2016	2017
Share of total liabilities in total revenues [%]	Urban gminas total	32.1	29.6	23.9	22.7
	Urban gminas in the Silesian Voivodeship total	26.1	26.0	20.9	19.1
Debt service [%]	Urban gminas total	5.0	5.0	4.3	3.6
	Urban gminas in the Silesian Voivodeship total	4.4	4.4	4.5	3.1
Share of own revenues in total liabilities [%]	Urban gminas total	8.6	8.7	8.2	7.1
	Urban gminas in the Silesian Voivodeship total	6.8	6.7	7.8	5.2
Share of due liabilities in total liabilities [%]	Urban gminas total	1.2	0.9	0.8	0.3
	Urban gminas in the Silesian Voivodeship total	1.5	1.4	0.5	0.5

Source: Own study based on data from the Ministry of Finance

Urban gminas experience fewer problems with the repayment of due liabilities. Their share in total liabilities was reduced from the level of 1.2% in 2014 to 0.3% in 2017. For urban gminas of the Silesian Voivodeship, these valueswere 1.5% and 0.5%, respectively. When assessing the burden of revenues with debt service expenditures, it can be emphasized that the ratio showed regression, with the expenditures on debt service having lower burden on revenues in urban gminas of the Silesian Voivodeship (5.2–6.8%) compared to urban gminas in total (7.1–8.6%). The difference between them in the analysed years was about 2%, except for 2016 (0.4%). It should also be noted that in 2014–2017, the share of own revenues in total revenues also decreased, which is shown by the data contained in Table 3.

The financial independence ratio concerning generating revenues in urban gminas in total ranged from 52.5 to 59.2%, whereas in such entities in the Silesian Voivodeship, this value was from 59.2 to 64.4%. In both examined groups of gminas, a downward tendency was observed for the indicator, although it can be stressed that these values were high, illustrating a high financial independence of the analysed entities, which to a lesser extent used financing within transfers from the statutory budget (total subsidies and specific grants).

Assessment of the impact of debt on the budget management in urban gminas should also refer the level of the individual debt ratio to the level of self-financing, investment activity and development potential (Table 4).

The high share of operating surplus and property revenues in total property expenditures was observed in the first three years and showed progression from 124.8% to 177.1% in the case of urban gminas in total and from 138.7 to 176.9% for urban gminas of the Silesian Voivodeship. Unfortunately, the investment activity of urban gminas was slower in this period. Despite the substantial self-financing opportunities, the share of property expenditures in total expenditures of urban gminas decreased from 15.9 to 10.3%, whereas in urban gminas in the Silesian Voivodeship, this decline was from 17.4 to 10.8%. This situation was caused by both the operational and total capability of the entities to develop, which was also characterized by a downward tendency throughout the period studied. The potential of the urban gminas of the Silesian Voivodeship to generate operating surplus from current revenues decreased in the analysed years from 10.68% in 2014 to 7.5% in 2017 and did not differ significantly from mean values for urban gminas in Poland in total. Total development capacity of the examined urban gminas ranged from 11.62 to 17.32%, whereas in the four years of the analysis compared to 2014, it decreased by 5.7%. Nevertheless, urban gminas showed greater capabilities of development and performed very moderate investment activities. They did not take full advantage of their development potential.

Table 4 The level of budget ratio of urban gminas in 2014–2017

		2014	2015	2016	2017
Share of own revenues in total revenues (financial independence indicator) [%]	Urban gminas total	59.2	59.3	53.6	52.5
	Urban gminas in the Silesian Voivodeship total	66.4	66.3	59.5	59.2
Self-financing ratio (share of operating surplus and property revenues in total property expenditures) [w%]	Urban gminas total	124.8	156.8	177.1	124.6
	Urban gminas in the Silesian Voivodeship total	138.7	148.6	176.9	114.8
Share of capital expenditures in total expenditures [%]	Urban gminas total	15.9	14.2	10.3	13.2
	Urban gminas in the Silesian Voivodeship total	17.4	15.3	10.8	13.3
Operational development capability (share of operating surplus in operating revenues) [%]	Urban gminas total	8.76	9.22	8.89	7.92
	Urban gminas in the Silesian Voivodeship total	10.68	9.11	8.58	7.5
Total development capability (share of operating surplus and property revenues in total revenues) [%]	Urban gminas total	16.33	16.12	13.81	12.98
	Urban gminas in the Silesian Voivodeship total	17.32	15.68	14.34	11.62

Source: Own study based on data from the Ministry of Finance

3 Conclusion

In order to develop, local government units cannot operate only based on the principle of self-financing. Therefore, external measures are becoming an integral element of the supply system. It is worth emphasizing that a chronic problem of asymmetry between the amount of funds available and the scope of tasks conducted leads to specific consequences, including, in addition to the effect of ousting investment tasks by current tasks and abandoning taking certain actions recognized at a given moment (subjectively) as of low priority, the increase in debt level should be mentioned as first [20]. The use of debt instruments by local government units occurs according to legal regulations, which have an effect on the level of local government debt, including the level of debt service liabilities [3]. The abolition of the debt level limits in local government units and the introduction of a limit only for payments for debt service in individual years covered by the debt forecast should encourage local government units to effectively manage debt (its level and service costs). In practice, debt limitation may encourage some LGUs to increase off-budget

debt, which remains outside the scope of monitoring and control of supervising bodies (hidden debt), in order to increase debt at high costs and risks [21].

Important elements of the LGU debt management process include continuous monitoring of debt level, budget burden analysis, and adjustment of the debt level to currently used ratios. Debt ratio analysis in local governments in gminas takes into account changes in time, environmental factors, multidimensional relations, and both explicit and implicit liabilities [18]. The debt ratio analysis conducted in the study for urban gminas of the Silesian Voivodeship confirmed that the introduction of new legal regulations in the field of limiting the debt level led in the first three years of 2014–2016 to a slowdown in the investment activity despite the fact that the opportunities for using foreign capital were increasing, and the self-financing rate allowed for involvement in investment activities to a broader extent. Moderate investment policies and budget surpluses resulted in accumulation of budgetary funds, which is confirmed by the high level of self-financing ratio in urban gminas. While monitoring debt thresholds, local governments in gminas were unwilling to engage in investment policies, thus limiting the risk of overinvestment. However, this led to stabilization of financial liquidity on a cash basis. It was only in 2017 that the trend was reversed and investment expenditures were escalated, with the simultaneous increase in individual debt ratio. However, this period was marked by the decreasing financial independence in terms of generating revenues, self-financing level, and operational and total development capabilities.

As argued by Poniatowiacz et al. [22], the need for the use of repayable financial instruments in LGUs was associated with the deficiency of funds to finance all planned budget expenditures or disbursements. Dylewski [7] emphasizes, however, that access to fund was reduced due to individual debt limitations. Local government units have to more effectively adapt their financial policies to individual budget periods, adopting a more perspective rather than an ad-hoc approach.

Jastrzębska [23] also postulated that the increase in investment activity of local government units, resulting from the increasing social needs, striving to reduce the development gap and using the European funds, may lead to overinvestment. Furthermore, the extending the scope of tasks imposed on LGUs, rising public service costs in the absence of adequate financial compensation from the state budget, the slowdown in LGU revenue growth, unfavourable modifications of the tax system, increasing tendencies to adopt liberal local tax policies and low efficiency of debt enforcement led to the tendencies of LGUs to increase debt, with the necessity to implement effective debt management.

In conclusion, debt management policies in urban gminas cannot be considered efficient, especially because the conditions were not conducive to taking effective actions in this area. As demonstrated in the study and assuming that effectiveness is synonymous with maximization of effects, and that the effects can be measured by the number and size of tasks, particularly of an investment nature, these activities were substantially limited in 2014–2016. This observation is confirmed by e.g. computed investment activity ratios, which in the case of urban gminas of the Silesian Voivodeship were characterized by regression in the first three years. It should be noted that a specific level of effects cannot be achieved at decreasing

expenditures (investment expenditures in this case). However, the year 2017 was a period when the opportunities for generating debt were improved, leading to a recovery of investment activities in urban gminas after three years of regression, especially in the gminas of the Silesian Voivodeship.

References

1. Dafflon B, Beer-Tóth K (2009) Managing local public debt in transition countries: an issue of self-control. Financ Account Manag 25(3):305–333. https://doi.org/10.1111/j.1468-0408.2009.00479.x
2. Bitner M, Cichocki KS (2008) Efektywność zarządzania długiem w samorządach. Ernst & Young Polska, Warszawa
3. Jastrzębska M (2009) Zarządzanie długiem jednostek samorządu terytorialnego. Oficyna a Wolters Kluwer business, Warszawa, p 95
4. Zawora J, Zawora P (2014) Deficyt i zadłużenie samorządów gminnych w świetle ograniczeń ustawowych. Przedsiębiorstwo i. Region 5:131–139
5. Galiński P (2017) Limitowanie długu jednostek samorządu terytorialnego w Polsce. Zarządzanie i Finanse 15(2/2):19–31
6. Bem A, Daszyńska-Żygadło K, Skica T (2015) Wpływ indywidualnego wskaźnika zadłuŻenia na moŻliwości absorpcji długu przez jednostki samorządu terytorialnego, "Samorząd Terytorialny" 2015, nr 5
7. Dylewski M (2014) Zadłużenie JST – problemy nowej perspektywy finansowej UE. Studia Ekonomiczne, Uniwersytet Ekonomiczny w Katowicach 198(1):125–134
8. Glumińska-Pawlic J (2005) Dług publiczny jednostki samorządu terytorialnego. In: Kosikowski C (ed) Finanse samorządowe. Dom Wydawniczy ABC, Warsaw, p 285
9. Gorzałczyńska-Koczkodaj M, Zioło M (2007) Elementy finansów publicznych (rządowych i samorządowych). In: Flejtarski S, Świecka B (eds) Elementy finansów i bankowości. CeDeWu, Warsaw, p 418
10. Law on Public Finance, as of 27 August 2009 (Journal of Laws 2009, No. 157, item 1240, with subsequent amendments)
11. Law on Public Finance, as of 30 June 2005 (Journal of Laws 2005, No. 249, item 2104, with further amendments)
12. Owsiak S (2009) Kontrowersje wokół zadłużenia jednostek samorządu terytorialnego. In: Filipiak B, Szewczuk A (eds) Samorząd terytorialny w zintegrowanej Europie, vol 526. Zeszyty Naukowe Uniwersytetu Szczecińskiego, Szczecin
13. Bem A, Daszyńska-Żygadło K (2013) Czy polskie samorządy nadal będą mogły się zadłużać? red. Jastrzębska M, Stańczak-Strumiłło K, Finanse wobec problemów gospodarki światowej, Wydawnictwo Uniwersytetu Gdańskiego
14. Łukomska-Szarek J (2011) Financial analysis as a method of assessment of financial standing in local self-governments. Publish House Education and Science s.r.o, OOO Rusnauckniga, Praha-Belgorod
15. Jastrzębska M (2016) Zadłużenie się jednostek samorządu terytorialnego w parabankach – przyczyny, skutki, przeciwdziałanie. Ekonomiczne problemy usług 125:187–200. https://doi.org/10.18276/epu.2016.125-15
16. Nawrocki B (2016) Model szacowania optymalnego poziomu zadłużenia oraz maksymalnych wydatków inwestycyjnych. Finanse Komunalne, 1–2
17. Rivenbark WC, Roenigk DJ (2011) Implementation of financial condition analysis in local government. Public Adm Q 35(2):238–264
18. Rivenbark WC, Roenigk DJ, Allison GS (2010) Conceptualizing financial condition in local government. J Public Budg Account Financ Manag 22(2):149–177

19. Wang X, Dennis L, Tu YS (2007, Summer) Measuring financial condition: a study of U.S. States. Public Budg Financ 27(2):1–21
20. Szewczuk A, Zioło M (2008) Zarys ekonomiki sektora publicznego. Uniwersytet Szczeciński, Szczecin
21. Jastrzębska M (2017a) Dług ukryty jednostek samorządu terytorialnego – przyczyny, skutki, przeciwdziałanie. Annales H – Oeconomia LI(4):125–132. https://doi.org/10.17951/h.2017.51.4.125
22. Poniatowicz M, Salachna JM, Perło D (2010) Efektywne zarządzanie w jednostce samorządu terytorialnego. Oficyna a Wolters Kluwer business, Warszawa, pp 93–94
23. Jastrzębska M (2017b) Działania służące i niesłużące efektywnemu zarządzaniu długiem jednostek samorządu terytorialnego. Problemy zarządzania 15/2(1):147–160. https://doi.org/10.7172/1644-9584.67.8

The Impact of Limiting Tax Costs for Expenditure on the Purchase of Intangible Services from Related Entities on the Level of Tax Charges

Paweł Kowalik and Dominika Tyczka

1 Introduction

From January 1, 2018, the Act on Corporate Income Tax (hereinafter referred to as the Act on CIT, Journal of Laws of 2017, item 2343, as amended), includes limiting the inclusion of taxable expenses for specific benefits acquired from related entities. According to the justification to the Act amending the CIT Act[1] introducing the limit, a new provision was introduced in order to tighten the tax system and prevent aggressive tax optimisation using transfer prices.

According to art. 15e of the CIT Act, taxpayers are obliged to exclude from the tax deductible costs in the statutory part, among others costs:

1. consultancy, management and control services and similar services,
2. all kinds of fees and charges for the use or right to use the rights or values referred to in art. 16b of the CIT Act, i.e. subject to depreciation, such as: proprietary or related property rights, licenses, rights specified in the Act of June 30, 2000—Industrial Property Law, the value equivalent to obtained knowledge-related information in the industrial and commercial field, as well as scientific or organisational (know-how).

[1]Government bill amending the Act on income tax from natural persons, the Act on income tax from legal persons, and the Act on flat-rate income tax on certain revenues earned by natural persons from October 4, 2017, file 1878 http://www.sejm.gov.pl/Sejm8.nsf/druk.xsp?nr=1878; (access on November 21, 2018).

P. Kowalik (✉) · D. Tyczka
Wrocław University of Economics and Business, Wrocław, Poland
e-mail: pawel.kowalik@ue.wroc.pl; dominika.tyczka@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_3

The costs incurred directly or indirectly for related entities referred to in art. 11 or entities with residence, registered office or management in the territory or in a country listed in the regulations issued on the basis of art. 9a paragraph 6.[2]

Costs are excluded in the part in which these costs in total in the fiscal year exceed 5% of the amount corresponding to the surplus of revenues from all sources of income reduced by interest income over the total tax deductible costs less the tax deductible costs recognised in the tax year referred to in Articles 16a to 16 m, and interest (*earnings before interest, taxes, depreciation and amortisation*—EBITDA).

The expenditures falling within the above-mentioned catalogue are subject to limitation, if they are not directly related to the cost of manufacturing the goods/services sold by the purchaser of the service.

If the costs are limited, this means that only part of them can be tax-deductible and thus reduce the tax base. To the full extent in the tax year, 3 million PLN may be recognised as costs, plus 5% of the company's EBITDA in a given year. Surplus over the limit cannot lower the tax base.

The article will present new regulations. It aims to evaluate how the new regulation may affect the tax burden of taxpayers cooperating with related entities. According to the authors, the imprecision of the amendment in the scope of art. 15e introducing the limit, consisting in the lack of defining the limited expenditure and exclusion provided for in the Act, may cause an unjustified increase in the tax burden of taxpayers cooperating with related entities. The academic discussion on the amendment is, in the opinion of the authors, indispensable in order to maintain the level of foreign investments in Poland. The imprecise nature of regulations or their over-rigorous interpretation by tax authorities and administrative courts may translate into a significant increase in tax burdens and an increase in the effective tax rate, which may discourage foreign investors from investing in Poland in the long term. The amount of the effective tax rate is an element of the competitiveness of the Polish economy on the international arena.

The new provision provides for similar limits to other types of expenses. The subject of this article, however, are two groups of expenses that are common in settlements between Polish taxpayers and their related entities and, in the opinion of the authors, generate a fundamental added value within the activities of capital groups:

1. advisory, management and control services, i.e. strategic services,
2. all kinds of fees and charges for the use or right to use the rights or values such as a license, know-how, copyrights (patents, trademarks, inventions), i.e. so-called strategic rights.

[2]The list of entities using the so-called harmful tax competition is defined on the basis of statutory delegations by the Minister of Development and Finance in the form of a Regulation. Currently, the Ordinance of the Minister of Development and Finance of May 17, 2017 is in force, on determining countries and territories applying harmful tax competition in the scope of personal income tax and the Regulation of the Minister of Development and Finance of May 17, 2017 on determining countries and territories using harmful tax competition in the area of corporate income tax.

It should be emphasized that in accordance with the provision, benefits of a similar nature to the indicated groups of expenses are also subject to limitation. The above-mentioned catalogue is an open catalogue.

When assessing the introduced limit, one should bear in mind the goal which the legislator had in mind when adopting it. Changes introduced to the CIT Act from January 1, 2018 were aimed at tightening the tax system and were an implementation of Council Directive (EU) 2016/1164 of July 12, 2016, presenting provisions aimed at counteracting tax avoidance practices that have a direct impact on the functioning of the internal market (*The Anti-Tax Avoidance Directive,* i.e. ATAD). The ATAD itself is the implementation of part of the activities recommended by the *Organization for Economic Cooperation and Development*, i.e. OECD) as part of a project to counteract the erosion of tax base and transfer of profits (*Base Erosion Profit Shifting,* i.e. BEPS). On July 19, 2013, OECD published the Report on the prevention of BEPS constituting the so-called *Action Plan on Erosion and Profit Shifting* [1], which included 15 actions recommended for implementation into local tax laws in order to eliminate tax avoidance.[3] The actions recommended by the OECD and the European Union aim to clarify local tax regulations in such a way that taxation takes place in the moment of actual generation of value and profit. The plan points to undesirable practices carried out by taxpayers. The designed changes are aimed at responding to these practices. Among common taxpayers' practices, there was transferring of taxpayer's income to entities located in countries with favourable taxation and overstatement of assets (usually intangible assets), without showing revenues. Justifying the introduction of limiting tax costs resulting from contracts for strategic and strategic services, the project provider points directly to practices that are aggressive tax optimisation, such as creating a tax shield by:

- artificial and unjustified overcharging of the tax deductible costs due to intangible rights and benefits. The designer indicates trademarks as an example. Such services, in the legislator's opinion, constitute optimal tools of abuse due to their individual and unmaterialized character and objective difficulty in determining their market value;
- determining overstated remuneration for other material benefits such as advisory and management services as a percentage of the turnover of a Polish daughter company;
- charging the Polish subsidiary with an inadequate part of the common costs, e.g. from advertising.

[3]The content of the report is available on the website http://www.oecd.org/tax/beps/beps-actions.htm (access on November 21, 2018).

2 Literature Review

This subject is relatively new and the scientific achievements in this field are small. The tested limit for including expenses in tax costs is effective from January 1, 2018. Taxpayers will, in principle, make an annual tax settlement taking into account the new regulations until March 31, 2019, assuming that their tax year corresponds to the calendar year. It is true that during the year taxpayers may be obliged in accordance with the principle of self-taxation to calculate and pay a monthly advance on income tax from legal persons. It seems that due to the ambiguities of the regulations, taxpayers could adopt a prudential strategy, i.e. they deduct expenses only up to the statutory limit of 3 million PLN, hoping that by the date of annual settlement the situation will be clarified and the settlements will be corrected.

The purpose of the amendment is assessed positively in the literature. The sealing of the tax system is the implementation of the constitutional principle of equal rights. Nevertheless, "*the principle of the rule of law results in a right for the taxpayer to shape their tax obligations in such a way as to minimise the tax burden*." Werner [2].

Additionally, the very form of elimination of undesirable ones described by the legislator as "aggressive tax optimisation" is different. At the moment, one cannot speak of two research theses, because research in this area is not prolific enough. However, one should point to the views assessing the form of the fight against aggressive tax optimisations positively and negatively.

T. Grzybowski [3] states that due to the fact that the 5% EBITDA limit will be applied to costs, the total value of which exceeds 3 million PLN in the tax year, it should be noted that the legislator "set common sense" to determine the free amount aimed at limiting the optimisation at large scale. At the same time, he assesses that changes introduced from January 1, 2018 (including the establishment of a limit on the cost of intangible services) will result in an increase in the tax burden of a specific group of taxpayers despite the fact that the legislator does not change the tax rate. Ultimately, however, the change itself evaluates positively, pointing to the limit being directed to large-scale optimisation. At the same time, the author positively assessed the justification for introducing the regulation as convincing and said that the cost settlement was formulated in detail in the amendment. It is difficult to agree with this view, inferring from the amount of requests submitted by taxpayers to the Director of the National Tax Information for issuing an individual tax law interpretation in the scope of art. 15e of the CIT Act and assessing whether the given benefit is subject to limitation or not. As of today, the number of individual interpretations issued after January 1, 2018 regarding the provision of art. 15e of the CIT Act is 411.[4] The

[4]The result was determined using a form that allows to search for interpretations of tax law and other tax information available on the ministerial website. Search criteria: phrase: "15e", date of interpretation: "from January 1, 2018 to November 21, 2018", regulations: "Act on corporate income tax, Chapter 3: Costs of obtaining revenue."

Ministry of Finance itself has decided to issue explanations in this regard[5] to discuss new regulations (hereinafter referred to as Explanations). It should be noted that after issuing the explanations, taxpayers are still submitting applications,[6] which may indicate the imprecision of the issued Explanations.

T. Werner [2] points out the improper justification for introducing the limit. Firstly, he indicates that the legislator somehow assumes that intangible services are always unreal. The regulations do not give the taxpayer the right to prove the reality of services. The change is guided by the assumption that such services are accounted for only for the purpose of aggressive tax optimisation. Secondly, Werner assesses as incorrect the statement indicated in the justification to the draft amending act on the inability to verify the adequacy of remuneration for a given service. It should be pointed out that the Act on CIT contains appropriate regulations, giving the tax authorities the right to verify whether the price set between related parties (transfer price) is marketable and the right to estimate it. At this point, it is worth pointing to the scientific achievements in the methodology of valuation of intangible assets. For example, it is worth referring to Flisiuk and Gołąbek to prove that it is possible to specify guidelines and recommended criteria for the selection of methods for the valuation of intellectual property and know-how for their commercialisation [4]. It seems reasonable to state that similar rules may apply to the verification of the valuation of benefits between related entities.

Analysing the effects of the amendment, T. Werner indicates that such a limitation may lead to the outsourcing of services covered by the limit (the purchase of intangible services from independent entities is not covered by the limitation specified in Article 15e), which may call into question the existence of so-called shared services centre within capital groups.

3 Methods

This article presents the analysis of a recently introduced article 15e of the Polish Act on Corporate Income Tax initiating tax cost limits. Additionally it presents the analysis of individual interpretations and an explanation of a given regulation issued by the Ministry of Finance. A case study was performed by means of simulation of a

[5]On the website of the Ministry of Finance: https://www.finanse.mf.gov.pl/abc-podatkow/znajdz-informacje/-/asset_publisher_faceted/e8GP/content/ograniczenie-wysokosci-kosztow-uzyskania-przychodow-zwiazanych-z-nabyciem-niektorych-rodzajow-uslug-i-praw-art-15e-ustawy-o-cit on April 24, 2018 four documents have been published, entitled: "Limiting the amount of acquisition costs for certain types of services and rights," "Categories of services covered by art. 15e para. 1 of the Act," "Service categories not covered by art. 15e para. 1 of the Act" and "Costs of directly related services – art. 15e para. 1 of the Act." According to the information published on the website, they constitute a discussion of new regulations.

[6]After April 25, 2018, 381 interpretations were issued until November 21, 2018. Part of them concerned applications submitted by taxpayers prior to the publication of the Explanations.

taxpayer's tax costs calculated before and after the introduction of the statutory cost limits and their comparison.

4 Discussion of the Rule

The rules of qualifying expenses to the costs of obtaining revenues are specified in the regulations contained in art. 15 and art. 16 of the CIT Act. Costs of obtaining revenues are defined as costs incurred in order to achieve revenues from a source of revenue or to maintain or secure a source of revenues, with the exception of costs listed in art. 16 sec. 1. The general rule formulated by the legislator requires the taxpayer to assess whether the expenditure is a tax deductible cost each time. The Act contains a list of expenses that are or are not tax-deductible. In the event of such regulation, the taxpayer does not have to make further assessment. However, if there is no direct regulation for the expenditure under analysis, it is necessary to examine the existence of a causal link between incurring the cost and generating income from the source or the possibility of tax revenue, or preserving or securing the source of obtaining it. Analysis therefore requires the purpose of incurring a cost. The expenditure will be the tax deductible cost (tax expense), when there is a causal relationship between its incurring and creation, an increase or the possibility of income.

In accordance with the provisions of the Act of October 27, 2017 amending the act on personal income tax, the act on income tax from legal persons and the act on flat-rate income tax on certain revenues achieved by natural persons (Journal of Laws of 2017, item 2175, hereinafter referred to as "amendment Act"), amendments to the Act on Corporate Income Tax have been made. Pursuant to art. 2 point 18 of the amendment Act, there was added to the CIT the Act from January 1, 2018. Art. 15e para. 1 of the CIT Act, pursuant to which taxpayers are obliged to exclude from costs of obtaining revenues the following costs:

1. Consulting services, market research, advertising services, management and control, data processing, insurance, guarantees and sureties, and similar services,
2. All kinds of fees and charges for the use or right to exercise the rights or values referred to in art. 16b para. 1 points 4-7,
3. Transfer of the debtor's risk of insolvency due to loans other than those granted by banks and cooperative savings and credit unions, including under obligations arising from derivative financial instruments and similar benefits incurred directly or indirectly for related entities referred to in art. 11, or entities with residence, registered office or management in the territory or in a country listed in the regulations issued on the basis of art. 9a paragraph 6, in the part in which these costs in total in the fiscal year exceed 5% of the amount corresponding to the surplus of revenues from all sources of revenues reduced by interest income over the sum of tax deductible costs less the tax deductible expenses recognised in the tax year; referred to in art. 16a-16 m, and interest.

Subject to the instruction of art. 15e of the Act are the following rights or values:

- copyright or related property rights,
- licenses,
- the rights specified in the Act of June 30, 2000—Industrial Property Law,
- a value equivalent to the knowledge-related information obtained in the industrial, commercial, scientific or organisational field (know-how).

The above expenses may be subject to a restriction as regards taxation if they are acquired directly or indirectly from affiliated entities. For costs incurred indirectly for the entities referred to in paragraph 1, the costs incurred for the benefit of an entity unrelated to the taxpayer, if the actual owner of the receivables referred to in para. 1, or its part is an entity related to the taxpayer in the manner referred to in art. 11. Article 11 defines capital-related entities as follows, i.e. when one entity holds, directly or indirectly, in the capital of another entity at least 25%. Entities are personally related if:

1. A natural person, a legal person or an organisational unit without legal personality, residing in the territory of the Republic of Poland, hereinafter referred to as a "domestic entity", directly or indirectly participates in the management of an enterprise located outside the territory of the Republic of Poland or in its control or has a share in the capital of this company, or
2. A natural person, a legal person or an organisational unit without legal personality, with residence, registered office or management outside the territory of the Republic of Poland, hereinafter referred to as "foreign entity", directly or indirectly participates in the management or control of a national entity or participates in the capital of this national entity, or
3. The same natural person, legal person or organisational unit without legal personality, at the same time directly or indirectly participates in the management and control of a domestic entity and a foreign entity or holds a share in the capital of these entities.

The restriction does not apply to the costs of services, fees and receivables to the extent that the decision on recognising the correct selection and application of the method of determining the transaction price between related entities includes the correct calculation of remuneration for these services, fees and receivables in the period which this decision concerns.

The limitation in recognition as the tax cost of this type of expenditure applies to the excess of the costs indicated in this provision, excluding costs in excess of 3 million PLN in the tax year. The limit specified in art. 15e refers to their total amount. In order to calculate this limit, it is necessary to sum up the costs of services and rights borne by particular titles mentioned in points 1-3 of the Act. 1 art. 15e of the CIT Act. If the tax year of the taxpayer is longer or shorter than 12 months, the amount of this threshold is calculated by multiplying the amount of 250,000 PLN by the number of months started in the taxpayer's tax year. The amount of costs not covered in a given tax year is deductible in the next five tax years.

The range of limited costs defined by law has caused numerous interpretation doubts both on the part of taxpayers and entities dealing professionally with tax consultancy. Already in the course of social consultations, the draft amending act was assessed as imprecise and generating potential disputes of interpretation. For example, in the letter dated on July 27, 2017, the Employers' organisation of the Republic of Poland demanded the removal of the proposed limit indicating, among others, that "The catalogue of services that would be covered by the limit also raises doubts—it is broad and imprecise. In particular, the entry 'and benefits of a similar nature' will cause numerous interpretative problems and will lead to disputes."[7] The Ministry of Finance and Development decided to publish the Explanations. According to the Explanations, "based on an internal system interpretation and historical interpretation," the services catalogue included in the scope of the restrictions did not include services such as legal, accounting, including financial audit services or recruitment. At the same time, the explanations indicate that in order to qualify services as being subject to limitation, a linguistic interpretation applies and it is appropriate to refer to the classification of the PKWiU for this purpose, and the explanations of the Central Statistical Office may be helpful.

In the area of strategic services, it was mentioned in the Explanations that due to the heterogeneous character of consulting services, their linguistic meanings should be referred to legal interpretations and specified in section M in part 70 in category 70.22.1 of Polish Classification of Products and Services 2015, i.e., among others, consulting related to strategic management, consulting related to financial management or production as well as market or human resources.

In regards to the strategic rights in the Explanations, it was confirmed that the limitation does not include costs (fees and receivables) for the transfer of rights mentioned in art. 16b para. 1 points 4-7 of the CIT Act.

In the field of services of a similar nature to the types of services indicated in the Act as limited in accordance with the Explanations, it is helpful to refer to the case-law created on the basis of the interpretation of the provision of art. 21 para. 1 point 2a of the CIT Act regulating the issue of withholding tax on payments made abroad.

The limitation does not apply to tax-deductible costs directly related to the creation or acquisition by the taxable person of a good or service. Thus, in accordance with the Explanations, if the cost covered by the scope of the limitation is in any way "incorporated" into a product or service, which affects the final price, is one of the elements forming the price, the limit does not apply. It is necessary to apply only an objective possibility to determine the impact of a given expense on the product price. The exclusion does not cover general costs that are not directly related to any specific product or service.

[7]Letter of July 27, 2017: https://legislacja.rcl.gov.pl/docs//2/12300402/12445384/12445387/dokument301814.pdf (access on November 21, 2018).

5 Tax Account

The following is a simulation of the corporate income tax calculation for two options:

- option 1: no limit on costs (legal status until December 31, 2017);
- option 2: application of cost limitation (legal status after January 1, 2018).

Each of the options presents the calculation of corporate income tax (hereinafter referred to as CIT) for the sample enterprise XYZ Sp. z o.o. enterprise for the same tax year of 12 months and in line with the calendar year. XYZ Polska Sp. z o.o. (also referred to as the Daughter Company) belongs to the capital group XYZ Group operating throughout Europe and dealing in the production and distribution of highly specialised components for solar panels. 100% of the company's shares belong to XYZ GmbH with its registered office in Germany. The Daughter Company employs 260 employees in Poland. The object of the activity of Daughter Company is the production of elements for photovoltaic panels. Daughter Company, under a license agreement of October 1, 2001, has the right to use the XYZ trademark belonging to the Mother Company. The parties agreed on a license fee of 5% of the daughter's company turnover. The companies have a benchmarking analysis according to which comparable independent entities agree on a rate of 4 to 7% of annual turnover in comparable transactions. The analysis showed that the average (median) of license fees is 5%. In the parties' assessment, a fixed transfer price of 5% of the annual turnover of the Daughter Company is at the same time the market price. The parties update the benchmarking analysis every year. The parties also concluded on October 1, 2014 a cooperation agreement between the mother company as a service provider and the Daughter Company as a service buyer. The subject matter of the contract is the provision by the Mother Company of support in the production and trading activities by the Daughter Company, in particular: support in the determination and negotiation of prices with new customers and support in ensuring the well-being of strategic suppliers of raw materials for production. Services are settled at a contractual hourly rate of 200 EUR. The Daughter Company has a benchmarking analysis confirming the market level of the hourly rate. In the year X, the Daughter Company benefited from support in the scope of 480 hours, the remuneration due to the Mother's company amounted to 1.4 million PLN.

XYZ Sp. z o.o. does not use the CIT tax exemption, the tax rate of 19% applies to the CIT calculation, the Daughter Company does not have the status of a small taxpayer. The company generated tax income in the amount of 250 million PLN. The company incurred expenses related to operating in the amount of 150 million PLN. A part of the expenses were expenses for the Mother Company, i.e. 12.5 million PLN for the fees for using the XYZ logo owned by the Mother Company and 1.4 million PLN for management services provided under a cooperation agreement. The

Daughter Company does not carry out other transactions with related entities or entities based in countries with harmful tax competition.

Option 1: no limit on costs (legal status until December 31, 2017, in PLN)

[1]	Tax revenue	250,000,000
[2]	Tax costs	150,000,000
[3]	Revenue = [1] − [2]	100,000,000
[4]	Tax = [3] × 19%	19,000,000

Option 2: application of cost limitation (legal status after January 1, 2018, in PLN)

[1]	Tax revenue	250,000,000
[2]	*Operating costs*	*150,000,000*
[3]	*Remuneration under the license agreement*	*−12,500,000*[a]
[4]	*Remuneration under the cooperation agreement*	*−1,400,000*[a]
[5]	*The statutory unlimited amount of expenditure on intangible services from related parties*	*3,000,000*
[6]	*Unlimited value of expenditure on intangible services calculated as 5% EBITDA*	*500,000*
[7]	Tax costs = [2] − [3] − [4] + [5] + [6]	139,600,000
[8]	Revenue	110,400,000
[9]	Tax = [8] × 19%	20,976,000

[a]For the calculations, it was assumed that the benefits indicated in the example will be subject to limitations in accordance with art. 15e of the CIT Act and these expenses will not be directly related to the costs of manufacturing products by the Daughter Company[8]

As indicated above, the introduction of the provision of art. 15e of the CIT Act on limiting the inclusion of expenses for intangible services provided by related entities to tax costs may lead to an increase in the CIT tax burden. Option 1 showed a tax to

[8]It is important to point out the position of the Director of the National Tax Administration indicated, among others, in an individual interpretation of November 20, 2018 (reference number 0111-KDIB1-3.4010.436.2018.1.JKT) according to which the fee: "Taking into account the description of the case, it should be considered that the above-mentioned costs of the license enabling the use of the trademark incurred by the Applicant for the benefit of a related party are costs directly related to the production of goods within the meaning of art. 15e para. 11 point 1 updop. In the case at hand, the remuneration paid to the related entity for granting the aforementioned license constitutes a certain percentage of net turnover from all products sold by the Applicant, which are marked with a trademark, which makes the remuneration directly dependent on the sale value of goods marked with the trademark in a given period settlement. As a result, the quota relation is also met (the amount of the cost depends on the value of the products sold), as an element of a direct relationship between these costs and the products produced and sold". A similar position is presented in the Explanations – except that the Explanations highlight the fees paid by the distributor. The above-mentioned position for manufacturers is confirmed in other interpretations (reference number 0115-KDIT2-3.4010.376.2017.1.JG in the scope of fees for the right to use industrial designs and reference number 0111-KDIB1-1.4010.192.2017.1.BK in the scope of the acquisition of the right to use intellectual property (patents) and know-how).

be paid in the amount of 19 million PLN. Option 2 showed a tax of almost 2 million PLN more, i.e. almost 10% higher in relation to the amount of tax before the introduction of the limit, if for the abovementioned benefits the restriction from regulation 15e of the CIT Act will apply. If the expenses for the Mother Company are recognised as directly related to the cost of manufacturing products by the Daughter Company, the limitation will apply and the tax burden will correspond to the charges before the amendment of the CIT Act, which is presented in the table below:

[1]	Tax revenue	250,000,000
[2]	*Operating costs*	*150,000,000*
[2.1]	*Remuneration under the license agreement*	*12,500,000*
[2.2]	*Remuneration under the cooperation agreement*	*1,400,000*
[2.3]	*Expenditures for independent entities*	*136,100,000*
[3]	Revenue = [1] − [2]	100,000,000
[4]	Tax = [3] × 19%	19,000,000

6 Results

The amendment will not in any way affect the tax burden of taxpayers purchasing such benefits from affiliated companies with a value of less than 3 million PLN per year. However, it should be noted that in such a case tax authorities have the right to verify the legitimacy and market nature of these costs, even if their value is below the statutory limit.

The amendment is also neutral for taxpayers purchasing this type of benefits from independent entities.

The most considerable effects in the form of an increase in tax risk and operating costs will be triggered by the amendment to entities acquiring strategic rights or services with an annual value of over 3 million PLN from related entities. If these services are not directly related to the cost of manufacturing services or products sold by the purchaser of these benefits, the taxpayer will have to limit the deduction of tax expenditures, which will result in an increase in the tax base and a higher income tax for legal entities. For entities involved in the transactions of purchase of services and strategic rights on a large scale, this means additional tax risk and costs for taxpayers related to, among others:

- calculating the tax cost limit;
- a registration obligation related to the calculation of the value of benefits and the company's EBITDA;
- verification of costs and identification of limited expenses.

7 Discussion and Conclusion

The analysed amendment introduced a limit deductible from the taxable base for expenditure on services and strategic rights. The purpose of the amendment is to tighten the Polish tax system in order to eliminate the use of aggressive tax optimisation through an artificial and economically unjustified overcharging of tax costs by introducing higher than market transfer prices for services and strategic rights. The justification for the amendment is directionally consistent with the direction recommended at the international level. Nevertheless, the designer does not indicate any research or statistics confirming that these benefits were always purchased under artificial structures in order to lower the tax base. The solution adopted by the Polish legislator does not have a precise prototype in international recommendations and is a native solution. The unjustified deprivation of Polish entrepreneurs of the right to deduct taxes from a certain group of expenses is a threat to the conduct of tax activity by a group of taxpayers and for the competitiveness of the Polish economy on the international arena.

The impact of the provision on the tax burden of taxpayers purchasing services or strategic rights depends on the value of the services purchased. Another important factor is the interpretation of the regulations, i.e. at this moment one cannot speak of a uniform interpretation line. Taxpayers often request individual interpretations which may indicate the imprecision of regulations.

The unclear provisions and Explanations, as well as the lack of a uniform interpretation line, generate additional economic risks on the part of these taxpayers associated with at least a temporary difficulty in identifying limited costs. It seems justified to state that one should expect the position of administrative courts in the definition of a direct relationship between the expenditure and the cost of production.

References

1. Action Plan on Base Erosion and Profit Shifting
2. Werner T (2018) Nieustające reformy opodatkowania dochodów osób prawnych – perspektywa istotnych zmian ustawy o podatku dochodowym od osób prawnych w latach 2012-2017. Analizy i Studia CASP 1(5):3–24
3. Grzybowski T (2018) Opodatkowanie CIT od 1 stycznia 2018 r. – korekty systemowe czy kryzys konstrukcji? (wybrane zagadnienia). Analizy i Studia CASP 1(5):25–55
4. Flisiuk B, Gołąbek A (2017) Praktyczna wycena własności intelektualnej i know-how na potrzeby komercjalizacji wiedzy w instytucjach naukowych. Zeszyty Naukowe Politechniki Śląskiej, Seria Organizacja i Zarządzanie 100:121–132

Environmental Aspects in Polish Public Procurement System

Tomasz M. Budzyński

1 Introduction

Public procurement system is a tool for the state to implement its financial policy by means of making final expenditures, which results in purchases of goods and services. Thus, they contribute to the creation of GDP and, hence, to the creation of economic growth, whose main measure is the real GDP growth rate.

The State's concern for sustainable economic growth and sustainable development policy also includes the use of public funds through the allocation function channel of the public finance. Thus, one of the key tasks of the modern state is to build a system of sustainable public procurement, whose operation contributes directly to emphasizing environmental and social aspects.

The aim of the article is to assess the scope of application of environmental aspects in the public procurement system in Poland.

2 The Role of Green Public Procurements

Green public procurement is understood in the literature on the subject in two ways [1]:

1. as such a kind of procedure that forces or encourages the use of modern technologies and other environment-friendly solutions;
2. as such a kind of policy pursued by contracting authorities, which consists in taking into account pro-ecological requirements and criteria in the public procurement procedures.

T. M. Budzyński (✉)
Maria Curie-Sklodowska University, Lublin, Poland
e-mail: tomasz.budzynski@umcs.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_4

EU institutions have stated in their documents that green public procurement is understood as the process by which public institutions attempt to purchase goods, services and construction works whose environmental impact during their life cycle is limited compared to the goods, services and construction works for the same purpose as would be ordered otherwise [2].

Public procurement taking into account environmental criteria is also called ecological public procurement or green public procurement (GPP). As early as at the beginning of the twenty-first century, a great potential was found in green public procurement that could become a key instrument of environmental policy implemented at international, EU and national level. Public institutions contracting public procurement may affect production and consumption trends. The emphasis on purchasing goods with greener features will therefore result in the creation or expansion of markets with ecological characteristics and contribute to the development of environmentally friendly technologies. Green public procurement contributes significantly to the effect of accelerating the demand and supply side of goods, services and construction works taking into account environmental aspects throughout the economy through the supply chain [2].

The interest in the issues of green public procurement took place relatively early on the OECD level—since 1996. A specific milestone in the development of the idea of green public procurement was the issuance of OECD recommendations in this matter in 2002 [3]. The purpose of the document was to convince national governments belonging to the Organization to implement an appropriate environmental policy taking into account the relevant framework of action and support. In addition, it was encouraged to develop procedures to identify "green" products, broad access to information on GPP, prepare a whole range of tools to support contracting authorities, which included training and technical assistance, as well as develop and launch a system for assessing and monitoring activities and implemented policies in the field of green public procurement [4, 5].

At EU level, the environmental aspects of public procurement were mentioned in the 2003 Commission Communication on Integrated Product Policy. The Commission asked Member States to develop and implement national action plans for green public procurement with a three-year horizon. The Commission's recommendations in this area were also facilitated by the adoption of new directives regulating the functioning of the system of classic [6] and sectoral [7] public procurement [8].

Implementing the treaty provisions[1] and striving for the systemic development of the application of environmental aspects in public procurement procedures by public sector entities, the European Commission enumerated ten priority sectors of the economy for green public procurement. These sectors have been identified based on the opportunities they offer to improve the environment and other key criteria

[1]Art. 11 of The Treaty on the Functioning of European Union [9] states that environmental protection requirements must be integrated into the definition and implementation of the Union policies and activities, in particular with a view to promoting sustainable development.

affecting the choice of products or services in the public procurement procedure. The priority sectors are [10]:

1. construction (includes raw materials: wood, aluminium, steel, concrete, glass and construction products: windows, wall and floor coverings, heating and cooling devices; aspects related to building operation and decommissioning; maintenance services for buildings and execution of construction works at location);
2. catering and catering services;
3. transport and transport services;
4. energy (electricity, heating and cooling using renewable energy sources);
5. office equipment and computers;
6. clothing, uniforms and other textiles;
7. paper and printing articles;
8. furniture;
9. cleaning products and cleaning services;
10. equipment used in health care.

In order to ensure uniform and widespread application of environmental aspects in public procurement procedures, the criteria in this respect for 21 groups of products and services that can be directly introduced into the documentation in the proceedings have been developed at the EC level. Simultaneously, EU sectoral legislation imposed mandatory requirements on the application of environmental criteria to certain types of public contracts awarded, and these concern, inter alia, [11]:

- IT office equipment—products of this type must meet the minimum energy efficiency requirements (Regulation No. 106/2008);
- road transport vehicles—it is necessary to take into account energy factors and the impact of vehicles on the environment, as well as to take into account operational costs throughout the vehicle's life cycle (Directive 2009/33/EC);
- buildings—must exhibit certain parameters relating to energy performance and demonstrate a minimum level of energy efficiency (Directive 2010/31/EU).

Analysing the process of the long-lasting implementation of the idea of green public procurement, a number of barriers obstructing and blocking the wider use of GPP [2] have been identified:

1. lack of a full range of environmental census criteria that may be directly and widely used;
2. limited mechanisms for the dissemination of knowledge about GPP and environmental criteria among others through appropriate databases;
3. low awareness of the benefits of environmentally friendly products and services;
4. uncertainty as to the legal possibilities and correct application of environmental criteria in public procurement procedures;
5. lack of (real) political support for the implementation/promotion of GPP, which limits the availability of funds e.g. for training and technical assistance;
6. lack of coordinated exchange of practices and information between regional and local institutions.

In addition, the OECD report highlights two major obstacles to the smooth functioning of GPP. The first and most important one is the awareness that products and services that have ecological assets are much more expensive than those that do not meet the environmental requirements, and thus the budgeting process is not earmarked for final expenditure of appropriately larger funds. The lack of necessary financial means compels the ordering party to significantly limit environmental aspects in public procurement procedures. The second issue raised in the report is the lack of adequate monitoring systems and instruments that would objectively assess the achievement of the objectives set for green public procurement [12].

Green public procurement entail a number of undisputable benefits which are highlighted in the three following areas [4, 5]:

1. financial, as green public procurement brings measurable financial savings in the horizon of the full life cycle of the good, not only the purchase costs;
2. economic, as green public procurement is the main incentive to create innovation in the economy that forces the production of more environmentally friendly goods, services and works;
3. environmental, as the implementation of the GPP has a positive impact on the currently unfavourable climate and environmental changes.

The latest conception of economic growth is the development of a circular economy. Its main purpose is to modify the rules for the use of products and materials in such a way that products and materials are maintained in the value chain for a longer period of time and the recovery of raw materials for their re-use after the use of the products. Public procurement is intended to support the closure of the *economy* by purchasing works, services and goods that are intended to ensure the closing cycle of energy and materials within supply chains while minimizing or eliminating negative environmental impacts and creating waste throughout the life cycle [13].

3 Legal Framework of Green Public Procurement in Poland

In response to the financial and economic crisis that strongly affected many EU Member States at the beginning of this decade, the Community institutions have developed a new strategy for fundamental structural reforms—Europe 2020, which is focused on implementing smart, sustainable and inclusive growth. One of the fundamental objectives of the current strategy is climate and energy, which are related to the priority related to sustainable development, which consists in supporting a more resource-efficient, more environmentally friendly and more competitive economy. The set goals and priorities have been used to set measurable goals of the strategy—to achieve the "20/20/20" model for climate and energy

(including a 30% reduction of carbon dioxide emissions). The project built on the basis of the strategy "Resource efficiency in Europe" assumes independence of economic growth from the use of resources, transition to a low-emission economy, greater use of renewable energy sources, modernization of transport and promotion of energy efficiency. The role of one of the most important instruments guaranteeing the achievement of the objectives of the Europe 2020 strategy was attributed to public procurement that would have a pro-innovative impact on companies, contribute to increasing resource efficiency and transformation into a low-carbon economy, stimulate changes in production and consumption methods and increase energy-saving construction and recycling investments [14]. Possibilities of proper fulfilment of the role assigned to the public procurement system depend on the creation of an appropriate legal framework for GPP. To this end, new procurement directives were adopted in 2014 for both classic,[2] and sectoral[3] procurers. In addition, the provisions of both directives were transposed into the national legislation through a comprehensive amendment to the Public Procurement Act[4] of 22 June 2016.

Possibilities to include environmental aspects in the awarded contract are several and depend on the stage of the proceeding. Pro-environmental nature of the contracting authority may award public procurement by: indication of the conditions for excluding contractors (optional), formulating the conditions for participation in the procedure, description of the subject of the contract and defining the criteria for the evaluation of offers and determining the terms of the contract.

The provisions of the Public Procurement Law provide contracting tools to exclude from contract awarding proceedings those contractors who violate environmental protection regulations. Compulsory exclusion from the procedure covers contractors who committed an environmental crime (for 5 years from the validation of the verdict). The legislator also allows the elimination of contractors (on a voluntary basis) who committed more serious offenses against the environment, and thus they were punished with arrest, restriction of liberty or a fine of a minimum of 3000 PLN. A contractor who has violated the obligations set out in the environmental protection law in a significant way or regarding payment of fees, among others for using the environment, in accordance with the decisions of the ordering party also may be subject to exclusion [16].

The subjective qualification of contractors for the implementation of a public contract also includes an assessment of their compliance with the conditions for participation in the procedure. Ecological issues may find their place in the group of conditions for participation in the proceedings concerning technical or professional

[2]Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC (*OJ L 94, 28.3.2014, p. 65–242*).

[3]Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC (*OJ L 94, 28.3.2014, p. 243–374*).

[4]The Act of 22 June 2016 on amending the Act of Public Procurement Law (Dz. U. poz. 1020) [15].

capacity of the contractor. Verification at this stage of the proceedings may include [17]:

1. contractor's experience related to the execution of orders in a manner consistent with the principles of environmental protection;
2. having employees with appropriate education, professional qualifications and experience enabling the proper implementation of a green public contract;
3. having appropriate technical devices or facilities that are of environmental importance (e.g. devices that minimize the generation of waste, leakage of pollutants, reduce fuel consumption);
4. implementation by the contractor of environmental management measures (e.g. EMAS system or possession of ISO 14001 certificate).

Description of the subject of the contract is a classic moment of the public procurement procedure, which allows the inclusion of environmental aspects; giving a relatively large area to be used by the contracting entity running the policy of greening public procurement. The description of the subject of the order containing "green" elements refers mainly to technical requirements specific for a given product or service. Environmental criteria include 21 product groups, such as: office buildings, roads, computers and monitors, paper, cleaning products and cleaning services; electricity, transport, furniture and water and sewage infrastructure [18].

Significant is the fact that the ordering parties may require having appropriate markings, i.e. a certificate that a building, service, product or process or procedure meets certain requirements. An example of such are labelled mandatory energy labels, tire labels or other types of marking indicating the ecological character of the offered object of the contract.

Environmental issues are also an important module affecting the development of criteria for offer evaluation and this can be done through four independent routes:

- by formulating the components of the best offer;
- through the direct application of environmental aspects in the evaluation of offers;
- by refraining from the model of a single-criterion evaluation of price-based offers;
- by using the mechanism of the abnormally low price examination procedure.

As a result of the amendment to the Public Procurement Law in 2016, the definition of the most advantageous tender has changed. The advantageous tender can be accepted by the ordering party in addition to the tender with the lowest price and the tender presenting the most advantageous balance in the multicriteria variant, also a tender in which the cost criterion replaces the price criterion. Thus, the horizon of the economic and financial calculation of the ordering party from the purchasing phase to the exploitation phase and ending the use of the given commodity, service and construction work is extended. The key phases of a product's life are the phases of its operation (e.g. the cost and quantity of consumables) and the end of life of the product (costs and methods of recycling and safe disposal for the environment).

The legislator, outlining a new catalogue of criteria for the evaluation of tenders (having the character of an open catalogue) directly encourages ordering entities to use environmental aspects in the assessment of offers. They will of course be specific

and closely related to the subject of the contract, i.e. the aforementioned GPP criteria for 21 product groups. Their use has obviously quantifiable difficulties, while the criterion for easy application is undoubtedly energy efficiency, the level of which is described in many cases by an obligatory labelling.

Consideration of environmental criteria for tender evaluation is additionally enforced by the legislator by limiting the use of only the price criterion. Entities of the public sector and entities not having legal personality not included in the public finance sector may apply price as the only criterion for the evaluation of offers or criteria with a weight exceeding 60%, if they specify quality standards in the description of the subject of the contract, referring to all relevant features of the contract and the protocol in how life cycle costs were included in the description of the subject of the contract.[5]

However, the examination procedure for abnormally low price allows for an indirect determination whether the contractor does not attempt to bypass environmental public procurement contracts or accepts such an execution method in the calculation, which does not take into account the necessary environmental costs (e.g. use of good quality filters for contaminants appearing in the course of executing the contract).

On the other hand, the phase of the order imposes on the contracting authority the obligation to enforce its declarations on the offer and accepted provisions of the specification of essential terms of the contract, referring to the conditions of participation in the procedure, description of the subject of the contract and the criteria for the evaluation of offers. Environmental aspects may also be included in the text of the contract itself, in which the contracting party obliges the contractor to respect the environment, save energy, reduce pollution and waste, etc.

4 Evaluation of Using Environmental Aspects in Public Procurement in Poland

Monitoring the scope of application of environmental aspects in the public procurement system is the systemic responsibility of the President of the Public Procurement Office. Therefore, the available aggregated data on green public procurement comes from annual reports prepared by the Public Procurement Office. The detailed data on green public procurement presented below are divided into two periods differing in the methodology of data collection and their detail.

The first period of monitoring the level of green public procurement covers the years 2006–2015. The level of greening procurements in a given year was estimated based on the analysis of contract notices selected based on a random sample of only 4% of procedures—divided into types of orders and type of publication (Public

[5] Art. 91 p. 2a of the Act of Public Procurement of 29 January 2004 r. (Dz. U. 2018, poz. 1986) [19].

Table 1 The level of "greenness" of public procurement in Poland

Year	2006	2009	2010	2011	2012	2013	2014	2015
Level	4%	10.5%	9%	12%	12%	12.1%	9.2%	11.4%

Source: The Public Procurement Office 2016

Procurement Bulletin or Official Journal of the European Union). The following elements were analysed in the announcements [20]:

- subject of the order (title and description);
- conditions for participation in the proceedings;
- criteria for the evaluation of offers;
- requirements related to the implementation of the contract (Table 1).

The most common examples of the use of green public procurement in Poland relate to [20]:

- for construction works: thermo-modernization (wall insulation, replacement of window frames and thermal insulation), street LED lighting and water supply and sewage works;
- for deliveries: purchase of office computer equipment and purchase of road vehicles;
- for services: development of documentation for thermo-modernization and photovoltaic installations, collection of municipal waste.

The second period of monitoring of GPP covers partly 2016 and the full year 2017, and the data comes from the annual mandatory reports on public contracts sent to the Public Procurement Office by all contracting authorities (about 37,000 entities), thus they are full data for the whole public procurement system and show a much greater degree of detail.

The number of contracting authorities applying environmental aspects amounted to 209 entities (2016) and 344 entities (2017).

The level of green tenders in Poland by 2015 should be considered as medium (from 9 to 12%) and significantly deviating from the target level of 20%. The method of estimating the level of green public procurement is a serious objection. Generalization conclusions were drawn based on the study of a relatively small random sample, although probably representative. It seems that it is not reliable, especially in comparison to the current data, to determine whether environmental aspects have been taken into account in a given proceeding. The evaluation of the data included in the report indicates that this difficult matter is superficially treated through a cursory analysis of published contract notices.

Therefore, it is also erroneous to estimate the value of orders taking environmental aspects into account in 2013–2015 for 17.3 billion PLN, 12.3 billion PLN, and 13.3 billion PLN [22] respectively.

The actual level of integration of environmental aspects in the procurement system in Poland is presented in the data for the one and a half year period of 2016–2017. They show that the level of greening orders is marginal (0.9% of

Table 2 Environmental aspects in public procurement in Poland in 2016–2017

	2016		2017	
	Number	Value (in mln PLN)	Number	Value (in mln PLN)
Cunducted procedures	589	1.040	1212	3.237
Canceled procedures	70	6	194	–
Environmental aspects in description of the subject-matter of contract	199	231	589	1.750
Environemnal criteria in offer evaluation	200	375	421	1.534
Labelling (sublect matter)	116	105	186	283
Environmental management systems	54	226	87	300
Labelling (evaluation criteria)	45	54	86	108
Cost (evaluation criteria)	7	38	17	67

Source: The Public Procurement Office [21]

contracts awarded and 2% of the value of orders) and therefore public procurement is not a channel for the implementation of environmental policy. Legislative measures taken by the legislator, as well as a package of training and advisory activities do not bring the expected results. It also means that there are important reasons why the contracting authorities do not decide to reach for environmental criteria in public procurement in many cases. It is necessary to take measures to identify real barriers blocking the process of greening public procurement and to consider extending the scope of mandatory environmental requirements. The financial aspect is also significant. Due to the large limitation of financial outlays assigned to a given public procurement, it does not create a financial space for accelerating green public procurement (Table 2).

Contracting authorities that award green public procurement use primarily two instruments that take environmental aspects into account: the description of the subject of the contract and the criteria for the evaluation of tenders. To a much lesser extent, the ordering parties used the requirement of labelling and having an environmental management system. A rarely used instrument in the offer evaluation criteria is the total life-cycle cost.

5 Conclusions

On the one hand, green public procurement is a key instrument in the field of environmental policy, by means of which the state can directly influence the market in order to force or intensify ecological trends. Green public procurement is also an important element of the EU 2020 economic strategy at EU level, as well as the building of a circular economy model.

The analysis of statistical data leads to the conclusion that we do not have a good model for monitoring the use of environmental aspects in public procurement. The

previously used method provided fragmentary data, the current method may also bring a suspicion that contracting authorities do not report all cases of the use of environmental values.

The level of green public procurement in Poland is low and deviates from the expected value to a large extent (currently set at 25%). Contracting authorities applying environmental criteria in the proceedings focus mainly on the use of environmental criteria for the evaluation of tenders and the inclusion of environmental aspects in the description of the subject of the contract. What is worrying is the very marginal use of the cost criterion as an element of the offer evaluation. Therefore contracting authorities do not focus on life-cost factors of tenders.

Concluding, it should be stated that in Poland we have a well-prepared legal framework for applying environmental aspects in public procurement that provide for a variety of applications in the procurement procedure. Empirical data indicate that in Poland we perceive potential benefits from green public procurement rather than discount them. Hence, the question arises about barriers hindering the development of the policy of green public procurement and the role of economic and non-economic factors performing the limiting functions for the development of green public procurement.

References

1. Sadowy J (ed) (2013) Public procurement system in Poland, Public Procurement Law. Public Procurement Office, Warsaw, p 32
2. Commission of the European Union (2008) Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions Public procurement for a better environment, COM(2008) 400 final
3. OECD (2002), Recommendation of the Council on Improving the Environmental Performance of Public Procurement, OECD/LEGAL/0311
4. OECD (2018). http://www.oecd.org/environment/tools-evaluation/greenerpublicpurchasing.htm
5. OECD (2018). http://www.oecd.org/gov/public-procurement/green/
6. Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts (OJ L 134, 30.4.2004, p. 114–240)
7. Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors (OJ L 134, 30.4.2004, p. 1–113)
8. Commission of the European Union (2003) Communication from the Commission to the Council and the European Parliament Integrated Product Policy. Building on Environmental Life-Cycle Thinking, COM(2003) 302 final
9. PPO (2009) Green Public Procurement, Warsaw, p. 33
10. European Commission (2016) Buying green! A handbook on green public procurement, 3rd edn. Publications Office of the European Union, Luxembourg, p 6
11. OECD (2015) Going Green: Best Practices for Sustainable Procurement
12. European Commission (2017) Public Procurement for a circular economy. Publications Office of the European Union, Luxembourg, pp 4–5

13. European Commission (2010) EUROPE (2020) A strategy for smart, sustainable and inclusive growth, COM (2010) 2020 final
14. Wiktorowska E, Skubiszak-Kalinowska I (2017) Public Procurement Law. Commentary. Wolters Kluwer, Warsaw, pp 373–375
15. Ołdak-Bułanowska K et al (2017) Sustainable public procurement. Social and enivironmental aspects of public procurement procedure in the light of amendment of Public Procurement Law. Public Procurement Office, Warsaw, pp 22–23
16. PPO (2018). https://www.uzp.gov.pl/baza-wiedzy/zrownowazone-zamowienia-publiczne/zielone-zamowienia/kryteria-srodowiskowe-gpp
17. PPO (2016) Report on functioning of public procurement system in 2015. Public Procurement Office, Warsaw, p 77
18. PPO (2018) Report on functioning of public procurement system in 2017. Public Procurement Office, Warsaw, p 161
19. PPO (2017) Domestic plan of operation in sustainable public procurement in 2017–2020. Public Procurement Office, Warsaw, p 36
20. Consolidated version of the Treaty on the Functioning of the European Union (OJ C 326, 26.10.2012, p. 47–390)
21. The Act of 22 June 2016 on amending the Act of Public Procurement Law (Dz. U. poz. 1020)
22. The Act of Public Procurement Law of 29 January 2004 r. (Dz. U. 2018, poz. 1986)

Divestment from Coal Sector in Response to Higher Risk Assessment by Insurance Companies: Poland Case Study

Malgorzata Burchard-Dziubinska

1 Introduction

The UN Framework Convention on Climate Change, adopted in 1992 at the Rio de Janeiro Earth Summit, came into force 3 years later. However, it took much longer to adopt specific commitments to actually reduce greenhouse gas (GHG) emissions. Discussions held during the annual Conferences of the Parties (COP) to the UN Framework Convention on Climate Change were often idle and for many years did not lead to the development of a program of decisive measures to reduce greenhouse gas emissions. According to the Intergovernmental Panel on Climate Change (IPCC), 2 °C is considered to be the maximum temperature rise before triggering significant risks to society. Staying below this threshold requires significantly limiting carbon emissions, and notably burning only 1/3 of existing fossil fuel reserves by 2050 according to the International Energy Agency. The provisions of the Kyoto Protocol did not bring the expected decrease in CO_2 emissions. The necessity to accelerate and strengthen actions for climate protection has been clearly articulated in the Paris Agreement during 21 COP of the United Nations Framework Convention on Climate Change. The main aim is dealing with greenhouse-gas-emissions mitigation, adaptation, and finance, starting in the year 2020. The Paris Agreement proved to be a significant impulse for the financial sector to redefine the directions of investment and insurance policy. It is expected, that enforcing carbon constraint through market, societal and regulatory pressures could result in significant loss of value ("stranded assets") for the most carbon intensive businesses. Meanwhile, predicted changes in the natural environment were taking place throughout that time, of which the most evident and dramatic effects are extreme weather and climate phenomena and those related to the melting of the mountain glaciers

M. Burchard-Dziubinska (✉)
University of Lodz, Lodz, Poland
e-mail: malgorzata.burchard@uni.lodz.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_5

feeding the rivers. This is reflected in statistical data on losses incurred in the last 10 years as a result of natural disasters caused by extreme weather phenomena and climate change. These data are closely followed by investors who increasingly give up spending on investments in industries responsible for the largest GHG emissions and in areas most threatened by extreme weather events. In other words, one can observe divestments motivated, on the one hand by the concern about economic benefits and, on the other, about the Earth's climate. The aim of the study was to find an answer to the question: Have foreign investors already started divestments from the Polish coal sector? The paper analyzes examples of divestments resulting from the new risk assessment related to climate change. Such trend is already evident among global insurance companies. It seems that it has just arrived in Poland too.

2 Methodology

In order to investigate the importance of insurance companies in the fossil fuel underwriting sector, the respective information provided on publicly accessible online sources by the insurance groups themselves was analyzed.

To answer the research question statistical data on coal mining and trading in Poland as well as information on investment strategies of insurance companies involved in the Polish coal sector were analyzed.

The study concerns the years 2015–2018, because of the strong impact of Paris Agreement (2015) on divestment from the coal industry around the world.

3 The Types of Risks Associated with Climate Change

From the point of view of origin, the following types of risk are associated with non-geophysical natural disasters:

- Meteorological—tropical storms, convection storms and local storms,
- Hydrological—floods and landslides,
- Climate—extreme temperatures, drought and forest fires.

They often occur together and are associated with weather extremes. It is estimated that since the 1980s, the amount of compensation paid for disasters caused by weather events has doubled every decade (indexed to inflation) [1]. It is estimated that about 3/4 of natural disasters are associated to hydro-meteorological phenomena. Threats concern both health and life of people, as well as the condition of infrastructure and property of various economic entities as well as the possibilities of investing and running a business. Hot waves (less frequently cold), pose a serious threat to the health and life of the population, rather than to the material infrastructure [2]. Data published by Munich Re for the years 2004–2015 show that all categories of weather and climate events accounted for the majority of natural disasters.

Considering four categories of data, their shares were as follows: total number of events from 85 to 94%, total losses from 39 to 97%, deaths from 5 to 95%, and insured losses from 56 to 99%. In 2015, 94% of worldwide insurance payouts for natural disasters stemmed from extreme weather events such as flooding and flash flooding, with payouts increasing even further in 2016. In its annual natural catastrophe review, Munich Re said flooding, including river flooding and flash flooding, caused more than a third of all losses—far above the 10-year average of 21% [3, 4]. In 2016, global losses from natural disasters amounted to USD175 billion—a two-thirds increase compared with 2015—caused by increasingly powerful storms and "exceptionally" high number of severe floods [5–7]. The report published in December 2016 by ClimateWise coalition said that the "protection gap"—the difference between the cost of natural disasters and the sum insured—increased fourfold up to USD100 billion.

In 2015, the total worldwide economic losses from natural and man-made catastrophes were estimated at USD92 billion, of which only USD37 billion was insured [8, p. 16].

The following risks are associated with climate change:

- Material—include threats to operating activities and supply chains resulting directly from extreme weather events;
- Regulatory—related to international efforts to limit the increase in the average temperature on Earth;
- Legal—refer to the concept of ecological harm and attempts to obtain compensation by injured persons;
- Technological—related to the development of new markets and sectors introducing risks for existing business models;
- Reputational—related to the expectations of increasingly ecologically aware stakeholders.

In connection with the increase in the frequency and intensity of impact of extreme weather phenomena commonly associated with climate change, one can observe changes in the behavior of enterprises and investors on the financial markets. This applies both to investments in companies dealing in the extraction and energy use of coal, and insurance companies and investment banks. On one hand, it manifests itself in the increase of the popularity of including the issues related to climate change (mainly CO_2 emissions and their changes) in their corporate social responsibility (CSR) reports; on the other hand it takes the form of divestments in the coal sector in accordance with the new principles of responsible investment (RI), as a part of environmental, social and governance (ESG) practices.

Reporting the risk related to climate change and taking into account climate protection issues in the investment processes and ongoing operations of enterprises has become a fact. This is evidenced by the publication of guides and formalized reporting principles addressed to various groups of investors. Examples of such practices include: Global Reporting Initiative (GRI), or "A Guide to Investment Preparation Taking into Account Climate Change, Its Mitigation and Adaptation to These Changes and Resilience to Natural Disasters" [10] published by the Polish

Ministry of the Environment. Criteria of ESG are increasingly used. Those criteria are a set of standards for a company's operations that socially conscious investors use to screen potential investments. Environmental criteria look at how a company performs as a steward of nature. Social criteria examine how a company manages relationships with its employees, suppliers, customers and the communities where it operates. Governance deals with a company's leadership, executive pay, audits, internal controls and shareholder rights [11].

4 Divestments from the Coal Industry

The Paris Agreement signed during the 21st COP was a strong impulse for undertaking actions directed against the development of coal business. The increasingly critical evaluation of the coal sector as the main perpetrator of climate change has become evident on the financial markets. It takes three forms:

1. Investors' withdrawal from direct financing of investments in new coal mines and power plants;
2. The withdrawal of investors from financing enterprises which derive a large part of their income from servicing the coal industry; This applies to all companies belonging, in the industry value chain: producers of machinery and equipment for coal mines, coal-fired power plants and coal processing, transport companies and their suppliers.
3. Tightening the criteria used by insurance companies with respect to enterprises (corporations), whose activities may pose a threat to climate protection.

The first global insurance company which decided to withdraw from the coal business was France-based insurer AXA, divesting hundreds of millions of dollars in coal investments in 2015. The AXA Group has a commitment to responsible investment, embodied in its Group Responsible Investment Policy. It is a key element of AXA's broader Corporate Responsibility strategy. AXA has decided to divest from companies most exposed to coal-related activities "in the belief that sending such a signal to markets and regulators generates a positive influence and contributes to de-risking our portfolios".

AXA will divest equity assets and will stop investing corporate fixed income assets in the following types of businesses:

- Electric utilities with coal share of power production (energy mix) over 30%;
- Electric utilities with coal-based power "expansion plans" over 3 gigawatts;
- Mining companies with coal share of revenues over 30%;
- Mining companies with annual coal production over 20 million tonnes.

As a global insurer, AXA will no longer cover certain risks as follows:

- The development of new coal capacity is banned by ending construction covers for any new coal plant and new coal mine, whichever the region or client (regardless of investment blacklist). This includes Marine Project Cargo policies related to the construction of new coal power plants or coal mines.
- The operation of existing coal projects is restricted by ending property covers for existing coal plants when these are included in coal-only risk packages. This does not apply to emerging countries where access to energy remains a concern for local populations, and baseload energy alternatives are not yet in place [12].

Other insurance companies followed AXA Group. Divestment behavior is demonstrated by other large financial companies such as Lloyd's of London, Allianz, Aviva, BMO Global Asset Management, Generali, Munich Re, Natixis, Legal & General, SCOR, Storebrand, Swiss Re, and Zurich Insurance Group. They began to exclude coal from their investment strategies and tightened the criteria for covering insurance in areas particularly exposed to hydrological, meteorological and climatic phenomena. According to the Unfriend Coal Network report the global coalition of organizations, about 15 billion pounds have been disposed of by insurers in the last 2 years. For example, the insurance market associated with Lloyd's of London implements the policy of excluding coal as part of a responsible investment strategy. This means that wherever possible Lloyd's will avoid investing in companies that mainly deal with coal.

Insurers are huge investors with approximately USD31 trillion of assets under management, and hundreds of billions of dollars invested in the fossil fuel sector [13, 14].

When focusing on the reported total assets under management (AUM), it can be seen that Aviva, with 3.2%, invests the highest proportion of its reported total AUM in the fossil fuels sector. Allianz (3.1%) and AXA (2.3%) both also invest more than 2% of their reported total AUM in the fossil fuels sector. In recent years approximately more than 1000 institutional investors representing more than USD793 trillion in assets have decided to divest their assets from fossil fuels in one way or the other [15].

The insurance groups can be classified into three different categories, indicating their level of involvement in the global fossil fuel underwriting sector:

1. "Low: the insurance group is barely involved in the global fossil fuel underwriting sector;
2. Medium: the insurance group is moderately involved in the global fossil fuel underwriting sector, being involved in at least two countries;
3. High: the insurance group is highly involved in the global fossil fuel underwriting sector, being one of the market leaders or active participants in at least one world region."

Investors, who exclude from their portfolios enterprises from the coal sector, most often apply thresholds in the amount of revenues obtained from coal mining or production of energy from coal at the level of 50 or 30%. This is an important change in the approach to investment. It may be insufficient, however, because the percentage criterion presents only the relative importance of coal in the company's operations. It is worth taking into account the absolute volume of production in the coal industry. This is included, for example, in Global Coal Exit List (GCEL) reports

which list all companies according to a 30% threshold share of coal or coal energy in revenues, and all companies which produce more than 20 million tonnes of coal per year or utilize over 10,000 MW of coal-fired power. This is important because among the 328 companies included in the GCEL reports, 30 out of them account for more than half of the global coal production, of which 11 have a share in revenues from coal above 50% [9].

5 Insurance of Coal Sector in Poland

An interesting situation is currently in Poland, where the government is still planning investments in coal mining and coal energy production. It is clear from the *Program for the hard coal mining sector in Poland* published by the government that by 2030 new investments are planned in this sector. It presents the development directions of the hard coal mining sector in Poland together with the objectives and actions necessary to achieve them [16].

The main goal of the Program has received the following wording:

Creating conditions conductive to the construction of a profitable, effective and modern hard coal mining sector, based on cooperation, knowledge and innovation, which, acting in a friendly and predictable program and legal environment, allows effective use of resource, social and economic capital to ensure high energy independence of Poland and supporting the competitiveness of the national economy.

This is a goal which is far from the clearly emerging global divestment trend in the coal sector.

> The European coal market has already been in a downward trend since 2012. Low wholesale electricity prices, the loss of fossil fuel energy share in the market in favor of subsidized renewable energy and the pressure from environmental regulations were the main reasons for the deteriorating situation. Hard coal production in the European Union countries has been decreasing. Among EU countries producing hard coal Poland, with a production of 70.4 million tonnes (2016), is significantly ahead of the Czech Republic (6.8 million tonnes), Great Britain (4.2 million tonnes), Germany (4.1. million tonnes) and Spain (1.7 million tonnes) [16, p. 9].

Insufficient own mining is supplemented by imported coal. In 2016, hard coal imports to the EU decreased to 166.8 million tonnes from 190.7 million tonnes in 2015. Germany remains the largest importer (53.1 million tonnes in 2016), followed by Italy (17.9 million tonnes), Spain (14.7 million tonnes), and the Netherlands (14.5 million tonnes). The largest, nearly 60% drop in coal imports, was recorded by the United Kingdom, which is associated with an increase in tax on emissions. It is worth noting that in the case of Germany, domestic mining plus imports together give a smaller amount of coal then that extracted in Poland. In the EU Countries, coal is on the third position with a 14% share in the European energy mix, after crude oil (37%) and natural gas (23.5%) [16]. As is clear from the quoted data, the situation in the coal sector in Poland clearly differs from European trends. According to the reference scenario included in the Program, in the perspective of 2030, the current

level of demand for total hard coal will be maintained (approximately 70–71 million tonnes per year, including energy coal 57–58 million tonnes, and coking coal 13.0 million tonnes). Polish companies are planning to build power plants able to generate more than 10 gigawatts and open new mines holding more than 3.2 billion tonnes of lignite, the dirtiest form of coal [17, 18]. However, the consumption structure will change—an increase in professional power engineering by 5.7 million tonnes and a decrease in households by 4.7 million tonnes. Implementation of the scenario will require government's support.

This is a conservative scenario, as if the Polish government did not see clearly visible changes in the global market of coal and energy from fossil fuels. The Program completely omits the issue of divestment in the coal sector, ignoring the fact of its clear presence on the international arena.

There is also a visible impact on insurance of investments in this sector.

So far, according to the Unfriend Coal report, European insurers invested over GBP1.15 billion in Polish coal companies, and since 2013 they have signed at least 21 insurance contracts for coal power plants. Allianz is the leader of the consortium, which insures the largest coal-fired power plant in Europe in Opole. The consortium includes also the Italian Generali, German Munich Re, British Aviva, and the Polish PZU. The current approach of these insurers to the issue of divestment is diverse. Their policy and approach to the divestments and exceptions is presented in Table 1.

Europe's biggest insurer, Allianz is one of the insurance groups with a global capacity in the fossil fuel underwriting sector, and one of the world's leading insurance partners for power and utility companies and the oil and gas industry. Allianz defines coal-based business models as:

- Mining companies deriving 30% or more of their revenues from mining thermal coal;
- Electric utilities deriving 30% or more of their generated electricity from thermal coal.

Coal mining related transactions are screened on environmental risks, such as mountain-top removal. Furthermore, use of brown coal in power plants is regarded an ESG risk and is also part of the screening criteria. Allianz has no policy to avoid insurance transactions with companies or projects involved in mining, extraction or energy production from fossil fuels. Allianz, is leading a consortium underwriting the biggest coal power plant under construction in Europe at Opole near Katowice, a PGE project, which is due to start operating in 2019.

Aviva is among a number of major European insurers which are backing the expansion of Poland's coal industry. Aviva has invested GBP372.7 million in Polish coal, more than any other insurance company apart from the Dutch firm Nationale Nederlanden. It has a 2.3% stake in the country's largest power company PGE, which operates two of Europe's most polluting coal plants at Bełchatów and Turów and plans to build new coal plants generating more than 5.2 GW. Aviva decided to focus on engagement rather than on divestment, and has only divested from very few companies if engagement was completely unproductive. According to Aviva's

Table 1 Policy, divestments and exclusions in the activity of foreign insurance companies involved in Polish coal sector

Insurance company	Policy	Divestments and exclusions
Allianz (Germany)	Allianz has a measurable target to reduce the carbon footprint of its operations (30% by 2020, against a 2010 baseline) and strives to maintain its carbon neutral status by investing in carbon offset projects	In November 2015 Allianz decided to stop financing coal-based business models, by divesting proprietary equity stakes amounting to EUR 225 million in coal-based business models by the end of March 2016 Fixed income stakes (amounting to EUR 3.9 billion) can be held until maturity (run-off) An exception to invest in these companies is only possible, following a case-by-case assessment, if the share of revenue or generated electricity from coal is between 30 and 50% and if the company has a clear strategy to reduce its coal share below the 30% threshold within a reasonable period
Aviva (Great Britain)	Aviva has public targets to reduce the direct (business units) and indirect (suppliers) environmental impact of its operations and reports about the results. The following of these targets are related to climate change: Reduce operational (buildings and travel related) CO_2 emissions by 5% on an annual basis; Reduce operational CO_2 emissions by 40% by 2020, and by 50% by 2030 with regard to the 2010 baseline	Divestment is part of Aviva's engagement strategy towards companies active in thermal coal mining or coal power generation and will be effectuated in case not sufficient progress is made towards the engagement goals set. In November 2016, Aviva announced that it had identified two companies for potential divestment, as they had planned to increase fossil fuel capacity instead of decreasing it. As for now, there are no reports that divestment from these companies has been effectuated
Generali (Italy)	For its own operations, Generali has a measurable target to reduce its greenhouse gas emissions by 20% by 2020 and publishes reduction performance data	No information found
Munich Re (Germany)	Munich Re seems to be quite aware of the risks involved with climate change. Through public statements and press releases, the insurance company expresses its concerns about an increase of catastrophe losses caused by extreme weather. Munich Re has set up a special research and development department to analyze the consequences of climate change and to come up with recommendations for action for the group	Declared not to hold "any equities of companies which generate more than 50% of its revenues with coal production or power generation with coal" There is no divestment policy for fossil fuels Exclusion is only used as a responsible investment strategy for the sustainable equity fund of Munich ergo asset management GmbH MEAG. Producers of tobacco, alcoholic beverages, and arms and weapons are excluded, as well as companies in the gambling industry

Source: [19]

managers, climate change will "render significant portions of the economy uninsurable, shrinking our addressable market" [20].

Italy's biggest insurer Generali has declared it would stop offering construction coverage for any new coal mine and new coal plant. In a further step up of its "green" policy, Europe's third biggest insurer added it would not provide insurance for coal-related assets of potential new clients [21].

Munich Re continues to be highly involved in financing and underwriting coal and other fossil fuel projects. The company has not excluded insuring new coal power plants, and holds assets in electric utilities which are currently planning new coal power plants to the tune of 13,100 MW [22]. Profundo identified at least USD2168 million of Munich Re assets invested in fossil fuel companies. This accounted for 8% of all investments found [13].

Polish Group PZU (through TUW PZUW and PZU SA), insures the mines responsible for approximately 80% of coal production in Poland, as well as coal-fired power plants generating nearly 30% of the capacity installed in the national power system. PZU insures the Połaniec Power Plant owned by Enea and five power plants of the Polish Energy Group (PGE). These are Bełchatów Power Station, Turów Power Plant, Dolna Odra Power Plant, Pomorzany Power Station and Szczecin Power Station. The PZU Group also insures the construction of new capacity at Elektrownia Opole (PGE), is involved in the project of Ostrołęka C Power Plant (Energa and Enea), and has insured the construction of a recently completed block in Kozienice Power Plant (Enea). In addition, six PGE CHP plants are covered by PZU insurance (in Bydgoszcz, Gorzów, Kielce, Lublin, Rzeszów and Zgierz) and three belonging to PGNiG Termika (combined heat and power plants Siekierki and Żerań in Warsaw and Elektrociepłownia Pruszków) [23]. In the Group's portfolio there are PLN3 billion located in shares and bonds of coal companies. The PZU Group does not address the issue of climate change or the relationship that links it to the burning of coal in the energy sector.

Because companies which insure coal mines and coal-fired power plants in Poland belong to world leaders, they face the necessity to clearly define their strategy, also in relation to this sector in this country. They are already criticized for the lack of coherence in the implementation of the declaration to restrict investments in coal companies. This may lead to increasing difficulties in insuring old facilities and new investments in this sector. It is very likely that the PZU Group will be more and more alone in the insurance of the Polish coal sector, but if a project is not insurable, it is not bankable.

6 Conclusions

The Paris Agreement of 2015 has become an important impulse for divestment in the coal sector in the world. Over 1000 enterprises have already officially declared such targeting of their actions. To a large extent, this applies to global insurance companies, which in recent years have also put a lot of effort into researching the risks

associated with climate change and the escalation of extreme weather events. An increased assessment of this risk meant that more and more insurance companies not only withdraw from the insuring companies in the coal sector, but also from financing this sector through the purchase of shares and bonds. A mere 30% share of revenue from coal mining or processing is sufficient to qualify the company as posing an increased risk to the climate. In Poland, contrary to the global trends, and certainly against European trends, the coal sector is an important part of the economy. What is more, it is planned to maintain coal production at the same level of about 70 million tonnes by the year 2030 and further development of the power industry using hard coal and lignite (brown coal). Meanwhile, insurance companies operating on global markets which are financially involved in the Polish coal sector face growing criticism from their own shareholders and customers. Answer to the research question posed in the introduction: Have foreign investors already started divestments from the Polish coal sector? is affirmative. The Polish coal sector is insured by Allianz, Aviva, Generali, Munich Re and PZU. In the analyzed period 2015–2018, foreign insurance companies entered the divestment path to a different extent: Allianz the most, Munich Re the least. It may mean that the Polish insurer PZU Group will be more and more alone in this field. So far, it has not declared divestment in the coal sector.

References

1. Mills E (2012) The greening of insurance. Science 338(1425). www.sciencemag.org. Accessed 15 Nov 2018
2. WMO, WHO (2015) Heatwaves and health guidance on warning-system development. World Meteorological Organization, World Health Organization, https://www.who.int/globalchange/publications/WMO_WHO_Heat_Health_Guidance_2015.pdf?ua=1. Accessed 12 Nov 2018
3. Burchard-Dziubinska M (2016) Ryzyko pogodowe na rynku ubezpieczeń. Ekonomia XXI wieku (Economics of the 21st Century) 4(12):49
4. https://www.munichre.com/touch/natural-hazards/en/natcatservice/annual-statistics/index.html. Accessed 15 Nov 2018
5. Cuff M (2017) 'Exceptional' number of severe floods propel natural disasters losses to four-year high (online), 5 Jan 2017. http://www.businessgreen.com/bg/news/3001897/exceptional-number-of-severe-floods-propel-natural-disasters-losses-to-four-year-high, Accessed 15 Nov 2018
6. Gould J (2016) Weather dominates insurance claims in 2015: Munich Re, Reuters, 4 Jan 2016. http://www.businessgreen.com/bg/news/3001897/exceptional-number-of-severe-floods-propel-natural-disasters-losses-to-four-year-high. Accessed 19 Dec 2018
7. http://www.reuters.com/article/us-disaster-insurance-idUSKBN0UI0XI20160104. Accessed 12 Nov 2018
8. Swiss Re (2016) 2015 Corporate responsibility report, June. http://reports.swissre.com/corporate-responsibility-report/2015/cr-report/solutions/insurance-linked-securities.html, Accessed 12 Dec 2018
9. Investments in coal power expansion. https://coalexit.org/report-investments. Accessed 29 Dec 2018
10. A guide to investment preparation taking into account climate change, its mitigation and adaptation to these changes and resilience to natural disasters (2015) Ministry of Environment, Warsaw

11. https://www.investopedia.com/terms/e/environmental-social-and-governance-esg-criteria.asp. Accessed 10 Nov 2018
12. AXA group policy on investments in and underwriting of coal mining and coal-based energy. https://www-axa-com.cdn.axa-contento-118412.eu/www-axa-com%2F7645550f-6fc4... Accessed 5 Jan 2019
13. Simons M, de Wilde J (2017) The involvement of European insurance groups in the fossil fuels sector. Profundo. https://pl.scribd.com/document/346370379/Profundo-Report-Final-The-involvement-of-European-insurance-groups-in-the-fossil-fuels-sector. Accessed 12 Nov 2018
14. McHale C, Spivey R (2016) Assets or liabilities? Fossil fuel investments of leading U.S. insurers. Ceres. https://www.ceres.org/sites/.../Ceres_AssetsRiskFossilFuel_InsuranceCo_060616_2.pdf. Accessed 12 Nov 2018
15. https://gofossilfree.org/divestment/commitments/. Accessed 12 Nov 2018
16. Program dla górnictwa węgla kamiennego w Polsce (2018) Ministerstwo Energii, Warszawa. Accessed 12 Dec 2018
17. Aviva under fire for pouring £370m into Polish coal industry (2018) The Guardian, 8 Feb. https://www.theguardian.com/business/2018/feb/08/aviva-under-fire-for-pouring-370m-into-polish-coal-industry. Accessed 20 Dec 2018
18. https://www.theguardian.com/business/2018/feb/08/aviva-under-fire-for-pouring-370m-into polish-coal-industry. Accessed 12 Nov 2018
19. Insuring Coal no more: the 2018 scorecard on insurance, coal and climate change. http://www.amisdelaterre.org/IMG/pdf/scorecard_2018_report_final_web_version.pdf. Accessed 29 Dec 2018
20. Aviva's strategic response to climate change, Jul 2015, p 14. tricri.org/wp-content/uploads/Avivas-strategic-response-to-climate_change.pdf. Accessed 20 Dec 2018
21. Generali to stop insuring new coal plants. https://www.reuters.com/article/generali-coal/generali-to-stop-insuring-new-coal-plants-idUSS8N1UR006. Accessed 20 Dec 2018
22. Munich Re needs to take bold action on climate change and coal (2017) Briefing paper by the Unfriend Coal Coalition and Urgewald, 2 Aug 2017. https://unfriendcoal.com/wp-content/uploads/2017/08/Briefing-paper-Munich-Re-0817-E.pdf. Accessed 12 Nov 2018
23. Chudzyński J. PZU i ubezpieczanie spółek węglowych, Odpowiedzialny inwestor. http://odpowiedzialny-inwestor.pl/2018/02/15/pzu-i-ubezpieczanie-spolek-weglowych/. Accessed 20 Dec 2018

Sustainable Management of Commercial Real Estate in the Context of Investment Performance

Iwetta Budzik-Nowodzińska

1 Introduction

The policy of sustainable development already so widely present in enterprises is also present in the real estate market and is defined as "maintaining the real estate in the best condition along with creating optimal conditions for its users, using available resources and materials obtained with the least damage to the environment and humans, while maintaining balance between costs and the resulting effect" [1].

Referring to the aforementioned sustainable development, the investment decisions on the real estate investment market should be based on the use of investment effectiveness research methods. This approach respects the principles and policies of sustainable development. However, this is not a common approach. Often, the investors try to make investment decisions quickly. That's happening because dynamic actions are expected from them, in the era of highly competitive environment. Such an approach may result in lowering the quality of the investment decision, as investors base their estimates on a simple calculation. Such a calculation is frequently based on operating income from real estate or a comparison of a selected property with another similar one. This approach is not consistent with the sustainable development policy.

The research problem is a specific question determining the quality and dimension of a certain lack of knowledge as well as the purpose and limits of scientific work. In the article, the formulation of a research problem refers to the confrontation of the legitimacy of applying methods for testing the effectiveness of investments with methods based on the calculation of operating income and comparison with another commercial real estate.

I. Budzik-Nowodzińska (✉)
Faculty of Management, Institute of Finance, Banking and Accounting, Czestochowa University of Technology, Czestochowa, Poland
e-mail: iwetta.budzik-nowodzinska@wz.pcz.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_6

Based on the research problem formulated in this way, it was hypothesised that making an investment decision on the commercial real estate market should be preceded by an examination of the investment effectiveness, consisting in the calculation of financial ratios. Indicators correctly illustrating the effectiveness of investments are, according to the author, the Net Present Value Index (NPV) and the Profitability Index (PI).

The case study method was used to achieve the objectives of the article. The research was carried out for two variants of investments in commercial real estate. Both of them assume renting an incomplete space, of which option I assumes rental in 50%, and option II in 90%. As the practice in the real estate market shows, there is practically no 100% rental. Subsequently, based on financial data relating to the operation of the analyzed shopping center, the net operating income and NPV and PI investment efficiency ratios were calculated for both variants. The result of the research conducted will be an attempt to answer to the practical question, also: should a capital investment decision be made on the basis of operating income from real estate?

The real estate sector accounts for more than a third of global greenhouse gas emissions and thus offers great potential for carbon abatement. Energy efficient and green buildings are rapidly transforming the commercial property sector, and institutional investors can benefit from that transformation through the value created by the greening of their real estate holdings [2]. In this context, it's very important for sustainable management to make the right investment choices.

Investors with large financial resources are constantly searching for opportunities to multiply their capital [3]. Unfortunately, it is essential to verify the profitability of bank deposits and juxtapose this with the instability of the stock market, therefore, it is hard to indicate the directions of effective investments in this field [4]. The emerging opportunity to invest in the real estate has its followers [5].

In the Polish commercial real estate market, for several years, there has been observed an increase in supply and it does not only refer to the warehousing or office segment but also the commercial one, which is inseparably associated with shopping centers. According to ICSC (International Council of Shopping Centers),[1] shopping centers are commercial real estate which has been planned, built and is managed as one commercial unit consisting of stores and common parts, with the minimum gross leasable area (GLA) of up to 5000 m^2 and consisting of minimum 10 stores. Shopping centers are the dominating commercial form in the Polish market. According to the report "Market Insights. Polska. Raport roczny 2018 (*Poland. Annual Report 2018*)", prepared by Colliers International,[2] there are more than 420 such objects in Poland. Their total area is 10.5 million m^2, which amounts to

[1] International Association uniting more than 25 national and regional shopping center councils in the world. It is a global organization operating in the industry of Shopping Centers, set up in 1957 in the United States, with 70,000 members in the United States, Canada and in over 80 other countries. The ICSC members are the owners of shopping centers, developers, managers, marketing experts, retailers, companies renting the commercial area and other specialists—academics and officials.

[2] A global consulting company in the area of commercial real estate.

73% of the total modern commercial area in Poland. However, other commercial forms, like e.g. freestanding warehouses, are still developing, as evidenced by the openings of Agata furniture stores and the stores of Castorama, Leroy Merlin and Selgros. The dynamics of the development can also be observed in the sector of retail parks, particularly small objects in smaller cities and also housing estate locations of large agglomerations.

Investments in the commercial real estate market, such as shopping centers, consist in building new objects by the investor or purchasing the already existing ones. Making a decision on investing in real estate is not easy. This results from the characteristics of the real estate and the characteristics of the market itself, such as high capital-intensity and low liquidity. In order to minimize the risk of their actions, investors use the methods of measuring the profitability of investments, perform calculations and forecast the situation in the market in the coming years [6]. In order to make the right decision investors conduct the analysis of future income from the real estate and juxtapose it with investment expenditures. For this purpose they use appropriate methods which may consist in the comparison with the investment of the same type but e.g. of a different location but they can apply more advanced methods associated with the estimation of future benefits [7, 8].

The latter type of the analysis is depicted in the present paper. In order to achieve this objective, the specificity of methods for assessing the profitability of investments in the commercial real estate market has been applied.

2 The Essence of Commercial Real Estate

Risk analysis of residential real estate investments requires careful analysis of certain variables. Because real estate is a key sector for economic and social development, this risk analysis is seen as critical in supporting decision processes relating to buying or selling residential properties, partly due to the pressures caused by the current economic environment [9].

The literature divides real estate into land property, building on land in perpetual lease (building real estate) and commercial and residential property. However, due to the fact that real estate may generate income for its owner, there is distinguished commercial real estate, which is real estate purchased for investment purposes bringing periodic income [10]. Thus, real estate can be divided into profitable and unprofitable [11]. Profitable real estate is non-residential property, purchased or built in order to generate profit. Among commercial real estate one may distinguish, among others, office buildings, shopping centers, hotels, sports centers, tourist destinations etc. The owners of such real estate may benefit from financial gain in different ways. This can be, e.g. income in the form of rental fees or shares in users/tenants' profit or capital benefits, resulting from an increase in the real estate value over time [12]. A particular type of commercial real estate is the shopping center whose organization consists in the fact that each of its stores exists under its own brand whereas the center itself promotes itself under its own brand. The objects of

this type are most frequently one and also two or three-storey buildings, possessing the internal structure centered around the glazed passage and parking lots are organized as parking premises. For investors, the main source of income is the rents paid by the individual tenants of commercial or service areas. Rents apply to rented space but additionally all tenants cover maintenance costs concerning the rented space and common area.

3 Commercial Real Estate as the Specific Investment Object

The category of real estate is also associated with the concept of real estate as investment. The Accounting Act indicates the definition of real estate purchased for investment purposes as the asset owned by the entity in order to achieve economic benefits from it, arising from an increase in the value of the asset, to get revenues in the form of benefits, also including the ones from the commercial transaction [13].

Investment is the targeted spending of the investor's funds to increase their income [14, 15, 16]. Investments are capital expenditures incurred on ventures of a different type aimed at generating specific benefits (effects). In this sense, investments are both outlays on fixed and current assets of the enterprise, purchase of stocks and shares as well as commercial real estate. On the other hand, the effects may include an increase in profits, net cash flows, scale of production and the level of its modernity, an improvement in financial liquidity and profitability of the enterprise [17].

Investment is the commitment of economic resources to the business venture aimed at multiplying the assets of the owner by achieving specific income [18]. According to the last two definitions, the condition necessary to make investments of a different type is possessing adequate capital, the size of which affects the manner of its investing and the scale of multiplication of its value [18]. The capital owner must demonstrate the willingness to abandon the current consumption of this capital and its savings, however, they may decide how to invest the accumulated capital in order to achieve certain financial benefits in the form of income in the future.

Investments in commercial real estate may consist in the purchase of a residential building or the construction of a shopping center in order to get income in the form of rent, the construction of hotels or leisure centers. All the listed investments are characterized by profitability over a long period of time, resulting from current profits and an increase in the value of real estate. This profitability can change periodically, which may result from, e.g. an economic downturn, the existing market competition, irregular payment of rent by tenants, the space which is partially not rented etc. As with any investment, there is a risk of investing, however, while assuming that these are long-term investments, the risk is reduced but not eliminated. Its increase is determined by the same factors as in the case of profitability.

The problem about investments in real estate is its financial liquidity since it is not easy for the investor to exchange real estate, e.g. a shopping center for cash. This means that its liquidity is low. Even in a situation when there is a purchaser the sales process can be very long. Another problem is large capital requirements in the form of capital expenditure. Therefore, the investors in the commercial real estate market are the ones with large capital.

4 Assessment of the Performance of Investment in Commercial Real Estate: Case Study

The objective of any economic entity, including the ones investing in the real estate market, is to achieve economic benefits from the undertaken investment projects. These benefits are reflected through income, profit and financial surplus [19, 20]. In the case of starting any real investment it is necessary to incur some financial expenditures which contribute to achieving these benefits. In connection with incurring expenses to receive income, it is necessary to establish if these funds have been used effectively, if the investor of the investment project, related to the purchase of commercial real estate, will achieve financial surplus or only return on investment [20]. The decisions of this type should be preceded by an account of economic efficiency of investment. The assessment of efficiency seems to be a necessary condition to make a decision on starting an investment project in the commercial real estate market.

The project analyzed in the paper, associated with the purchase of commercial real estate, should be subjected to implementation by a potential investor only if it guarantees the advantage of effects over expenditures and, as a result of its implementation, the investor remains with the economic surplus allowing for income growth.

The account of investment performance includes all the calculations related to comparing the effects achieved from the realized investment in the operation period with the expenditures necessary to achieve them [21].

The scope of methods applied for the assessment of efficiency of investment in real estate is very diverse, from comparing the real estate with another one to more complex techniques, including the income stream generated by the real estate. The investors only beginning their activity in the commercial real estate market often make decisions on the basis of the comparison of selling prices of interesting real estate or actual operating income. On the contrary, xperienced investors deal with the problem while focusing not on the price of the purchased real estate, nor future income but future cash streams.

For investors in the commercial real estate market an important factor is the period of time the specific real estate will operate for, which is multiannual. Due to the above, for the assessment of their financial performance, there should be used methods taking into account this condition. Discount methods, in which the subject

of the analysis is projected cash flows in the assumed forecast period, are fundamental [22]. The indicators calculated on the basis of the above are more convincing grounds for making an investment decision than the already mentioned comparison with similar real estate. Spreading over time the projected streams of revenues and expenditures, related to the specific investment, is possible due to the use of the discount technique. This technique allows for bringing all the values of expenditures and income occurring at different periods of the project operation to the comparable size at the time of the analysis [15]. The use of discount allows for including the entire lifetime of the implemented project in the analysis and significantly contributes to the accuracy of the analysis [22].

In order to accomplish the objective of the research in the present paper, to assess investment performance in the commercial real estate market, there have been usedseveral methods, namely, selected discount methods. The methods of net present value and Profitability Index (PI) have been applied.

The case study refers to the possibility of investing capital in the real estate market. There has been made an assumption on the exposure, in the market for sales purposes, of the operating shopping center with the rental area of 3822 m^2, with half of the rented space. For the analysis there has been selected a typical commercial real estate, which serves as a shopping center with a multi-spot two-storey parking lot, located in a small village in Poland. Initially, the assumptions have been made subsequently used for the assessment of investment performance. The conducted analysis assumes the purchase of the real estate for the price of PLN 13.8 million, which is determined by the market value of the investment assessed. There has been assumed own financing and external financing in the form of a bank loan. Due to the fact that banks granting mortgage apply LTV (Loan-to-Value), which links the amount of loan with the value of loan collateral of up to 80%, the analysis assumed a 50/50 financing. Therefore, 50% of the value of investment will be financed with a bank loan. The characteristics of bank loans made on the basis of the analysis of the mortgage market in Poland are the following: the amount of loan—PLN 6.9 million, repayment period—10 years, nominal annual interest rate—5.95%, commission—1.5%.

The case study assumes ineffective management of the real estate offered for sale with only half of the rented space. Therefore, at the day of the decision-making there are vacancies amounting to 50%. The vacancies of 50% are a very high value and uncommon in the market of the real estate of this type. According to the Colliers Agency [23], the vacancy rate in Poland in 2017 on average amounted to 6% in big cities, thus, it can be assumed that, in small cities, this rate will be higher and it amounts to about 10%. Therefore, the analysis of profitability has been conducted for two variants—compliant with the actual fact and with the value of vacancies assumed in the market. When analyzing investment performance in the commercial real estate market, the adequate terminology is applied. Therefore, there are: gross possible income, effective gross income and net operating income. Gross possible income (GPI) includes all possible income from real estate, established by assuming the rent of the total space and full receivables collection [24]. Gross possible income, which becomes more realistic when taking into account income loses, allows for

determining effective gross income (EGI). It is the value actually obtained by the investor. Thus, it is potential income minus losses resulting from vacancies, uncollected receivables. The difference between effective gross income and operational expenditure is determined by net operating income (NOI). The difference between effective gross income and net operating income in the process of valuation is not affected by the items such as: depreciation or credit costs [25]. In turn, as stated by E. Kucharska-Stasiak, operational expenditure is "regular and expected expenditures essential for maintaining the real estate and its generating income" [24].

In the assessment of economic efficiency of the investment project undertaken by the potential investor, an important aspect is therefore the analysis of the amount of future income from renting the real estate and the analysis of the projected costs related to real estate management. While determining the stream of income from real estate it is necessary to take into account the financing with external capital and the amount of income tax paid. Cash flows for real estate are established in accordance with the following pattern [22]:

Net operating income (−) Debt service = Pre-tax cash flows (−) Income tax = Post-tax cash flows.

The realized revenues from the real estate analyzed in the paper occur in the form applied in the market—a monthly rent paid by tenants for using the commercial space and in the form of service charge constituting the tenants' share in the operating costs of maintaining the real estate.

In the assessment of efficiency of investment in commercial real estate, the basis for determining the stream of income from real estate is net operating income [NOI]. The value calculated could be use by the novice investors to make a decision related to invest capital in a given commercial property. Annual operational expenditures incurred for the analyzed real estate amount to PLN 267,993. They mostly consist of management costs (PLN 134,118) and property tax (PLN 70,000). The other operating costs are: land value tax, insurance, accounting, security and service charges for ventilation and elevators.

Net operating income can be defined as income that can be generated by real estate from which there will be subsequently subtracted the value of debt, depreciation and income tax. It is the value which determines the potential of real estate for achieving net profit by the investor. The calculated net operating income for the analyzed commercial real estate is presented in Tables 1 and 2. The calculations relate to two variants of the assumed vacancies: 50% and 10%.

Net operating income is the value used by investors who consider the purchase of commercial real estate. When analyzing the results obtained in Tables 1 and 2, there can be observed high operating income in both variants. In the variant with the rented space, in 50% the income is from PLN 1.2 million to PLN 1.6 million annually in 10 years of the analysis. In the other variant, it can be noticed that the income is twice as much. If the investor were to make a decision right now they would not give it a thought since both variants bring high financial results.

The calculation of the value of NOI and its analysis is however only the introduction to the assessment of financial performance of the investment consisting

Table 1 Net operating income [PLN] (variant I) [PLN]

Income and its constituents	1	2	3	4	5	6	7	8	9	10
Possible income	3,004,293	3,094,422	3,187,255	3,282,873	3,381,359	3,482,799	3,587,283	3,694,902	3,805,749	3,919,921
Loss of income (50%)	1,502,147	1,547,211	1,593,627	1,641,436	1,690,679	1,741,400	1,793,642	1,847,451	1,902,875	1,959,961
Effective income	1,502,147	1,547,211	1,593,627	1,641,436	1,690,679	1,741,400	1,793,642	1,847,451	1,902,875	1,959,961
Operational expenditure	267,993	267,993	267,993	267,993	267,993	267,993	267,993	267,993	267,993	267,993
Net operating income	1,234,153	1,279,218	1,325,634	1,373,443	1,422,686	1,473,406	1,525,648	1,579,457	1,634,881	1,691,967

Source: Own study based on the obtained data

Table 2 Net operating income [PLN] (variant II) [PLN]

Income and its constituents	1	2	3	4	5	6	7	8	9	10
Possible income	3,004,293	3,094,422	3,187,255	3,282,873	3,381,359	3,482,799	3,587,283	3,694,902	3,805,749	3,919,921
Loss of income (10%)	300,429	309,442	318,725	328,287	338,136	348,280	358,728	369,490	380,575	391,992
Effective income	2,703,864	2,784,980	2,868,529	2,954,585	3,043,223	3,134,520	3,228,555	3,325,412	3,425,174	3,527,929
Operational expenditure	267,993	267,993	267,993	267,993	267,993	267,993	267,993	267,993	267,993	267,993
Net operating income	2,435,871	2,516,987	2,600,536	2,686,592	2,775,229	2,866,526	2,960,562	3,057,418	3,157,181	3,259,936

Source: Own study based on the obtained data

in the purchase of the analyzed shopping center. An important part for the investor is the amount of cash flows which they can expect from the activity carried out with the real estate. The analysis assumes an annual rise of 3% in the net rent and thus the possible income will grow at the rate of 3% per year. Operational expenditure will remain at the same level throughout the projection period. The cash flow forecast is presented in Tables 3 and 4.

The analysis of cash flows for 10 years indicates the advantage of the second variant, where vacancies amount to 10%. The calculations performed in Tables 3 and 4 lead to the conclusion that the variant II generates cash flows of about ten times higher than the variant I. Therefore, if the investor purchases the analyzed shopping center, they should focus on its management so that they fully utilize the commercial space for generating profits.

Investments in commercial real estate are long-term investments, thus long-term periods are typical of them. As mentioned above, to assess their profitability, there should be used financial methods not including single periods of time (year, quarter or month) but the methods based on the values of income and costs forecasted for subsequent years. Thus, for the purposes of the paper, there have been used discount methods of the assessment of investment profitability, using the changing time value of money.

The analysis has started with the method of net present value (NPV) known in literature which, as stated by J. Pawłowski, is the difference between the market value of the investment project and the expenditure necessary for its implementation [15]. Net present value allows for the assessment of benefits (surplus cash) the investment in the commercial real estate will bring over the lifetime of the project [18]. One of more important issues when calculating NPV is estimating their future cash flows. They consist of net capital expenditures on setting up the venture and future cash receipts from rents and generated by the analyzed real estate.

The calculations of net present value (NPV) have been performed in Table 5 as the difference between the sum of discounted net cash flows achieved during the operation of the shopping center and the total capital expenditure [26]. In the calculations, there has been assumed the discount rate at the market level, increased by 2 pp. As noted from the analysis of the market of the leading commercial real estate in Poland, on average, the rate amounts to 6%. Due to the fact that the real estate analyzed in the paper is not the leading one in the country, the value has been increased to 8%.[3] Discounting has served for updating all future income from the rent of the commercial space, which will be generated by the purchased real estate in the future (Table 6).

In this way, the calculated NPV for the analyzed real estate is the negative value for the first variant and the positive value for the second one [27]. The investment project associated with the purchase of the shopping center and the assumption on

[3] www.savills.pl/polskie wiadomości, the article of 16 April 2018 prepared by the experts of the real estate market, the Savills global company listed on the London Stock Exchange; www.wyborcza.biz/giełda of 16.04.2018 (accessed on 10.09.2018).

Table 3 Cash flow forecast (variant I) [PLN]

Specification	1	2	3	4	5	6	7	8	9	10
NOI	1,234,153	1,279,218	1,325,634	1,373,443	1,422,686	1,473,406	1,525,648	1,579,457	1,634,881	1,691,967
Debt service	1,085,154	1,044,099	1,003,044	961,989	920,934	879,879	838,824	797,769	756,714	715,659
Pre-tax cash flows	148,999	235,118	322,590	411,453	501,751	593,527	686,824	781,688	878,167	976,308

Source: Own study

Table 4 Cash flow forecast (variant II) [PLN]

Specification	1	2	3	4	5	6	7	8	9	10
DON	2,435,871	2,516,987	2,600,536	2,686,592	2,775,229	2,866,526	2,960,562	3,057,418	3,157,181	3,259,936
Debt service	1,085,154	1,044,099	1,003,044	961,989	920,934	879,879	838,824	797,769	756,714	715,659
Pre-tax cash flows	1,350,716	1,472,887	1,597,492	1,724,602	1,854,295	1,986,647	2,121,737	2,259,649	2,400,466	2,544,276

Source: Own study

Table 5 Calculation of NPV (variant I) [PLN]

Specification	0	1	2	3	4	5	6	7	8	9	10
Pre-tax cash flows	−6,900,000	148,999	235,118	322,590	411,453	501,751	593,527	686,824	781,688	878,167	976,308
Discount rate		8%									
Discount factor		0.9259	0.8573	0.7938	0.7350	0.6806	0.6302	0.5835	0.5403	0.5002	0.4632
Discounted cash flows	−6,900,000	137,962	201,576	256,082	302,431	341,484	374,023	400,755	422,322	439,302	452,219
NPV	−3,571,845 PLN										

Source: Own calculations

Table 6 Calculation of NPV (variant II) [PLN]

Specification	0	1	2	3	4	5	6	7	8	9	10
Pre-tax cash flows	−6,900,000	1,350,716	1,472,887	1,597,492	1,724,602	1,854,295	1,986,647	2,121,737	2,259,649	2,400,466	2,544,276
Discount rate		8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
Discount factor		0.9259	0.8573	0.7938	0.7350	0.6806	0.6302	0.5835	0.5403	0.5002	0.4632
Discounted cash flows	−6,900,000	1,250,663	1,262,763	1,268,140	1,267,634	1,262,002	1,251,924	1,238,013	1,220,818	1,200,831	1,178,492
NPV	5,501,282 PLN										

Source: Own calculations

Table 7 Profitability index PI

Specification	Variant I	Variant II
NPV	−3,571,845	5,501,282
Capital expenditures in the initial period	6,900,000	6,900,000
Profitability index PI	0.48	1.80

Source: Own calculations

the rented space of 50% occurs to be financially ineffective, thus it should be rejected [28]. The 90% rent of the area is characterized by the positive net present value, which means that the realization of the investment is profitable for the potential investor. The condition in favor of the acceptance of the project—NPV ≥ 0 is fulfilled [20, 29–32]. While comparing the investment of the specific amount in the purchase of commercial real estate with the hypothetical investment of the same amount only in the capital market (e.g. in the form of bank deposit) it has been found that the investor will achieve higher economic benefits from the investment in commercial real estate. The calculated NPV for it amounts to more than PLN 5 million, which means that the investment of the own amount in the purchase of real estate and taking out a loan generates more by over PLN 5 million than an exemplary bank deposit.

The calculations indicate that the investor purchasing the analyzed shopping center with the rented space for 10 years, but only in 50%, must manage the property so efficiently that the vacancy rate changes from 50% to at least 10%. Then, their investment will meet the requirement of financial profitability and they will receive the surplus of benefits over expenditures of more than PLN 5 million.

NPV, which expresses investment performance in amount, does not inform on the scale of its profitability. For a more complete picture, there has been used a supplement of the NPV method, namely profitability index (PI) [33]. According to J. Jaworski, it is one of indicators referring the effects of investment to the expenditures incurred previously [34] (Table 7).

The calculated values of profitability index (PI) respectively amount to—for the first variant (vacancies of 50%) 48%, and for the other variant (vacancies of 10%) 180%. The subject literature indicates that investment is cost-effective if PI > 1, which means that the sum of discounted income is higher than capital expenditures [32, 35]. Therefore, the calculations clearly indicate that if the investor does not apply good real estate management and does not increase the rented area, their purchase of the shopping center will be unsuccessful from the financial point of view. This is confirmed by the calculated NPV (negative value) and the calculated profitability index (PI), which, for the variant with the vacancy of 50%, amount to less than one. This means that the purchase and benefiting financially in the form of rent from the analyzed real estate which is the shopping center, only in the second variant with the vacancy of 10% will provide the investor with additional free money amounting to 80% of the invested amount.

5 Conclusions

The variety of methods used to evaluate the effectiveness of the investment in real estate is very diverse. Starting from comparing a given property with another, to more complex techniques taking into account the income stream generated by the property. Investors who are just starting their activity on the commercial real estate market often make decisions based on a comparison of the sale prices of the properties they are interested in and on the basis of the operational income that can be obtained. In contrary, experienced investors deal with this problem focusing not on the price of the purchased property nor net income, but on future cash flows.

The conducted research has shown that the investment project may be a financially effective one for a potential investor. However, the rental area must be increased from 50 to 90%—compared to the initial state.

The research conducted has shown that the value of operating income should not be the only prerequisite for undertaking investments in a given commercial real estate. The operating income calculated for the two variants of managing the shopping gallery indicates that both will be effective for the investor, the difference is only in the income amount.

More comprehensive analysis based on NPV and PI investment performance indicators shows that Option I is ineffective, which means that future income will not be sufficient to cover investment expenditures, so Option I should be rejected. Consequently, it should be stated that a fast investment decision based on the size of operating income—results in lowering the quality of such decision and is therefore inconsistent with the policy of sustainable development. The calculation of the DON value and its analysis should be an introduction to the study of the financial efficiency of the investment, if the purchase of the analyzed shopping center is being deliberate. In the author's opinion, an important issue for the investor is the level of the expected cash flows that he can expect from the business activity carried out on the property.

The research conducted confirms the hypothesis, that making an investment decision if the commercial real estate market is the issue, should be preceded by an examination of investment effectiveness, consisting in the calculation of financial ratios. The NPV and PI used in the case study correctly illustrated the effectiveness of the investment undertaken.

The analysis of financial performance of investment associated with the purchase of the shopping center indicated that the operation of the center for a new investor with the previously rented commercial space will be financially unprofitable.

References

1. Colliers International (2014) Zielony przewodnik dla najemców, p 4
2. Bauer R, Eichholtz P, Kok N, Quigley J (2011) How green is your property portfolio? The global real estate sustainability benchmark. Rotman Int J Pension Manag 4(1):34–43

3. Lieser K, Groh AP (2014) The determinants of international commercial real estate investment. J Real Estate Financ Econ 48(4):611–659
4. Ramian T (2004) Ryzyko w działalności inwestycyjnej na rynku nieruchomości. In: Henzel H (ed) Inwestycje na rynku nieruchomości. Wydawnictwo AE w Katowicach, Katowice, p 73
5. Warren-Myers G (2012) The value of sustainability in real estate: a review from a valuation perspective. J Prop Invest Financ 30(2):115–144
6. Gołąbeska E (2014) Mierniki opłacalności inwestowania na rynku nieruchomości. Biul Stowarzyszenia Rzeczoznawców Majątkowych Województwa Wielkopolskiego 4:38
7. Hahn J, Bienert S, Wiegelmann T (2016) Real estate management strategies in the low-interest environment – a roadmap for economic sustainability through the market cycle, 23rd annual European real estate society conference. ERES: conference. Regensburg
8. McDonald J (2015) Capitalisation rates for commercial real estate investment decisions. J Prop Invest Financ 33(3):242–255
9. Ribeiro M, Ferreira F, Jalali M, Meidutė-Kavaliauskienė I (2017) A fuzzy knowledge-based framework for risk assessment of residential real estate investments. Technol Econ Dev Econ 23 (1):140–156
10. Siemińska E (2011) Rynek nieruchomości jako miejsce lokowania kapitału. In: Siemińska E (ed) Inwestowanie na rynku nieruchomości. Poltext Sp. z o.o, Warszawa, pp 24–26
11. Gawron H (2006) Opłacalność inwestowania na rynku nieruchomości. Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań, pp 10–11, 13
12. Kietliński W, Woźniak C (2009) Nieruchomości komercyjne, Nieruchomości 06(130):34–42
13. The Act of 29 September 1994 on Accounting Journal of Laws of 2018 item 395
14. Walica H (1996) Inwestycje przedsiębiorstwa. Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice, p 7
15. Pawłowski J (2004) Metodyka oceny efektywności finansowej przedsięwzięć gospodarczych. Wydawnictwo Uniwersytetu Łódzkiego, Łódź, pp 11–12, 71
16. Gawron H (1997) Ocena efektywności inwestycji. Akademia Ekonomiczna w Poznaniu, Poznań, p 13
17. Kurek W (2006) Metody oceny rzeczowych przedsięwzięć inwestycyjnych. Wydawnictwo Uniwersytetu Rzeszowskiego, Rzeszów, p 9
18. Nowak E, Pielichaty E, Poszwa M (1999) Rachunek opłacalności inwestowania. Wydawnictwo PWE, Warszawa, pp 15–16, 258
19. Brigham EF, Gapenski LC, Erhardt MC (1999) Financial management. Theory and practice. Dryden Press, Fort Worth, p 13
20. Ciborowski RRW, Gruszewska E, Meredyk K (2001) Podstawy rachunku efektywności inwestycji. Wydawnictwo Uniwersytetu w Białymstoku Białystok, pp 17, 82
21. Kryński H (1978) Rachunek ekonomicznej efektywności zamierzeń inwestycyjnych. Wydawnictwo PWN, Warszawa, p 24
22. Marcinek K (2009) Finansowa ocena inwestowania w nieruchomości komercyjne Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice, pp 48, 88, 102
23. Colliers International (2018) Raport market insights. Polska Raport roczny 2018
24. Kucharska-Stasiak E (2001) Wartość rynkowa nieruchomości. TWIGGER, Warszawa, pp 71–72
25. Dydenko J (2015) Podejście dochodowe w wycenie nieruchomości. In: Dydenko J (ed) Szacowanie nieruchomości. Rzeczoznawstwo majątkowe. Wolters Kluwer, Warszawa, p 553
26. Crundwell FK (2008) Finance for engineers: evaluation and funding of capital projects. Springer, Londyn
27. Machała R (2004) Praktyczne zarzadzanie finansami firmy. PWN, Warszawa, p 112
28. Sobczyk M (2007) Kalkulacje finansowe. Placet, Warszawa, p 253
29. Felis P (2005) Metody i procedury oceny efektywności inwestycji rzeczowych przedsiębiorstw. Wydawnictwo WSE-I, Warszawa, p 115
30. Jajuga T, Słoński T (1998) Finanse spółek – długoterminowe decyzje inwestycyjne i finansowe. Wydawnictwo Akademii Ekonomicznej we Wrocławiu, Wrocław, pp 1–5

31. Michalski M (2009) Analiza metod oceny efektywności inwestycji rzeczowych. Ekon Mened 6:119–128
32. Zachorowska A (2006) Ryzyko działalności inwestycyjnej przedsiębiorstw. Wydawnictwo PWE, Warszawa, pp 13, 90
33. Gawrońska D (2009) Ocena efektywności projektu inwestycyjnego na podstawie indeksu zyskowności PI w warunkach niepewności. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław No. 48, Zarządzanie finansami firm: teoria i praktyka, pp 278–286
34. Jaworski J (2009) Założenia metodyczne oceny opłacalności inwestycji rzeczowych w małym przedsiębiorstwie. Pr Nauk Uniw Ekon Wrocławiu 58:93–10
35. Zarzecki D (1999) Metody wyceny przedsiębiorstw. Wydawnictwo Fundacja Rozwoju Rachunkowości, Warszawa, p 73

Financial Aspects of the Common Agricultural Policy for the Environmental Sustainability of Polish Agriculture

Karol Kociszewski

1 Introduction

Financial instruments of environment protection in agriculture generate an economic burden for polluters and/or positive incentives for agents delivering ecological services and public goods. Such actions have been introduced as a result of Poland's accession to the European Union (EU). Sustainable development integrates economic, social and environmental aspects, and the relations between these dimensions. This paper is focused on the latter one (environmental sustainability) under the influence of a meaningful part of economic policy. The impact of the Common Agricultural Policy (CAP) on sustainable development of agriculture has been assessed in many studies, some of which concern the economic aspects [1]. Another describes the evolution of the CAP towards sustainability thanks to increased funds for environmental protection [2]. That is why the purpose of the article is to characterise the implementation of financial instruments for environmental protection in Polish agriculture within the framework of the CAP. It concerns two essential parts of the CAP budget: the Pillar I (direct payments) and the Pillar II (rural development). One of the research studies showed that an increase in the share of Pillar II payments (especially the agri-environmental programmes—AEP) promoted environmental sustainability and that direct payments do not help to achieve it [3]. It was also mentioned by Osterburg et al. [4]. Consequently, they should be directed to support delivery of environmental public goods. That is why, in that paper, attention was paid to the greening of direct payments and their relation to standards of environment protection—in the Pillar I. In the framework of the Pillar II, pressure was put on pro-ecological operations: the AEP, aid for farms in Less Favourite Areas (LFAs)—presently called Areas Facing Natural or Other Specific Constraints

K. Kociszewski (✉)
Wrocław University of Economics and Business, Wrocław, Poland
e-mail: karol.kociszewski@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_7

(ANCs)—and afforestation programmes for agricultural lands. Increased attention was paid to the most important measure—the AEP. From 2014, its name was changed into Agri-environment-climate Measures (AECM), which is the manifestation of the strengthened connection between the CAP and the climate policy of the EU. From the same year, the special measure aimed at support for organic agriculture was separated from the previous AEP. All the aforementioned instruments—based on subsidies—are positive incentives for pro-ecological operations.

2 Methodological Aspects

A characteristic of the implemented rural development operations enumerated in the introduction focuses on the effectiveness of allocation of the European Union's funds intended to protect the environment in Polish agriculture. The first part of the paper shows why they do contribute to environmental sustainability. More advanced characteristics of implementation of environmental second pillar measures would require further research referring to data on the area under the related financial support, the number of farms involved, institutional and other aspects. Some of the data was presented to show the change in the environmental dimension of sustainability after Poland's accession into the EU. On the one hand it concerned area under the AEP, on the other the changes in the agricultural impact on the environment in Poland compared to the EU. However, generally, the effectiveness of allocation was assessed on the basis of the extent to which the funds were used compared to the opportunities. These opportunities were determined on the basis of international comparisons concerning distribution of the CAP funds into the Pillar I and Pillar II, and the percentage the share of expenses into the described operations within the Pillar II in the entire EU and Poland. The higher the share of the second pillar in total CAP expenses, the higher the possibilities to finance the environment protection. This situation promotes the effectiveness of the operations. Finally, this effectiveness depends on internal decisions in member states where the CAP funds are definitely divided into both pillars and into particular instruments within the Pillar II. The result is the value of the funds contributing to environmental sustainability. In this case a comparative analysis was applied on an international scale on the basis of available statistical data.

The effectiveness of the allocation for environment protection was evaluated also in a dynamic approach—on the basis of changes of CAP environmental expenditures in consecutive periods after Poland joined the EU. In this case a descriptive analysis was conducted in the framework of subsequent financial perspectives (2004–2006, 2007–2013 and 2014–2020). Presently, the EU budget is being designed for the incoming period (2021–2027). For this reason a time frame was accepted—from joining the EU to the time in relation to which it is possible to predict the funds level for the discussed operations (2004–2027).

The elaboration was based on the results of a study of the subject-matter literature and analysis of secondary sources, due to which the theoretical part was developed.

Factual material and statistical data were collected to describe the manner, direction and extent of implementation of the agricultural policy instruments with their connections to environmental requirements. This analysis were accomplished with results from an empirical survey conducted with Polish farmers, and helped to show their willingness to take part in the AEP.

3 Specificity of Implementation of Financial Instruments in the Light of Environmental Sustainability

Sustainable development is the process referring to an entire economy, society and environment. However, according to the author, besides such a holistic approach, it is also a concept referring to particular sectors of the economy (among others, to agriculture). Taking into consideration the literature connected with sustainable development [5–7], and with sustainable development of rural areas [8], it is possible to define sustainable development of agriculture. It is a process based on agricultural production ensuring a safe and secure food supply, meeting satisfactory ecological, economic and socio-cultural standards for all people in rural areas and outside of them (nowadays and for future generations) [9]. Together with economic and social aspects of welfare, such a process is based on stability within ecosystems whose status depends on agricultural production, so it is desirable to take into account its positive and negative environmental external effects [10]. They are under influence of measures used within the CAP. If these instruments have an influence on the reduction of negative and/or enhance positive externalities, it is desirable to increase the funds for such measures. The consequences and effectiveness of the implementation of financing instruments for agriculture environmental sustainability depend on decisions made at the EU level and in member states.

- In the first case, they concern the shape of the main groups of instruments and the value of the potential funds divided into the Pillar I and Pillar II (and in the case of certain instruments—their required allocation share in the second pillar). At this level there are also being shaped environmental requirements and other principles binding for beneficiaries of agricultural subsidies.
- In the second case, the authorities and domestic organisations (including Polish ones) decide on the final share of the Pillar II in domestic envelopes (the values of the funds granted to a particular state) and on the share of pro-ecological subsidies in the Pillar II. This is dependent on the current operations of the Ministry of Agriculture and Rural Development (MARD) and the Agency for Restructuring and Modernisation of Agriculture (ARMA).

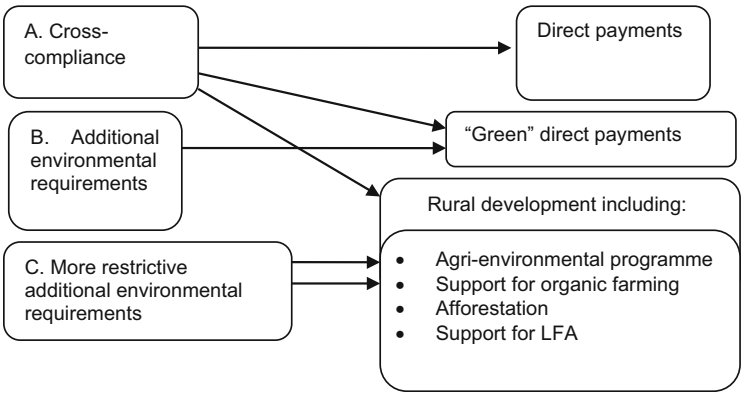


Fig. 1 The Scheme of dependency between environmental standards and economic instruments supporting agriculture in the EU (Source: Author's own elaboration)

3.1 Economic Aspects of Environmental Requirements and Measures

A part of the subsidies stimulates the delivery of environmental services from agriculture (Fig. 1b, c). On the other hand, the risk of reduction or withdrawal of the CAP subsidies in case of failure to meet these standards (Fig. 1a) is the only financial sanction against the negative agricultural impact on the environment.

A. According to the *cross-compliance* (Fig. 1a) principle, farmers who receive direct payments from the Pillar I and subsidies from the Pillar II must meet basic environmental requirements. They limit the negative external effects of farming caused by emissions to water, air pollution, degradation of soils and losses in biodiversity. Due to this, conventional agriculture is closer to the standard which could be the sustainable development of agriculture.
B. Since 2014, as a result of CAP reform, direct payments for additional obligatory pro-eco activities (Fig. 1b) have been implemented. They must constitute 30% of the funds from the Pillar I in every member state. Farms must meet, among others, requirement of diversification of crops in order to enhance the quality of soils and ecosystems; they must also establish Ecological Focus Areas (EFAs) in 5% of Utilised Agricultural Areas (UAA) in each farm.

   These areas are supposed to enhance water protection and protection of natural habitats and of wild fauna and flora. EFAs include such elements of the rural landscape as set-aside, woodlands, terraces and buffer zones. Apart from this, farmers must maintain grasslands promoting biological diversity and absorption of contaminants. Such a change to the Pillar I means that it promotes external ecological benefits.
C. The AEP generate external benefits and, at the same time, reduce environmental external costs. It results from the essence of the instrument—a farmer must meet

Table 1 The division of CAP funds into Pillar I and Pillar II in Poland and the EU

Time period		2004–2006 (%)	2007–2013 (%)	2014–2020 (%)	2021–2027 (%)	
Poland	Pillar I	51.8	52.9	73.2	70	74.3[a]
	Pillar II	48.2	47.1	26.8	30	25.7[a]
EU	Pillar I	79.3	76.5	76.6	78.5	
	Pillar II	20.7	23.5	23.4	21.5	

Source: Author's own elaboration based on Council regulation [11] and documents from the European Commission (EC) [12–14] and MARD [15–17]
[a]The shares calculated in the scenario according to which 15% of Pillar II was reallocated to Pillar I

essential environmental standards (*cross-compliance*) and, next, he/she is paid for additional environmental services. In an economic dimension it affects growth of the farmers' incomes and it increases the availability of higher quality foodstuffs (in terms of the support for organic farming). Similar impacts related to the maintenance of extensive farming along with eco-system services arise from the application of subsidies for LFA. However, this impact is much weaker because farmers do not have to render additional environmental services. Afforestation of agricultural land contributes to increased external benefits and lower external costs, but to an extent limited to the functions of forests.

3.2 Implications from Decisions Made at the Community Level

In the first period of Poland's membership in the EU (2004–2006), the structure of CAP expenses in Poland was more advantageous for the Pillar II (than for the first one) compared to the entire EU level (Table 1). The share of the Pillar II in total value of CAP equalled 56%.[1] These solutions were the effects of the pre-accession negotiations in the framework of which the "old" member states (EU 15) had not agreed to grant new members (EU 10) the same direct payments as they had. As a compromise, the value of the funds for rural development has been relatively increased in the EU 10. At the same time reallocation of 20% of value of the Pillar II into the Pillar I was enabled. Polish institutions dealing with agricultural policy (MARD and ARMA) were not prepared for the implementation of environmental operations in the Pillar II, and for this reason they made full use of the opportunity of the reallocation (direct payments are much easier in implementation). As a result, according to calculations made by the author, the total allocation into the rural development (4.05 billion euros) was reduced by 14% to 3.49 billion euros. As such, the advantageous possibilities to finance environment protection operations made by the EU were reduced as an effect of the domestic decisions (Polish ones).

[1]Author's own calculation based on sources presented above in Table 1.

From 2007 to 2013, the share of CAP Pillar II in new member states was still more advantageous for environmental sustainability than in the entire EU. The overall EU funds for agricultural policy in Poland went up from 7.23 billion euros in the years 2004–2006 to 28.5 billion euros in the years 2007–2013 (by 50.3% in a year scale[2]), and from 3.49 to 13.4 billion euros in the CAP Pillar II in the same time period (by 46.5% per year). The growth was less dynamic compared to the first pillar (where it equalled 54.1%), and consequently the share of rural development in total CAP allocation for Polish agriculture decreased slightly (from 48.2 to 47.1%).

Formally, the structure of expenses for 2014–2020 have been changed a little (Table 1). However, the member states may transfer 15% of Pillar II value into the first one, and states—where the rate of direct payments per hectare is lower than 90% of the average rate in the EU (for example Poland)—may allocate an additional 10 percentage points of value of the Pillar II for this goal. Member states may also transfer funds reversely and, in consequence, most of the member states decided to move a part of the direct payments for rural development. A projection of the financial flows shows that across the EU around 4 billion euros will be transferred from Pillar I to Pillar II over 6 years—from 2014 to 2019 [18]. Poland (together with Hungary, Malta, Slovakia and Croatia) made an inverse decision and reallocation from rural development to direct payments had impact on limited possibilities for pro-ecological measures. The value of CAP financial support for Polish agriculture has not been reduced in relation to the period 2007–2013. It equals 28.5 billion euros in fixed prices from 2011.[3] However, the value of the Pillar II was reduced by 5.76 billion euros in real terms (by 43%) compared to the period 2007–2013 because MARD [20] decided that 25% of CAP Pillar II funds be transferred into the Pillar I. As a result, the share of the second pillar in the total CAP value for Poland decreased from 47.1% in the previous period to 26.8% in the years 2014–2020.

On the other hand, it is worth paying attention to the changes in the direct payments system. Since 2015, 30% of them are granted for greening (Fig. 1b). It results from the impact of the ecological policy of the EU on the CAP—20% of the total EU budget must be allocated for goals related to protection of climate [11]. Thanks to that, opportunities for funding environmental protection from the CAP were increased in the member states (as more specifically described in Sect. 4). However, it should be mentioned that changes in the Pillar I turned out to be less advantageous for making the agriculture more ecological than was originally planned.[4] At the time of negotiations related with CAP reform for 2014–2020, conditions for greening direct payments were reduced in relation to primary assumptions. Requirements of crops diversification apply only to farms exceeding 10 ha, instead of farms exceeding 3 ha as in the original version of the reform. Finally, it

[2]The value of the allocation from the years 2004–2006 should be divided by 2.67 (2 years and 8 months), and the value of the support in the years 2007–2013 by 7 (years).

[3]To calculate the real value (in 2011 prices), the European Commission (EC) applied the deflator 1.125 [19].

[4]Final solutions of the CAP reform for 2014–2020 were described by Kociszewski [21].

will concern only 15.4% of the total number of Polish farms.[5] Planned pro-ecological changes were also limited in the case of EFAs, which are to include 5% instead of the planned 7% UAA in every farm. It concerns farms exceeding 15 ha (previously more than 3 ha) i.e. only 8.6% of farms in Poland. Originally, it was to concern additional areas apart from existing permanent grasslands. At present, it is possible to include them into EFAs, and member states acquired a certain freedom when it comes to the criteria for these lands. Besides this, the rules of control of the maintenance of permanent pastures (the third element of the greening) are much weaker than was planned.

In 2021–2027 (mainly because of the projected Brexit) the EU budget for agriculture will be reduced by 5% nominally—to 365 billion euros in current prices [13]. In fixed prices (from 2014)[6] it will be 324 billion euros (20% less than in years 2014–2020). 285.2 billion euros (in current prices) is destined for Pillar I and 78.8 billion euros for rural development. It means that the allocation for Pillar II will be reduced by 21.2% in real terms. The value of financial support proposed for Polish agriculture is 30.4 billion euros in current prices (21.2 for Pillar I and 9.2 for Pillar II). In real terms, it is planned to be reduced by 16.5% (to 27 billion euros in prices from 2014) compared to the previous period. The value of the Polish Pillar II will be cut by 25% in real terms (8.17 billion euros). That change is unfavourable for environmental sustainability, but could be even worse if the Polish authorities decided to reallocate 15% of expenditures[7] from the Pillar II do Pillar I. The value of rural development would be 7.82 billion euros in current prices (6.95 in fixed prices), and its share in CAP funds for Poland would be decreased from 30% (according to the EC proposal) to 25.7%.

Irrespective of disappointing—in the light of environment protection—decisions regarding CAP reform for 2014–2020 (limitation of the second pillar, weakened requirements for greening) and the reduction of funds for rural development in 2021–2027, it must be stated that due to growing Pillar II expenditures in the previous periods and their relations with environmental requirements, the accession to the EU established advantageous conditions to implement instruments favourable for environment protection in agriculture. Unfortunately, the Polish authorities decided on a reduction of the Pillar II share in the total value of the CAP expenditures. Consequently, it limited the possibility to implement pro-ecological instruments in a wide range. One can refer here to the theory of cumulative conditioning of Myrdal [23]. Primary conversion (in this case a decrease of the second pillar funds) causes the consequences of cumulating changes into a direction caused by the initial change—the relative limitation of funds from this source at subsequent periods and the reduction of implementation of environmental measures. As a result of the first

[5]Author's own calculations based on data published by Central Statistical Office [22]. As a reference point all farms have been included—2277 million.

[6]The EC has used the deflator 1.126 to calculate budget for 2021–2027 [13].

[7]According to the new rules for CAP 2021–2027, the rate of reallocation cannot be higher than 15% (in the years 2014–2020 it could be 25%).

Table 2 The shares of expenditures on environmental measures in overall allocation for the Pillar II in Poland

Time period	2004–2006 (%)	2007–2013 (%)	2014–2020 (%)	2021–2027[a]
AEP	4.1	13.7	15.2	–
LFA	18.7	14.8	16	–
Afforestation	1.9	3	2.2	–
Overall	24.7	31.5	33.4	–

Source: Author's own elaboration based on available literature [24], strategic documents of the European Commission [12–14], European Union DG Agri [25] and MARD [15–17]
[a]There are neither plans nor allocations available yet

decision, the Polish government agendas did not effectively prepare for the implementation of rural development measures. When the procedures connected with them occurred to be too difficult (with special consideration of the AEP), they had to reduce CAP expenditures on that goal. In consequence, the possibilities to lead in the environmental second pillar programmes were limited once again.

4 The Implementation of Environmental Measures in Polish Agriculture

In the period before 2004, Polish institutions were not prepared for implementing the AEP and other environmental instruments of the CAP Pillar II. Consequently, after the accession, the value of funds for them was significantly reduced in relation to the possibilities established within the CAP. In 2004–2006, allocation of the AEP constituted the highest share in the CAP Pillar II value among all its instruments at the level of the entire EU (22.6%). In Poland, the programme came sixth in this respect—a mere 0.17 billion euros from the EU budget (4.1% of Pillar II value; Table 2). A similar situation took place in the case of the share of funds for afforestation of agricultural lands. The share of LFA subsidies in the Pillar II turned out to be relatively high because this instrument does not require difficult tasks from beneficiaries, and it is not related with complicated administrative procedures. Hence, it is more easily implemented by agricultural agencies.

In 2007–2013, the sum of values allocated for the AEP, LFA and afforestation increased by 322% in absolute value (from 1 to 4.22 billion euros), by 60% per year (from 0.375 to 0.602 billion euros) and in relation to the overall expenses from the Pillar II in Poland (from 24.7 to 31.5%). It mainly results from the increased allocation for the most important measure (the AEP). According to the author's own calculation based on data from MARD [15, 20], the EU funding for it was increased from 0.17 to 1.84 billion euros—by 310% per year. In terms of the share in the Polish rural development fund (13.7%), the AEP was third among other operations. It means that opportunities arising from the CAP were used to a larger extent.

However, the AEP allocation was still much lower compared to the entire Union (EU-27), where it stayed at the first position—23.1% of value of the Pillar II [25].

According to the author's own calculation based on data from European Union DG Agri [25], the programme was implemented there at 14.8% UAA. In Poland it covered a smaller area (9% UAA) and was implemented in a relatively small number of farms (4.5% of the total number) [16]. In this respect the activities of Polish institutions involved in the agricultural policy may be considered as ineffective, especially taking into account the results of the author's own survey, according to which 13% of Polish farmers declared that they had a willingness to take part in the AEP. It showed that there is a demand from agricultural producers concerning environmental issues, so there is potential to lead in the AEP in a wide range.

In 2014–2020, the total value of EU support for enumerated operations in Poland (similar to these from 2007–2013) equalled 2.77 billion euros in nominal terms [20], including AECM along with subsidies for organic farming 1.2 billion euros, afforestation 0.19 billion euros and LFA—1.38 billion euros. In real terms, that value equals 2.46 billion euros (annual average 0.35 billion euros) which is 1.8 billion euros less compared to the previous period. It means smaller dynamics of decrease in funds (−42.2%) than in the case of the aforementioned reduction of total value of the Pillar II for Poland (Sect. 3.2). Due to this, the share of operations in the area of the environment protection in Polish rural development allocation went up minimally (from 31.8 to 32.1%). It results from the EU requirement: 30% of the funds from the Pillar II must be allocated for actions related to the environment protection. It is the next (apart from previously indicated) symptom of the European Union's ecological policy impact on the CAP.

Assuming that to the end of present financial perspective 30% of the value of direct payments (6.225 billion euros in real terms) is to be allocated for "greening", the reduction of the real value of environment protection support (1.8 billion euros) will be compensated for even with a surplus. That surplus would be 4.425 billion euros, however it should be mentioned that three main requirements of the greening are less restrictive than in the AEP and, hence, factors stimulating environmental services are much weaker too. Apart from this, they will concern only larger conventional farms. For the rest of the farms the "green" direct payments are rather a kind of social aid, maintaining the dispersed structure of the farms.

As was mentioned above, the rural development funds were strongly reduced for the years 2021–2027. Assuming the same share of environmental measures in Pillar II as in the previous period (33.4%), the allocation calculated according to the initial proposal from the European Commission [13] would be 3.07 billion euros in current prices or 27.2 billion euros in fixed prices (from 2014). After probable reallocation of 15% of Pillar II to the Pillar I, the expenditures for these measures in Poland would be 2.22 billion euros in current prices or 1.97 billion euros in fixed prices. It means that the support for environmental sustainability within rural development would be cut by 20% (by 0.5 billion euros in real terms) in comparison to the previous period. The real value of the support would be 0.28 billion euros per year, which is the smallest one from the beginning of Poland's membership in the EU.

5 Conclusion

The change in the structure of the CAP budget shows the impact of the EU's environmental policy. It is expressed in the growing share of allocation for environment protection operations in overall CAP funds. It has established possibilities of support for environmental sustainability of Polish agriculture. Before accession to the EU, no financial instruments were applied to finance environment protection in this sector of the economy. The way of financing of domestic agricultural policy was assessed critically in the light of the use of these opportunities. It is proven by the effects of the Polish authorities' decisions on the structure of the CAP funds (especially in the years 2004–2006 and 2014–2020, as well as probably in the years 2021–2027). It concerns relatively low (compared to the European Union's average) financial value of the AEP/AECP and other pro-ecological operations, which is a derivative of relatively small amounts allocated for the Pillar II. It does not mean that the way of implementation of the CAP should be the same in all member states (the problems are different), but it is desirable to take into consideration changes in the relations between the three dimensions (economic, social and environmental) of sustainable development. They have changed in a direction which is disadvantageous for the environmental one. It effects from political will—the Polish authorities treat improvement of the economic farms situation as a priority and that is why they reallocated a part of CAP Pillar II to increase expenditures for direct payments. It was done to contribute to the modernisation of Polish agriculture.

We can observe positive economic consequences of direct payments; however, after the EU accession environmental pressure of Polish agriculture was increased [26]. Pillar I enabled increasing the external factors of production and influenced the general intensification of plant production. Following the accession, the fertilisation rate (NPK) went up by 50% per year, and emission of nitrogen—by 52% per year (pressure on water quality). In 2008, the consumption of nitrogen in Poland (70.7 kg/ha UAA) exceeded the average for the EU (64 kg/ha UAA). In 2015, in Poland (69 kg/ha UAA), it was 11.5% larger than in the entire EU (61.2 kg/ha). The annual greenhouse gases (GHG) emission from Polish agriculture went up by 2.4% and it was more dynamic compared to the changes in the entire EU (by 1% per year in the same period). In 2016, the share of agriculture in total emission of GHG from the economy was 10.3% in Poland and 9.8% in the EU. In the period 2003–2015, the consumption of pesticides increased three times per year over what is hazardous for biological diversity in rural areas. Growing environmental pressure was insufficiently mitigated by direct regulation instruments (cross compliance, greening) and rural development funds. It was also affected by the low effectiveness of institutions involved into domestic agricultural policy. In the period prior to accession they were not prepared for implementing the AEP, which resulted in limited funds allocated for this instrument in the subsequent periods of EU membership.

From a present and future financial perspective, environmental measures will grow in importance within direct payments, but they less effectively support environmental sustainability than the ones within the rural development fund. To

compensate for the decrease in its value, the environmental impact of the CAP should be strengthened in the aspect of more restrictive and better controlled requirements for farmers receiving subsidies from Pillar I. It refers to the projected CAP reform for the years 2021–2027.

References

1. Czyżewski B, Matuszczak A, Miśkiewicz R (2019) Public goods versus the farm price-cost squeeze: shaping the sustainability of the EU's common agricultural policy. Technol Econ Dev Econ 25(1):82–102
2. Kociszewski K (2014) Ekologiczne aspekty zmian Wspólnej Polityki Rolnej a zrównoważony rozwój polskiego rolnictwa. In: Zegar JS (red) Z badań nad rolnictwem społecznie zrównoważonym, vol 23. Instytut Ekonomiki Rolnictwa i Gospodarki Żywnościowej Państwowy Instytut Badawczy, Warszawa, p 124–157 (Ecological aspects of the changes to the common agricultural policy and the sustainable development of Polish agriculture. In: Zegar JS (eds) From the research on socially-sustainable agriculture, vol 23. Institute of Agricultural and Food Economics National Research Institute, Warsaw, pp 124–157)
3. Czyzewski B, Matuszczak A, Muntean A (2018) Influence of agricultural policy on the environmental sustainability of European farming. J Environ Prot Ecol 19(1):426–434
4. Osterburg B, Nitsch H, Laggner A, Wagner S (2008) Analysis of policy measures for greenhouse abatement and compliance with the convention on biodiversity. Institute of Rural Studies of the vTI Johann Heinrich von Thünen-Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries, p 119
5. Baker S (2006) Sustainable development. Routledge, London
6. Chichilnisky G (1996) Sustainable development: an axiomatic approach. Soc Choice Welf 13 (2):231–257
7. Ekins P, Folke C, De Groot R (2003) Identifyng critical natural capital. Ecol Econ 44 (2–3):165–185
8. Hardaker J (1997) Guidelines for the integration of sustainable agriculture and rural development into agricultural policies. Series no. 4. FAO Agricultural Policy and Economic Development, Rome, pp 4–49
9. Kociszewski K (2018) Sustainable development of agriculture—theoretical aspects and their implications. Econ Environ Stud 18(3(47/2018)):1119–1135
10. Pretty J et al (2000) An assessment of the total external cost of British agriculture. Agric Syst 65 (2):113–136
11. Council Regulation (EU, Euratom) No 1311/2013 of 2 December 2013 laying down the multiannual financial framework for the years 2014–2020 (OJ L 347/884 30.12.2013)
12. European Commission (2002) Financial framework for enlargement 2004–2006 – indicative allocation for commitment and payment appropriations. Copenhagen Package. European Commission, Brussels, pp 3–18
13. European Commission (2018) Proposal for a regulation of the European Parliament and of the council on the financing, management and monitoring of the common agricultural policy and repealing regulation (EU) no 1306/2013. Brussels, 1.6.2018 COM(2018) 393 final
14. European Commission (2003) Some facts and figures. Publications Office of the European Union, Luxembourg, pp 1–5
15. MARD (2005) Rural development plan for 2004–2006. MRiRW, Warsaw, pp 105–156
16. MARD (2011) Rural development programme for 2007–2013. MRiRW, Warsaw, pp 317–322
17. MARD (2014) Rural development programme for 2014–2020. MRiRW, Warszawa, pp 627–687

18. European Commission (2019). https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/common/rdp-list_en.pdf
19. European Commission (2013) Overview of CAP reform 2014–2020, agricultural policy perspectives brief no 5. European Union, Brussels, pp 1–10
20. MARD (2013) Biuletyn informacyjny. MRiRW 10(166):3–6
21. Kociszewski K (2016) The final solutions for common agricultural policy in years 2014–2020 – step towards environmental sustainability or business as usual? Econ Environ Stud 16(1 (37/2016)):9–20
22. Central Statistical Office (2011) Report on results common agricultural census 2010. GUS, Warsaw, pp 26–40
23. Myrdal G (1957) Economic theory and under-development regions. Jarrod and Sons, Norwich
24. Konecny M (2004) EU enlargement and agriculture: risks and opportunities. Friends of Earth Europe, Brussels, p 63
25. European Union DG Agri (2013) Rural development in the European Union, statistical and economic information. Report 2012, Brussels, pp 312–383
26. Kociszewski K (2018) Changes in the environmental impact of polish agriculture after the accession to the European Union. J Agribus Rural Dev 50(4):385–393

Transition to a Green Economy: Programming for a Low-Carbon Economy at the Voivodeship Level

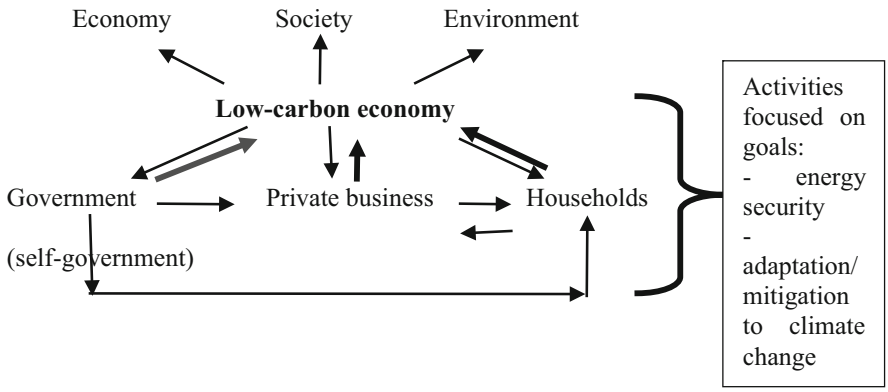
Paulina Szyja

1 Introduction

The issue of a low-carbon economy gained strongly in importance during and after the real economy crisis of 2008–2010. The term is strongly related to two main elements: energy efficiency and renewable energy sources (compare to [1, p. 1709]). Activities which should be undertaken on various levels (public, of companies and of households) have to give directions to cut down the emission of greenhouse gases (carbon dioxide in particular). Moreover, introduction of practices of energy efficiency and investments in renewable energy sources should allow to provide energy security and help to adapt to or mitigate climate changes. The mentioned actions are strongly connected with economy, society and environment. In all these areas there is a need to introduce significant changes. For example, traditional sectors of economy should be modernized, and new ones should be launched. As for society, changes in habits are needed. Furthermore, there should be mental changes in thinking about the role of the environment for humanity: not as an inexhaustible reservoir of resources, but a reservoir of services which should be looked after due to its importance both for the possibility of creating competitive advantages in the economy and for future generations. In the European Union, we have just started our march towards a low-carbon economy, which is the reason of strong commitment of governments (by appropriate central policy, programming of sectoral policies, legal regulation, financial instruments, education), private business (by new sectors or branches of economy, eco-innovative products and services, activities related to energy efficiency in operational processes, consumption energy from renewable energy sources), and households (changes in energy consumption habits, sustainable consumption in general), which is presented in Picture 1 by arrows in bold (Picture 1).

P. Szyja (✉)
Pedagogical University of Cracow, Kraków, Poland

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_8



Picture 1 Elements of low-carbon economy, subjects and goals (Source: Author's own)

All mentioned action require a comprehensive approach that takes into account a number of conditions, changes and/or adaptations in many areas, ranges. That is why we are talking about transformation for a low-carbon economy [2]. This, in turn, contributes to the shaping of the new development framework, which were at the heart of the low-carbon economy idea. International organizations, such as the Organization for Economic Co-operation and Development ("Declaration on Green Growth") [3] or the United Nations Environment Programme ("Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication") [4], called governments to introduce structural changes to make the natural environment the main area of interest. At the beginning, the idea of changes was strongly related to the concept of sustainable development. This opinion confirmed "A European Union Strategy for Sustainable Development", adopted in 2001. In this document it was pointed out on key areas of operations, of which the first was: *limit climate change and increase the use of clean energy* [5]. The term of low-carbon economy, step by step, gained into importance as operationalization the concept defined in report "Our Common Future" [6]. Nowadays, the idea of a low-carbon economy is implemented in the form of plans or programs and also as element of strategies of development at the levels of the European Union ("Europe 2020") [7], individual member states (Poland: "Strategy for Responsible Development") [8, 9] and local authorities and then implemented in practice, taking into account the conditions at both local and national level. However we can't forget about a certain factor of an external nature for Poland—the goals of climate and energy policy of the European Union, which include cutting down emission of greenhouse gases (by 40% in 2030 compared to 1990), increase of energy efficiency (by at least 27% by 2030) and share of energy from renewable energy sources (to at least 27% in 2030) [10, 11].

The main subject of this paper is an analysis of the issue of the low-carbon transition in Poland on the level of self-governments, on the basis of its status in the development strategy records.

The following questions are to be answered:

- Is the issue of a low-carbon economy included in documents?
- If so, what role does it play?

- Whether the low-carbon economy or its components are included in the area of development objectives of the region?
- Whether there are identified possible opportunities of the transition to a low-carbon economy (for example: establishment of new branches or sectors,—improvement of air quality)?
- Is there a need for a systematic approach to the issue and to undertaking the necessary structural changes?
- Whether and within which areas of change a low-carbon economy is identified?

2 Methods and Procedures

In Poland, there are three levels of administrative division, and the research is focused on the voivodeship level. Arguments for this selection are related with their number, area, spheres of activities, and specificity of development programming. Taking into account the first one, it should be pointed one that, in reference to the 16 voivodeship, it is definitely more possible to analyze strategic documents for the needs of preliminary research in the field of transformation for a low-emission economy on a local level. However, we must be aware that the most practical activities related to implementation of a low-carbon economy in Poland take place in municipalities, due to their direct dependence on and communication with their residents. As for the second one, the area, it is larger than that of other levels of local government. As for the third one: detailed scope of activities, listed in the Act of 5 June 1998 on Voivodeship Self-government. Fourth one refers to i.e. innovation, health, energy, and spatial development [12, p. 248].

The method of research is based on analysis of the development strategies of the 16 voivodeships in Poland, with the issue of a low-carbon economy taken into account. It has been checked in detail whether the term of a low-emission economy appears, what its relation to the objectives of the social and economic development of a voivodeship is, and which areas of activity and/or areas it is related to: goals of economy (e.g. energy sector), society (counteracting social exclusion), or maybe environment (elements of improvement of environment quality).

3 Literature Review

The research method in this paper is mainly based on analysis of source materials—development strategies of the 16 voivodeships. Its groundwork includes an overview of literature in terms of the issue of a low-carbon economy transition, its elements, and its role in development strategies documents.

As for the first one, the word "transition" is explained as *a change from one form or type to another, or the process by which this happens* [13]. The word "process",

derived from the above definition, is the key element in development of a low-carbon economy. In literature, the issue is an object of study including:

- institutional and non-institutional actors involved,
- areas of activities,
- sectors of economy involved,
- system's approach,
- role of the market,
- results of transition for economy, human, and environment.

The shift to a low-carbon economy needs structural changes in economy (on operational level in all sectors and branches), new regulations, new programs, plans and politics, financial instruments, and education to create environmental awareness. There is a need for a systematic transition. According to Tracy Wolstencroft: *Transitioning to a low-carbon economy presents both a significant opportunity and an enormous challenge. An opportunity in that the commercialization of low-carbon solutions, including clean energy technologies, can further catalyze an important emerging market and support the transformation of the global energy sector. Simultaneously, this transition presents an enormous challenge given the significant capital required to transform economies that have been reliant on an energy system that has been largely fossil-fuel based* [2].

In turn, Bożena Ryszawska highlights that a sustainable transition *is a transition (targeting, transition) from the current economy to the environmentally and socially responsible activity: a low-carbon, resource-efficient, "green" economy, based on "clean" technologies; to responsible consumption of greater equity and social equity within and between generations* [14, p. 188].

Government, business and society are the main actors of the transition to a low-carbon economy. The literature contains examples of the contribution of each of them to the transformation. For example, as for the government, involvement of the state itself is crucial [15], and then so are the policies implemented, such as the financial or the monetary [16]. Moreover, transition to a low-carbon economy requires changes in economic policy [17], legal regulations [18], programming [19], education, investment [20] etc., and therefore a comprehensive approach with a significant role of the government is necessary [21].

Private business should introduce some changes in operational processes, and offer environmental friendly products and/or services. There are some papers which discuss the impact of the transition on creation of cooperation between enterprises [22] or the role of innovation for sustainability of the transition [23].

In turn, in households there is a need to change previous consumption habits to be more "eco".

A transition of economy requires undertaking activities in many areas, i.e. in financial sphere; particularly, public and private financial instruments are crucial for the transformation process [24]. Next field is related to sectors such as: industry [25]; manufacturing [26]; energy [27]; services; and financial sector [28]. What is more, the role of the market needs to be analyzed, e.g. in cleantech transition [29].

In literature we can point to publications which are based on empirical research related to the energy or the emission of greenhouse gases from different sectors, as well as methods and ways to reduce their impact on humans and environment [30].

The transition to low-carbon economy can bring a lot of benefits, but simultaneously the process of implementing the necessary changes is associated with some restrictions [19].

According to this paper, the last (but not the least important) element is the role of a development strategy, which can be a substructure for transition to a low-carbon economy. The issue is undertaken by researchers through some theoretical backgrounds: explanation of the term of development policy [31] and the role of the government in development programming [32]. Then literature includes both theoretical aspects of creating strategies as documents [12] as practical ones. In the first issue authors are also describing the problem of construction and implementation of development strategies, including subjective range, for example:

- countries [33],
- cities, highlighted the environmental and social aspects [34],
- local authorities [35],
- business [36],

or different sectors:

- of economy [37], especially by analysis some sectors on local level according to its emission and possibilities to implement low-carbon economy plans [38],

and problematical issues:

- poverty reduction,
- environmental and natural resource dimension [33].

Taking into account some practical aspects, it is also worth to point out on *policy guidance on good practice in developing and implementing strategies for sustainable development* [39].

It need to be emphasized that above mentioned aspects are presented in literature by the concept of sustainable development.

In turn, taking into account practical aspects of development strategies, there is emphasized their role to introduce some solutions, for example: planning and implementing large—scale infrastructure projects according to overcome climate change [40].

In relation *strictly* to the issue of development strategy and low-carbon economy, more and more common are papers, which present self-government, in reference to the challenges that it face in the context of climate change. A lot of articles on this topic are written by authors from Asia, which describe situation of cities, for example Hong Kong [41]. According to the European Union, we can find documents and studies, both of a regional nature—"A Roadmap for moving to a competitive low carbon economy in 2050" [42]; "The EU Long Term Climate Strategy" [43], as individual countries ("Climate Action Plan 2050. Principles and goals of the German government's climate policy") [44]; cities (Stockholm action plan for climate and

energy 2012–2015 with an outlook to 2030) [45] or local communities. But this documents and papers in the EU are mostly separate from the development strategies. They present mainly the issue of sustainable development or low-carbon economy or climate policy goals, with emphasis of it for development in general meaning. We can accept, that thanks to this solution, especially in documents at EU and national level, the importance of this issue is underlined. However, there is a question: is there a connection between development strategies—documents and transition to a low-carbon economy as element or goal of development, pointed out on mentioned strategies in general? This problem is area of interest in this paper with reference to the regional development strategies of voivodeships in Poland.

4 Development Strategy at Voivodeship Level and a Low-Carbon Economy

Strategy is a very important tool in programming socio-economic development. This method, taken from management sciences, is very helpful in defining the developmental framework due to the necessity to set goals, key areas of activity, and methods of implementing these activities, as well as required tangible and intangible assets [35]. In addition, it is necessary to take into account the dynamics of the ambiance and certain constraints and barriers, as well as opportunities and challenges. Strategies are adopted at both national and local levels by relevant authorities. Strategies adopted at the central level often give direction to those at the local government level. Development strategy is related to planning. As Andrzej Sztando highlights, *Planning activities of territorial self-governments take place wherever such local governments exist. It results from the necessity of proper implementation of a series of activities for which they were established* [12, p. 247]. In Poland this applies to communes (gminy), counties (powiaty) and voivodeships. Article 11.1 of the Act of 5 June 1998 on Voivodeship Self-government specifies goals that should be included in a voivodeship's development strategy (The Act of 5 June 1998 on Voivodeship Self-government) [46]:

1. *nurturing Polishness, and developing and shaping residents' national, civic and cultural consciousness, as well as nurturing and developing local identity;*
2. *stimulation of economic activity;*
3. *raising the level of competitiveness and innovativeness of the voivodeship's economy;*
4. *preservation of the value of the cultural and natural environment with the needs of future generations taken into account;*
5. *shaping and maintaining spatial order.*

What is more, article 11.2 defines areas of the voivodeship's development policy:

1. *creating conditions for economic development, including creation of the labor market;*
2. *maintenance and development of social and technical infrastructure of voivodeship's importance;*

3. *acquiring and combining public and private financial resources in order to carry out tasks in the field of public utility;*
4. *supporting and conducting activities for raising the level of citizens' education;*
5. *rational use of natural resources and shaping the natural environment, in accordance with the principle of sustainable development;*
6. *supporting development of science and cooperation between the spheres of science and economy, and supporting technological progress and innovation;*
7. *supporting development of culture, taking care of cultural heritage, and its rational use;*
8. *promotion of advantages and development opportunities of voivodeship;*
9. *supporting and conducting activities for social integration and counteracting social exclusion.*[1]

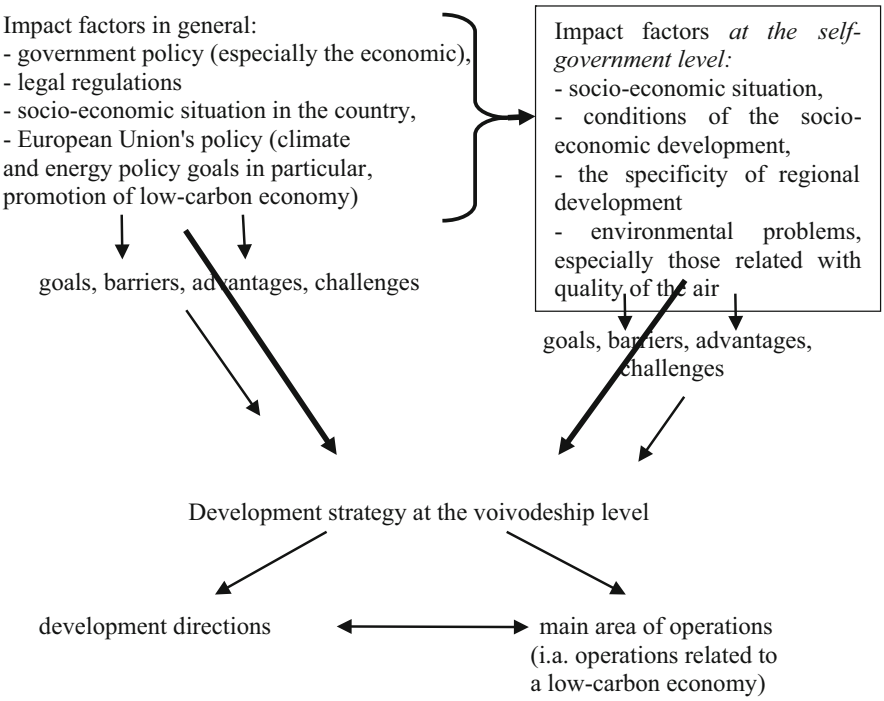
The presented act do not emphasise directly the issue of a low-carbon economy as an element of development programming. However, the act may point it out indirectly in the areas related to appropriate conditions for economy, rational use of environment, and also opportunities. The reference to this legal regulation results from the necessity to indicate functional grounds for the voivodeships' operation. The quoted law is one of the elements which influence the substantive content of the voivodeship's strategies (Picture 2). We have to remember that self-government level is determined by central government's policy or the European Union. A particularly important thing is the promotion of a low-carbon economy on the European Union's level ("A Roadmap for Moving to a Competitive Low Carbon Economy in 2050") [42] and that of the state (some elements of this issue in "Strategy for Responsible Development") [8, 9].

The subject of analysis in this publication are the latest strategies adopted in the 16 voivodeships of Poland, together with many important issues, also those related to a low-carbon economy. The key issue is the role of this last one in creating future development frameworks.

The strategies of development at the voivodeship level have been recently adopted for the period of 2011/2013/2014 to 2020/2030. These documents contain the term of a low-carbon economy, not directly though, but by describing activities that are part of the issue discussed in this paper:

- highlighting the issues of air quality improvement by increasing energy efficiency, increasing production of energy from renewable energy sources, and modernization of energy infrastructure;
- pointing out on: some changes in traditional sectors of economy; development of clean technologies; development of "green industries". In literature we can find papers on these elements: [27, 29, 30]; however, they are one of the key elements of modern transformation processes in economies.

[1] Author's self translation.



Picture 2 Factors affecting the substantive content of the strategy (Source: Author's own)

The low-carbon economy issues are very often related to ecological or environmental purpose only, for example in "The Development Strategy of the Świętokrzyskie Voivodeship until 2020", goal 6: Concentration on ecological aspects of the region's development, and similarly in "The Updated Development Strategy of the Wielkopolska Region until 2020", strategic goal 2: Improvement of the environment and rational management of its resources. Nevertheless, it cannot be limited to this dimension [21].

Furthermore, there are sentences which refer to a low-carbon economy in a confusing way. This is evidenced by the provisions of two strategies. In "The Development Strategy of Łódź Voivodeship 2020" we can find strategic direction of actions: development of modern energy economy. This term raises serious doubts as to the understanding of the term of a low-carbon economy. The "modern energy economy" refers only to one sector, i.e. the energy sector, and a low-carbon economy does to the entire systemic economy including a system of sectors, industries and branches on one hand (as literature selection emphasizes: industry—[25]; manufacturing—[26]; services and financial sector—[28]), and on the other connections and interdependencies between various subjects (governments, enterprises etc.). In turn, "The Development Strategy for Lower Silesian Voivodeship 2020" emphasizes only the need to adapt to the climate change. It is

indeed a very important field of action but not the only reason for transition to a low-carbon economy [2].

The discussed documents indicate a number of terms related to a low-carbon economy:

- low-emission technologies,
- low-emission transport,
- "green industry",
- "green" construction,
- ecological industry.

They are presented in literature, however, the reader may get the impression that the terms are used without understanding the importance of the issues. It is a result of backwardness in the analysis of the issue and lack of clear definitions of a low-carbon economy.

Only in two cases the way to a low-carbon economy is pointed out directly. In "The Strategy for the Development of Opole Voivodeship until 2020" an operational objective was pointed out: to support a low-carbon economy. In turn, in "The Development Strategy of Podlaskie Voivodeship until 2020" one of the areas of activity in relation to the operational objective was emphasized: protection of the environment and rational management of its resources.

At the same time, it is worth to look at the titles of individual priority axes in the voivodeships' operational programmes. In case of eight of them, we are dealing with a priority axis simply called a low-carbon economy: so it is in Lower Silesian, Lubusz, Łódź, Opole, Podlaskie, Kuyavian-Pomeranian, Lublin, and Silesian voivodeship (Table 1). What is more, in one of the voivodeships most threatened by smog—Lesser Poland voivodeship—there are no indications for a low-carbon economy or its elements.

5 Conclusions

Currently, the role of a development strategy is indisputable, both in business and in public programming. Therefore, it is important to prepare documents which include a whole spectrum of socio-economic and environment problems, methods, instruments and sources to obtain targets in terms of development strategies. It is also very important to take into account changes in the surrounding, both domestic and international. The same is related to self-government.

Analysis of source materials and literature allows to indicate a few comments. There is a wide selection of areas of interest with reference to sustainable development strategy and separately the issue of transition to low-carbon economy (subjects, goals, elements, instruments and other of the process). There are documents, which emphasize the issue of sustainable development strategy, low-carbon economy strategy or climate strategy. However, there is lack of articles, which describe connection between development strategy (in meaning of document: development

Table 1 The term of a low-carbon economy in development strategies of 16 voivodeships and their regional operational programmes

Voivodeship	Document	Regional operational programs—priority axis related to a low-carbon economy
Lesser Poland	The Strategy of Lesser Poland Voivodeship 2011–2020	–
Silesian	The Strategy of Silesian Voivodeship "Silesian 2020"	4. Energy efficiency, renewable energy sources and low carbon economy
Lublin	The development strategy for Lublin Voivodeship for 2014–2020 (with a perspective until 2030)	5. Energy efficiency and low-emission economy
Lower Silesian	The Development Strategy for Lower Silesian Voivodeship 2020	3. Low-carbon economy
Opole	The strategy for the development of Opole Voivodeship until 2020	3. Low-carbon economy
Subcarpathian	Voivodeship Development Strategy—Subcarpathiand 2020	3. Clean energy
Świętokrzyskie	The development strategy of Świętokrzyskie Voivodeship until 2020	3. Effective and green energy
Łódź	The Development Strategy of Łódź Voivodeship 2020	3. Low-carbon economy
Greater Poland	The updated development strategy of the greater Poland region until 2020	3. Energy
Lubusz	The Development Strategy of Lubusz Voivodeship 2020	3. Low-carbon economy
Masovian	The development strategy of Masovian Voivodeship until 2030. Innovative Masovia (synthesis)	4. Environment, risk prevention and energy
Kuyavian-Pomeranian	Kuyavian-Pomeranian Voivodeship's development strategy until 2020 Modernization plan 2020+	3. Energy efficiency and low-carbon economy in the region
West Pomeranian	The development strategy for west Pomeranian Voivodeship	2. Low-carbon economy
Pomeranian	Pomeranian Voivodeship's Development Strategy 2020	10. Energy
Warmian-Masurian	The strategy for socio-economic development of Warmian-Masurian voivodship until 2025	4.Energy efficiency
Podlaskie	The development strategy of Podlaskie Voivodeship until 2020	5. Low-carbon economy

Source: Author's own

strategy) and low-carbon economy as element of creating the framework of social and economic development.

The subject of this paper was an analysis of the 16 Polish voivodeships development strategies, taking into account the issue of transition to a low-carbon economy.

The arguments confirm the thesis: the voivodeships' development strategies emphasize the role of the transition to a low-carbon economy, but do not treat it as the main platform of future development. The results are the following:

- lack of a direct highlighted goal: the transformation to a low-carbon economy's
- lack of understanding of the assumptions of a low-carbon economy,
- using terms without knowing the importance of the issues,
- inclusion of the low-carbon economy issues in areas related more to the environment than to the economy.

'Introduction' section presents the scope of the necessary changes and the systemic approach to creating a low-carbon economy. None of the analysed documents refers to this, i.e. due to the reasons mentioned above.

Perhaps this state of affairs results from developmental conditions at the national level, where the role of coal in the energy system is emphasized. Meanwhile, a low-carbon economy assumes a reduction of emissions resulting from the combustion of this fuel. However, the national Strategy for Responsible Development, from 2017, brings some changes, for example the issue of development of electromobility, ecobuildings, the role of ecoinnovation. That is way, voivodships should adopt new development strategies.

Further research should be focused on practical aspects related to financing the transition to a low-carbon economy, and its implementation on a local level—in municipalities—in Poland.

References

1. Yuan H, Zhou P, Zhou D (2011) What is low-carbon development? A conceptual analysis. Energy Procedia 5:1706–1712
2. Goldman Sachs (2010) Transition to a low-carbon economy. https://www.goldmansachs.com/insights/archive/archive-pdfs/trans-low-carbon-econ.pdf. Accessed 3 Apr 2019
3. OECD (2009) Declaration on green growth adopted at the meeting of the council at ministerial level on 25 June 2009 [C/MIN(2009)5/ADD1/FINAL]. https://www.oecd.org/env/44077822.pdf. Accessed 10 Jan 2019
4. UNEP (2011) Towards a green economy: pathways to sustainable development and poverty eradication. https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=126&menu=35. Accessed 10 Jan 2019
5. European Commission: Communication from the Commission. A sustainable Europe for a better world: a European Union strategy for sustainable development. Brussels, 15.5.2001 COM(2001)264 final
6. UN (1987) Our common future. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf. Accessed 17 May 2019
7. Communication from the Commission: EUROPE 2020. A strategy for smart, sustainable and inclusive growth. Brussels, 3.3.2010 COM (2010)2020
8. Ministry of Development (2017) Strategy for responsible development until 2020 (with perspective until 2030), Warsaw

9. Strategy of the responsible development until 2020 (with a view until 2030) (Strategia na rzecz Odpowiedzialnego Rozwoju do roku 2020 (z perspektywą do 2030 r.), Warsaw. 2017. https://www.miir.gov.pl/media/48672/SOR.pdf. Accessed 10 Jan 2019
10. European Commission: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A policy framework for climate and energy in the period from 2020 to 2030. Brussels, 22.1.2014, COM(2014) 15 final
11. European Commission. EU climate action. https://ec.europa.eu/clima/citizens/eu_en. Accessed 19 Dec 2018
12. Sztando A (2013) Model of development strategy construction procedure of territorial self government unit. Reg Library 13:247–266
13. Cambridge. Meaning of "transition" in the English Dictionary. https://dictionary.cambridge.org/dictionary/english/transition. Accessed 23 Dec 2018
14. Ryszawska B (2016) Zielona transformacja gospodarki jako droga do gospodarki umiaru. In: Pach J, Kowalska K, Szyja P (eds) Ekonomia umiaru-realna perspektywa? Nowy paradygmat Grzegorza W. Kołodko. Wydawnictwo Naukowe PWN, Warszawa, pp 187–204
15. Blakeley R (2016) Policy framework for New Zealand to transition to low-carbon economy. Policy Q 12(2):13–22
16. Campiglio E (2016) Beyond carbon pricing: the role of banking and monetary policy in financing the transition to a low-carbon economy. Ecol Econ 121:220–230
17. Pearce W, Paterson F (2017) The influence of policy, public service, and local politics on the shift to a low-carbon economy in the east midlands. In: Baranova P, Conway E, Lynch N, Paterson F (eds) The low carbon economy. Palgrave Macmillan, Cham
18. Xie H (2014) Legal regulation of low-carbon economy. IERI Procedia 8:170–175
19. Xin X, Yuding W, Jianzhong W (2011) The problems and strategies of the low carbon economy development. Energy Procedia 5:1831–1836
20. Scheffran J, Froese R (2016) Enabling environments for sustainable energy transitions: the diffusion of technology, innovation and investment in low-carbon societies. In: Brauch H, Oswald Spring Ú, Grin J, Scheffran J (eds) Handbook on sustainability transition and sustainable peace. Hexagon series on human and environmental security and peace, vol 10. Springer, Cham
21. Szyja P (2015) Role of system transformation in creating green economy order. Stud Pap Fac Econ Manag 40:57–69
22. Parrish BD, Foxon TJ (2009) Sustainable entrepreneurship and equitable transitions to a low-carbon economy. Greener Manag Int 55:47–62
23. Martinez-Covarrubias J, Garza-Reyes JA (2017) Establishing framework: sustainable transition towards a low-carbon economy. In: Baranova P, Conway E, Lynch N, Paterson F (eds) The low carbon economy. Palgrave Macmillan, Cham
24. Ryszawska B (2013) Financing the transition to green economy in Europe. Res Pap Wrocław Univ Econ 302:146–155
25. Xiong X, Tang Y (2014) Strategic development of Beibu gulf economic zone of Guangxi: from the perspective of low carbon economy. In: Xu J, Fry J, Lev B, Hajiyev A (eds) Proceedings of the seventh international conference on management science and engineering management. Lecture notes in electrical engineering, vol 242. Springer, Berlin
26. Mu F, Chang D (2013) The research of low-carbon supply chain design of manufacturing firm. In: Zhang Z, Zhang R, Zhang J (eds) LISS 2012. Springer, Berlin
27. Weber G, Cabras I (2017) The transition of Germany's energy production, green economy, low-carbon economy, socio-environmental conflicts, and equitable society. J Clean Prod 167:1222–1231
28. Chen S (2013) Green finance and development of low carbon economy. In: Chen F, Liu Y, Hua G (eds) LTLGB 2012. Springer, Berlin
29. Linnenluecke MK, Han J, Pan Z, Smith T (2018) How markets will drive the transition to a low carbon economy. Econ Model:1–13

30. Thorne RJ (2016) Transition to a low carbon economy; impacts to health and the environment. In: Pacyna J, Pacyna E (eds) Environmental determinants of human health. Molecular and integrative toxicology. Springer, Cham
31. Addison T (2004) Development policy—an introduction for students. Discussion paper no. 2004/9. United Nations University WIDER
32. Levy B, Fukuyama F (2010) Development strategies integrating governance and growth. Policy research working paper 5196. World Bank, Washington, DC
33. DSD. National sustainable development strategies – the global picture. https://sustainabledevelopment.un.org/content/dsd/dsd_aofw_nsds/nsds_pdfs/NSDS_map_bg_note.pdf. Accessed 19 May 2019
34. Rasoolimanesh SM, Badarulzaman N, Jaafar M (2012) City development strategies (CDS) and sustainable urbanization in developing world. Procedia Soc Behav Sci 36:623–631
35. Bercu A-M (2015) The sustainable local development in Romania – key issues for heritage sector. Procedia Soc Behav Sci 188:144–150
36. Wyrwińska MK, Jaźwińska K (2016) The sustainable development strategy a case study of Kompania Piwowarska S.A. Res Logist Prod 6(4):299–307
37. CIOSLP (2014) Construction strategy 2014–2020. https://www.cioslep.com/assets/uploads/documents/1465899426_lep%20construction%20strategy%202015%20final.pdf. Accessed 18 May 2019
38. Wiśniewski P, Kistowski M (2018) Assessment of greenhouse gas emissions from agricultural sources in order to plan for needs of low carbon economy at local level in Poland. Geogr Tidsskr Dan J Geogr 118(2):123–136
39. OECD (2001) The DAC guidelines strategies for sustainable development. Paris. https://www.oecd.org/dac/environment-development/2669958.pdf. Accessed 19 May 2019
40. Gibbert J (2017) Strengthening sustainability planning: the City capability framework. Procedia Eng 198:200–211
41. Environment Bureau (2017) Hong Kong's climate action plan 2030+. Hong Kong. https://www.enb.gov.hk/sites/default/files/pdf/ClimateActionPlanEng.pdf. Accessed 1 Apr 2019
42. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and Committee of the Regions. A Roadmap for moving to a competitive low carbon economy in 2050, Brussels, 8.3.2011 COM(2011) 112 final
43. Marcu A, Zachmann G, Holguera SG, Stoefs W (2018) Developing the EU long term climate strategy. Special report. Bruegel, Brussels. http://bruegel.org/wp-content/uploads/2018/04/20180418_FINAL-_TechnicalPaper.pdf. Accessed 20 May 2019
44. Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (2016) Climate action plan 2050 principles and goals of the German government's climate policy. https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/klimaschutzplan_2050_en_bf.pdf. Accessed 20 May 2019
45. Stockholm action plan for climate and energy 2012–2015 with an outlook to 2030. Stockholm
46. The Act of June 5, 1998 on the self-government of the voivodship. Dz.U. 1998 nr 91 poz. 576

Fostering Eco-innovation Through Smart Specialization Strategies and Support of EU Funds

Dorota Murzyn

1 Introduction

Sustainable growth is increasingly related to the capacity of regional economies to innovate and therefore is interrelated with smart growth. Innovation, especially eco-innovation is the factor that makes it possible to connect environmental and economic goals and link them to sustainable and smart growth. Sustainable and smart growth are two of three pillars (aside from inclusive growth) of the Europe 2020 strategy and European Union efforts to promote such growth and eco-innovation have intensified in recent years. EU regional policy is particularly vital for mobilizing the potential of European regions to decouple growth from resource overuse and smart specialization strategies can play an important role in this process. This is an important topic both in the current debate about a new industrial policy for Europe and as the ability to support environmental actions. Moreover, smart specialization is promoted by the European Commission as an ex ante conditionality for all regions in Europe to receive EU funds in the field of innovation. Poland was taken as an example because this country is by far the largest beneficiary of cohesion policy funding among member states and can be seen as an interesting "laboratory" for studying the effectiveness of those funds.

The aim of the paper is to analyze and assess the role of smart specialization strategies and EU funds in fostering eco-innovation and promoting sustainable growth. The study sheds more light on the implementation of smart specialization and supporting eco-innovation with public funds by examining the Polish experiences in the period 2014–2018. The paper points out the need to reinforce synergies

D. Murzyn (✉)
Institute of Law, Administration and Economics, Pedagogical University of Cracow, Cracow, Poland
e-mail: dorota.murzyn@up.krakow.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_9

between smart and sustainable growth to deal with the climate change, environmental and energy challenges as well as growing resource scarcity.

The study reviews the main literature, with particular reference to debates surrounding smart specialization concept, as well as academic material the paper also reviews the literature on the subject produced by the international and Polish institutions. Moreover, the research involves the analysis of primary sources, such as policy documents and legislation. An important aspect of the research is to study the smart specialization strategies of Polish regions for 2014–2020 (RIS 3) and regional operational programs in terms of supporting eco-innovations. The empirical analysis in this study builds on a dataset containing details on all projects implemented within the framework of smart specializations under 16 regional operational programs (RPO) for 2014–2020 in Polish regions (as of 1 November 2018). This dataset was created on the basis of the information made available by the Marshall Offices of all regions implementing the RPO. Data regarding projects were supplemented by own examination of other sources such as project descriptions, policy reports and official websites.

Because these considerations have been developed against the background of just one sample country, the general validity of arguments may be limited. Moreover, programs for the years 2014–2020 are in progress and the right conclusions can only be drawn only after their completion. As a result of such peculiarities, further cases of smart specialization implementation both in Poland and in other EU member states have to be researched before the level of speculation can be abandoned.

2 Eco-innovation in the European Union Strategy

In the times of major economic challenges at a global scale, innovation has been perceived as a way of overcoming difficulties, ensuring and preserving economic growth and, in consequence, addressing social problems more effectively in countries affected by the crisis [1]. Nowadays, policy makers in order to address the new global challenges turn toward sustainable alternatives, green innovation or eco-innovation. According to many scholars, international organizations and think tanks (e.g. [2, 3]), these kinds of innovation will probably drive the next wave of innovation. Innovations connected with changes in production processes as well as in products and services being more environmentally friendly represent a new approach to global challenges by giving a practical dimension of the implementation of the principles of sustainable development. The concept combines two essential elements: economical and ecological intended innovation [4]. Eco-innovations are defined as new products and processes creating value for enterprises and clients, and reducing (negative) environmental effects [5]. The EU—Innovation Observatory defines eco-innovation as "the introduction of any new or significantly improved product (good or service), process, organizational changes or marketing solutions that reduce the use of natural resources (including materials, energy, water, and land) and decreases the release of harmful substances across the life-cycle"

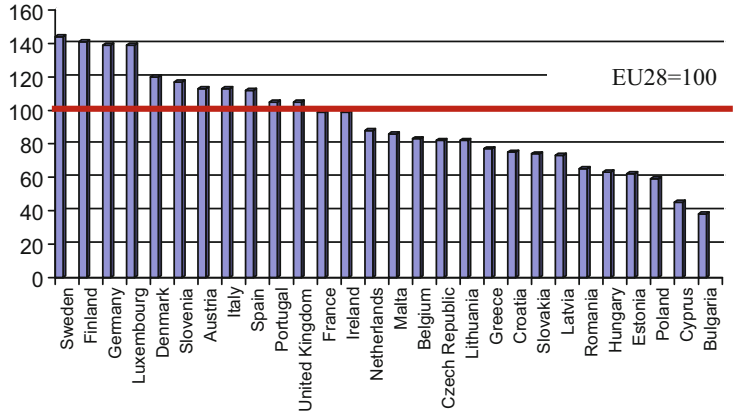


Fig. 1 Eco-innovation index in the European Union 2017, EU28 = 100. Source: European Commission, https://ec.europa.eu/environment/ecoap/indicators/index_en (3.01.2019)

[6]. Incremental innovations such as green products and eco-efficiency improvement is the dominant form of eco-innovation in industry [7]. The literature on determinants of eco-innovation accentuates the important role of regulation, cost savings, customer benefits and a complex set of different supply, firm-specific, and demand factors [8].

Emphasizing eco-innovation as a means for achieving sustainable development requires information on the performance of main actors, in particular, countries [9]. The Eco-Innovation Observatory developed the Eco-Innovation Scoreboard in 2010 as a tool to assess and illustrate eco-innovation performance across the EU member states. The Eco-Innovation Index shows how well individual Member States perform in different dimensions of eco-innovation compared to the EU average and presents their strengths and weaknesses. The situation in this respect in the European Union is very diverse (Fig. 1).

Government efforts to promote greener growth and green innovation have intensified in the recent years. The European Union has also moved in this direction. It has introduced an ambitious future climate plan [10], and also the Europe 2020 strategy, that is the Union's growth strategy, promotes structural change with a sustainability orientation. The EU 2020 strategy is about delivering growth that is: smart, through more effective investments in education, research and innovation; sustainable, thanks to a decisive move towards a green economy, resource efficient and competitive; and inclusive, with a strong emphasis on job creation and poverty reduction [11]. Moreover, the EU emphasizes that the ability of the economy to adapt and become more climate change resilient and resource-efficient and, at the same time, to remain competitive, depends on high levels of eco-innovation of a societal, economic, organizational and technological nature. According to the EU, eco-innovation may provide valuable new opportunities for growth and jobs and enable the transition towards a green economy that takes into account the sustainable use of resources.

The European Union has published many documents emphasizing the need to further development and use of environmental technologies, the most important are: Environmental Technologies Action Plan (ETAP) adopted in 2004; Eco-innovation Action Plan (EcoAP), launched in December 2011 [12]; The 7th Environment Action Programme (EAP)—adopted in November 2013; Green Action Plan for SMEs, launched in 2014. They provide actions aimed at strengthening incentives and overcoming barriers to the implementation of innovative environmentally friendly solutions, and present ways for SMEs to turn environmental challenges into business opportunities.

The European Union has also prepared a number of financial instruments to support eco-innovation in the current programming period, 2014–2020 [13]. One of the most important are the funds of cohesion policy.

3 EU Cohesion Policy for Eco-innovation

Cohesion policy is a very important policy in terms of funding (one third of the EU budget) and objectives as it is seen as the EU's main investment policy. Therefore, it is also one of the most important tools in attaining the Europe 2020 goals. Since 2014, the European Commission has mainstreamed eco-innovation in the cohesion policy. The cohesion policy focuses on the economic and social pillars of sustainable development by strengthening growth, competitiveness, employment and social inclusion. Some of the priorities of the cohesion policy contribute to the promotion of environmental technologies (including eco-innovations), of sustainable transport and energy systems, and also of investment project improving water, air and soil quality and addressing climate change problems.

Cohesion policy has set 11 thematic objectives for the 2014–2020 period [14], 4 of which may be associated with the support of eco-innovation: strengthening research, technological development and innovation; supporting the shift towards a low-carbon economy; promoting climate change adaptation, risk prevention and management; preserving and protecting the environment and promoting resource efficiency. Importantly, under the EU's 2014–2020 budget, the investments under the European Regional Development Fund (ERDF) should be concentrated ("thematic concentration") on four key priorities: research and innovation (including eco-innovation), the digital agenda, support for small and medium-sized enterprises and the low-carbon economy (e.g. energy efficiency, renewable energies, smart distribution grids, sustainable multimodal urban transport), depending on the category of region (less developed: 50%, transition: 60%, and more developed: 80%) [15]. Furthermore, some ERDF resources must be channelled specifically towards low-carbon economy projects (less developed regions: 12%, transition regions: 15% and more developed regions: 20%). Funding for cohesion policy in the 2014–2020 period amounts to EUR 351.8 billion. Around EUR 117.8 billion will be dedicated to thematic objectives: research and innovation, low carbon economy, climate change and risk prevention, environment and resource efficiency.

Poland is by far the largest beneficiary of cohesion policy funding among member states. For 2014–2020, Poland has been allocated around EUR 77.6 billion (current prices) which represents more than 20% of total cohesion policy funding. The country is implementing 22 operational programs (OP) under EU cohesion policy: 6 national OP and 16 regional OP (for each voivodeship).

Poland is also among the countries that have scored lowest in the European Eco-Innovation Scoreboard since 2010. In the 2017 edition, it came third to last in the EU with a score well below the EU average (Fig. 1). The country underperforms particularly in R&D and innovation investments and early-stage investments in green technologies, as well as in economic activities related to eco-innovation. Although Poland has not developed an integrated approach to eco-innovation policy, the development and implementation of eco-innovative technologies are now supported by the objectives of key national and regional strategy documents, among which they are the National Smart Specialization and regional innovation strategies containing regional smart specializations. They have priorities relevant for eco-innovation and circular economy, such as waste reduction, re-use and recycling, sustainable transport, energy-efficient construction, water efficiency technologies as well as material substitution.

4 Smart Specialization Strategies and EU Funds as a Way of Supporting Eco-innovation

Conceived within the reformed Cohesion policy of the European Commission, smart specialization is a place-based approach characterized by the identification of strategic areas for intervention based both on the analysis of the strengths and potential of the economy and on an "entrepreneurial discovery process" with wide stakeholder involvement [16–18]. The EU cohesion policy aims to reduce differences between regions and to ensure growth across Europe. Structural funds are among its main tools. Its efficient use and management is a crucial factor for many regions in Europe to overcome the economic crisis and develop. For this reason, to develop a Research and Innovation strategy for Smart Specialization (RIS3) was a prerequisite in order to receive funding from the European Regional Development Fund (ERDF).

Smart specialization is the concept of innovation policy in order to promote efficient and effective use of public investment in research, innovation and technological development. It provides a framework for prioritizing the allocation of public resources related to innovations that are sensitive to the regional context. The smart specialization approach offers a number of advantages in the design of an appropriate innovation policy, while taking into account the diverse evolutionary nature of regional economies. Smart specialization can therefore be seen as the result of long-needed convergence between regional development policy and innovation policy [19]. The concept of smart specialization assumes that regional potential and strengths (regional specializations) determine the development of the region. The

basis of the development is to identify their own areas of specialization ant to concentrate public intervention initiatives and projects implemented on them. Regional diversity favors different growth paths through innovation and specialization, and challenges policymakers to develop the right policy mix tailored to regional potentials and needs [20, 21]. The concept of smart specialization is especially important for Central and Eastern Europe countries, Karo and Kattel [22] position it as the third external and conditionality-based reform of economic policy rationales—after Washington Consensus and Europeanization—in this region.

Within the smart specialization process, every region should nominate activities that aim at exploring and discovering new technological and market opportunities in order to open perspectives for regional competitive advantage [23]. The process of identification of smart specializations took place differently in Polish regions. It seems that smart specialization of regions in Poland have a tendency to follow strategies of the leading regions and tap the specialization areas of modern high technologies and advanced innovation processes. Among specializations elected by the regions often come specializations within the biotechnology and the bioeconomy, energy, including renewable energy and environmental protection or eco-innovations (Table 1). Eco-innovations can play a key role in the implementation of other specializations of the regions, for example: bio-economy, low-emission energy generation, green economy, eco-effective technologies, sustainable energy development. Smart specializations are implemented through regional operational programmes (RPO) co-financed by European Regional Development Fund. In Poland there are 16 RPO, 1 in every voivodeoship. In each of them, activities supporting regional smart specializations have been planned. References to eco-innovation are present in almost all of them, either directly (preference is given to projects in the field of eco-innovation, for example in lubelskie, lubuskie, podlaskie) or indirectly (in strategic documents there is no direct support for eco-innovation, but there is an indicator: "the number of enterprises supported in the field of eco-innovation").

All projects implemented within the framework of smart specializations under 16 regional operational programs (RPO) for 2014–2020 in Polish regions (as of 1 November 2018) were analyzed. Data regarding projects were supplemented by own examination of other sources such as project descriptions, policy reports and official websites. The analysis shows that despite references to eco-innovation in program documents, only a few projects that have received EU funding concern such innovations. Two regions are especially interesting in this regard: kujawsko-pomorskie and podlaskie. They have identified eco-innovations as one of their regional smart specializations. So it would be interesting to look into their actions towards supporting eco-innovations and their results. When we analyze the use of this fund so far (as of 1 November 2018) we can see that in kujawsko-pomorskie only 5 (out of 250) projects co-financed by ERDF were connected with eco-innovations (contain a reference to eco-innovation in the description), and this connection was rather weak. Better situation is in podlaskie where 67 (out of 202) projects co-financed by ERDF were connected with eco-innovations (contain a reference to eco-innovation in the description or even the title of the project), but

Table 1 Smart specializations of Polish regions and their support through EU funds

Region	Smart specialization	Allocation of ERDF (EUR) for smart specializations under RPO
Dolnośląskie	ICT; Chemical and pharmaceutical industry; High quality food; Manufacture of machinery and equipment, materials processing; Raw materials and recyclable raw materials; Spatial mobility.	395,846,718
Kujawsko-pomorskie	Healthy and safe food; Health and health tourism; Advanced materials and tools; Transport and mobility; Cultural heritage, arts, creative industries; ICT services; Eco-innovation; Industrial automation.	404,623,387
Lubelskie	Low-carbon emission energy; Medicine & Health; IT & automation; Bioeconomy.	377,715,751
Lubuskie	Health & quality of life; Green economy; Innovative industry.	191,328,826
Łódzkie	Advanced construction materials; Innovative agriculture and agri-food industry; Energy; IT and telecommunications (ICT); Modern Textile and Fashion Industry; Medical Industry, pharmaceuticals and cosmetics.	476,455,223
Małopolskie	Life science; Sustainable energy; ICT; Chemistry; Production of metals and metal products; Electrical engineering and machinery industry; Creative and leisure industries.	470,018,348
Mazowieckie	Professional services for business; Quality of life; Intelligent management systems; Safe food.	474,560,155
Opolskie	Metal and machine industry technologies; Energy technologies and renewable energy; Life and environmental science; Chemical technologies; Food and agriculture technologies; Construction and wood technologies.	158,500,000
Podkarpackie	Aerospace; Quality of life; Automotive; ICT.	374,372,710
Podlaskie	Medical sector, life sciences and sectors related by value chain; Eco-innovations, environmental science; Agri-food and value chain related sectors; Metal and machinery industry, shipbuilding.	232,367,214
Pomorskie	Off-shore, port and logistics technologies; Interactive technologies in an information-saturated environment; Eco-effective technologies; Medical technologies in the area of civilization and ageing-associated diseases.	297,340,017
Śląskie	Energy; Medicine; ICT; Emerging industries (including eco-industries); Green economy.	512,813,075
Świętokrzyskie	Metal and casting industry; Modern agriculture and food processing; Resource-efficient	257,419,604

(continued)

Table 1 (continued)

Region	Smart specialization	Allocation of ERDF (EUR) for smart specializations under RPO
	construction industry; Health and health-promoting tourism; ICT; Trade fair and congress industry; Sustainable energy development.	
Warmińsko-mazurskie	High Quality Food; Water economy; Wood and Furniture.	320,543,756
Wielkopolskie	Manufacturing of the future biomaterials and food for sophisticated consumers; Interiors of the future; Specialized logistics processes; Modern medical technologies; ICT-based development; Industry of tomorrow.	467,900,000
Zachodnio-pomorskie	Large-scale water and land constructions; Advanced metal products; Wood and furniture products; Multimodal transport and logistics; Modern agri-food processing; ICT-based products; Eco-friendly packaging; Chemical and materials engineering products.	323,050,000

still most of them uses the terms "eco-innovative" and "ecological" interchangeably. In podlaskie, eco-innovations are understood very widely (in RPO), as: solutions for an integrated approach to the efficient use of resources, including energy and raw materials; investments limiting material and energy consumption and related to the recovery of recyclable materials; actions to adapt existing production installations to the best available technology standards, support for investments adapting to environmental protection requirements; activities related to the implementation of environmental management systems and obtaining certified eco-labels, pro-ecological management and pro-ecological marketing.

Access to EU funds plays an important role in mobilizing activities for eco-innovation in Poland. However, it seems that the poorer regions cannot fully exploit their potential, as well as the potential of smart specializations. The latter pose challenging demands on fragile or limited institutional frameworks, but at the same time this also offers real opportunities for institutional learning and the upgrading of governance capabilities [24]. Finding ways to better utilize EU cohesion policy funds to help with institutional upgrading and enhancing the quality of governance in these regions is also a key priority in order to better foster both smart innovation-driven growth and also wider aspects of sustainable and inclusive growth [25]. Moreover, policy instruments for eco-innovation support should help to create demand for eco-innovative products and services, for example through green public procurement.

5 Conclusion

Eco-innovation is gaining ground within both industry and government as an effective way to tackle climate change and to promote sustainable growth. Smart specialization can be a way to foster eco-innovation and, at the same time, a way to combine smart and sustainable development. Innovation, especially eco-innovation is the factor that makes it possible to connect environmental and economic goals and link them to sustainable and smart growth.

Although almost all Polish regions have emphasized the need to support eco-innovation, some of them have even indicated it as their regional specialization, this analysis of the actual use of EU funds proves the difficulties with the implementation of those activities. The analysis shows that despite references to eco-innovation in program documents, only a few projects that have received EU funding concern such innovations. It may be the result of some bottlenecks (e.g. the lack of local pre-conditions in the local economy and limits of governance) that have already been identified by the researchers [26]. This also may be due to the fact that programs created on the basis of EU requirements ("thematic concentration" on research, innovation and the low-carbon economy) are not fully in line with the potential of regional economies, especially in the case of economically weaker regions. Such results may have policy implications and encourage rethinking of development strategies for less developed regions.

International comparisons of innovative and eco-innovative potential (Innovation Union Scoreboard, Eco-Innovation Scoreboard) indicate that they are closely related, so we need to remember that the development of a specific area of innovation (like eco-innovation) without support of a general base for the knowledge-based economy can be ineffective.

European Union is allocating substantial funds from its budget to support eco-innovation, also through smart specialization. Access to EU funds plays an important role in mobilizing activities for eco-innovation in Poland (the biggest beneficiary of EU cohesion policy). But the effectiveness of these activities will be greater if the concept of smart specialization is properly interpreted and implemented, then it can be an opportunity for the development of eco-innovation in Polish regions.

References

1. OECD (2009) Policy responses to the economic crisis: investing in innovation for long-term growth. OECD, Paris
2. Moody JB, Nogrady B (2010) The sixth wave. How to succeed in a resource-limited world. Random House Australia, Sydney
3. The Worldwatch Institute (2008) State of the World 2008: innovations for a sustainable economy. W.W. Norton, Washington, DC

4. Schiedering T, Tietze F, Herstatt C (2012) Green innovation in technology and innovation management – an exploratory literature review. R&D Manag 42(2):180–192
5. Fussler C, James P (1996) Driving eco-innovation: a breakthrough discipline for innovation and sustainability. Pitman Publishing, London
6. EIO (2010) Methodological report. Eco-Innovation Observatory, Brussels
7. OECD (2012) The future of eco-innovation: the role of business models in green transformation. OECD, Paris
8. Horbach J, Rammer C, Rennings K (2012) Determinants of eco-innovations by type of environmental impact – the role of regulatory push/pull, technology push and market pull. Ecol Econ 78:112–122
9. Park MS, Bleischwitz R, Han KJ, Jang EK, Joo JH (2017) Eco-innovation indices as tools for measuring eco-innovation. Sustainability 9(12):1–28. https://doi.org/10.3390/su9122206
10. European Commission (2007) Towards a low carbon future: European strategic energy technology plan. MEMO/07/493, Brussels
11. European Commission (2010) Europe 2020. A strategy for smart, sustainable and inclusive growth. COM (2010) 2020, Brussels, 3 March 2010
12. European Commission (2011) Innovation for a sustainable future – the eco-innovation action plan (Eco-AP). COM/2011/899 final, Brussels
13. Murzyn D, Szyja P (2015) European Union efforts to create green growth through green innovation. In: Pintilescu C, Wierzbiński B, Zarotiadis G (eds) Openness, innovation, efficiency and democratization as preconditions for economic development. Proceedings of the 11th ASECU Conference, Foundation of the Cracow University of Economics, Cracow, 2015, pp 36–49
14. Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17.12.2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund. OJ EU L 347, 20 December 2013, pp 320–469
15. Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17.12.2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal. OJ EU L 347, 20 December 2013, pp 289–302
16. Carayannis EG, Rakhmatullin R (2014) The quadruple/quintuple innovation helixes and smart specialisation strategies for sustainable and inclusive growth in Europe and beyond. J Knowl Econ 5(2):212–239
17. Foray D, David PA, Hall BH (2011) Smart specialization. From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation. MTEI Working Paper, November. MTEI, Lausanne
18. McCann P, Ortega-Argilés R (2015) Smart specialization, regional growth and applications to European Union Cohesion Policy. Reg Stud 49(8):1291–1302. https://doi.org/10.1080/00343404.2013.799769
19. McCann P (2015) The regional and urban policy of the European Union. Cohesion, results-orientation and smart specialization. Edward Elgar, Cheltenham
20. Camagni R, Capello R (2013) Regional innovation patterns and the EU regional policy reform: toward smart innovation policies. Growth Chang 44(2):355–389
21. Grillo F, Nanetti RY (2016) Innovation, democracy and efficiency: exploring the innovation puzzle within the European Union's regional development policies. Palgrave Macmillan, Houndmills
22. Karo E, Kattel R (2015) Economic development and evolving state capacities in Central and Eastern Europe: can "smart specialization" make a difference? J Econ Policy Reform 18 (2):172–187
23. Foray D, Goddard J, Beldarrain XG, Landabaso M, McCann P, Morgan K, Nauwelaers C, Ortega-Argilès R (2012) Guide to research and innovation strategies for smart specialisation (RIS 3). May

24. McCann P, Ortega-Argilés R (2016) The early experience of smart specialization implementation in EU cohesion policy. Eur Plan Stud 24(8):1407–1427
25. Muscio A, Reid A, Rivera Leon L (2015) An empirical test of the regional innovation paradox: can smart specialization overcome the paradox in central and Eastern Europe? J Eur Econ Policy Reform 18(2):153–171. https://doi.org/10.1080/17487870.2015.1013545
26. Capello R, Kroll H (2016) From theory to practice in smart specialization strategy: emerging limits and possible future trajectories. Eur Plan Stud 24(8):1393–1406

Risk Management in Innovative Startups and the Role of Investors and Business Accelerators

Adriana Kaszuba-Perz and Marta Czyżewska

1 Introduction

The development of risk management methodologies in recent years has allowed, at least to some extent, to make transactions and processes predictable. Enforced by the pressure of competition, undertaking innovative business operations involving an increased level of risk turns out to be necessary, because abandoning risky activities in the long run may pose a greater threat to enterprises than to undertake them. Young startups that take risks to implement new, often breakthrough solutions into business practice are much more likely than other companies exposed to above-average risk. There are authors refuting the widespread myth that one in ten startups is falling. From the observation of the American market, it is already experiencing two out of ten startups. The chance of a startup's success grows by 50% due to investors, while business acceleration increases this factor by up to 80%.

The aim of the article was to bring the issue of risk perception by start-ups and analysis based on the responses received from entrepreneurs regarding their approaches to dealing with the risks occurring in their environment, as well as inside the startups.

The analysis presented in this study has been prepared as a part of broader research on the use of management support tools in SME's. To the study 40 startups were selected from 250 surveyed companies, only those who operated for no longer than 5 years and which declared themselves as startups. The issue seems to be all the more interesting because the startup group presented in the study developed their

A. Kaszuba-Perz (✉)
Politechnika Rzeszowska im. I. Łukasiewicza, Rzeszow, Poland
e-mail: aperz@prz.edu.pl

M. Czyżewska
Uniwersytet Pedagogiczny im. Komisji Edukacji Narodowej w Krakowie, Krakow, Poland
e-mail: marta.czyzewska@up.krakow.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_10

businesses in innovative industries which are crucial for the Podkarpackie Province according to Regional Innovation Strategy of the Podkarpackie Voivodeship [1].

The research was conducted by interviewers in the form of direct interviews using a standardized questionnaire which contained mostly closed-ended questions. The interviewers were previously trained in the scope of the study, in order to explain the doubts of the entrepreneurs about the definitions, concepts and classifications applied in the questionnaire (e.g. types of risk). The authors tried to answer the research questions: if and how the startups implementing innovative and therefore risky solutions, managed the risk. In the research they also check whether and which risk identification and mitigation procedures are used among startups operating in the Podkarpackie Province. The methodologies and approaches commonly applied to management were also analyzed, and their application may help to minimize the negative effects of the risks accompanying an implementation of innovative business ventures that are usually undertaken by the startups' founders.

The similar research studies were conducted by M. van Gelderen, R. Thurik and N. Bosma but covered success and risk factors in regard with pre-startup phase [2].

In the study the authors also analyzed (on the basis of data and literature available) the role of business incubators and accelerators as institutions supporting the risk management in startups and lowering the rate of failures.

2 Risk and Innovative Startups Development

The risk accompanies every aspect of human activity, including business. With regard to a startup as a new business venture (see definitions: [3, 4]), the risk should be perceived not only as a threat of not achieving the projected results, but also in terms of the possibility of achieving the outcomes (in terms of cash inflows) much higher than expected.

The risk may not only mean a threat (clean risk), but also constitute an opportunity for the development of the venture (speculative risk). The risk perceived this way makes it impossible to use only the methods of eliminating and counteracting potential threats, but also forces to accept the risk as a development factor and to manage it [5, 6].

The process of creation and development of startups is recognized as a difficult, complex and risky process [7, 8]. It is usually associated with a significant demand for capital which is offered by various types of investors, both institutional and private ones (e.g. seed capital funds, venture capital funds and business angels). Investing capital in startups is often accompanied by risks related to the accuracy of predictions regarding the projected expenses and revenues. One can identify the risk of misestimating the effects assumed by an investor and startup founders that reveals in not achieving the results within the projected time period or in not obtaining any of the milestones or business plan assumptions due to difficulties in predicting the demand for new solutions.

The work of Galton, Laplace, Poincare, Knight, Drucker, Zangwill, Schumpeter played a significant role in the creation of the risk theory [9–14]. Knight recognized that the risk can be measured and he identified the risks associated with the management of the company, operational risk and risk related to the implementation of innovation.

Foster [15] pointed out that the limitations of long-term company activities resulted from the inevitability of profound changes in the management methods, giving in the technological periods of "discontinuities" the economic advantage to young, aggressive, flexible companies on large enterprises. This flexibility, which is a source of competitive advantage related with an active search for unique production resources that are costly to copy, is the basis for the concept of resource-based theory. This concept, unlike other theories of competitive advantage, emphasizes the need for quick and adequate responses to accurately anticipated changes and takes into account the operation in a situation of "generalized uncertainty". The issue of risk involved in the entrepreneur's activity is also analyzed by other researchers (e.g. [16–19]).

Hawley in 1893 claimed that in every industry, as well as society as a whole, there was growing wealth from year to year, which was a compensation for the risk incurred. Business rewards people not only for their work, but also for their fears [20]. We can assume that even a few-century theories, regarding our observation and research, are still valid.

There are many risks associated with the creation and development of innovative startups, in particular in the areas of:

- time (risk of delays),
- quality (risk resulting from insufficient experience and knowledge of the founders),
- costs and revenues (risk resulting from erroneous estimates, usually underestimating costs and overestimating revenues),
- other aspects of startup development (e.g. risk of inappropriate partners selection, violation of legal regulations e.g. unintentional, resulting from lack of specialist knowledge; changes in exchange rates, risk of various employee behavior, lack of team integration).

Regarding capital investors investing in startups, the types of risk associated with the investments can be categorized as follows [5]: political risk, risk related to changes in trends in securities prices, risk of fluctuations in market prices, liquidity risk (difficulty in closing investments, sale of securities), inflation risk, interest rate risk, exchange rate risk, risk of default by the issuer, reinvestment risk (investor's income at a different interest rate), demand-side risk (related to futures and bonds), risk of convertibility (e.g. bonds to shares in adverse conditions) for the investor) and financial risk (in the case of using foreign capital).

In general, there is a wide variety of risk classifications in the literature. These include those of a general nature, such as political, economic and financial risks, and those that are directly related to the functioning of a company, e.g. competition risk, industry risk, the risk of cooperators and suppliers, internal risks [21–25].

The categories of risks adopted in the study result from the literature review and were also indicated by entrepreneurs reviewed.

3 Business Accelerators and Investors Support in Managing Risk at Startups

As Drucker said the entrepreneurship had to be systematic and based on targeted innovation. He claimed that innovators succeeded in the areas where they could identify and reduce risk. They are successful in the areas where they systematically analyze the opportunities for innovation, and then they take advantage of these opportunities [26]. McGrath and MacMillan stated that startup failures could be avoided or at least their related costs could be reduced if managers of the new ventures would use the appropriate tools for control and planning [27]. Discovery-driven planning states that organizations operating in high-uncertainty environments must implement processes of evolution in which funds are released and invested in the company as it reaches certain goals or checkpoints [28]. This way investors can condition the follow-on investments on the basis of milestones' achieved by the startup's founders. This milestone-based funding from investors (known as "tranched investing") can limit natural evolution of new ventures, so called business model pivoting [29].

Trimi and Berbegal-Mirabent [8] predicate that the major cause of a failure in startups is the lack of a structured process to discover and understand their markets, identify their customers and validate the hypotheses in the early stages of design.

To minimize the startup risk Lavinsky, a co-founder of Growthink and Guiding Metrics, suggests several ways: first is to build a board of advisors, comprised of industry experts and other professionals that can help to grow the business; second is to secure beta customers—non-paying customers who are willing to test the new solution that help founders to make improvements before a public launch; third is to forge partnerships that prove a startup viability and position it for success; forth is to secure publicity to increase customers interest in the new solution; fifth is to prove by generated revenues that the key risk mitigating milestones were achieved and that there is a real demand for the startup's offer [30].

The abovementioned statistics that a startup's success grows by 50% due to investors, while acceleration increases this factor by up to 80% need to be proven. Investors usually support and control the startups in their portfolio by supervisory boards or boards of directors. Tranche investing is another controlling and risk mitigating tool saving investor's capital in case of not achieving milestones by startup founders.

As Ries said that "startup success can be engineered by following the process, which means it can be learned, which means it can be taught." A very common place for teaching startups are business accelerators—organizations that offer a range of support services and funding opportunities for startups [31].

The most widespread practitioner driven methods of startup creation and development used within accelerators are [32]: lean startup methodology [33], customer development framework [34] and design thinking [35].

Lean startup is a scientific approach to creating and managing startups in order to deliver the desired product to customers' hands faster. Ries recommends building a minimally satisfactory product (minimum viable product, MVP), i.e. a prototype or the basic version that has the most important functions and presents customers the benefits of having it. By experimenting and empirical verification of hypotheses, based on MVP, the final version of the product is created. This process is called validated learning [33].

Customer development methodology supports startups with developing product more successfully and with less market risk by developing better understanding of customers. The customer development and the product development are parallel processes to balance the relationship between developing a product and understanding customers' needs. According to Blank and Dorf, there are two main types of risks that affect startups: invention risk and customer (market) risk or a combination of the two. The invention risk is where it is uncertain if the product can even be developed. When the issues have customer acceptance and market adoption, this methodology shows the path, and startups that want to solve customer and market risk should follow this path [34].

Design thinking was defined by Brown as a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity [35].

In design thinking, the first step is to establish the need for a product or a service, second to understand a customer's problem, instead presenting him/her a solution built on the startup founders' assumptions. Design thinking emphasizes user's desirability and identifies potential blind spots within the founder's understanding or assumptions.

To sum up, as Perez said, director at the Hasso Plattner Institute of Design Thinking at the University of Cape Town, the approaches take the idea to product in the fastest way possible, but the key difference is where the product appears in the innovation cycle [36].

4 Research Results

This study presents research conducted on a group of 40 startups operating in the Podkarpackie Province. All of the companies operate for no longer than 5 years. The characteristics of the surveyed enterprises are presented in Table 1. The aim of the research was to try to assess to what extent the small and young enterprises managed the risk to which they were exposed in the current operation and in the perspective of their further development. The research was carried out in the fourth quarter of 2017 and in the first and second quarter of 2018, in the form of a survey based on a

Table 1 The structure of micro and small companies surveyed (startups) by sectors

	Share (in %)	Including share of the sectors:								
		Food	ICT	Cosmetics/ fitness sport	Construction/ geodesy	Office services, accounting, legal services	Medical and rehabilitation services	Wood/ paper	Automotive/ mechanic	Other
Micro	70	17.86	10.71	17.86	17.86	17.86	–	–	7.14	10.71
Small	30	25.00	25	–	–	–	16.67	8.33	8.33	16.67
Total	100	–	–	–	–	–	–	–	–	–

Source: Own study based on the research conducted

Table 2 Risk types perceived in entrepreneurs' opinions

Risks occurring in the following areas[a]:	Total (in %)	Impact on the business		
		Small	Significant	Very significant
Political risk	6.36	4.55	0.91	0.91
Economic risk	19.09	10.00	7.27	1.82
Currency risk	5.45	3.64	0.00	1.82
Risk of dishonest business partners	16.36	7.27	7.27	1.82
Risk of high competition on the market	21.82	9.09	7.27	5.45
Risk of unfair competition (unfair competition behaviors)	18.18	7.27	7.27	5.45
Financial risk	2.73	0.00	1.82	0.91
Industry risk	8.18	3.64	4.55	0.00
Internal risks (e.g. Loss or lack of qualified staff)	1.82	0.91	0.91	0.00

Source: Own study based on the research conducted

[a]Categories of risks were explained in details in the written instructions given to the interviewers and they were previously trained in the scope of the study and construction of the questionnaire

questionnaire. Risk is a factor that can have a significant impact on the young ventures functioning. On the other hand, there is a widespread opinion about the high propensity of small enterprises to risk. It should also be emphasized that the surveyed companies are located in the Podkarpackie Province—the region that is considered to be less developed and also differentiated regarding the development level across sub-regions. These conditions may also be additional factors increasing risks that will not be noticeable by entities located in other regions of Poland. Therefore, in the conducted survey, entrepreneurs were asked to determine the degree of the impact of various types of risks on the operations of the companies (Table 2).

Entrepreneurs are most severely affected by the risk of high competition (over 21% of respondents). A slightly smaller percentage of surveyed entrepreneurs declared the importance of economic risk (over 19%), however, in general, the degree of impact of this type of risk on their activity was assessed as low. In a significant way (which was also confirmed by 18.8% of responses) entrepreneurs feel the effects of unfair competition. It probably has its reference in the still-existing "grey economy", especially when it comes to employment. Employment without formal confirmation by a contract—is still considered a good method of reducing costs, especially in the construction sector. This industry is particularly characterized by high seasonality, and the location of the region in the Ukraine's neighborhood is an important factor conditioning the ease of recruitment of employees with qualifications and skills that are satisfactory to the employer, and not always requiring formal employment. Entrepreneurs who start their activity usually run the business on the basis of self employment, so avoiding or reducing labor costs is not possible. Their commitment, effort, skills, creativity—are the main "assets" shaping the company position in the market. Also in the case of startups experience, knowledge

Table 3 Identification and risk analysis in startups surveyed

An analysis and methods used in risk identification and control	Activities applied by the surveyed enterprises (in %)
Risk analysis conducted in the company environment	20.0
Internal risk analysis is carried out (internal factors of risk are analyzed)	5.0
Individual risk analysis by the entrepreneur himself/herself	20.0
Methods of identification and analysis are used	8.0
Instruments are used (actions taken) to limit the negative effects of the risks involved	12.5

Source: Own study based on the research conducted

and skills of employees also significantly determine the existence and further business development.

According to the analysis, a small number of startups identifies risks. 20% of the surveyed enterprises conducts a risk analysis of their environment, and only 5% referring internal factors. The results confirm that, although risk identification and analysis procedures are conducted—in all these cases—such actions are taken intuitively by the entrepreneurs themselves (Table 3). Some of the surveyed entrepreneurs declared that in order to identify and estimate the risk they used industrial espionage, scenario analysis and analysis of the risk effects. About 12.5% of respondents confirmed the use of tools that limit the negative effects of the risks as reserves creation and flexible pricing policy application.

It is extremely interesting that over 8% of surveyed entrepreneurs admit that it is their own predisposition (risk propensity) that affects risky decisions regarding the company operations. On the other hand, over 20% of respondents believed that risky activities were permanently inscribed in the activities of their enterprises, while the share of these activities in relation to all tasks and processes of the entity is in the range from 10% up to 30%.

5 Conclusions

Undoubtedly, uncertainty and risk occur in every area of the company operations and are indispensable elements of every decision-making process. Building stabilization in the first years of an enterprise's existence and its future in the long-term perspective is connected with making decisions that are often difficult and risky. However, as Olkiewicz writes [37] it is also a contribution to future activities, because it has a character that stimulates entrepreneurial activities, which may in turn create new opportunities. From this point of view of the negative effects of risks, each company looks for optimal solutions tailored to precisely defined situations, so as to minimize the negative deviations from the goals assumed in the operation. Considering the fact that we dealt with startups, both in the creation of entrepreneurial behaviors in the use of risks occurring in the company business and in the

reduction of failures resulting from these risks, an enormous role is attributed to the entrepreneur himself. Direct interviews revailed that the experience of the founder, his or her knowledge, awareness of constant changes and requirements to be met, will be the factors shaping the ways of risk management in the company and thus determining its future.

A significant role in this process of managing the risks play business accelerators and investors who share the risk with founders and at the same time professionally control the businesses. They also teach young entrepreneurs how to economically and professionally prepare innovative solutions responding to or even exceeding customer expectations.

References

1. Woźniak L, Sobkowiak A, Dziedzic S, Kąkol W, Kud K, Woźniak M, Wyrwa D (2015) Regiona Innovation Strategy of the Podkarpackie Voivodeship for smart specialization (RIS3) 2014–2020. Rzeszow. https://www.rpo.podkarpackie.pl/images/dok/15/RSI_2014_2020_wersja_angielska.pdf. Accessed 04 June 2019
2. van Gelderen M, Thurik R, Bosma N (2005) Success and risk factors in the pre-startup phase. Small Bus Econ 24(4):365–380
3. Eisenmann T, Ries E, Dillard S (2011) Hypothesis-driven entrepreneurship: the lean startup. Harvard Business School Background Note 812-095, pp 1–23
4. Paternoster N, Giardino C, Unterkalmsteiner M, Gorschek T, Abrahamsson P (2014) Software development in startup companies: a systematic mapping study. Inf Softw Technol 56 (10):1200–1218
5. Jajuga K, Jajuga T (1998) Inwestycje, instrumenty finansowe, ryzyko finansowe, inżynieria finansowa. Wydawnictwo Naukowe PWN, Warszawa, p 99
6. Teczke J (1996) Zarządzanie przedsięwzięciami zwiększonego ryzyka. Wydawnictwo Oddziału PAN w Krakowie
7. Chrisman JJ, McMullan E, Hall J (2005) The influence of guided preparation on the long-term performance of new ventures. J Bus Ventur 20(6):769–779
8. Trimi S, Berbegal-Mirabent J (2012) Business model innovation in entrepreneurship. Int Entrep Manag J 8(4):449–465
9. Drucker PF (1995) Zarządzanie organizacją pozarządową. Teoria i praktyka, Centrum Informacji dla Organizacji Pozarządowych, BORDO, Warszawa
10. Kaczmarek TT (2005) Ryzyko i zarządzanie ryzykiem. Ujęcie interdyscyplinarne. Difin, Warszawa, pp 25–29
11. Knight FH (1921) Uncertainty and profit. Houghton and Mifflin, Boston, MA
12. Schumpeter JA (1934) The theory of economic development: an inquiry into profits, capital, credit, interest and the business cycle. Harvard University Press, Cambridge, MA
13. Schumpeter JA (1962) Capitalism, socialism and democracy. Harper and Row, New York
14. Zangwill WI (1993) Lighting strategies for innovations. Lexington Books, New York
15. Foster RN (1986) Innovation: the attacker's advantage. Summit Books/Simon & Schuster, New York, after: Foster RN, Kaplan S (2003) Twórcza destrukcja. Dlaczego firmy nastawione na stopniowe ulepszanie swojej działalności nie mają szansy przetrwać – i jak je skutecznie przekształcać, translation: Nycz M, Jakubczyc J, Mach M., Herbik E, Galaktyka, Łódź, p 15
16. Frey FL (1993) Entrepreneurship: a planning approach. West Publishing Company, pp 23–28
17. Hisrich RD, Peters MP (1992) Entrepreneurship, starting, developing and managing a new enterprise, 2nd edn. IRWING, Boston, p 10
18. Ronstadt RC (1984) Entrepreneurship. Lord Publishing, Dover, MA, p 28

19. Vesper K (1980) New venture strategies. Englewood Cliffs, NJ, Prentice-Hall, p 2
20. Hawley FB (1893) The risk theory of profit. Q J Econ 7/4:459–479
21. Adamska A (2009) Ryzyko w działalności przedsiębiorstwa: podstawowe zagadnienia. In: Fierla A (ed) Ryzyko w działalności przedsiębiorstw. Wybrane aspekty, Oficyna Wydawnicza SGH, Warszawa
22. Chapman RJ (2011) Simple tools and techniques for enterprise risk management. Wiley
23. Kaszuba-Perz A, Perz P (2010) Rola zarządzania ryzykiem w przedsiębiorstwie w obliczu wzrostu zewnętrznych czynników ryzyka. „e-Finanse", vol 6/2
24. Raczkowski K, Noga M, Klepacki J (2015) Zarządzanie ryzykiem w polskim systemie finansowym. Difin, Warszawa
25. Thlon M (2013) Charakterystyka i klasyfikacja ryzyka w działalności gospodarczej. Zeszyty Naukowe UEK, p 902
26. Drucker PF (1985) Innovation and entrepreneurship. Harper, New York, pp 30–129
27. McGrath RG, Macmillan IC (1995) Discovery driven planning: turning conventional planning on its head. Harv Bus Rev 73(4):44–54
28. Bortolini RF, Cortimiglia MN, de Moura Ferreira Danilevicz A, Ghezzi A (2018) Lean Startup: a comprehensive historical review. Manag Decis. https://doi.org/10.1108/MD-07-2017-0663
29. Karp A (2017) Why milestone-based agreements are bad for early stage startups. The Startup. https://medium.com/swlh/why-milestone-based-agreements-are-bad-for-early-stage-startups-15c759995121. Accessed 06 Dec 2017
30. Lavinsky D (2013) 5 Ways to minimize risk for investors. https://www.entrepreneur.com/article/226602. Accessed 09 May 2013
31. What is a business accelerator – and how does it differ from an incubator? https://smallbiztrends.com/2016/08/business-accelerator-differ-incubator.html. Accessed 09 August 2016
32. Mansoori Y (2016) How the lean startup methodology affects entrepreneurs and their organizations: the case of a Swedish startup accelerator, February. doi:https://doi.org/10.13140/RG.2.1.3294.9361. https://www.researchgate.net/publication/303717836_How_the_Lean_Startup_Methodology_Affects_Entrepreneurs_and_their_Organizations_The_Case_of_a_Swedish_Startup_Accelerator
33. Ries E (2011) The lean startup: how today's entrepreneurs use continuous innovation to create radically successful businesses. Random House Digital, pp 60–61
34. Blank S, Dorf B (2012) The startup owner's manual: the step-by-step guide for building a great company. K&S Ranch
35. Brown T (2008) Design thinking. Harvard Business Review, June 2008
36. Design thinking vs. lean startup; If you build it, will they come? Solution Space, UCT Graduate School of Business. http://gsbsolutionspace.uct.ac.za/article-design-thinking-vs-lean-startup
37. Olkiewicz AM (2012) Ryzyko i jego wpływ na decyzje przedsiębiorstw. Zeszyty Naukowe Uniwersytetu Szczecińskiego Nr 737, Finanse, rynki finansowe, ubezpieczenia nr 56, Szczecin, p 561

Local Development as a Function of Budgetary Policy and Entrepreneurship

Tomasz Skica, Marta Czyżewska, and Leszek Gajecki

1 Introduction

Local development is a topic very often analyzed in the literature. There were several research attempts regarding the problem of measuring the territorial units development (including [1–8]).

Pomianek [9] points out the difficulties with local development measuring caused by the lack of statistical data collected at the commune level, allowing to calculate indicators describing the level of economic development as Gross Domestic Product (GDP) per capita or Human Development Index (HDI).

Most of the research concentrates on building multidimensional indicators presenting the level of development instead of explaining the factors responsible for its level (see i.a.: [10–16]). For this reason the knowledge on factors determining the development level of local government units, remains unchanged (see i.a.: [17–19]).

Parallely in the literature there is a lack of studies aimed at measuring and explaining the level of local development in other way than using synthetic development indexes. Usually research concentrates on building the development

T. Skica (✉)
Institute for Financial Research and Analyzes, University of Information Technology and Management, Rzeszow, Poland
e-mail: tskica@wsiz.rzeszow.pl

M. Czyżewska
Department of Economics and Political Economy, Pedagogical University of Cracow, Cracow, Poland
e-mail: marta.czyzewska@up.krakow.pl

L. Gajecki
Department of Computer System Applications, University of Information Technology and Management, Rzeszow, Poland
e-mail: lgajecki@wsiz.rzeszow.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_11

classification, and does not undertake the issue of development variables. Due to this fact, the matter of variables explaining the development level is still not fully recognized. There are some works that focus on the alternatives in development measuring (see: [20–22]), nevertheless the dominating approaches are the traditional ways of expressing development at the lowest level of government.

There is a lot of criticism of the measures in the form of multidimensional synthetic development indexes (i.a. [23, 24]). They are based on the subjective weights assigned to variables, some of them focus separately on the social and economic development, and some merge all the aspects together in sustainable development indicators [25, 26]. Moreover, the construction of a multidimensional indicator of development limits the possibilities of development level estimations, because very often all explanatory variables are included into the indicator. Finally, due to the lack of the data available at the lowest level of government (i.e. communes), development indicators usually concentrate on the upper level (i.e. poviats) of territorial units [27]. All of the difficulties limit the possibility for comparisons of the local development. For these reasons attempts of other development measures creation seem to be very important and valuable.

2 Local Development Determinants: Literature Review

Local development is a very complex phenomenon widely analyzed and defined by many researchers. Many studies derived that it is conditioned by range of economic, social and other factors.

Sekuła [28] identified two groups of local development definitions. In the first of them, the local community and its needs were considered the center of gravity, while in the second—changes occurring within the local system.

The theory of the learning region emphasizes the importance of social values as a leading development factor that encourages economic initiatives. These values are the climate of trust and cooperation, the traditions of entrepreneurship, the presence of demanding and rich consumer market, the availability of office and industrial base, large and varied in terms of qualifications and requirements, labor resources (both poorly educated and highly qualified). The condition for creating an environment conducive to entrepreneurship is the development of networks of cooperating institutions: public, economic, service, financial, social and scientific for the exchange of ideas, creation of trust and economic cooperation. This enables the emergence of innovative phenomena and new forms of entrepreneurship. Proponents of this theory recommend an active attitude of public authorities with a precise strategy to stimulate entrepreneurship. This concept emphasizes the extraordinary importance of personal contacts between cooperating parties, even informal contacts of managers [29].

Nowińska [30] links local development with the area of a commune subordinate to self-government authority. Local authorities, institutions, organizations and individuals are involved in the use of local opportunities and resources and conduct

activities in various fields for the benefit of communities forming the local community. Similarly, Parysek [31, 32] emphasizes that local development is the result of cooperation between local communities (i.e. residing in a local territorial unit), local self-government and other organizations and institutions, mainly non-profit. Myna [33] divides the initiators of local development into five groups: local authorities, ecological lobbies, socio-cultural association, entrepreneurs and local communities. These groups cooperate with each other, mobilizing the energy of the entire local environment and lead to the achievement of local development goals.

Finally, Bagdziński [34], Grzebyk [35], as well as Pomianek [9], classify local development factors into three groups. The first one consists of political factors (the regime, competence and power of authority at various levels, way of governing, government-community relations and the degree of public acceptance of power). The next is related with social factors (needs and values, aspirations, interpersonal relations, attitude to reforms, innovation and technical progress, private entrepreneurship and the attitude of local authorities to entrepreneurship). The last one is connected with economic-environmental-spatial factors (natural resources, environmental values, human resources and their qualifications, economic potential, including technical and economic and social infrastructure as well as investment potential).

Based on the key findings from the literature review, we have found two alternative indicators as measures of local development. The first one describes intensive local development. It concentrates on communes' own revenue. This variable is used in various configurations for development measuring. Czyszkiewicz [17], as well as Grzebyk and Stec [36], use the share of own revenue in total revenue as a measure of economic development and wealth of the population. Stawicki [37], uses the dynamics of own revenues as a measure of local development. Madras and Mitura [38], use the share of own revenues in total revenue as a measure of endogenous economic potential. Stanny and Strzelczyk [39] apply the per capita income ratio to measure the possibility of generating own financial inflows by communes.

The second measure focuses on the total revenue of local governments to reflect local development, that describes both intensive and extensive development (see: i.a. [40], as well as [41]). The revenue consists of three components: own revenue, general subsidies and grants (see: [42, 43]). The sum divided by the number of inhabitants could be used as a measure of overall development resulting from the submission of both funds received from the central budget and the efficiency of own sources of budgetary inflows. Based on the comparison of both measures we decided to use the total revenue of local governments as the measure of total (intensive and extensive) local development.

In the article the variables explaining the development of communes were classified into two groups. The first was budgetary policy analyzed through the prism of expenditures' structure (see: [42]). The second was entrepreneurship [44]. The literature review proves that there are no optimal, imperfection-free measures describing local development. Similar difficulties accompany the selection of development measures at the countries' and regions' levels. The presented

research approach is a starting point for further in-depth studies aimed at perfecting the methodology of local development measurement.

3 Data and Methods

The analysis was based on the datasets of local government units in Poland. The communes were divided into three categories: urban, urban-rural, and rural. The time interval adopted for the study covered the years 2008–2016. The data were obtained from Statistics Poland, Local Data Bank (LDB) and Ministry of Finance. The explained variable was local development, defined as the total revenue of commune per capita (in PLN), as a measure of intensive and extensive local development.

Explanatory variables were: budgetary policy and entrepreneurship. To describe budgetary policy of communes, we used the following variables:

1. share of investment expenditure in total expenditure (%),
2. expenditures on agriculture and hunting per capita (in PLN),
3. expenditures on transport and communications per capita (in PLN),
4. expenditures on tourism per capita (in PLN),
5. expenditures on dwelling economy per capita (in PLN),
6. expenditures on public administration per capita (in PLN),
7. expenditures on public safety and fire protection per capita (in PLN),
8. expenditures on servicing public debt per capita (in PLN),
9. expenditures on education per capita (in PLN),
10. expenditures on health care per capita (in PLN),
11. expenditures on social assistance per capita (in PLN),
12. expenditures on municipal economy and environmental protection per capita (in PLN),
13. expenditures on culture and national heritage per capita (in PLN),
14. expenditures on physical education per capita (in PLN).

In the description of entrepreneurship level, we used one variable:

1. the number of newly registered economic entities per 10,000 people at working age.

Due to missing data for other potential indicators measuring the entrepreneurship, we excluded them from the study. Attribute selection method gives the subset of attributes that have predictive ability to the considered variable (here total revenue per capita). The attributes, which were not selected we considered redundant to the others. In this work we used method CfsSubsetEval [45], with search method Best-First. This method prefer such subset of attributes, which are strongly correlated with given class. On the other hand these attributes cannot be highly correlated among themselves. The merit M_s of feature subset S contains k features.

$$M_s = \frac{k\overline{r_{cf}}}{\sqrt{k + k(k-1)\overline{r_{ff}}}} \tag{1}$$

where:
$\overline{r_{cf}}$—mean feature-class correlation,
$\overline{r_{ff}}$—mean feature-feature correlation.

Clustering method groups the instances into mostly uniform groups called clusters. The values of respectively attributes have some similar properties. The k-means method [46] is performed in the following steps:

1. Initialization: choose k clusters' means $m_1^{(1)},\ldots, m_k^{(1)}$ as randomly chosen observations. Repeat 2–3 while assignment of observation doesn't change.
2. Assignment step t: assign each observation x_p to such cluster S_i, which mean has the smallest distance to this observation:

$$S_i^{(t)} = \left\{ x_p : \left\| x_p - m_i^{(t)} \right\| < \left\| x_p - m_j^{(t)} \right\| \ \forall_j 1 \le j \le k \right\} \tag{2}$$

3. Update Step—Calculate the mean of new cluster.

$$m_i^{(t+1)} = \frac{1}{\left| S_i^{(t)} \right|_{x_j}} \sum_{S_i^{(t)}} x_j \tag{3}$$

In this algorithm we used Manhattan distance:

$$\|x - y\| = \sum\nolimits_i |x_i - y_i| \tag{4}$$

In feature selection analysis we did not consider total expenditure per capita, which could not be taken as a reason of revue. We took into account the components of expenditures, they should not be measured by simple correlation. Correlation was used for feature selection, but for such selected features we analyzed the clusters and we did not provide exact analysis of correlation.

We will show also, that in out research the correlation coefficients are not strong. However we will be able to find some characteristics using cluster analysis.

4 Research Results

The analysis of the data was performed in two steps. The first was attribute selection, and the second clustering. For attribute selection we used CfsSubsetEval [45], with search method Best-First. These algorithms were performed separately on each type

Table 1 Selection of attributes in each commune type to predict total revenue per capita

Attribute	Type of commune		
	Urban	Rural	Urban-rural
Newly registered economic entities per 10,000 population	+	+	
Share of investment expenditure in total expenditure	+	+	+
Expenditure on tourism per capita		+	+
Expenditure on transportation and communication per capita	+		
Expenditure on public administration per capita	+		
Expenditure on public safety and fire protection per capita	+		+
Expenditure on servicing debt per capita	+	+	+
Expenditure on education per capita		+	+
Expenditure on health care per capita	+	+	+
Expenditure on physical education per capita		+	

Source: Own study

of commune. The results are shown in Table 1. For better visualization we removed also the communes with total revenue per capita significantly higher than the others' communes. Thus the communes: Kleszczów, Rewal, Krynica Morska, Rząśnia were clustered together according to the higher total revenue per capita.

We use k-means with Hamming Distance. This method was applied for each type of communes separately. Clusters have different sizes. For example in case of urban communes we have clusters with 52 elements as well as 6 elements (together 300 communes). For rural communes the clusters are higher by average, since we analyzed around 1600 communes. The number of clusters (10) was chosen that is big enough to cover different subsets of data. This number in our opinion is optimal to perceive visually different subsets. Data, which we used don't need normalization or discretization. Clustering algorithm works for any floating point vectors as points of data, so we didn't apply any additional techniques.

The graphs below do not illustrate all the relationships between local development and explanatory variables. Although the attribute selection showed that they should be included in clustering, the obtained results did not explain the relationship between the explanatory variables and the explained variable (local development).

For urban communes we can observe (Fig. 1) that total revenue per capita and newly registered entities per 10,000 people are not strongly related, although we expect that with growing number of newly registered entities increases the communes' revenue per capita. We can observe, that only cluster 9 describe communes with higher (>150) number of newly registered entities, with also higher (>6500 PLN) revenue per capita. Cluster 4 in major number of cases shows moderate (120–200 PLN) number of newly registered entities, with revenue per capita ranging from 4800 to 5800 PLN. Very dense area on the Fig. 1 represents the lower or moderate range of 80–170 of newly registered entities, and lower level of revenue per capita in the range from 3100 to 4200 PLN (e.g. cluster number 3).

At this point we can discuss the correlation coefficients between total revenue per capita and newly registered economic entities per 10,000 population. Presented

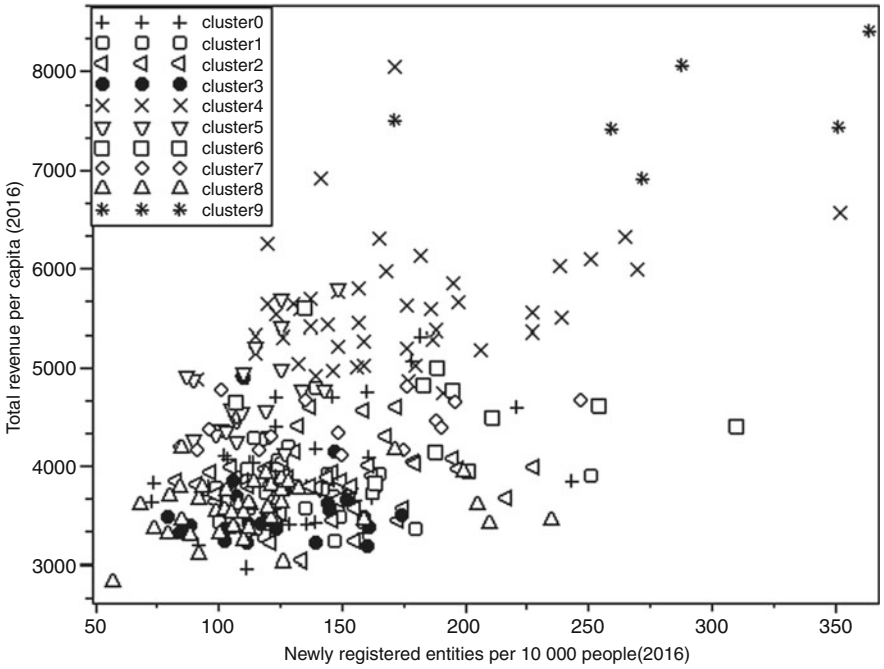


Fig. 1 The relationship between total revenue per capita (2016) and newly registered economic entities per 10,000 population (2016) in urban communes. Source: Own study

Table 2 Correlation between total revenue per capita (2016) and newly registered economic entities per 10,000 population (2016) in urban communes

Cluster	Correlation coefficient
0	0.368
1	0.056
2	0.095
3	0.045
4	0.297
5	0.470
6	0.230
7	0.366
8	0.214
9	0.358

Source: Own study

values (Table 2) don't prove strong correlations. The highest value 0.47 is for cluster 5. In cluster description we don't need correlation measured by correlation coefficient. We analyze the ranges of values for both axes in figure. The data division into clusters assume dependencies between the data on the base of distance to cluster mean. If in the whole data there is no strong correlation we don't expect strong correlation for separate clusters. From this reason we will not provide the correlation

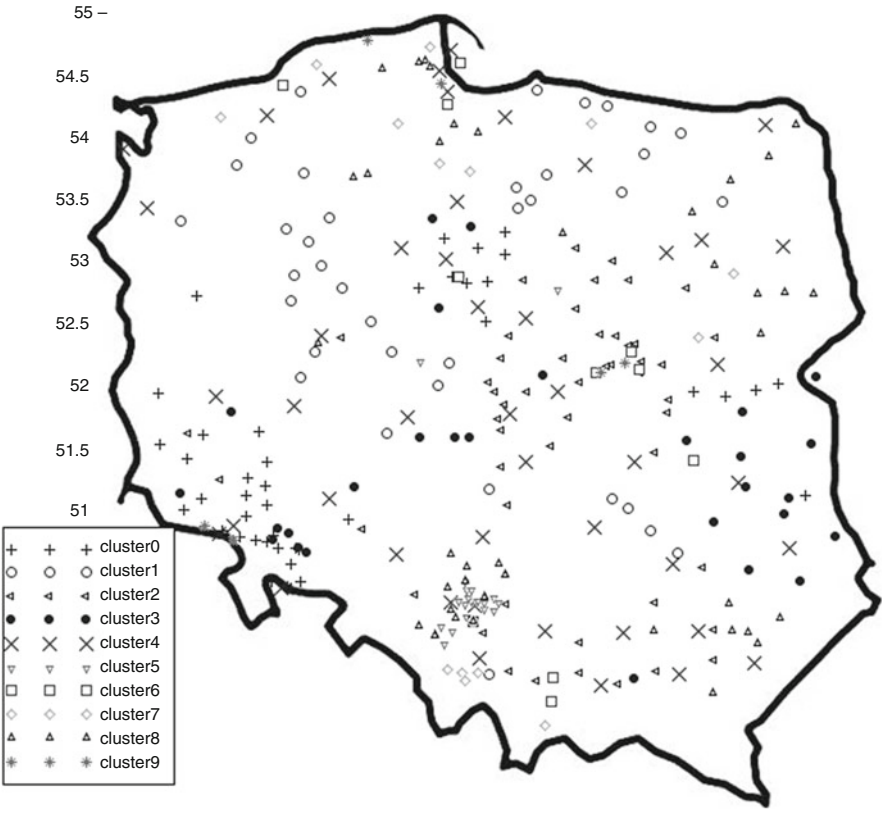


Fig. 2 Locations of urban communes according to division into clusters. Source: Own study, source of contour map: https://pl.pinterest.com/pin/333829391126901000/

analysis for other discussed variables. In the same way we think, that regression function analysis is unnecessary.

In our case division into clusters don't assume geographical location (we don't use such variables). However we can check if some clusters may be specific for some regions. On Fig. 2 we observe that some of clusters are distributed over larger areas of country. Some of them are limited to a smaller area, e.g. cluster 5 covers Upper Silesia. Cluster 3 extends from Lubelskie Voivodship, by Lower Silesia region to central parts of Poland.

The relationship between total revenue per capita and share of investment expenditures in urban communes (Fig. 3) seems to be more complicated. We can observe the area densely located characters: 2–22% share of investment expenditures and the revenue around 3100–4100 PLN. Lower level of investment expenditures (here in 2013) may result in lower level of revenue (year 2016). We can also observe widely scattered investments: 3–30% associated also by a wide range of communes' revenue per capita (3500–6200 PLN).

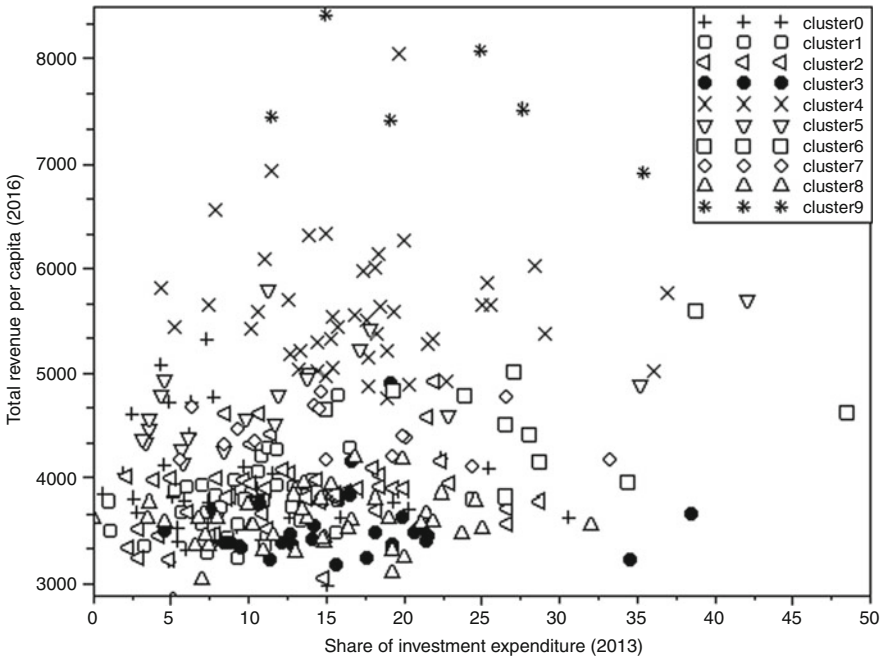


Fig. 3 The relationship between total revenue per capita (2016) and share of investment expenditures (2013) in urban communes. Source: Own study

The expenditures on transportation and communication, public administration, public safety and healthcare also significantly influence the communes revenue. Regarding the transportation (Fig. 4) the relationship is not very strong—e.g. in cluster 4 the moderate expenditures in the range 400–1400 PLN result in moderate revenue in the range from 4800 to 5800 PLN. The lower level of expenditures (<500 PLN per capita), results in the lower level of revenue (3200–4100 PLN), cluster 3.

For rural communes we observe weak relationship between total revenue per capita and the number of newly registered entities per 10,000 people (2009) and similarly with expenditures on servicing public debt (2015), (Fig. 5). Regarding the number of newly registered entities there is a densely dotted area at the range 30–180 of entities (lower and moderate number), which results in smaller and moderate revenue 3200–5000 PLN. We can also observe characters, that belong to cluster 1, where the number of entities is moderate and high (70–250) and of high revenue >5000 PLN per capita.

The expenditures on education per capita (2010) same as expenditures on healthcare are weakly related with the revenue (Fig. 6). The most densely marked area shows that expenditures on education within the range 500–1300 PLN per capita, result in revenue within the range of 3300–5000 PLN per capita. There are some cases confirming the significant dependence, especially, that belongs to cluster

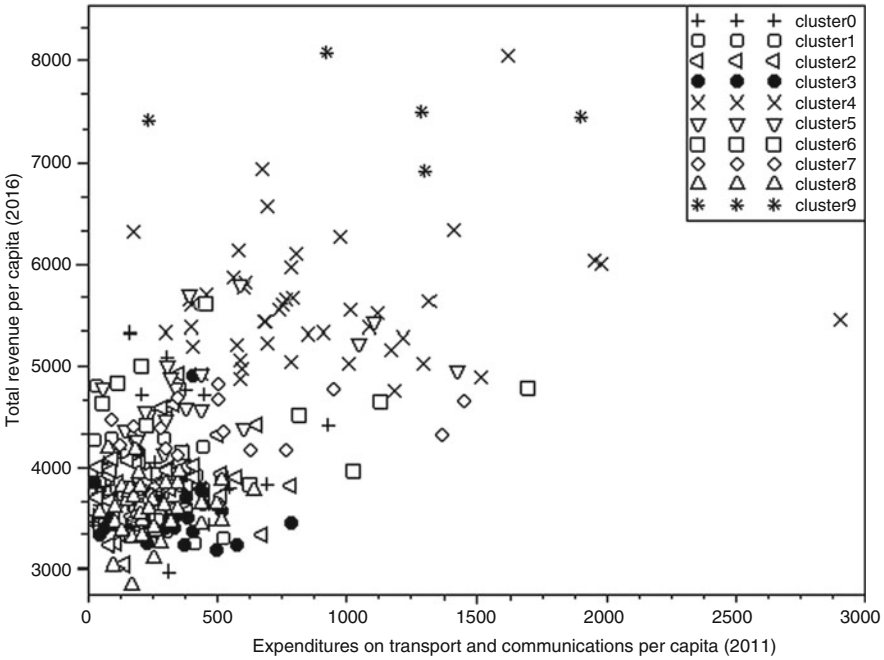


Fig. 4 The relationship between total revenue per capita (2016) and expenditures on transport and communication (2011) in urban communes. Source: Own study

1: higher expenditures >1000 per capita result in higher total revenue >5000 per capita.

In case of urban-rural communes, the relations between total revenue per capita (2016) and share of investment expenditures (2013) is relatively weak (Fig. 7). The high density of data marks we can observe at the range 2–25% of share which result in the total revenue per capita from 3200 to 4500 PLN. On the other hand there are cases, in which the share of investment expenditures was as above, but revenue >5000 PLN, or >25% share that resulted in revenue <5000 PLN per capita.

The similar relation can be observed between total revenue per capita and expenditures on public debt. A bit more stronger relation is between total revenue per capita and expenditures on education, healthcare and public safety. For example, higher expenditures on education may result in higher level of total revenue per capita—we can observe weak dependence for densely marked area but also for cluster 5 (Fig. 8).

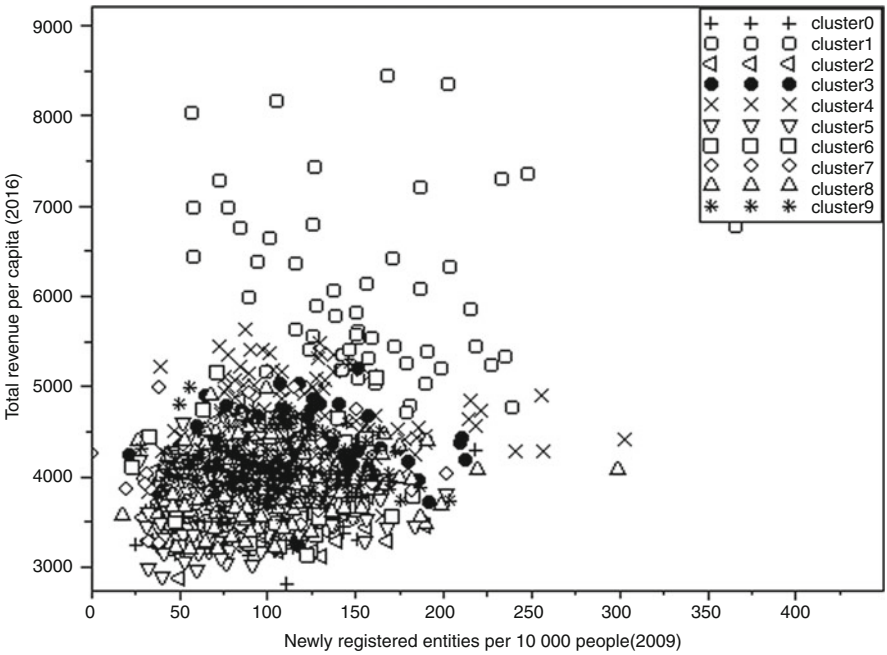


Fig. 5 The relationship between total revenue per capita (2016) and number of newly registered entities per 10,000 people (2009) in rural communes. Source: Own study

5 Conclusions

The article presents the results of the conducted research and refers to the explanation of total revenue per capita as the variable describing the intensive and extensive development of the communes as local self-government communities.

We clustered the territorial units according to chosen sets of variables measuring the local development, but we did not assigned any subjective weighs to variables to ensure objectivity of the results. We used correlation in the process of the variables selection and clustering. In the next phase of the analysis We focused on verification on if and how the variables (that are already identified by other researchers as measures of local development, and with data available for the communes—the lowest level of territorial units) actually influence the local development.

The results achieved do not fully confirmed our initial assumptions as they show no visible relation between communes' total revenue per capita and level of entrepreneurship (measured by the newly registered companies). What seemed less obvious the expenditures on transportation and communication, public administration, public safety and healthcare significantly influence the urban communes revenue (but that relation is not visible for rural and rural—urban communes). This can be explained that communes revenues are of a less "entrepreneurial nature", however it's a "business type" indicator.

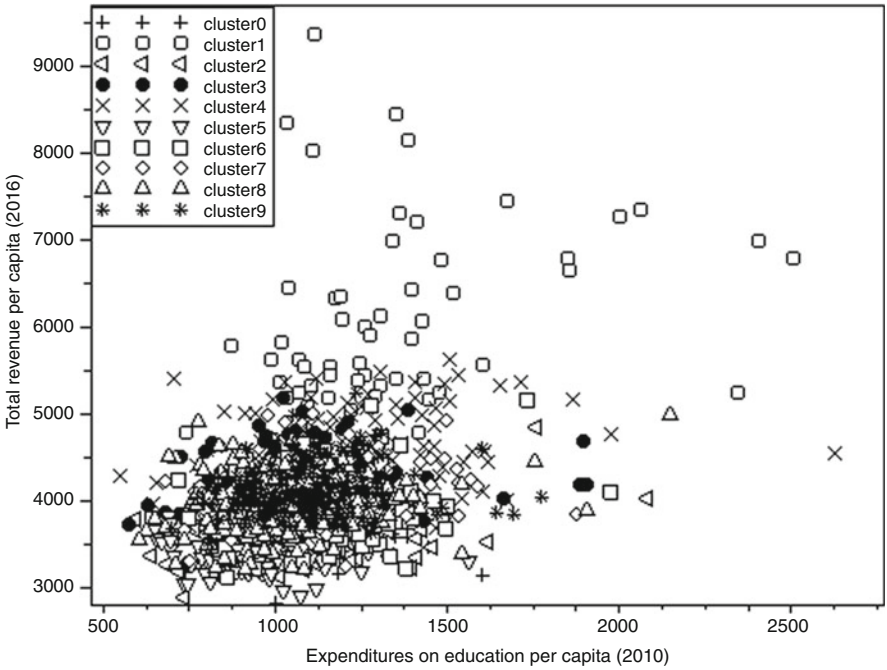


Fig. 6 The relationship between total revenue per capita (2016) and expenditures on education per capita (2010) in rural communes. Source: Own study

The obtained results allow us to formulate several interesting conclusions. The first one proves the possibility of explaining local development by application of selecting essential attributes and clustering methods. The research concept applied by the authors can be applied to all municipalities in the country, regarding the communes categories' division.

Secondly, another important research finding is also the fact that individual explanatory variables have a differentiated impact on the variable explained depending on their values, and on the municipalities' categories (urban, rural, urban-rural). Studies have shown that the same explanatory variables in different categories of municipalities and at a different level of describing them values result in different level of communes' development. Therefore it is possible, to try to configure variables affecting the development according to the type of commune and the required minimum values, starting from which the stimulus effect begins to be identified.

The third finding resulting from the conducted research indicates the need to include in the analyzes the effects of using explanatory variables—delays between the year in which the instrument was used (e.g. increased investment expenditure) and the year in which the results it influenced the local development (total revenue per capita). Studies have shown that comparing explanatory variables and their effects (in the commune development) in the same year often did not prove the

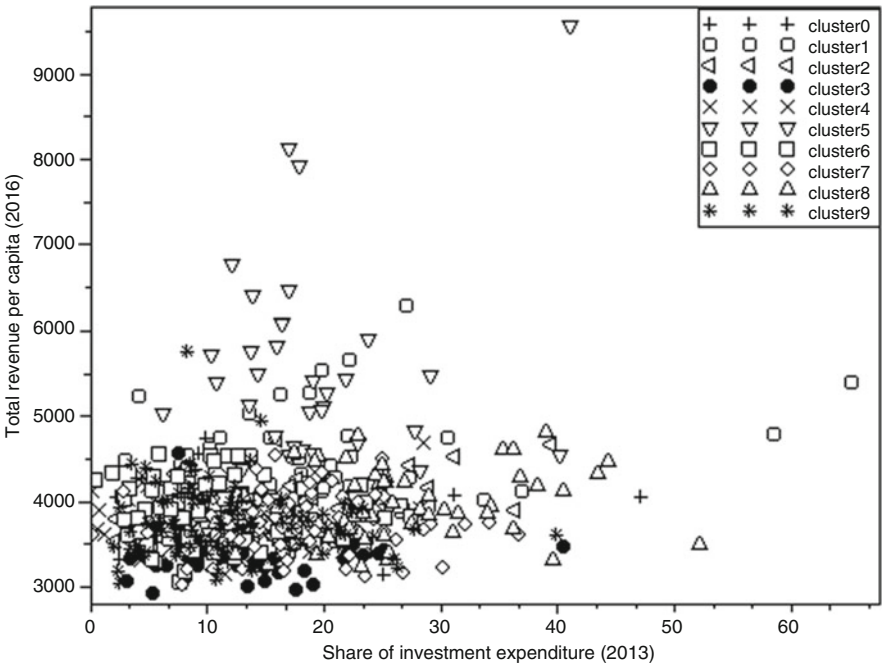


Fig. 7 The relationship between total revenue per capita (2016) and share of expenditures on investments (2013) in urban-rural communes. Source: Own study

possibility of using a given variable to explain the total revenue per capita level. However, comparing it with the use of delay gave a different result, confirming its usefulness in explaining local development.

Fourthly, the research carried out so far very clearly indicates the relationship with the local development of variables belonging to two groups, i.e. budgetary (expenditure) policies of municipalities, as well as entrepreneurship, but not with every single variable among these groups. Therefore, these studies will be repeated in relation to the another explanatory variable describing the development, i.e. own revenue per capita, reflecting the intense development of the analyzed communes.

Fifth, the results obtained justify taking into account in the research on local development, not only the relationships concerning individual explanatory variables with the variable explained in the form of the level of development (extensive and intensive together). The further research will also verify the relations between the variables explaining development, classified as: budget policy and entrepreneurship.

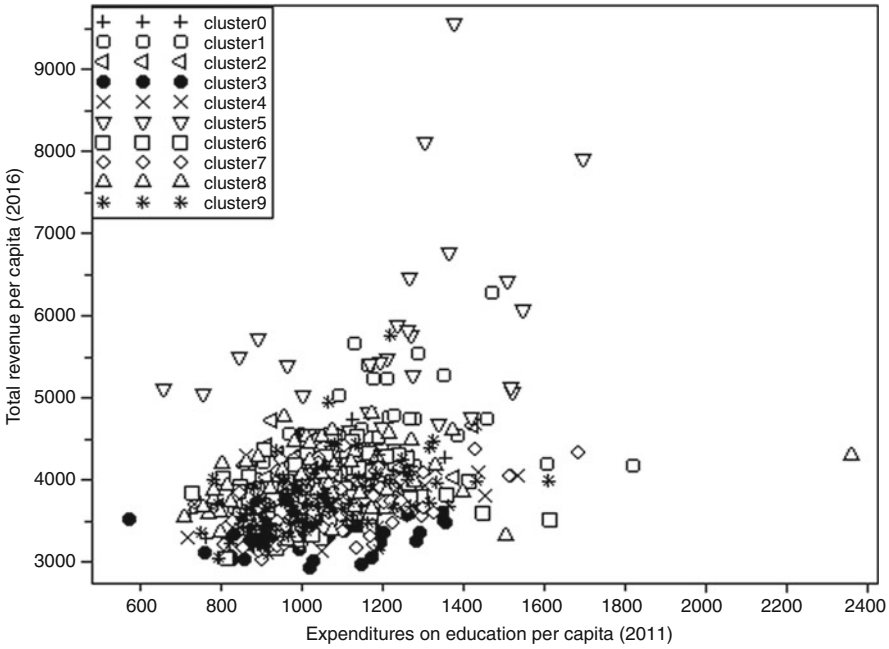


Fig. 8 The relationship between total revenue per capita (2016) and expenditures on education (2011) in urban-rural communes. Source: Own study

References

1. Babuchowska K, Kisiel R (2006) Wpływ samorządu gminnego na lokalny rozwój gospodarczy na przykładzie gmin województwa warmińsko-mazurskiego. Acta Sci Pol Oeconomia 5 (2):1–10
2. Rosner A (ed) (1999) Typologia wiejskich obszarów problemowych. IRWiR PAN, Warszawa
3. Rosner A (ed) (2002) Wiejskie obszary kumulacji barier rozwojowych. IRWiR PAN, Warszawa
4. Rosner A (ed) (2007) Zróżnicowanie poziomu rozwoju społeczno-gospodarczego obszarów wiejskich a zróżnicowanie dynamiki przemian. IRWiR PAN, Warszawa
5. Sobala-Gwosdz A (2005) Ośrodki wzrostu i obszary stagnacji w województwie podkarpackim. Instytut Geografii i Gospodarki Przestrzennej Uniwersytetu Jagiellońskiego, Kraków
6. Wojewódzka A (2007) Klasyfikacja gmin miejsko-wiejskich województwa mazowieckiego według poziomu rozwoju. In: Strahl D (red) Gospodarka lokalna w teorii i praktyce, Prace Naukowe AE Wrocław, vol 1161
7. Zeliaś A (ed) (2000) Taksonomiczna analiza przestrzennego zróżnicowania poziomu życia w Polsce w ujęciu dynamicznym. Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków
8. Gralak A (2005) Poziom konkurencyjności wschodnich regionów Polski na tle zróżnicowań międzyregionalnych. Acta Sci Pol Oecon 1:71–83
9. Pomianek I (2010) Poziom rozwoju społeczno-gospodarczego obszarów wiejskich województwa warmińsko- mazurskiego. Oeconomia 9(3):227–239
10. Bieńkowska W (2013) Poziom rozwoju lokalnego gmin wiejskich województwa mazowieckiego. Folia Pomeranae Universitatis Technologiae Stetinensis. Oeconomica 299 (70):7–16

11. Chrzanowska M, Drejerska N (2016) Ocena rozwoju społeczno-gospodarczego gmin województwa mazowieckiego z wykorzystaniem metod analizy wielowymiarowej. Wiadomości Statystyczne 6:59–69
12. Cyburt A (2014) The activity of local governments in the absorption of EU funds as a factor in the development of rural communes. Acta Sci Pol Oecon 13(4):31–42
13. Grzebyk M (2017) Statystyczna ocena zróżnicowania poziomu rozwoju gmin wiejskich województwa podkarpackiego w latach 2005-2014. Studia KPZK:457–467
14. Kiczek M (2015) Ocena rozwoju gmin województwa podkarpackiego (z wykorzystaniem metody Hellwiga). Publishing House of Rzeszow University of Technology, vol XX, 22 (3):87–100
15. Pomianek I (2016) Klasyfikacja gmin miejsko-wiejskich w Polsce według poziomu rozwoju społeczno-ekonomicznego. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu 450:458–471
16. Ziemiańczyk U (2010) Ocena poziomu społeczno-gospodarczego gmin wiejskich i miejsko-wiejskich w województwie małopolskim. Infrastruktura i ekologia obszarów wiejskich. PAN, Oddział w Krakowie, Komisja Technicznej Infrastruktury Wsi 14:31–40
17. Czyszkiewicz R (2003) Wskaźnik rozwoju wspólnot terytorialnych-koncepcja o praktycznym zastosowaniu. Studia Regionalne i Lokalne 2(12):77–90
18. Kamińska A, Janulewicz P (2009) Klasyfikacja gmin wiejskich województwa lubelskiego na podstawie rozwoju społeczno-gospodarczego. Folia Pomeranae Universitatis Technologiae Stetinensis Oeconomica 57:31–42
19. Krakowiak-Bal A (2005) Wykorzystanie wybranych miar syntetycznych do budowy miary rozwoju infrastruktury technicznej. Infrastruktura i Ekologia Terenów Wiejskich 3:71–82
20. Hryniewicz JT (2000) Endo-i egzogeniczne czynniki rozwoju gospodarczego gmin i regionów. Studia regionalne i lokalne 2(2):53–77
21. Hryniewicz JT (2017) Czynniki lokalnego rozwoju gospodarczego-20 lat później. Samorząd Terytorialny 6:5–23
22. Wysokinska AA (2017) Institutions or culture? Lessons for development from two natural experiments of history, pp 1–55. https://ssrn.com/abstract=2857893 or https://doi.org/10.2139/ssrn.2857893. Accessed 10 Nov 2018
23. Bański J (2014) Współczesne typologie obszarów wiejskich w Polsce – przegląd podejść metodologicznych. Przegląd Geograficzny 86(4):452
24. Sadowski Z (2005) Postęp społeczno-ekonomiczny i jego mierzenie. [w:] Sadowski Z (red) Transformacja i rozwój. Polskie Towarzystwo Ekonomiczne, Warszawa, p 12
25. Borys T (1999) Wskaźniki ekorozwoju. Wydawnictwo Ekonomia i Środowisko, Białystok, p 99
26. Smarzewska A, Bodzak D (2015) Measurement on sustainable development of rural communes of Bialski district. Econ Reg Stud 8(2):54–66
27. Godlewska-Majkowska H, Perło D (2017) Zastosowanie metody wagowo-korelacyjnej i modelowania miękkiego do analizy atrakcyjności inwestycyjnej powiatów w Polsce. Zarządzanie i Finanse 15(3):207
28. Sekuła A (2001) Koncepcje rozwoju lokalnego w świetle współczesnej literatury polskiej – zarys problem. Zeszyty Naukowe Politechniki Gdańskiej, Ekonomia 40:89–95
29. Gałązka A (2017) Teoretyczne podstawy rozwoju regionalnego–wybrane teorie, czynniki i bariery rozwoju regionalnego. Studia BAS 1:9–61
30. Nowińska E (2000) Strategiczne planowanie rozwoju gmin na przykładzie gmin przygranicznych. In: Strategie rozwoju lokalnego na przykładzie gmin pogranicza polsko-niemieckiego, Wydawnictwo Akademii Ekonomicznej, Poznań, p 67
31. Parysek JJ (1995) Rola samorządu terytorialnego w rozwoju lokalnym. In: Parysek JJ (ed) Rozwój lokalny: zagospodarowanie przestrzenne i nisze atrakcyjności gospodarczej. PWN, Warszawa, p 37
32. Parysek JJ (1997) Podstawy gospodarki lokalnej. Wydawnictwo Naukowe Uniwersytetu Adama Mickiewicza, Poznań, p 46
33. Myna A (1998) Rozwój lokalny, regionalne strategie rozwoju, regionalizacja. Samorząd Terytorialny 11:32

34. Bagdziński SL (1994) Lokalna polityka gospodarcza (w okresie transformacji systemowej). Wydawnictwo Uniwersytetu Mikołaja Kopernika, Toruń, p 15
35. Grzebyk B (2003) Szanse i ograniczenia rozwoju przedsiębiorczości na obszarach prawnie chronionych (na przykładzie gminy Baligród). In: Czudec A (ed) Regionalne uwarunkowania ekonomicznego rozwoju rolnictwa i obszarów wiejskich, vol 2. Wydawnictwo Uniwersytetu Rzeszowskiego, Rzeszów
36. Grzebyk M, Stec M (2016) Statystyczna ocena poziomu rozwoju jednostek terytorialnych szczebla lokalnego województwa podkarpackiego w latach 2005–2013. Mod Manag Rev 21–23(3):71–87
37. Stawicki M (2012) Koniunktura gospodarcza a rozwój gmin peryferyjnych po wstąpieniu do Unii Europejskiej. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu 4(14):115–120
38. Madras T, Mitura M (2014) Dochody własne miast wojewódzkich w analizie ich kondycji finansowej. Econ Manag 6:123–134
39. Stanny M, Strzelczyk W (2015) Zróżnicowanie przestrzenne sytuacji dochodowej gmin a rozwój społeczno-gospodarczy obszarów wiejskich w Polsce. Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu 17(4):301–307
40. Wojarska M, Marks-Bielska R (2015) Fundusze Unii Europejskiej jako źródło finansowania rozwoju lokalnego gmin województwa warmińsko-mazurskiego. Optimum Studia Ekonomiczne 4(76):104–120
41. Jegorow D (2015) Samodzielność finansowa polskich gmin-dyspersja regionalna. Zarządzanie. Teoria i Praktyka. Wyższa Szkoła Menedżerska, Warszawa 2(12):25–30
42. Skica T, Golejewska A, Bielak J (2018) Budgetary policy of local government and its impact on entrepreneurship. Int J Contemp Manag 17(2):35–62
43. Standar A (2017) Ocena kondycji finansowej gmin oraz jej wybranych uwarunkowań na przykładzie województwa wielkopolskiego przy wykorzystaniu metody TOPSIS. Wieś i Rolnictwo 2(175):69–92
44. Skica T, Rodzinka J, Harasym R (2017) Impact of financial policies of local authorities on entrepreneurship: comprehensiveness of policy matters. In contemporary trends and challenges in finance. Springer, Cham, pp 257–269
45. Hall M (1998) Correlation-based feature subset selection for machine learning. PhD Thesis, Hamilton, New Zealand
46. MacQueen JB (1967) Some methods for classification and analysis of multivariate observations. Proceedings of 5th Berkeley Symposium on Mathematical Statistics and Probability. 1. University of California Press, pp 281–297

Overall Assessment of Corporate Social Responsibility and Irresponsibility: A Map of Responsibility

Ewa Głuszek

1 Introduction

Corporate social responsibility in fact has two sides of the coin—it covers both socially responsible and socially irresponsible activities. Empirical research unequivocally confirms the fact, known from eyewitness observations and media reports, that most companies engage in both types of initiatives at the same time. It should be noted that despite many reservations and controversies, corporate social responsibility (CSR) has become a business megatrend in the last decade, which cannot be underestimated as it becomes an important factor determining the long-term competitive advantage. In this situation, the question of the social responsibility of a given company becomes important for many stakeholders. Such evaluation is expected primarily by investors, but also potential business partners, consumers, non-governmental organizations or the general public. A reliable, comprehensive assessment of corporate social responsibility should therefore include both areas: corporate social responsibility (CSR) and corporate social irresponsibility (CSI). The article introduces the concept of overall corporate social responsibility (oCSR), which includes both socially responsible and socially irresponsible activities.

The aim of the article is to propose a simple tool in the form of a map used for the assessment of overall corporate social responsibility, allowing for a comprehensive and objective evaluation of the company's activities. Such a map, hereinafter referred to as the Map of the Overall Corporate Social Responsibility (MoCSR) provides better understand the phenomenon of corporate social responsibility, and in particular the relationship between CSR and CSI. The paper uses two research methods: literature review (referring to conceptual and empirical research) to justify

E. Głuszek (✉)
Faculty of Management, Department of Management Systems Design, Wrocław University of Economics and Business, Wrocław, Poland
e-mail: ewa.gluszek@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_12

the separation (orthogonality) of CSR/CSI concepts and to propose criteria for their evaluation, and logical analysis to construct a oCSR evaluation map as a proposal for an evaluation scheme, and formulation of 10 key conceptual or empirically testable propositions. Analyzing the issues of corporate social responsibility concerning its positive and negative character, the article is in line with the normative, axiological research trend, which deals with determining "how it should be".

2 Corporate Social Responsibility and Corporate Social Irresponsibility

Corporate Social Responsibility (CSR) has been the subject of interest of managers and management theorists for over half a century. The concept of CSR itself has proved so complex and controversial that it has not yet been possible to develop a uniform definition of the concept, acceptable to many schools within the scope of management sciences and the practitioners themselves. On the contrary, the concept of corporate social responsibility has begun to evolve in a number of different ways, concepts and terms, so that it now seems impossible to reach a consensus. The article adopts the most common term: Corporate Social Responsibility (CSR), which according to the ISO 26000 standard means the responsibility of an organization for the impact of decisions and actions taken on society and the environment. CSR therefore means the efforts of an organization to strike a balance between economic, environmental and social requirements (without having to ignore the expectations of stakeholders), while at the same time providing the opportunity to make their own contribution to the benefit of different stakeholder groups.

In the last decade, especially since the financial crisis of 2008, the notion of Corporate Social Irresponsibility (CSI) has become more and more common in the context of corporate social responsibility. The current interest in this phenomenon can be attributed, firstly, to the finding that the sources of the 2008 financial crisis are inherent in irresponsible decisions and actions taken by the financial institutions of their time, and, secondly, the finding that the vast majority of companies engaging in CSR, simultaneously takes socially irresponsible activities [1–5]. The Corporate Social Irresponsibility result from many different causes and motives. It may be a geographical dispersion of many business units operating in different legal and cultural systems [5], treating CSR as a strategy to compensate for socially irresponsible behavior [3, 4], or selectively engaging only in some aspects (e.g. environmental protection), and omitting/marginalizing others [1, 2].

Many authors associate CSI with a lack of morality, considering it an immoral practice based on fraud and manipulation of stakeholders [6], or unethical management behaviors (usually individual behavior) that necessarily prefer the interests of one group (usually shareholders) at the expense of interests and expectations of other stakeholders [7, 8]. Still others point to the illegality or deliberate exploitation of loopholes and ambiguities in legislation [9]. Corporate Social Irresponsibility can be

treated as the opposite of Corporate Social Responsibility (Ferry 1962, in: Lin-Hi and Muller [10]); since CSR is therefore defined as a business response to social expectations (meeting stakeholders' expectations), CSI is a non-response, disregard or failure to meet society's expectations [1]. The common denominator of these different approaches is that CSI have negative consequences for stakeholders and therefore generally reduce social welfare [10].

Proposition 1 Overall Corporate Social Responsibility (oCSR) in fact consists of two aspects (areas): Corporate Social Responsibility (CSR) and Corporate Social Irresponsibility (CSI).

To sum up, social irresponsibility can be considered as achieving business goals in a way that is inconsistent with the applicable legal order and accepted ethical standards, leading to negative impacts on at least one group of stakeholders. It should be stressed that the concept of irresponsibility of business is—similarly to CSR—strongly influenced by the context. This means that the assessment of a company's performance as socially irresponsible depends on the cultural norms (and constantly evolving norms), laws, the state of the economy, standards of living and education, traditions, customs, etc. Thus, the same behavior may be assessed differently in different places [11]. It seems that at the level of analysis, the term "corporate social irresponsibility" is a natural complement to the concept of "corporate social responsibility", and therefore it is only by combining these two concepts that we can better understand the essence of CSR idea [12].

Proposition 2 Corporate Social Responsibility (CSR) generally means positive effects for stakeholders (raising the level of social welfare), while Corporate Social Irresponsibility (CSI) is associated with negative effects for stakeholders (lowering the level of social well-being).

The interconnection and interdependence between CSR and CSI is probably one of the most important issues that can help to better manage this area. This relationship can be understood in two ways: as a one-dimensional construct, i.e. responsibility and irresponsibility of business are the two extremities of one continuum (continuity model), or as a two-dimensional construct, i.e. CSR and CSI are rather two different, relatively independent phenomena, which may occur simultaneously at the same time (the concept of two continuous—orthogonal model). There are a number of arguments in favour of adopting an orthogonal approach [13]; First, observations and studies show that a large number of companies are involved in both responsible and irresponsible initiatives [1, 2]. Secondly, the assessment of the social responsibility of the activities undertaken by the companies depends on the point of view of the evaluating entity [14]. Thirdly, there may be a causal-impact relationship between CSR and CSI, namely that involvement in CSR is often a strategy to compensate for socially irresponsible behaviour [3].

3 Criteria for Assessing Overall Corporate Social Responsibility

Despite many efforts of the academic community and practitioners, it has not yet been possible to develop a reliable and credible measure that would allow to objectively assess the degree of responsibility of the organization, i.e. the advancement of managerial practices concerning the application of CSR standards. So far, three main approaches have been used to assess corporate social responsibility: expert assessments (reputation rankings and databases), one- and multi-indicator indices, and management surveys [15]. They all make a significant contribution to the understanding and development of the CSR, but also have certain limitations. The most important of these is focusing only on one, positive side of social responsibility. As it seems, there is a need to develop a slightly different method of evaluating corporate social responsibility than previously. The one which—firstly—will allow to take into account both the positive and negative side of the activities undertaken in this area, and secondly, one that will be as simple to use as possible, but at the same time clear and unambiguous. Recognizing both CSR and CSI in the assessment is a necessary condition for obtaining a comprehensive picture of the overall company's responsibility, and thus for a more reliable, objective assessment of the company's approach to the issue in question. Moreover, such an assessment should be more friendly in the sense of ease of interpretation for potential users, e.g. clients, investors, business analysts or managers. It would be optimal to find a "golden mean", to center between one-dimensional indicators (such as the index of charitable expenses or corporate punishment), and complex scales of multidimensional assessment or extensive social reports.

Proposition 3 A reliable assessment of overall corporate social responsibility (oCSR) should include CSR and CSI activities.

The method of comprehensive social responsibility assessment proposed in the article uses of graphic form of the matrix (a kind of map) to present the results of the assessment. The proposed Map of Overall Corporate Social Responsibility (MoCSR) is a two-dimensional coordinate system that takes into account two areas of evaluation: corporate social responsibility (CSR) and corporate social irresponsibility (CSI), and two criteria for assessing these areas. These evaluation criteria could be (1) the extent of influence on stakeholders and (2) intentionality/strategicity. The first criterion, which allows to assess the degree of social responsibility/irresponsibility of the enterprise, is the impact of the action taken on stakeholders, understood as the extent of the affected entities and, by default, the size of the benefit or damage [16]. In assessing the degree of social responsibility/irresponsibility, it is not important which stakeholder group has benefited or been harmed, but rather the number and extent of such benefits/damages. Here we can refer to Davis' "iron principle of responsibility", which makes the company's degree of responsibility dependent on its ability to exert influence. This means that the more power and control a company has over a given situation, the greater its responsibility

[17]. Large transnational corporations should therefore be judged more strictly on the extent of their impact—both real in terms of social and economic impact and moral, i.e. good/bad example for others and of reducing/increasing social scepticism and distrust of CSR idea.

Proposition 4 The criteria for assessing the overall corporate social responsibility (oCSR) may be: the extent of impact on stakeholders and intentionality/strategicity.

Proposition 5 The broader the impact of a given company, i.e. the greater the number of stakeholders who benefit or suffer (directly and indirectly), and the greater the amount of these benefits/harm to stakeholders, the greater—respectively—responsibility (CSR) or irresponsibility (CSI) of the company.

The second criterion for assessing the social responsibility of a company may be the strategicity or intentionality of activities. In the case of corporate social responsibility, this criterion refers to the degree of integration of different initiatives at the strategic level, their skillful prioritization and implementation of effective management instruments [8, 18, 19]. This criterion is based on the dominant model of activities practiced by the company, which distinguishes three basic types of CSR: charity (philanthropy), integration with operational activities and innovations [20, 21]. Charitable activities include activities that are motivated by charity, even if they may result in positive business benefits; Integration with operational activities refers to activities that aim to achieve benefits for the company as well as positive environmental or social impacts; Innovation means CSR programs whose essence is a fundamental change in the business "ecosystem" aimed at strengthening the long-term competitive position of the company, while creating significant social value [21]. These three types of CSR differ in relation to the core business, objectives of the undertaken activities and expected benefits. At the same time, they reflect the degree of "strategicity" of the innovations undertaken by the company. Strategicity in this case means the degree of thought-out, planned rooting of CSR initiatives in the key activity of the company, and therefore their sustainability and the significance of effects for society. The gradual scale of activities would start with philanthropic initiatives (not usually related to the key activity of the company), through activities aimed at achieving mutual benefits (integrated more or less with the operational activity), up to innovations proposing quite radical changes in the business model and/or completely new, socially desirable products.

Proposition 6 The greater the strategicity of initiatives that have positive effects for stakeholders, the greater is the corporate social responsibility (CSR).

In the case of corporate social irresponsibility, one can speak not about the strategicity, but about the intentionality of the activities. One of the threads of discussion about the CSI is the distinction between intentional and unintentional behavior [2, 10, 14]. Intentional CSI means that the enterprise deliberately takes actions that are disadvantageous or even harmful to some stakeholders, such as corruption of local officials, non-payment of employees, tax evasion, etc. [10]. Intentional corporate social irresponsibility is characterized by two features; Firstly, it is

usually aimed at achieving a higher level of profits, and secondly it requires some effort to hide it from public opinion. In contrast, unintentional CSI means that the damage of the stakeholders arose unintentionally, so they were not the result of conscious actions aimed at achieving a certain goal, but rather the result of a case, accident, disaster or just a side effect of certain activities [10]. Thus, the degree of purposefulness, intentionality of actions taken by the company may be a good measure of corporate social irresponsibility: the greater the intentionality of the company's behavior, the greater its social irresponsibility. The scale of actions (in this case, gradation of intentions) would start with completely unintentional, accidental behavior, through unintentional actions, but resulting from obvious negligence of the company (i.e. deliberately risky and exposing stakeholders to damages), to behavior undertaken with full intention to obtain benefits for a company or managers.

Proposition 7 The greater the intentionality of the company's behavior causing negative effects for stakeholders, the greater its corporate social irresponsibility (CSI).

4 Map of the Overall Corporate Social Responsibility (MoCSR)

Both dimensions of overall corporate responsibility assessment can be summarized as follows:

Proposition 8 The greater the strategicity of a given action and the greater its positive impact on stakeholders—the greater responsibility (CSR) of given company.

Proposition 9 The greater the intentionality of a given company's activity and the greater its negative impact on stakeholders—the greater irresponsibility (CSI) of the given company.

The proposed criteria can be grouped in a coordinate system, creating a kind of oCSR map, which displays the various responsible and irresponsible actions of the company (Fig. 1). In order to facilitate interpretation, a qualitative approach to estimating both dimensions can be applied—similarly as in project management assessment of risk, where impact and probability are evaluated [22]. Therefore, a 3-point scale can be assumed: low (1), medium (2), high (3) impact, or low (1), medium (2), high (3) strategicity/intentionality.

Proposition 10 To assess the overall social responsibility of a company (oCSR), a qualitative approach can be used and a 3-point rating scale can be adopted, where: 1—means small, 2—means medium, and 3—means high impact or strategicity/intentionality.

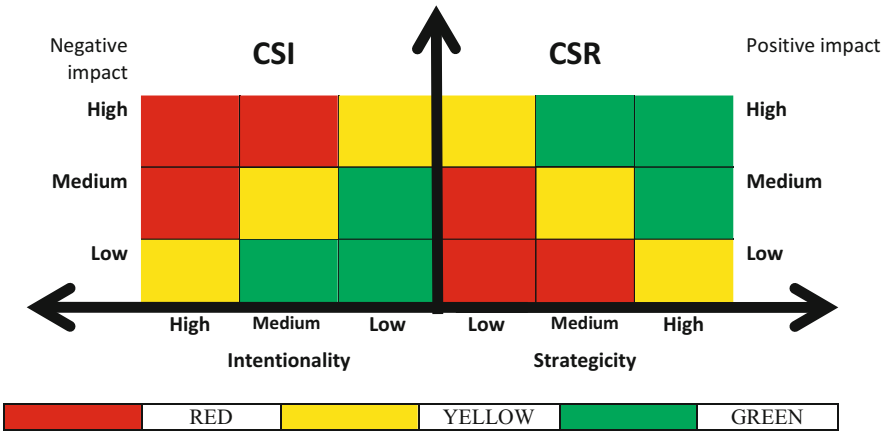


Fig. 1 Map of the overall corporate social responsibility (MoCSR). Source: Own elaboration

This qualitative analysis of the company's initiatives makes it possible to distinguish (estimate) the degree of overall CSR—from small to large—and to compare (benchmark) different companies with each other. The individual measures taken by the company in a given period of time can therefore be assigned a rating according to two criteria, obtaining an overall picture of social responsibility (oCSR).

The map of all-encompassing responsibility makes it possible to compare the degree of responsibility/irresponsibility of various social initiatives (and other activities) in the company's portfolio. In such a qualitative assessment of oCSR 1 point would mean low impact (small damage/benefit to a very limited number of stakeholders—green colour), or a small intentionality/strategicity (accidental, unintended event, or charity), and 3 points would mean a big impact (serious damage/benefit for a large number of stakeholders—red colour) or high intentionality/strategicity (fully intended activities or implementation of significant innovations). Similarly to the risk map (risk profile) prepared for projects implemented in the enterprise, its various social initiatives can be presented on a similar map in three traffic-lights colors.

One can also use the color code to indicate different activities that are socially responsible or irresponsible. And so: actions that will be found in the red fields mean respectively very negative (CSI) or very poorly positively evaluated initiatives (CSR)—means the zone of the highest irresponsibility or smallest responsibility; Those in the yellow fields are rated as moderately bad or good—this is the area of average irresponsibility/responsibility; On the other hand, initiatives on green fields represent the least harmful or the most beneficial actions from the point of view of stakeholders—the zone of the lowest irresponsibility or the highest responsibility.

To illustrate the use of a Map of the Overall Corporate Social Responsibility the example of BP can be used. BP is one of the largest oil companies in the world. A number of crisis situations that occurred in the company's history led BP to undertake a global campaign of corporate image change in 2000, aimed at presenting BP as a corporation caring for the natural environment. Since then, the company has

been trying to actively undertake various initiatives in the field of CSR and promote clean energy. At the same time, however, in the last decade, BP has contributed to several major environmental disasters, the most serious of which was the Deepwater Horizon explosion in 2010, which caused a massive oil spill to the Gulf of Mexico, causing enormous damage to the local population, industry (fisheries) and the environment. In order to illustrate the use made of the responsibility map, Table 1 lists the selected activities relevant for the assessment of this area in BP [23]. Figure 2 shows a summary of these activities on the map on the CSI or CSR side, respectively.

The list of various initiatives and activities undertaken by BP in the last two decades on the map of the overall responsibility assessment allows you to see a full picture of the social responsibility and social irresponsibility of the described company. It shows that social initiatives within the CSR area have a relatively small range (positive impact on stakeholders), as well as relatively low strategicity (impact on the way of conducting key activities). On the other hand, the situation in the CSI area is quite different—there are a lot of conscious negligence measures in terms of compliance with safety standards (even own internal standards) that indicate a high intentionality of irresponsible behavior and several serious crises whose degree of intentionality is admittedly small, but with a very big negative impact on stakeholders and the natural environment. When comparing the two sides of BP's overall social responsibility, it should be stated that the general balance is disadvantageous to the company—the irresponsible behaviors clearly prevail.

5 Conclusions

The article presents a way of making a comprehensive assessment of corporate social responsibility based on the use of graphic form (matrix). The proposed Map of the Corporate Social Responsibility (MoCSR) is a two-dimensional system of coordinates that takes into account two areas of evaluation: corporate social responsibility (CSR) and corporate social irresponsibility (CSI), and two criteria for assessing these areas: the extent of their impact on stakeholders, and intentionality/strategicity. A comparison of the assessment of social responsibility/irresponsibility of various activities in which a given company is involved with the use of a graphical tool in the form of a map gives a number of benefits; Firstly, it shows most of the company's relevant initiatives by giving an overall view of its approach to social responsibility; Secondly, it distinguishes and separates between positive (CSR), and negative (CSI) actions from the perspective of stakeholders, avoiding mixing them together or creating the impression that they can be compensated for each other; And—thirdly, it presents them in a way that is easy to interpret, even by those with little substantive background (e.g. NGOs). Tracking changes in such responsibility maps, e.g. on a year-to-year basis, can also provide a lot of interesting information. Knowing whether a company is improving or deteriorating its social responsibility status seems particularly valuable to investors (e.g. Social Responsible Investment). The

Table 1 List of selected BP initiatives/activities in the field of overall Corporate Social Responsibility

	Initiatives/activities	CSR or CSI	Influence	Strateg/ intentionality
A	Design the right technology for restricting greenhouse gas emissions with collaboration with International Energy Agency	CSR	2	2
B	Use of and investment in renewable sources of energy such as biofuels, wind, and solar energy (e.g. the acquisition of Solarex)	CSR	1	2
C	Cooperation with non-governmental organizations, involvement in local community initiatives	CSR	2	1
D	Diversity policy (the diversified workforce structure and appropriate employee recruitment)	CSR	2	1
E	Preparing sustainability reports with clear structure and detailed information in terms of its sustainability progress and impacts	CSR	1	1
F	Clear no-tolerance policy with regard to abusive behaviours	CSR	1	1
G	Petrol stations designed and operated in accordance with the requirements of environmental protection	CSR	2	1
H	A 2005 explosion at a refinery in Texas City, Texas, which led to the death of 15 workers and the injury of hundreds more	CSI	2	1
I	Noncompliance with safety regulations arising from the Texas City explosion—"failed to meet [BP's] own standards and the requirements of the law."	CSI	2	3
J	A 2006 problems in refinery Toledo (Ohio) with pressure relief valves, which OSHA instructed BP to remediate (2 years later inspectors found that BP didn't fix all the valves)	CSI	1	3
K	In 2006 a portion of BP's Alaska pipeline near Prudhoe Bay had repeatedly been leaking oil into the tundra due to pipe corrosion (the State of Alaska accused BP of "poor maintenance practices")	CSI	1	2
L	In 2009 a repeat OSHA inspection back at the Texas City refinery found safety violations, much like the ones that led to the 2005 explosion, and imposed the largest fine in the agency's history	CSI	2	3
M	On April 20, 2010, catastrophe on Deepwater Horizon platform—an explosion and fire, that killed 11 crewmen and sank the platform. 184 million gallons of oil leaked into the Gulf of Mexico.	CSI	3	1

Source: Own elaboration based on Cherry and Sneirson [23]

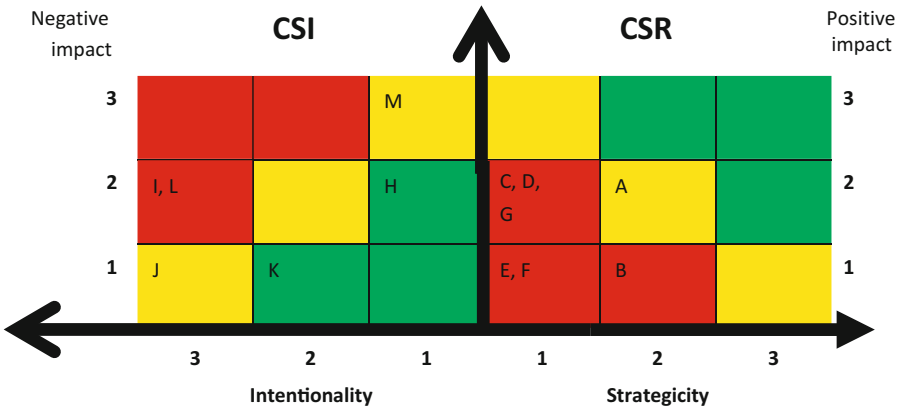


Fig. 2 Selected socially responsible and irresponsible BP activities on the map of the overall corporate social responsibility. Source: Own elaboration

proposed concept of the Map of the Overall Corporate Social Responsibility contributes to a better understanding of the concept itself, and fills a research gap linked to the omission of social irresponsibility from the consideration of the companies' approach to the issue.

References

1. Herzig C, Moon J (2013) Discourses on corporate social ir/responsibility in the financial sector. J Bus Res 66(10):1870–1880
2. Keig DL, Brouthers LE, Marshall VB (2015) Formal and informal corruption environments and enterprise social irresponsibility. J Manag Stud 52(1)
3. Kotchen M, Moon JJ (2012) Corporate social responsibility for irresponsibility. B.E. J Econ Anal Policy 12(1)
4. Muller A, Kräussl R (2011) Doing good deeds in times of need: a strategic perspective on corporate disaster donations. Strateg Manag J 32(9)
5. Strike VM, Gao J, Bansal P (2006) Being good while being bad: social responsibility and the international diversification of US firms. J Int Bus Stud 37(6):850–862
6. Greenwood M (2007) Stakeholder engagement: beyond the myth of corporate responsibility. J Bus Ethics 74:315–327
7. Stachowicz-Stanusch A, Amann W (2017) Corporate social responsibility and corporate social irresponsibility. Scientif Quart Organ Manag 4(40)
8. Windsor D (2013) Corporate social responsibility and irresponsibility: a positive theory approach. J Bus Res 66(10):1937–1944
9. Clark T, Grantham K (2012) What CSR is not: Corporate Social Irresponsibility. In: Tench R, Sun W, Jones B (eds) Corporate Social Irresponsibility: a challenging concept. Critical studies on corporate responsibility, governance and sustainability, vol 4. Emerald GPL
10. Lin-Hi N, Müller K (2013) The CSR bottom line: preventing corporate social responsibility. J Bus Res 66(10):1928–1936
11. Campbell JL (2007) Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. Acad Manag Rev 32

12. Tench R, Sun W, Jones B (eds) (2012) Corporate social irresponsibility: a challenging concept. Governance and sustainability, vol 4. Emerald Group Publishing
13. Riera M, Iborra M (2017) Corporate social irresponsibility: review and conceptual boundaries. Eur J Manag Bus Econ 26(2)
14. Lange D, Washburn NT (2012) Understanding attributions of corporate social irresponsibility. Acad Manag Rev 37(2):300–326
15. Maignan I, Ferrell OC (2004) Corporate social responsibility and marketing: an integrative framework. J Acad Mark Sci 32(1):3–19
16. Wood S (2012) The case for leverage-based corporate human rights responsibility. Bus Ethics Q 22(1):63–98
17. Davis K (1975) Five propositions for social responsibility. Bus Horizons 18(3)
18. Rok B (2013) Podstawy odpowiedzialności społecznej w zarządzaniu. Warszawa, Poltext
19. Scherer A, Palazzo G (2011) The new political role of business in a globalized world: a review of a new perspective on CSR and its implications for the firm, governance, and democracy. J Manag Stud 48(4)
20. Kourula A, Halme M (2008) Types of corporate responsibility and engagement with NGOs. Corp Gov 8(4):557–570
21. Rangan K, Chase L, Karim S (2012) Why every company needs a CSR strategy and how to build it. HBS Working Paper No. 12-088, 5 April
22. PMBoK Guide (2017) Sixth Edition PMI
23. Cherry M, Sneirson J (2011) Beyond profit: rethinking corporate social responsibility and greenwashing after the BP Oil Disaster. Tulane Law Rev 85:983

System for Financing Investments in Renewable Energy Sources in Poland

Alicja Małgorzata Graczyk, Andrzej Graczyk, and Tomasz Żołyniak

1 Introduction

Transformation in power engineering is reflected mainly in the decentralisation of production. The use of renewable energy (RE) reduces environmental impact and protects the climate. The development of local sources fosters the inclusion of local communities and even individuals in the processes typical for a modern economy. The negative effects of transporting energy over long distances, i.e. energy losses, and the need to expand the transmission network are eliminated. Energy production in renewables usually generates much lower external costs in comparison to energy production in conventional sources [1–3].

The European Union has adopted an ambitious strategy to increase the share of renewable energy sources in final energy consumption. By 2020, this share is expected to be 20% [4–6]. Each EU Member State has its own specific strategic goal. Poland is included in the group of countries, in which the share was lower in 2017—11%—from the target adopted for 2020 (15%) [7]. The Clean Energy for all Europeans package [8] has set broad energy sector development goals, where renewable energy sources (RES) play a particular role. The package included a proposal to amend the Directive 2009/28/EC [9]. The European Council, on 24 October 2014, endorsed a binding EU target of 27% share of renewable sources in gross final energy consumption by 2030. In 2018, the Commission, the Parliament and the European Council determined the target to at least 32%. These goals will be difficult to achieve unless the system of financing and RES development supporting are adapted [10].

The transformation process with the use of renewable energy sources requires devising methods for financing investments necessary in the development of the

A. M. Graczyk (✉) · A. Graczyk · T. Żołyniak
Wroclaw University of Economics and Business, Wroclaw, Poland
e-mail: alicja.graczyk@ue.wroc.pl; andrzej.graczyk@ue.wroc.pl; tomasz.zolyniak@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_13

production base, the regulatory system and the power grid. In Poland, the combined efforts of the public sector, enterprises and citizens will be necessary. Due to worldwide research, direct public investment has generally constituted a small share of total renewables finance. It fluctuated between 12% and 16% in 2013–2015 and dipped to 8% in 2016. The bulk of RES investment (more than 90% in 2016) was financed by private investors ([11], p.12). Development finance institutions (multilateral, bilateral, national) have accounted for the majority of public investment, with an annual average of 85% of the total in 2013–2015, which has fallen to 73% in 2016 ([11], p.13).

The costs of producing energy from renewables are systematically decreasing, especially in photovoltaic technology. They are high, however, even for rich countries such as Germany [12]. Therefore, the transition to these technologies and the development of distributed energy requires adequate financing of investments, especially in the case of countries with low GDP per capita. In countries such as Poland, it will be necessary to combine public sector, enterprise and citizen efforts.

The research problem is to determine the system composition for financing investments in renewable energy sources in Poland. The problem of RE financing is globally essential. Bloomberg New Energy Finance (BNEF), shows the rapid global growth (10 years time: 2004–2014) in the amount of RE finance along the entire innovation chain (from R&D sector to asset finance for full-scale power plants) [13]. M. Mazzucato and G. Semieniuk [14] widely described the relationship between different types of finance and their willingness to invest in RE. They proved financial actors create directions towards RE technologies and vary considerably in the composition of their investment portfolio. The effectiveness of policies induces RE investments was widely discussed by F. Polzin, M. Migendt, F.A. Täube, P. von Flotow [15].

The aim of the article is to identify, analyse and assess the elements that are absolutely essential for green energy transformation: the support of investments from public funds (the first part of the article), a mechanism for investing in commercial projects (the second part) and the financing of small projects provided by households (the third part). This research uses Poland as a case study. The problem, however, has a universal character, and is especially relevant to countries with relatively low possibilities of investing private funds in the development of RES [16]. The development of the renewable energy financing system in Poland started later than in the EU15. Therefore, the authors formulate the hypothesis: at the current stage of RES development, this system is not yet coherent.

The article consists of three parts devoted to the main elements of the renewable energy financing system in Poland. Different research methods were adopted in each part. The first part assessed the package of solutions proposed in the national energy policy draft until 2020 based on the analysis of the strategic document. The starting point is the presentation of forms of public support for renewable energy development typical for more developed countries. On this basis, the directions and forms of support proposed in the Polish energy policy were evaluated. The research problem in this section is the extent to which European solutions can be applied in Poland. In the second part, the primary research method was individual interviews conducted

with selected financial institutions, such as the European Investment Bank, CEE Equity Partners and Green Investment Group Limited (Macquarie Group). The research problem is the composition of models for financing energy projects using short- and long-term financial instruments available commercially in Polish market conditions.

In the third part, government support for prosumer installations development was identified and assessed. Then, willingness to invest in RES by households was analysed based on Polish surveys carried out by the research company CBOS and the Wroclaw University of Economics. In the last part, the results of Graczyk research are introduced. The survey was conducted from April to May 2016 in the form of face-to-face interviews on a paper questionnaire (PAPI) in 500 households living exclusively in single-family or terraced houses in the Lower Silesia region in Poland. The main research problem was to determine and assess Polish government support for prosumers and household willingness to invest in RES.

2 The System of Supporting Investments in Renewable Energy Sources with Public Funds

The state is an essential element of the development of renewable energy as indicated by global [17] and European experience [18].

In order to reach its RES target, each European Member State should implement a mix of different policy instruments to support RES development, particularly in the energy sector. The majority of energy policy instruments are based on targets for specific RES shares in electric energy generation, heating and cooling, as well as for the transport sector. Fundamental national mechanisms in renewable energy support policies include regulatory policies, fiscal incentives, as well as public financing for the following:

- quota obligations with tradable green certificates,
- feed-in tariffs (FIT),
- feed-in premiums (FIP),
- investment grants,
- soft loans,
- loan guarantees,
- tax incentives,
- tendering schemes.

Feed-in tariffs and feed-in premiums are the most frequently introduced key mechanisms [19]. European experience from previous years indicates that FITs or quota obligations were widely used in the timeframe 2007–2012. The rapid decline in RES investment cost, however, led to financial support for certain technologies beyond what was required. This resulted in FITs reductions. Growing RES competitiveness also led to another trend observable in that period towards FIPs and tendering procedures. Introducing those mechanisms increased cost-effectiveness

and limited competitive distortions between the Member States. The EU state aid rules will accelerate the trend by the gradual replacement of FIT by FIP and the gradual introduction of competitive bidding processes, aimed to subject RES to market signals. In the draft of the State Energy Policy until 2040 (PEP 2040), the objective of 21% share of renewable energy in the final gross energy consumption in 2030 was adopted. This is approximately 27% of RES's share in net electricity production. The mechanisms of support and promotion of the generation of energy from RES will be tailored to market needs [20]. This means that the entities that are able to undertake investment activities in response to market signals, counting on possible support from public funds, will be the initiators of investment projects. The draft indicates that the following solutions will be favoured:

– ensuring maximum availability (high efficiency and utilisation rate, controllability, use of energy storage), with the relatively lowest cost of energy generation;
– satisfying local energy needs (heat, electricity, transport), but also associated with waste management (in line with the waste management hierarchy) and the use of local potential.

Therefore, the public support system will not favour investments in onshore wind farms, solar farms, and household installations that use wind and solar energy, which is the most important part of the renewable energy potential in Poland.

It is envisaged that support will depend on the type of renewable source and its size. The following forms of support can be distinguished:

– priority access to the grid;
– auctions—intended for sources generating energy in a professional manner, i.e. ensuring availability and appropriately high power;
– feed-in tariffs and feed-in premium system—intended for installations with relatively small power that manage energy unused by small producers;
– subsidies, repayable assistance—a mechanism dependent on local needs, distributed in regions;
– guarantees of origin treated as a kind of voluntary certificate, the demand for which is created by recipients who want to be perceived as environmentally-friendly companies;
– aid mechanisms targeted at specific technologies—this solution is intended for sources that do not have competition on the market, as they are a new technology (e.g. offshore wind energy). For various reasons, however, their implementation on the market is important for the country—e.g. high power consumption in a year ([20], p.41).

The support system for the generation of energy in renewable sources functioned in Poland already before 2019. The review of support mechanisms in Poland was presented by Graczyk [21]. The support system did not cause an increase in investments in renewable energy sources to meet the target of the required level of share of renewable energy in its final consumption by 2020 [22].

An auction system and a fixed/guaranteed price mechanism will be of paramount importance for the support of financing in RES investments. On 13 December 2017,

the European Commission accepted the Polish system of supporting the development of renewable energy sources worth PLN 40 billion (approximately EUR 9.4 billion), based on the auction system, i.e. a competitive bidding procedure [23].

The auction system should help to reduce the costs of the offered energy. Under the present executive regulations, however, it "accumulates" additional elements. Consequently, this leads to increased costs, while the tenderer cannot increase the price of contracted energy.

The auction support system did not arouse investors' trust in the public support system, aimed at the development of RES ([24], p.53). The system encourages investors to offer a low price for energy in order to obtain an order. Price downgrading may result in investors' withdrawals from contracts, attempts to renegotiate terms and conditions, or prolong investment time, if they can count on savings due to price reductions from equipment suppliers (this tendency occurs as a result of rapid market growth and technical progress).

The system, based on a fixed guaranteed price, displays simplicity which also means a high level of public spending. The subject of market arrangements is the amount of energy supplied from renewable sources. In the case of a fixed price system, the risk area for public authorities is the potential increase in the supply of renewable energy. It can arise from technical progress, which is currently quite rapid in this field. Then, public authorities would have to buy more energy at a specified price. The way to contain this risk would be to introduce a limit on the purchase of an appropriate amount of energy from renewable sources. In this case, however, the energy producers, aware that they may not sell all of the renewable energy they supply, will not be particularly interested in implementing innovations and reducing costs. As a result, this system may limit both the scale of investments in RES, as well as reaching for the latest technological solutions.

The fixed price systems are inherently closed to renewable energy suppliers from other countries. Public authorities will not be interested in granting public funds to foreign energy suppliers. In light of the solutions of Directive 2009/28/EC, this may constitute a serious limitation for the development and financing of joint projects.

Other proposed solutions of the support system may probably promote cooperation in the generation of RES at the local level. This may apply to energy clusters and cooperatives. It is not known, however, what their role would be—probably it could be limited to using locally generated energy [25]. The solutions proposed to prosumers, however, will result in a decrease in the supply of market energy and rather limit self-consumption.

The public support system introduced in the Polish energy policy should, to a greater extent, be oriented towards the needs of the development of dispersed energy. In particular, this concerns combining projects with typically commercial projects, and supporting the prosumer sector.

3 Financing Investments in Commercial Projects

The lack of predictability of the legal system is significant for the assessment of the current financing system. This may have an impact on the conditions of financing projects in renewable energy in Poland, as the regulatory risk is an important aspect in determining loan terms [24]. In these conditions, it is particularly important to prepare carefully scenarios that will limit the remaining risks and enable investment financing. For this purpose, literature analysis and individual interviews were conducted with selected financial institutions, such as the European Investment Bank, CEE Equity Partners and Green Investment Group Limited (Macquarie Group). Interviews were conducted in July 2018 with persons at decision-making positions. The aim of the research was to simulate a project that has the ability to obtain financing without public support. Individual interviews lasted 2 hours and were carried as discussions, to work out the best possible scenarios with the greatest probability of implementation. It involved ten institutions and the selected ones are quoted in the article. These three institutions have a documented investment track record on other markets and can act as leaders on the Polish market in the financing of commercial projects in renewable energy sources. Until now, no financing for a PPA-type commercial project on a significant scale has been obtained in Poland. Due to the uncertainty associated with public support, traders acquire funding primarily in two models: on the basis of the company balance sheet and in the "project finance" model. In order for projects to be financed, it is required to determine their bankability. In practice, this means the status of the investment project, which allows the financing institution to make a positive decision on granting funding for its further development. It should be remembered, however, that from the point of view of financing institutions, "bankability" will also refer to a number of other elements that determine the proper development of the project, in particular: regulatory risk, technical risk and financial risk. The problem is not shortage of money but the shortage of reliable projects to invest in. Large-scale production of bankable projects could strongly attract institutional investors into the infrastructure markets of developing countries [26, 27].

Financing based on the company balance sheet (corporate financing) is practised when the size of the investment is adequate to the current scale and activity of the company. Corporate financing is usually the most advantageous option for obtaining financing in terms of cost. It also gives greater flexibility in the availability of funds from the loan.

Financing based on the balance sheet is usually granted for a period of 3–5 years; it occasionally happens that the financing period reaches 7 years. If the financing period exceeds 7 years, some elements of project financing are incorporated into the corporate financing structure or financing is completely arranged in the "project finance" formula. In this context, it can be said that institutional investors may not prefer instruments that have a short life span, such as loans [28].

Another possible option of balance sheet financing is treating it as bridge financing for the investment period, until its closure and technical acceptance. Ultimately,

the completed and already working part of the enterprise may be separated into a special purpose vehicle (SPV) and refinanced using a long-term loan granted directly to SPV. For example, pension funds and insurance companies have long-term liabilities [17]. In this case, from the point of view of financing institutions, the risks associated with the investment process are eliminated. This significantly improves the comfort of creditors and allows investors to save time and costs associated with bank supervision over the investment process and the assessment of contractors' risk. Besides, because the loan refinances a ready investment, which is free of the risks associated with the investment process, it can be granted under terms and conditions much more favourable than standard ones. The ability to obtain financing based on the balance sheet is limited by a debt ratio up to 3 × EBITDA.

Project financing is based on the assumption that it will be fully repaid from the funds generated by the project. Until now, the "project finance" formula was most often used for financing wind farms. The best example is Green Investment Group Limited, which is part of the Macquarie Group. The typical preparation of a project for project financing in the scope of terms and conditions consists of:

- developing the project concept and, in the case of a larger number of investors, establishing the principles of their cooperation;
- conducting a feasibility study;
- obtaining appropriate licenses and permits;
- analysing the environmental impact and obtaining environmental permits;
- establishing and negotiating the contract structure;
- preparing the tender and selecting the general contractor;
- obtaining financing for the project.

Conversely, the interview with financial institutions shows that at the stage of organising financing in the "project finance" formula, we have to divide the risks occurring at the construction and operational phases of the project between the investor, general contractor and financing institutions. When analysing a project in the field of electricity generation, banks assess its risk by taking into account many factors, including:

- structure of contracts for energy reception, adequacy of the period for which they are concluded in relation to the financing period, standing of energy recipient and the merchant risk size of the project;
- terms of contracts for the supply of fuel;
- main provisions of the EPC contract, including the level of performance bonds and contractual penalties, as well as the standing of the main contractor, their financial capacity, and experience in implementing similar units;
- the technology of the power generation unit and experience in its use in similar projects in the world.

Financial institutions also conclude direct agreements with the most important parties to the project, allowing the company to acquire the rights of the special-purpose vehicle and continue the project in the event of their breach. In the case of "project finance", financial documentation is more restrictive and more extensive

than in the case of corporate financing. Moreover, in contrast to corporate loans, where financial ratios are based on the balance sheet and the company income statement, project financing uses indicators related to cash flows generated by the project.

The financing periods of the commercial bank tranches in project financing usually range from 8 to 15 years, and repayment is usually adjusted to the flows generated by the project. Banks are prepared to finance projects in the "project finance" structure, but it needs to be secured by a stable source of profits protected by the government [29].

4 Financing Small Projects (Prosumers)

In past years, the Polish financial support scheme has favoured big renewables investments, which has resulted in little to no locally owned renewable energy generation. Finally, in 2015, Directive 2009/28/EC on the promotion of the use of energy from renewable sources was implemented in Poland by the new Renewable Energy Sources Act [30]. In the course of the energy transition towards more sustainable production and energy consumption, a new actor has entered the Polish energy market—the prosumer (energy producer and energy consumer). The definition of prosumer introduced by the Renewable Energy Sources Act denotes an owner of micro-installations and the end-energy user who generates and consumes energy for own purposes only (entrepreneurs are excluded, see [31]). The term in the Polish energy sector is associated mainly with households, and concerns less frequently energy clusters and energy cooperatives. Probably, in 2019, a new amendment will be introduced to enable churches, schools, local governments, and small and medium companies to become prosumers [32]. The new concept is also to motivate prosumers to produce energy properly for their use. It assumes energy balancing according to the following rules: for micro-installations with a capacity of up to 7 kW and with a capacity of 7 kW and more. The first group of prosumers can exchange the surplus of electricity production for the provision of electricity in times of insufficient generation (modified net metering) in relation 1–0.7 kWh, and the second group in relation 1–0.5 kWh. Concluding, the net metering system in Poland has been modified once again and the change limited government support. In 2018, prosumers could benefit from exchanging in relation 1 to 0.8 or 0.7 depending on installation size [33]. Government support is planned for 15 years, but will not extend beyond 31 December 2035.

One of the basic institutions supporting local community green energy development in Poland is the National Fund for Environmental Protection and Water Management. Due to its support, more than 67,000 households received financial support under the programme of surcharges to credits for solar collectors. Continuing development of civil power engineering from renewable energy, the National Fund has recently introduced the Prosumer programme, the Bocian programme and the Energia Plus programme (the latter two are dedicated to companies only) [34]. The Prosumer programme (2014–2022), dedicated to households, enables

40% renewable energy investment cost reduction. All funds collected by the National Fund originate from many sources: national, the EU, the Norwegian Fund and EEA funds, as well as those under the GIS green investment system. Due to the limited resources available to the National Fund, it has also entered a public-private partnership with six banks. Prosumers who benefited from public support in building their micro-installations must remember the new law amendment planned to be introduced in 2019, according to which they can exchange their energy surplus production only in relation 1–0.35 kWh.

In line with updating the European energy policy framework in March 2019, the European Parliament has voted the Clean Energy for all Europeans package [8]. The new rules will be formally adopted in the first few months of 2019. For Polish prosumers, the new policy framework brings regulatory certainty and empowers them to be more active players in the energy market. These new rules aim to allow electricity to move freely to where and when it is most needed via undistorted price signals. Prosumers will also benefit from the dynamic prices system and smart home energy meters.

According to the 2018 report of the Polish Energy Regulatory Office [35], there are 51,163 prosumers in Poland. They produced 130,370,162 MWh of electric energy in 2018. Photovoltaic micro-installations constitute 99.2% of the micro-installations with 344,239 MW installed capacity, thus dominating the market. In a study commissioned by Optimal Energy, 95% of respondents believe that more renewable energy should be generated in Poland ([36], p.7). The possible electricity and heat production from micro-generation is estimated at nearly 4.4 million households in the countryside ([37], pp.23–24).

Worldwide research has shown that investment behaviour differs by age, sex, educational background, life situation, investment motivation and even marital status [38–40]. General observations prove households show a risk-averse investment behaviour [41].

Studies conducted by means of face-to-face interviews by the Centre for Public Opinion Research (CBOS) in January 2016 on a representative random sample of 992 adult Poles, indicated that when asked about investment plans in the next 2–3 years related to the production of renewable energy for their own needs (at home and in commercial buildings), 22% of Poles responded positively. As many as 72% declared interest that they would like to generate heat, and 46% that they would be interested in producing electricity in their households ([42], p.8). Only 9% were interested in selling electricity to the grid.

There is, however, a significant discrepancy between declarations of willingness to invest and the possibilities and scale of financing. This has been confirmed by the results of the research conducted by Graczyk [43] in a Polish region with favourable conditions for the development of RES micro-installations and relatively high income of residents (reaching 75% of the EU average). The main objective of the questionnaire survey was to identify and analyse factors influencing demand and supply for renewable energy in Polish households located in the Lower Silesian Voivodship. The research was conducted from April to May 2016 in the form of face-to-face interviews on paper questionnaire (PAPI) in households living

exclusively in single-family or terraced houses. Such inhabitants have the opportunity to decide on an individual source of heat, electricity or assembly of devices, e.g. solar collectors on the roof. The research sample consisted of 500 households. In this research, every fifth respondent replied that they are planning or are interested in investment in RES in the following 5 years. More than 83% would like to generate thermal energy (solar collectors, heat pumps) and 16.3% would like to generate electricity (in micro-generation wind farms, water plants and solar panels). Also, every fifth respondent expressed their willingness to spend their own funds on RES installations for the needs of their household. Eleven per cent were hesitant, and every tenth gave the amount of one thousand, two, three, five, ten or twenty thousand zlotys. It is worth adding that 92% of respondents expected financial support from the state at a level of 50–89% of the investment value. The modal value ranged from 60% to 69% of funding. Only 8% of respondents were willing to allocate their funds for the purchase of renewable energy installations for commercial purposes, i.e. to become prosumers. Over 5.5% of respondents declared that they would allocate their funds for that purpose. A similar number, 8%, would have liked to be a member of an energy cooperative and generate electricity for the needs of its residents. The respondents were also asked about their willingness to pay more for electricity in exchange for the development of RES, which would contribute to increasing air cleanliness. Only 4% expressed such a desire, while 7% were hesitant. Those interested in the additional payment were usually willing to spend 50 zlotys more.

Based on the results of the surveys carried out in the Lower Silesia region in Poland, it can be concluded that there may be a discrepancy between declarations regarding the willingness to install renewable energy sources (every fifth respondent) and the willingness to spend own funds for this purpose (about 11% of respondents). This may indicate that only half of those interested are going to invest in RES. Public financial support, however, at a level similar to the one expected by the respondents is required, which will allow to increase the return on investment.

Drawing up the conclusions concerning prosumer support in Poland, three main factors should be outlined: first, the growing demand for micro-installations and the willingness to invest; second, non-stable energy law; third, the rapidly declining government support, e.g. elimination of feed-in tariffs, constant reduction of the hardly profitable surplus energy exchange system. These factors may stop the green energy transformation process at a local level.

5 Conclusions

The renewable energy financing system in Poland showed some similarities to the solutions used in countries that had previously started the green energy transformation. In Poland, however, the system of green certificates was used on a larger scale, and the FITs and FIPs systems were introduced to a lesser extent. The implementation of the auction systems in Poland took place late and did not result in the expected increase in new RES installations. As a result, Poland will not achieve

the assumed RES share of energy in final energy consumption in 2020. Currently, the scale of public support for investments in renewable energy sources is relatively low. There is need for clear direction in regard to technologies with unstable electricity generation characteristics and regulatory uncertainty. Auctions, which constitute the most important system of public support for major projects, have not aroused investors' trust so far. The auction system may encourage the offer of a low price at the auction, which carries the risk of withdrawal from already ordered investment projects in the future. Guaranteed prices, dedicated to smaller projects, under conditions of rapid decline in unit costs, will make public authorities reduce the scale of support and, as a consequence, reduce the scale of investment in RES.

Corporate financing is usually the most advantageous option of obtaining financing in terms of cost. Investments requiring high expenditure in relation to the existing scale of operations need project financing. This financing formula is also chosen to limit the risk of financing institutions. Huge projects can also count on public support and funds from international financial institutions. It is crucial to develop bankable projects within a short period, taking into account the short- and long-term financing perspective. The shortage of reliable projects to invest in could fail to attract institutional investors. The terms and the financing model are not conducive to small projects and projects intended for household purposes.

Sustainable development of the energy sector requires that the energy generated by conventional production sources is gradually replaced by smaller, dispersed generation units. The existing and foreseeable conditions for financing investments in renewable energy sources will favour rather larger projects. Opportunities for investment in the development of dispersed and smaller scale sources should be found in reducing technology costs and improving the competitiveness of energy prices in the market. Prosumers should face cost-reflective network tariffs [44], designed to reflect costs and benefits, e.g. fixed costs of building, operating and maintaining networks, and benefits of supporting the network by self-generation. The government support system ought to be stable for at least 5 years or more. The results allow concluding that the RES financing system is not coherent. In the countries such as Poland, with a relatively low level of GDP per capita, the possibilities of financing investments by commercial entities and households are limited. The public support system is not sufficient to ensure the development of financing RE.

Looking to the future and planning financial system development of RES in Poland, and even in some other Member States, the Polish experience can be taken into account. First of all, even in conditions of renewable energy production decreasing costs, it is better to maintain public support than to limit it. This should be maintained until the RES costs technologies can compete with the production costs in the installations to be phased out. Secondly, it is necessary to identify the financial needs and limitations of entities that could engage their resources in the development of renewable energy installations. Systematic monitoring will enable the adjustment of the scale and conditions of public support to the scale and directions of investing in RES dedicated to a specific country. Thirdly, it is necessary to increase the scope of financial advisory and guarantees for entities preparing for

such investments. Such activities do not involve large public funds and may cause the activation of interested entities. Fourth, it is advisable to research on financing the development of renewable sources in various countries. This will allow not only the exchange of experiences and learning of good practices, but also the creation of transnational financing systems (bilateral, joint, transnational).

Acknowledgments This article was financed by the National Science Centre as part of two projects with the following decision number: 2012/07/D/HS4/00733 and 2011/01/N/HS4/01306.

References

1. Gawlik L (2017) The Polish power industry in energy transformation process. Mineral Econ 31. https://doi.org/10.1007/s13563-017-0128-5
2. Graczyk A (2009) Ekologiczne koszty zewnętrzne energetyki odnawialnej. In: Graczyk A (ed) Ekonomiczne problemy wykorzystania odnawialnych zasobów przyrodniczych do produkcji energii, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu no. 83: 154–165
3. Owen AD (2004) Environmental externalities, market distortions and the economics of renewable energy technologies. Energy J 25(3):127–158
4. Central Statistical Office (2017) Energy 2017. Warsaw. http://stat.gov.pl/download/gfx/portalinformacyjny/en/defaultaktualnosci/3304/1/5/1/energy_2017.pdf. Accessed 30 Mar 2019
5. Directive of the European Parliament and the Council 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Official Journal of the European Union L 140 of 5 June 2009, p. 16, as amended)
6. IEA (International Energy Agency) (2015) Energy and climate change. OECD/IEA, Paris
7. Eurostat (2019) Consumption of renewable energy more than doubled between 2004 and 2017. https://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics#Consumption_of_renewable_energy_more_than_doubled_between_2004_and_2017. Accessed 30 Mar 2019
8. European Commission (2016a) Clean energy for all Europeans. COM/2016/0860 final, November
9. European Commission (2016b) Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast) COM/2016/0767 final/2 – 2016/0382 (COD)
10. Willis R, Simcock N (2019) Consumer (co-)ownership of renewables in England. In: Lowitzsch J (ed) Energy transition. Financing consumer co-ownership in renewables. Palgrave Macmillan, Cham, pp 370–372
11. IRENA and CPI (2018) Global landscape of renewable energy finance. International Renewable Energy Agency, Abu Dhabi
12. Egerer J, Oei PY, Lorenz C (2018) Renewable energy sources as the cornerstone of the German Energiewende. In: von Hirschhausen C et al (eds) Energiewende "Made in Germany". Springer, Cham
13. UNEP & BNEF (2015) Global trends in renewable energy investment 2015. Frankfurt School of Finance & Management. Google Scholar
14. Mazzucato M, Semieniuk G (2018) Financing renewable energy: who is financing what and why it matters. Technol Forecast Soc Change 127:8–22

15. Polzin F, Migendt M, Täube FA, von Flotow P (2015) Public policy influence on renewable energy investments—a panel data study across OECD countries. Energy Policy 80:98–111. https://doi.org/10.1016/j.enpol.2015.01.026
16. Holstenkamp L (2019) Consumer (co-)ownership of renewables energy sources. In: Lowitzsch J (ed) Energy transition. Financing consumer co-ownership in renewables. Palgrave Macmillan, Cham, pp 370–372
17. OECD (Organisation for Economic Co-operation and Development) (2017) The government role in mobilising investment and innovation in renewable energy. OECD, Paris
18. CEER (Council of European Energy Regulators) (2018) Status review of renewable support schemes in Europe for 2016 and 2017. Ref: C18-SD-63-03, Brussels, 14 December 2018
19. Renewable Energy Support Policies in Europe. https://climatepolicyinfohub.eu/renewable-energy-support-policies-europe. Accessed 31 Mar 2019
20. Ministerstwo Energii (2018) Projekt Polityki Energetycznej Państwa do 2040 roku (PEP 2040), Warsaw, 23 November 2018
21. Graczyk A (2016), Zmiany wsparcia publicznego na rynku energii odnawialnej, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Uniwersytet Ekonomiczny we Wrocławiu, no. 453: 199–208
22. Central Statistical Office (2018) Energia ze źródeł odnawialnych w 2017 r., stat.gov.pl/.../pl/.../energia_ze_zrodel_odnawialnych_w_2017.pdf. Accessed 31 Mar 2019
23. European Commission (2017) State aid: commission approves PLN 40 billion (around €9.4 billion) Polish support scheme for renewable energy, Brussels, 13 December 2017
24. NIK (Najwyższa Izba Kontroli) (2018) Informacja o wynikach kontroli. Rozwój sektora odnawialnych źródeł energii, Warsaw
25. Szambelańczyk M (2016) Co przyniesie nowelizacja ustawy o OZE? Czysta Energia 6
26. Deloitte Resources Study (2018) Energy management: most consumers and businesses push for cleaner energy. https://documents.deloitte.com/insights/DeloitteResourcesSurvey2018. Accessed 8 Jan 2019
27. Koh JM (2018) Producing Bankable Projects. Institutional Investors, PPPs and Bankable Projects. Palgrave Macmillan, pp 235–268
28. Inderst G (2009) Pension fund investment in infrastructure. OECD Working Papers on Insurance and Private Pensions
29. Independent Evaluation Group (2009) The World Bank Group Guarantee Instruments. World Bank, Washington, DC
30. Ustawa z dnia 20 lutego 2015 r. o odnawialnych źródłach energii, Dz.U. 2015 poz. 478, z późn. zm
31. Ustawa z dnia 6 marca 2018 Prawo przedsiębiorców, Dz.U. 2018 poz. 646
32. Nowelizacja ustawy o OZE: prosument nie zarobi (2019). http://www.planergia.pl/post/nowelizacja-ustawy-o-oze-prosument-nie-zarobi-2354. Accessed 31 Mar 2019
33. Goebel K (2019) Consumer (co-)ownership in renewables in Poland. In: Lowitzsch J (ed) Energy transition. Financing consumer co-ownership in renewables. Palgrave Macmillan, Cham, pp 348–351
34. National Fund for Environmental Management and Water Protection (2019) Oferta finansowania. http://www.nfosigw.gov.pl/oferta-finansowania/. Accessed 30 Mar 2019
35. Urząd Regulacji Energetyki (2019) Raport zawierający zbiorcze informacje dotyczące energii elektrycznej wytworzonej z odnawialnego źródła energii w mikroinstalacji (w tym przez prosumentów) i wprowadzonej do sieci dystrybucyjnej w 2018 r. (art. 6a ustawy OZE), Warsaw, March 2019
36. Mało wiemy o OZE (2014) Agroenergetyka 1:7
37. OZE szansą na przerwy w dostawach prądu (2014) Agroenergetyka 2:23–24
38. Barber BM, Odean T (2001) Boys will be boys: gender, overconfidence, and common stock investment. Quart J Econ 116(1):261–292

39. Ricciardi V (2008) The psychology of risk: the behavioral finance perspective. In: Fabozzi FJ (ed) Investment management and financial management, Handbook of finance, vol 2. Wiley, Hoboken, NJ, pp 85–111
40. Schooley DK, Worden DD (1999) Investors' asset allocations versus life-cycle funds. Financ Analysts J 55(5):37–43
41. Guiso L, Sapienza P, Zingales L (2018). Time varying risk aversion. J Financial Econ. https://doi.org/10.1016/j.jfineco.2018.02.007. Accessed 30 Mar 2019
42. CBOS, Collegium Civitas (2016) Polacy o oszczędzaniu energii i energetyce obywatelskiej, Komunikat z badań no. 36/2016, Warsaw, March, p 3–8
43. Graczyk AM (2019) Gospodarowanie odnawialnymi źródłami energii w ekonomii rozwoju zrównoważonego. Teoria i praktyka, PWN, Warsaw
44. CEER (Council of European Energy Regulators) (2016) Position paper on renewable self-generation. Ref: C16-SDE-55-03, Brussels, September 2016

Selected Errors Made in Economics, in Research on Global Climate Change

Stanisław Czaja and Agnieszka Becla

1 Introduction and Methodology

In modern economic literature, there can be found an increasing number of studies which employ statistical tools to assess the impact of various sources on research on specific problems and on the development of knowledge in this field. Their goal is to discover the regularities governing quotations in the context of their impact on subsequent studies and human awareness of the existence of a given issue. This is undoubtedly the effect of the increasingly common parameterisation in economics or, more broadly, in modern science, and the substitution of substantive and qualitative assessments with indicator-quantitative assessments. In this way, the assessment of the number of citations, and not the substantive content, or the actual strength of influence, becomes the determinant of the value of a given study. This leads to numerous important, in our opinion, errors that are made in a number of current articles and monographs. They are also the cause of consciousness-knowledge of a given phenomenon (challenge) being shaped in a specific way, from complete ignorance, through colloquial, often very simplified consciousness, to variously fixed approvals (consciousness and willingness to reduce-liquidate) or negation (more or less justified challenging of it). The factors of these interactions are sometimes surprising, especially if their source is not rooted in science. There are numerous criticisms and doubts in the scientific studies, attempts to verify or falsify. In ideological terms, there dominate unjust dogmas and the "one and only" correct interpretation of the issue.

The purpose of the following text is to attempt to identify some of the errors of research in economics, and indirectly, the factors that shape the awareness of a given

S. Czaja (✉) · A. Becla
Department of Ecological Economics, Wroclaw University of Economics and Business, Wroclaw, Poland
e-mail: stanislaw.czaja@ue.wroc.pl; agnieszka.becla@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_14

challenge. Within the case study there are analyses and studies on global climate change, one of the most controversial challenges of modern science, not just of economics. In recent years, numerous studies have been published—articles, monographs, reports—discussing various aspects of this complex, multifaceted and at the same time very important civilizational challenge. The research method uses critical literature analysis and the desktop research approach. It has been adapted to the problem and is based on deductive and partly inductive reasoning.

The methodology of the investigation enclose the opinion (valorise and rank):

- relationships between economy and the different disciplines of the science (A);
- legitimacy of citation (B);
- reference to empirical data (C);
- presence of the methods of physics, natural sciences and geography (D);
- level of abuse of mathematical modelling (E);
- statistical studying of the empirical data (F);
- the state of global climate changes (G);
- the pragmatism of conclusions (H).

Valorization incorporated following levels: 0—absolutely insufficiently, 1—insufficiently, 2—on the average, 3—sufficiently correctly, 4—correctly, 5—well, 6—very good, 7—perfectly. The detailed criteria of opinion were worked out (not presented in article).

The matrix of valorization had figure:

	Rank							
Plane of opinion	0	1	2	3	4	5	6	7
A								
B								
C								
D								
E								
F								
G								
H								

The scale of opinion of studies accepts figures: bad <0, 16>, on the average <17, 32>, good <33, 48>, very good <49, 56>, perfectly <57, 64>.

In the literature, more than 50 important items of scientific character have been published by reliable publishing houses. In the analysis, more than 700 studies (precisely 732) dealing with the issues of global warming and global climate changes of various character have been used, all of which appeared after the Ecological Earth Summit in Johannesburg in 2002.

2 Selected Literature References in the Field of Global Climate Change and Results of Research

Global climatic changes, due to their complexity, are of interest to numerous disciplines of science, especially climatology and meteorology, paleoclimatology, natural sciences, physical geography, astronomy, as well as sociology, political science and economic sciences. Each of them presents selected aspects of global climate change, exposing primarily issues of interest to a given discipline and applies its characteristic research methods.

According to the criterion of the discipline of science, there can be distinguished several groups of generic publications on global climate change, namely:

(1) strictly climatic senses, discussing the nature, causes, course and potential effects of global climate change, as well as the paleohistory of climate change [1–12];
(2) in the field of economics of global climate change, covering a wide range of issues such as: (1) anthropogenic causes of global climate change and their consequences for humans and their civilisations [1–4, 13–24]; (2) regional consequences of climate change and global warming [14, 25–30]; (3) generic consequences of climate change (for agriculture, fishery, forestry, transport, settlement, drinking water supply or international trade) [27, 31–35]; (4) economic modelling of global climate change [36–39]; (5) ethical and axiological intra- and intergenerational effects of global climate change [16, 40, 41]; (6) international legal and institutional regulations and their significance for global warming [3, 13, 16, 39, 42–49]; (7) regional climate and energy policies and their instruments [14, 16, 39, 43–47, 50]; (8) concepts of global climate policy in the perspective of sustainable development [1–3, 16, 17, 33, 41, 42, 45, 46, 51–53];
(3) political and historical, focusing on discussions on how to interpret global climate change—accepting or questioning the phenomenon [1–4, 15–17, 54–56];
(4) in the field of climate policy and international legal and institutional regulations [3, 13, 16, 31, 40, 42, 45, 46, 48, 52–54, 57, 58].

In the world literature, the issue of global climate change related to the global warming process is eagerly discussed. There are no official statistics in this area, but the estimates speak of hundreds of thousands of publications per year. This means not only their universality, but also the phenomenon of "dissemination". There is no possibility of substantive verification, and the vast majority of recipients shape their picture of the phenomenon based on random sources of information. In addition to magazines and scientific monographs subjected to peer review, but with a minimum range of impact (coverage), other sources of universal information, such as mass media or the Internet are not subject to verification of credibility, and the information provided by them are not verified regarding their truthfulness. This can be easily assessed by making a diagnosis of how many readers of this article are familiar with

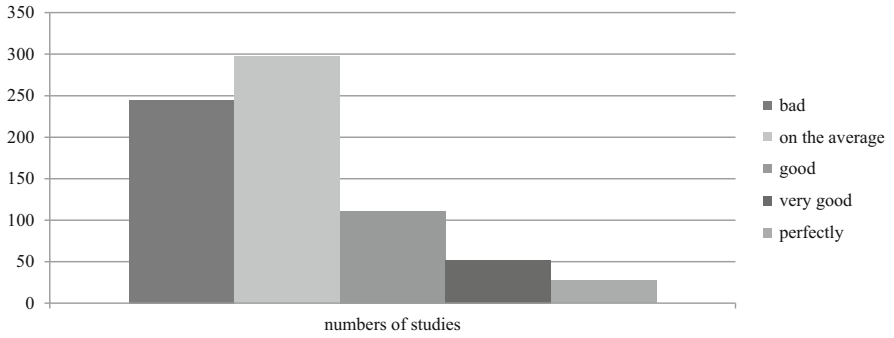


Fig. 1 Results of opinion of selected studies in the field of global climate change. Source: Own research and preparation

the sources referenced in it. Although they are the result of serious scientific studies, they are not the most popular ones.

This situation poses new questions about real (actual) and apparent sources of research and knowledge in the field of global climate change. Are multidisciplinary studies of multidimensional problems really carried out? How much statistical "processing" of data allows to better understand the course (and therefore the essence, causes and effects) of the studied phenomenon? Have we not, through parameterisation, entered the phase of a specific "scholastics" based on quotations-authorities, and not real scientific research and substantive values? Searching for answers to these and other questions led to the formulation of eight major, in our opinion, errors made, among others, in the study of global climate change.

In research, it was received following results (Fig. 1).

The majority of studies reached results: *on the average* (297) and *bad* (245). Only 27 studies have got a level *perfectly* and 52 *very good*. Why? What are the main errors in the implementation of research and development of knowledge in the field of global climate change.

3 Main Errors in the Implementation of Research and Development of Knowledge in the Field of Global Climate Change

A less, and especially more careful reading of studies dealing with various aspects of global climate change makes it possible to notice specific errors in this area of research and publication. They are both methodical and cognitive in character and they can be presented as follows (Table 1).

Interesting and, in a sense, surprising is the error based on the lack of an effective flow of knowledge (information) between scientific disciplines dealing with global climate change. The most interesting information and data are obtained in this

Table 1 Basic cognitive and methodological errors in research and development of knowledge about global climate change

Number	Name	Specification
1.	Error of the flow of information	Insufficient flow and verification of information between different disciplines of science in the field of research on global climate change.
2.	Error of unnecessary quoting	The situation of excessive number of citations conditioned by parameterisation, not the real influence.
3.	Error of disregarding empiricism	Lack of sufficient support for research on global climate change on available, non-transformed empirical data.
4.	Error of inadequate testing methodologies	Methodical errors related to avoiding methods from physics, chemistry or natural sciences in economic analyses; lack of physicalisation of economic inquiries.
5.	Error of excess modelling	The abuse of economic modelling to describe the course of natural or social phenomena.
6.	Error of excess statistical "processing"	The use of statistically predefined data in empirical and model studies and giving studies 'scientific' character through the use of graphs and statistical parameters (indicators).
7.	Error of the temporal "Titanic" effect	Accepting the assumption that there are no threats or they are distant in time.
8.	Error of the lack of pragmatism	Accepting, as a rule, non-executable declarations instead of effective (at least potentially) strategies and procedures.

Source: Own preparation

respect from meteorology and climatology, physical geography and natural ecology, and thus disciplines focusing on attempts to directly measure the causes and effects of global warming. They are largely ignored by economists and politicians, despite declarations of the need for interdisciplinary research [59]. There may be two reasons for such a situation—ignorance and/or excessive cognitive-methodical autarky of individual disciplines of science. The first one does not allow to understand the achievements of other researchers due to lack of knowledge and skills. It can be overcome quite effectively. The second one is more complex and means the conviction that only the given discipline has the right methods of researching a given phenomenon. A characteristic feature in the economists' environment is, for example, the extraordinary ease of going to money analysis, as N. Georgescu-Roegen has already noted ironically that "*only on paper can anyone draw a production function as they want, without looking at the dimensions or other physical barriers*." [60]. How difficult it is to overcome the error of the lack of information flow can be proved by the accomplishments of W. Nordhaus, the current Nobel Prize winner in the field of economic sciences, criticised by economists for excessive "naturalness" and poorly understood by naturalists due to "economism".

The second error, rather of a technical and methodological nature, becomes also widespread. Publishing any work—a monograph or an article—requires the text to be enriched with the right amount of cited sources. This is a formal requirement for text editing procedures. It is not important whether their influence was real (specific

concepts, methods, formulas, quoted fragments) or not. In the case of small articles, of a few or a dozen pages, there is an absurd situation in which, after presenting the goal and research methods and reviewing the current achievements, there is no place for the proper presentation of one's own, original achievements, which should be the essence of the publication. The creator presents their achievements and ways of reaching the obtained results. Critical verification of its value is the task of other researchers. Not every work should be a review of other works.

The quoted sources are most often selected from the language key, specific names, titles of journals or publications, or publication dates. The language key assumes that English-language publications should be used, which is often done without assessing their actual cognitive or methodological value. Approach by names prefers famous or fashionable authors, treated as indisputable authorities (absolutely unacceptable in the natural sciences, physics, chemistry or mathematics). This is similar to the method of indisputable dogmatism used in scholastics, which is not conducive to or can even delay the development of science. Fiercely defended paradigms or "hard cores" are then created, in which their creators and epigones do not allow for a more serious critical check. Hence the *ad personam* arguments, not *ad rem*. The key based on publishing houses means that in centres that are not in the top positions in rankings (has anyone seriously and critically examined their methodologies?), there cannot exist studies at the highest substantive level. Therefore, the assessment of source selection is "geographical" and not substantive. The key based on publication dates assumes, however, that releases from many years ago are of a lesser value than the current ones and/or have been absorbed by newer studies. A very good counter-example are works from economic cybernetics—current ones and those from the 60s and 70s of the twentieth century, or from the methodology of science—current and, for example, those by T. Kotarbiński. Another example can be works from mathematical analysis or algebra from the 70s of the twentieth century. We leave the evaluation of individual studies to the reader.

An important error, especially when examining phenomena that can be accurately measured, is to disregard empirical data. They are ignored in studies. There are also no attempts to explain their actual formation. Measurement errors (e.g. due to the indeterminacy principle) or the search for better measures, desirable accuracy levels or measuring devices (techniques) are not examined, and in the case of economic sciences, the possibility of departing from monetary approaches and/or at least reducing the measurement errors associated with them. The source of this error may be difficulty with the correct use of deductive and inductive reasoning and with the transition from one to the other without breaking the rules of logic [61].

The error of neglecting empirical data is connected with the sixth, already mentioned error related to various statistical "processing" of actual data, which leads to analyses based on unreal data—averaged, standardised, unified, ranked or variously ordered. Analyses become "research" based on a fictional relation to the phenomenon, numerical material. Therefore, it is a more idealisational/scenario approach rather than an attempt to discover the causes of the course of phenomena occurring in the socio-economic and informational reality (material-energy and information reality). Real data are harder to model, not "arranged" according to

the desired or expected trajectory, and each deviation requires the examination of its causes. As a consequence, we must move "deep inside" the phenomenon, looking for better causes, more consistent with its actual state and essence and not following "along" the modelled path. It is much more cognitively interesting to understand the appearing deviations than to "match" data to modelled, estimated, expected values.

Another error concerns inadequate test methods and methodologies, which may stem from the aforementioned avoidance of approaches particular to physics, chemistry or natural sciences in economic analyses. This is clearly seen in the study of global climate change. The lack of physicalisation of economic inquiries, translated by the need to compare all elements in monetary units, leads to the simplification of the research process. The problem is not so much on the imperative of widespread introduction of methods from the natural sciences to economic sciences. A fertile cognitive approach should use the following guidelines:

- use methods and categories of economic sciences where they are justified by the nature of the phenomena,
- search for proper mutual adaptation of economic and natural methods and categories where possible and cognitively fertile,
- use natural methods where they are necessary and difficult to replace, and seek their proper economic interpretation.

Economic research includes objects and phenomena of material, energy, and informational character, and their monetisation is only a form of idealisation. In order to make economic inquiries more cognitive and useful in decision-making, they can no longer remain in the sphere of examining cash flows and analyses based solely on the monetary approach. With the problem of the right relationship between the real and monetary dimensions of broadly understood economic processes, economics has been in trouble since the early beginnings of its existence. This can be seen, for example, in economic value theories, economic development theories, in the commonly accepted model of production functions, and nowadays in theories of ecologically conditioned economic growth [62] as well as, which is symptomatic in the case of ongoing discussions, in economic analyses of global climate change.

Another error in research on global climate change has a long history in economic sciences and a much broader context. It concerns the mutual relations between formal and theoretical models and facts describing real (and also monetary) economic and social phenomena. In a broader sense, it pertains to the scope of the use of mathematics and quantitative methods in economic research. After the initial period of fascination in the second half of the nineteenth century and first half of the twentieth century, a critical evaluation of the usefulness of mathematical and model approaches appeared. They have their advantages, but also serious simplifications. In the case of global climate change, the problems relate mainly to significant discrepancies between the model and the actual distributions of parameter values, which undoubtedly connects with the complexity of the studied phenomena (a significant number of real factors affecting the number of model parameters), insufficient knowledge in this respect, and with the non-linear nature of the studied phenomena, using linear (linearized) models and analytical methods [63]. As a

result, the emerging discrepancies and interpretative constraints of a methodical nature are used by opponents to question the existence of the phenomenon of global climate change. Methodical and cognitive imperfections of research cannot be a reason for not noticing the real symptoms of threats resulting from global warming and not taking preventive (protective) measures.

The aforementioned error of excess statistical "processing" is associated with an attempt to assign "scientific" character to the studies by means of using various techniques for the development of empirical data, describing the phenomenon actually studied. There were quite a few entities involved in the collection and initial sorting (processing) of data (databases) with the help of appropriate statistical programs, which then in articles or monographs are subjected to attempts to describe the model. The procedures concealed under attractive acronyms provide parameters (indicators), which should raise doubts in every statistically educated reader. And for three reasons, at least: (1) the nature of the accounting procedure used, (2) adjusting it to the nature of the phenomenon under investigation, and the scope of modification of input data. The mere placement of graphical charts and the presentation of the obtained indicators, without their substantive evaluation, does not allow for the formulation of logically correct and true conclusions or recommendations. In studies on global climate change, this is particularly evident.

The penultimate of the set errors can be called the "Titanic effect," which is particularly dangerous at the human-civilization-economy-natural environment interface. This also applies to global climate change. This effect manifests itself in the assumption, often resulting from ignorance, that the real threats are non-existent or that they are distant in time. This can be illustrated by the following diagram (Diagram 1). The phenomena appearing at the interface between the economy and

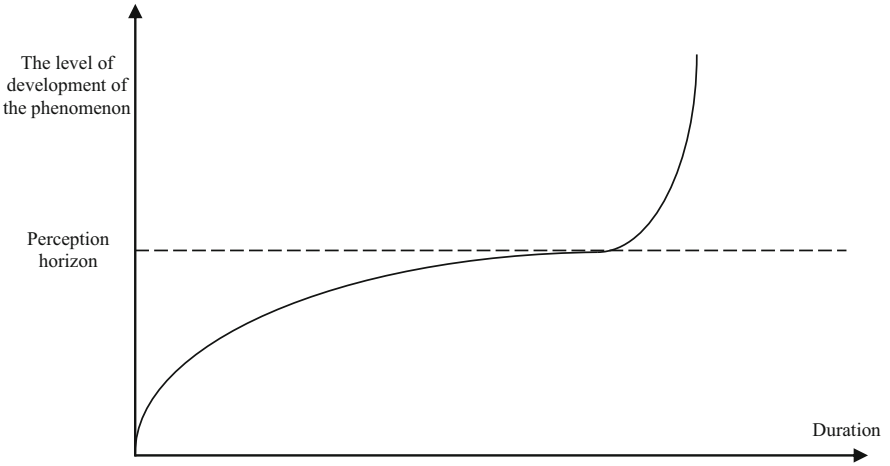


Diagram 1 The development of the phenomenon according to the S-logistic curve. Source: S. Czaja, A. Becla, *Ekologiczne podstawy procesów gospodarowania*, Publisher of the Oskar Lange University of Economics in Wroclaw, Wroclaw 2007, p. 169 [64]

the natural environment often develop according to such a curve. Initially, they slowly change the internal conditions of ecosystems and are difficult to observe, approaching the horizon of perception. This should be understood as the level of the phenomenon that is recorded by appropriate monitoring or the negative consequences of this phenomenon are noticed. After exceeding the horizon of perception, destructive impacts on ecosystems are so large and grow so exponentially that they do not allow a sufficiently quick reaction on the part of human beings. As a result, there is an accelerated degradation of a given environmental component, and the costs of corrective actions and elimination of its effects are very high or are impossible to be liquidated. Such a situation may concern the consequences of global climate change.

The Intergovernmental Panel on Climate Change report presented before the recent COP Katowice climate summit 2018 states that the period of effective responses to climate change has been reduced to a dozen or so years (the deadline is 2030) [65]. Taking into account the state of advancement of work on global climate policy, one may agree with D. Attenborough's opinion that "*humanity is a disease that life on Earth suffers from*." [66]. We do not fully understand the importance of the natural environment for human existence and the existence of its civilization, and therefore people have problems with imagining the consequences of degradation of individual components of ecosystems, or their global character.

The last of the errors is connected with the lack of sufficient level of pragmatism in the conducted research, especially regarding conclusions and recommendations. It manifests itself in accepting difficult to implement declarations instead of preparing effective, at least potentially, strategies and procedures of conduct, as well as identifying the conditions of implementation and the effects of their implementation in socio-economic life on a global and/or regional scale [67].

A good example of this error are the solutions adopted at the last Earth Climate Summit COP Katowice 2018. On the one hand, there were universal declarations and dramatic appeals for the need to protect the Earth's climate and counteract global warming. On the other hand, there were statements in defence of coal fuels and maintenance of current sources of energy carriers or reckless quasi-ecological projects, and above all, lack of agreement on the meaning (and sometimes existence) of global climate change for the future of life on Earth and the survival of human civilization. If we actually live in Anthropozoic (Anthropocene),[1] what will be its future? Deprived of pragmatism, declarations are only an expression of current dilemmas that are hard to grasp for the ordinary inhabitant of the planet.

[1] Anthropozoic is a concept proposed by Antonio Stoppani and Joseph LeConte at the turn of the nineteenth and twentieth centuries as a new geological epoch after the Holocene. However, it was rejected by the geologists. In the late 90s of the twentieth century, Nobel Prize winner Paul Crutzen (ozone layer researcher) proposed the term Anthropocene. It became the subject of serious discussions, also at the forum of the British Geological Society, while at the same time it became accepted in the scientific and popular science literature. M. Błoński, *Skończył się holocen, rozpoczęła nowa epoka geologiczna?* https://kopalniawiedzy.pl/holocen-antropocen-Ziemia-epoka-geologiczna.13050 [access: December 31, 2018] [68].

4 Summary and Recommendations

In modern economics, there can be found numerous studies that present the issue of global climate change in different perspectives. Therefore, their reliable substantive assessment may cover only a part of them. It is impossible to conduct such analyses due to their number and lack of adequate resources at the disposal of research teams. Thus, a classic situation of information noise is created, within which it is more difficult to find studies valuable cognitively. It also raises the relativisation of problems and their limitation in social and individual consciousness.[2]

On the basis of even partial research, however, one can notice some rather characteristic errors that are made when preparing such studies. They have been briefly characterised in the presented article, and one general recommendation results from the conducted studies—efforts should be made to avoid these errors in future studies and researches. Otherwise, the pessimistic forecasts in the last IPCC report will become true.

It is also possible to formulate a few more detailed recommendations referring to the highlighted errors.

First of all, it is necessary to deepen the actual processes and not the declarative interdisciplinary nature of scientific research. This does not mean that individual disciplines do not maintain their autonomy and do not develop their own research methods. However, this development must take place in mutual relations with other disciplines. This is particularly important in the study of global climate change and other global environmental problems, such as: (1) destruction of the ozone layer, (2) acidification of the atmosphere and surface waters, (3) deforestation of the planet's surface, (4) stepping and desertification of the Earth's surface, (5) pollution of seas and oceans, (6) degradation of drinking water resources, (7) limiting biodiversity and ecological non-economic uses, (8) polluting outer space and (9) overexploitation of renewable and non-renewable resources.[3]

Secondly, the right balance between the current achievements of science and the search for new, better cognitive effects should be maintained. The essence of scientific cognition is a better, i.e. more real (in accordance with the actual state of affairs) understanding of the surrounding material-energy and information reality. The previous achievements are only a starting point for further research.

Thirdly, the data and information describing the studied phenomena, such as global climate change, should be treated more carefully from a cognitive point of view. In particular, the attention of researchers should focus on the methods of

[2]It would be interesting to learn the conclusions of research in the field of knowledge acquired by the inhabitants of Poland and Upper Silesia as a result of the projects constituting the Earth Climate COP Katowice 2018. It can be argued that it would be close to zero, and the only trace would be left by ill-conceived statements.

[3]The other global ecological problems mentioned here, arising at the interface between human-economy and natural environment, generate very similar challenges as global climate change. The related executive errors (cognitive, methodical or descriptive) are made during their examination and description.

measuring these phenomena, their causes and consequences, as well as on how to interpret the obtained results.

Fourthly, one should strive to limit the predominance of form over essence, content in scientific research, especially economic research. The language of mathematics and quantitative-model methods are to help discover the essence of the studied phenomena, not to dominate the research. In economics, these are the problems of excess idealisation modelling and monetary approaches.

Fifth, research on global challenges such as global warming or the loss of biodiversity must be embedded in a different understanding of the dimensions in which they occur, especially time and space, as well as real conditions, which are physical and chemical laws, especially the first and second law of thermodynamics. Economists often do not include them or interpret them incorrectly.

Sixth, studies of problems such as global climate change have their cognitive and application goals. In the second case, they must be pragmatic, i.e. possible to implement projects, proposals for solutions or instruments that control the course of desired processes.

These few recommendations are a minimum improvement program in the field of economic research on global climate change.

Selected Literature in the Field of Global Climate Change

1. Czaja S (1998) Globalne zmiany klimatyczne. Wydawnictwo Ekonomia i Środowisko, Białystok
2. Flannery T (2007) Twórcy pogody i przyszłe skutki zmian klimatu. Wydawnictwo CKA, Gliwice
3. Griffin J (ed) (2003) Global climate change. The science, economics and politics. Edward Elgar Publishing, New York
4. Schonwiese C-D (1997) Klimat i człowiek. Wydawnictwo Prószyński i Spółka, Warszawa
5. Horton B et al (2014) Expert assessment of see-level rise by AD 2100 and AD 2300. Quaternay Science Reviews, No. 84/2014/January
6. Popkiewicz M, Kordaś A, Malinowski S (2018) Nauka o klimacie. PostFactum, Katowice
7. Berger A et al (2012) Climate change. Springer, Wien
8. Pierrehumbert RT (2009) Principles of planetary climate. Cambridge University Press
9. Davis B (2017) Calculating glacier ice volumes and see level equivalents. IPCC, Antarctic Glaciers
10. Liebrand D (2017) Evolution of the early Antarctic ice ages. PNAS
11. WGI: Climate Change 2013, The Physical Science Basis (2013) IPCC, AR5
12. Weart S (2008) The discovery of global warming. Harvard University Press, Cambridge, MA
13. Kooten van C (2004) Climate change economics. Why international accords fail. Edward Elgar Publishing, New York
14. Mendelsohn R (ed) (2001) Global warming and the American economy. A regional assessment of climate change impacts. Edward Elgar Publishing, New York
15. Joseph LE (2013) Słoneczny kataklizm. Wydawnictwo Iluminatio, Białystok
16. Baranzini A et al (eds) (2004) Voluntary approaches in climate policy. Edward Elgar Publishing, New York
17. Zmiany klimatyczne (2011) Biblioteka Gazety Wyborczej, Warszawa

18. Hansen JE, Sato M (2012) Paleoclimate implications for human climate change. Springer, New York
19. Luebken FJ, Berger U, Baumgarten G (2014) Temperature trends for the period 1871–2009 in the midlatitude summer mesosphere. Advancing Reanalysis, No. 10
20. Malina M et al (2014) What we know. The reality, risk and response to climate change. AAAS Climate Science Panel, American Association for the Advancement of Science
21. Norgaard K-M (2011) Living in denial: climate change, emotions, and everyday life. MIT Press, Cambridge, MA
22. Peters G et al (2012) Rapid growth in CO_2 emissions after the 2008–2009 global financial crisis. Nature Climate Change 2, No. 1/January
23. Porter J et al (2014) Climate change 2014: impacts, adaptation, and vulnerability. In: Fields CB et al (eds) Cambridge University Press, Cambridge
24. Nordhaus WD (2007) A review of the stern review on the economics of climate change. J Econ Lit 45(3):686–702
25. Giupponi C et al (eds) (2003) Climate change in the Mediterranean. Socio-economic perspectives of impacts, vulnerability and adaptation. Edward Elgar Publishing, New York
26. Ruth M (ed) (2006) Regional climate change and variability. Impact and responses. Edward Elgar Publishing, New York
27. Dietz A et al (eds) (2004) The impact of climate change on drylands. With a focus on West Africa. Springer/Kluwer Academic Publisher, Berlin/Los Angeles
28. Smith J, Mendelsohn R (eds) (2006) The impact of climate change on regional systems. Edward Elgar Publishing, New York
29. Smith J et al (eds) (2006) The impact of climate change on regional systems. A comprehensive analysis of California. Edward Elgar Publishing, New York
30. Erfanian A, Wang G, Fomenko L (2017) Unprecedented drought over tropical South America in 2016: significantly under-predicted by tropical SST. IPCC, Scientific Reports
31. Carraro C et al (eds) (2007) Climate and trade policy. Bottom-up approaches towards global agreement. Edward Elgar Publishing, New York
32. Hannesson R (ed) (2006) Climate change and the economics of the world's fisheries. Examples of small pelagic stocks. Edward Elgar Publishing, New York
33. Dore M, Guevara R (eds) (2000) Sustainable forest management and global climate change. Selected case studies from the Americas. Edward Elgar Publishing, New York
34. Frederic K (ed) (2007) Water resources and climate change. Edward Edgar Publishing, Cheltenham
35. Weintrobe S (ed) (2013) Engaging with climate change. Routledge, East Sussex
36. de Miguel C et al (2006) Economic modelling of climate change and energy policies. Edward Elgar Publishing, New York
37. Andrews DG (2009) An introduction to atmospheric physics. Cambridge University Press, Cambridge
38. Nordhaus WD (2013) The climate casino: risk, uncertainty, and economics for a warming world. Yale University Press
39. Nordhaus WD (2015) A new solution. The climate club. Princeton University Press
40. Pinguelli-Rosa L, Munasinghe M (eds) (2002) Ethics, equity and international negotiations on climate change. Edward Elgar Publishing, New York
41. Page E (2007) Climate change, justice and future generations. Edward Elgar Publishing, New York
42. Faurie M et al (eds) (2003) Climate change and the Kyoto protocol. The role of institutions and instruments to control global change. Edward Elgar Publishing, New York
43. Harris P (ed) (2007) Europe and global climate change. Politics, foreign policy and regional cooperation. Edward Elgar Publishing, New York
44. Carraro C, Egenhofer C (eds) (2003) Firms, governments and climate policy. Incentive-based polices for long-term climate change. Edward Elgar Publishing, New York
45. Albrecht J (ed) (2002) Instruments for climate policy. Limited versus unlimited flexibility. Edward Elgar Publishing, New York

46. Ierland van E et al (2003) Issues in international climate policy. Theory and policy. Edward Elgar Publishing, New York
47. Rübelka D (2002) International climate policy to combat global warming. An analysis of the ancillary benefits of reducing carbon emission. Edward Elgar Publishing, New York
48. Wicke L (2004) Beyond Kyoto – A new global climate certificate system. Springer/Kluwer Academic Publisher, Berlin/Los Angeles
49. Nordhaus WD (2018) Projections and uncertainties about climate change in an era of minimal climate policies. Am Econ J Econ Policy 10(3):333–360
50. Peeters M (ed) (2006) EU climate change policy. The challenge of new regulatory initiatives. Edward Elgar Publishing, New York
51. Ruth M (ed) (2006) Smart growth and climate change. Regional development infrastructure and adaptation. Edward Elgar Publishing, New York
52. Nordhaus WD (2008) A question of balance: weighing the options on global warming policies. Yale University Press
53. Nordhaus WD (2010) Economic aspects of global warming in a post-Copenhagen environment. Proc Natl Acad Sci. https://doi.org/10.1073/pnas.1005985107
54. Klein N (2016) To zmienia wszystko. Kapitalizm kontra klimat. Warszawskie Wydawnictwo Muza S.A., Warszawa
55. Schellnhuber HJ et al (2012) Turn down the heat. A report for the World Bank, Potsdam
56. Anderson K, Bows A (2012) A new paradigm for climate change. Nature Climate Change, 2, No. 9/September
57. Kooten van C (2004) Climate change economics. Why international accords fail. Edward Elgar Publishing, New York
58. Burns W, Strauss A (eds) (2013) Climate change geoengineering: philosophical perspectives, legal issues, and governance frameworks. Cambridge University Press, New York

Source Literature

59. Gorynia M (2016) Nauki ekonomiczne a postulat interdyscyplinarności. In: Czaja S, Graczyk A (eds) Ekonomia i środowisko. Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław, pp 92–101
60. Georgescu-Roegen N (1979) Scarcity and growth reconsidered. The John Hopkins University Press, Baltimore
61. Chalmers A (1993) Czym jest to, co zwiemy nauką? Wydawnictwo Siedmioróg, Wrocław
62. Czaja S, Fiedor B, Jakubczyk Z (1993) Ekologiczne uwarunkowania wzrostu gospodarczego w ujęciu współczesnej teorii ekonomii. Wydawnictwo Ekonomia i Środowisko, Białystok
63. Czaja S, Becla A, Włodarczyk J, Poskrobko T (2012) Wyzwania współczesnej ekonomii. Wybrane problemy. Wydawnictwo Difin, Warszawa
64. Czaja S, Becla A (2007) Ekologiczne podstawy procesów gospodarowania, Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu, Wrocław
65. Intergovernmental Panel on Climate Change (2018) Global warming of 1.5°C. Summary for policymakers. IPCC, Switzerland, October 2018. https://report.ipcc.ch/sr15/pdf/sr15_spm_final-pdf. Accessed 27 Dec 2018
66. Szewczyk O (2018) Ma dość ludzkości i ma powody (w) „Polityka", nr 49 (3189), 5.12–11.12.2018, s. 100–105
67. Becla A, Czaja S, Poskrobko T (2014) Międzynarodowa ochrona środowiska. Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław
68. Błoński M (2018) Skończył się holocen, rozpoczęła nowa epoka geologiczna? https://kopalniawiedzy.pl/holocen-antropocen-Ziemia-epoka-geologiczna.13050 [data wejścia: 31.12.2018]

Crowdfunding Campaigns and Success: A Systematic Literature Review

Gábor Csepy, Nikolett Kovács, and Erika Jáki

1 Introduction

Crowdfunding is one of the novelties of the emerging financial technology sector providing an innovative way for entrepreneurs to collect funds to be able to start a new business. With this solution, fund seekers launch a campaign on an internet-based platform in order to connect to their potential investors who can provide the required amount of money within limited time. Since the appearance of the phenomenon, scientists are interested in identifying the ways of success for the campaign or at least predict the outcome of different behaviors.

The aim of this paper is to summarize the knowledge gathered from already conducted crowdfunding campaign success related studies to create a conceptual framework for further studies and identify new research directions for the future. That is why we set the following research question: what are the key areas of success factors for crowdfunding campaigns according to academic researchers?

Research funded by: *EFOP-3.6.3.-VEKOP-16-2017-00007 "Young researchers from talented students—Fostering scientific careers in higher education"*

G. Csepy · N. Kovács · E. Jáki (✉)
Business School Faculty, Corvinus University of Budapest, Budapest, Hungary
e-mail: erika.jaki@uni-corvinus.hu

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_15

In order to answer the research question, we conducted a systematic literature review of academic articles using the theory building power of qualitative content analysis. In our findings, we identify 60 factors influencing the success rate of the crowdfunding campaigns grouped into 17 categories and 4 themes. Our results show that the majority of the investigated success factors can be directly affected by the project initiators cautiously.

In the upcoming sections we introduce the phenomenon of crowdfunding and elaborate on the details of the used methodology. Our results are introduced in detail and the conclusions are drawn down with potential future directions added.

2 Literature Review of Crowdfunding

Crowdfunding can be interpreted as a subtype of crowdsourcing, where a job is outsourced to a public group in an open call via the internet [1]. Excluding some aspects of crowdsourcing, crowdfunding is an umbrella term used to describe a broad form of fundraising [2]. A variety of research studies use and define the concept of crowdfunding, however, the definition used varies depending on the focus of each article.

The basic idea of crowdfunding is collecting money from more than one person [1]. This core concept can be further detailed in different directions.

Focusing on the initiator's part, crowdfunding can be understood as the efforts by entrepreneurs to fund their ventures or projects by counting on small contributions from a large number of individuals using the internet [3–6].

On the contrary, the phenomenon can also be seen from the supporter's perspective. This considers crowdfunding as a collective effort by networking consumers who pool their money together online, with the aim to invest in and support other people's or organizations' ideas or projects [7, 8].

As for the types of crowdfunding, Belleflamme et al. [9, 10] differentiates these when defining the concept of crowdfunding as an open call online, aiming to receive financial resources to support specific purposes. To particularize the different types, the literature generally differentiates between four forms: donation-based, equity-based, lending-based and reward-based funding [1].

In donation-based crowdfunding, a classic fundraising objective is set for a non-profit or charity cause without a monetary or material reward [11]. Examples for platforms are Betterplace.org, GoFundMe, Crowdfunder, Leetchi.

In the equity-based model, the fundraiser markets an equity stake or stock in return for the investment [10]. Examples for such crowdfunding platforms are MicroVentures, Companisto, Seedmatch, Crowdcube, Indiegogo and SEEDRS, a leading UK equity crowdfunding platform [12].

Lending-based crowdfunding comes from the typical banking model, without a financial institution. In peer-to-peer lending a private lender lends money to a private borrower, while microlending includes monetary provision to companies/

entrepreneur [1]. Platform examples are Auxmoney and Kiva, the latter being the largest lending-based pro-social crowdfunding platform [13].

Reward-based model is the most common form of crowdfunding. Here the backer receives a gift or product from the founder after the contribution (patronage model), or can order the product with price advantage or in a special version before production (pre-order model) [10]. Examples for platforms are Startnext and Kickstarter, the second being the largest in the USA [14].

Besides the types of crowdfunding, the crowdfunding campaign itself is another often researched phenomenon. It is an open call to financially support a project or idea within a limited timeframe, typically 30–45 days. It consists of the project description and efficient interaction [15]. Although the primary goal of a crowdfunding campaign is to raise funds, it also comes with the benefit for entrepreneurs to test, promote, and market their products. Initiators can also have a better understanding of their consumers and innovate the product reflecting on the market needs [16].

Crowdfunding campaign success consists of different factors. An outstanding objective of crowdfunding and measure of success is whether the funding goal has been achieved [4, 17]. A more sophisticated definition of successful crowdfunding considers time as well, and only labels a campaign successful if it does not only reach the monetary goal, but it also happens in a specified timeframe [12]. Success can also be evaluated in terms of the number of investors, funding, and funding speed [2, 18]. In this article, we argue that a crowdfunding campaign is successful if the funding goal is achieved within the timeframe specified by the initiator.

3 Methodology

The main goal of this article is to provide a structured summary of the key success factors identified by researchers and create a conceptual framework as a basement for further empirical research to be conducted in the field. The main concept for the methodology applied in this paper is the combination of the strict sampling rules of systematic literature review and the conceptualization power of qualitative content analysis (QCA) using inductive coding. Systematic literature review is a method using an evidence-based approach which allows an objective overview on search results while eliminating biases and error issues [19]. QCA can be defined as "a research method for subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" ([20], p. 1278). QCA methodology is usually applied "to answer questions such as what, why and how, and the common patterns in the data are searched for" ([21], p. 138). The guide of the inductive type of the methodology consists of multiple steps such as (1) selecting the unit of analysis, (2) open coding, (3) formulating preliminary codes out of data, (4) data coding, (5) revising codes and (6) developing categories and themes [22].

As a first step to conduct our analysis we searched in five relevant databases at the end of October 2018 (Scopus, ScienceDirect, BASE, Business Source Complete, Academic Search Complete) to improve the validity of our results. During the base search, the keywords "success" and "crowdfunding" were used which were looked up in the fields of "article title" or "abstract" or "keywords" to ensure that only the relevant articles will be captured. Furthermore, the results were limited to academic journals in English language.

The search results from all the databases were extracted as CSV (comma separated version file format) into Excel, where all duplicates were removed, resulting a base dataset consisting of 166 articles. Moreover, the initial results were further narrowed with the use of relevance check applied on the abstracts resulting in 82 articles left. During the relevance check, we looked for evidences of any crowdfunding campaign success related finding. If such information was not found in the abstract, the article was excluded from further analysis. Articles using non-empirical methodology were excluded as well as we wanted to focus on results which were empirically proven. Another exclusion criterion was the articles' high degree of focus on a specific industry or sector as we want to conclude as generalizable conclusions as possible. After the abstract relevance check, only those articles were kept for further analysis which were published in journals ranked by Scimago as Q1, to ensure that only high quality and peer-reviewed findings are included into our analysis, resulting in 29 articles remaining. Hereupon, we started to read the articles fully and based on the criteria set of the abstract relevance check we excluded 7 additional articles from our scope.

When the data sampling was done and confirmed, the relevant parts of the results and conclusions sections of the articles were cut and analyzed with the logic of the QCA in order to create categories and higher abstraction level themes from the inductive codes emerging from the text. Due to the page limitations of this paper, the success factors and their affects are not elaborated in detail in the Results section.

4 Results

In the following section we introduce the results of the QCA analysis performed on the selected set of articles. Sixty analyzed factors within 17 categories and four main themes emerged from our work, namely: Campaign characteristics, Characteristics of participants, Communication, and Network. During the upcoming sections, all these themes are explained and drilled down into categories which consist of potential success factors investigated by academic researchers.

4.1 Campaign Characteristics

The most popular research direction and most robust theme in our analysis is called Campaign characteristics. Under this theme we understand those success factors which are part of the initial setup for launching a project on a crowdfunding platform. There are seven different categories within this theme: duration, monetary goal, financial planning, project scope, pledges, gain of backers, and platform features. All factors identified within the mentioned categories can be influenced by the project initiator directly before launching the campaign.

One of the basic mandatory settings of a crowdfunding campaign is the *duration*, which means the number of the days the funding process lasts [4, 23–27]. The other key component of the campaign features is the *monetary goal*, which refers to the amount of the money to be collected during the duration of the campaign [4, 23–28]. Another category within the Campaign settings theme is the *financial planning* which is defined as the agenda of the initiator explaining the next steps of the project when the campaign is successfully closed [2, 18, 26]. Under the category name of *pledges*, we understand the monetary contribution of the backers to the crowdfunding project [25, 28]. Excluding the donation-based crowdfunding model, the backers receive different types of benefits from the initiator for their investment which we call the *gain of backers* [2, 23, 25, 28, 29]. Another important category emerged during our analysis which we identified as the *project scope*, which refers to the main goal or result to be achieved by the initiator with the money received from the backers [25, 28]. The last category within the Campaign settings theme is called *platform features* which means the specific characteristics of the crowdfunding website chosen by the initiator to launch a project there [27, 30].

4.2 Characteristics of Participants

During our analysis, we identified a key theme which refers to the main personal attributes of backers and project initiators, which we call Characteristics of participants. This high abstraction level of success factors consists of four main categories: the initiator's intellectual capital, the crowdfunding experience of the initiator, the initiator's personality, and the characteristics of backers. The success factors collected in the Characteristics of participants theme can be influenced directly but not instantly as the mentioned categories cannot be changed by a click—the participants need to invest time and effort before they launch a campaign.

Most of the analyzed articles deal with some key features of the project initiator. The most recent studies confirm that the *intellectual capital of the funder* significantly influences the funding success [2, 31]. We identified another key initiator related category in the investigated studies which we named the *initiator's personality* [29, 31, 32]. Under this term we understand characteristics to be key parts of the founder's nature observable through the interactions on the platform. Besides the

Table 1 Summary of the typology of success factors in crowdfunding campaigns

Theme	Relevant sources used	Category	Factors[a]
Campaign characteristics	Mollick [4], Ahlers et al. [2], Hörisch [25], Calic and Mosakowski [28], Lukkarinen et al. [26], Barbi and Bigelli [23], Cho and Kim [18], Skirnevskiy et al. [27], Wessel et al. [30], and Crosetto and Regner [24]	Duration	1
		Monetary goal	2
		Financial planning	2
		Project scope	3
		Pledges	3
		Gain of backers	3
		Platform features	2
Characteristics of participants	Ahlers et al. [2], Zheng et al. [34], Allison et al. [31], Butticè et al. [33], Courtney et al. [35], Li et al. [32], Skirnevskiy et al. [27], Zhao et al. [36], and Oo et al. [29]	Initiator's intellectual capital	3
		Initiator's crowdfunding experience	4
		Initiator's personality	3
		Backer characteristics	3
Communication	Hörisch [25], Kim et al. [37], Kromidha and Robson [38], Lukkarinen et al. [26], Yuan et al. [39], Zheng et al. [34], Allison et al. [31], Barbi and Bigelli [23], Courtney et al. [35], Cho and Kim [18], Parhankangas and Renko [40], Pietraszkiewicz et al. [41], and Crosetto and Regner [24]	Initiator-backer interactivity	5
		Initiator's active reporting	3
		Semantics	10
		Video	2
Network	Butticè et al. [33], Zheng et al. [34], Mollick [4], Calic and Mosakowski [28], Kromidha and Robson [38], Skirnevskiy et al. [27], Li et al. [32], Lukkarinen et al. [26], and Ahlers et al. [2]	Internal network	5
		External network	6

[a]Count of success factors within each category

given attributes of the initiator, another category emerged from our analysis which emphasizes the importance of the *crowdfunding experience of funders* [27, 33–35].

Besides the characteristics of the initiator, another category has been identified during our analysis which we call *backer characteristics* [36] (Table 1).

4.3 Communication

Another theme identified is Communication, which refers to all verbal and non-verbal ways of giving information within the boundaries of the crowdfunding campaign, coming either from the initiator, the crowd or the backers.

Communication as a theme consists of four categories, which are the following: initiator-backer interactivity, initiator's active reporting, semantics and video.

Initiator-backer interactivity means the two-sided communication between the initiator and the backer [18, 24, 34, 35, 38].

Initiator's active reporting refers to the efforts of the initiator to keep (potential) backers updated on any changes and committed to the project [4, 24, 38].

All the text-related aspects of the crowdfunding campaign were also found to be a significant factor during our analysis. This emphasizes the importance of *semantics*, regarding the text of the about section of a crowdfunding campaign [23, 26, 31, 37, 39–41].

As a crowdfunding success category, *video* refers to the moving visual images content, usually a pitch video, that the initiator uploads to the crowdfunding platform for the crowd to see, as part of the campaign [4, 23, 25, 35].

4.4 Network

The third theme generated refers to all the professional and personal connections of the initiator that somehow can (potentially) be related to the crowdfunding campaign. Most of the time, researchers look into the details of online networking proofs or opportunities, such as Facebook LinkedIn, Twitter and YouTube [32–34].

Internal network refers to all the connections that were built during a crowdfunding campaign before. This includes the network based on experience of backing other projects, and of being a serial crowdfunder as well [33, 34].

In the theme of network the second category is *external network* that equals connections of the initiator that are not based on a former crowdfunding-related experience [2, 4, 26–28, 32, 38]. Many articles focused on Facebook when analyzing the effect of external networks. Many accounts in Kickstarter as an example are linked to Facebook, which makes it possible to determine the number of Facebook connections of initiators [4].

5 Conclusions

The success of the crowdfunding campaigns is an increasingly popular research topic amongst academics, as according to our database search, the number of publications increases year by year. This paper offers a structured summary for researchers and business practitioners about the main topics related to crowdfunding campaign success.

The main themes identified based on crowdfunding campaign success factors are campaign characteristics, characteristics of participants, communication and network, all of which includes different categories of factors. These themes cover the three factors that crowdfunding is made up of: the people, namely initiators and

backers, the crowdfunding project itself and the platform [1]. The majority of studies analyzed include factors that participants have a significant influence on, while the bigger picture including the factors of the macro-environment—such as law or society—are not fully covered by the researchers.

Since crowdfunding is an Internet-based phenomenon, three conclusions can be identified. First, building a connection in person is limited, which makes intellectual capital, personality and evidence of crowdfunding experience of the initiator important for the backers. Second, communication plays a significant role in crowdfunding campaign success, as with the limited nature of communication channels—such as using texts and videos—choosing the right alterative for each and every word became critical. As for the third conclusion, collecting monetary contributions on an Internet-based platform makes building Internet-based connections essential.

This article—just like every other—has its limitations. As part of our research, methodology articles that are not Q1 articles were excluded. Recreating our methodology with non-Q1 articles could be of interest, besides, a comparison of results of such an analysis and ours could provide added value to the research. Furthermore, a detailed introduction and deeper analysis of crowdfunding campaign success factors could be useful for practitioners and researchers as well. Based on the results of analyzing the success factors, an empirical study could be implemented. These future research directions include ideas to consider for those who want to contribute to the constantly growing research base regarding crowdfunding, while providing useful insights for practitioners of this area.

References

1. Jovanovic T (2018) Crowdfunding: what do we know so far? Int J Innov Technol Manag 16:1950009. https://doi.org/10.1142/S0219877019500093
2. Ahlers GKC, Cumming D, Günther C, Schweizer D (2015) Signaling in equity crowdfunding. Enterp Theory Pract 39(4):955–980. https://doi.org/10.1111/etap.12157
3. Burtch G, Ghose A, Wattal S (2016) Secret admirers: an empirical examination of information hiding and contribution dynamics in online crowdfunding. Inf Syst Res 27(3):478–496. https://doi.org/10.1287/isre.2016.0642
4. Mollick E (2014) The dynamics of crowdfunding: an exploratory study. J Bus Ventur 29(1):1–16. https://doi.org/10.1016/j.jbusvent.2013.06.005
5. Thies F, Wessel M, Benlian A (2016) Effects of social interaction dynamics on platforms. J Manag Inf Syst 33(3):843–873. https://doi.org/10.1080/07421222.2016.1243967
6. Tomczak A, Brem A (2013) A conceptualized investment model of crowdfunding. Ventur Cap. https://doi.org/10.1080/13691066.2013.847614
7. Lehner OM, Nicholls A (2014) Social finance and crowdfunding for social enterprises: a public-private case study providing legitimacy and leverage. Ventur Cap 16(3):271–286. https://doi.org/10.1080/13691066.2014.925305
8. Ordanini A, Miceli L, Pizzetti M, Parasuraman A (2011) Crowd-funding: transforming customers into investors through innovative service platforms. J Serv Manag 22(4):443–470. https://doi.org/10.1108/09564231111155079
9. Belleflamme P, Lambert T, Schwienbacher A (2013a) Individual crowdfunding practices. Ventur Cap 15(4):313–333. https://doi.org/10.1080/13691066.2013.785151

10. Belleflamme P, Lambert T, Schwienbacher A (2013b) Crowdfunding: tapping the right crowd. J Bus Ventur:1–25. https://doi.org/10.1016/j.jbusvent.2013.07.003
11. Gleasure R, Feller J (2016) Does heart or head rule donor behaviors in charitable crowdfunding markets? Int J Electron Commer 20(4):499–524. https://doi.org/10.1080/10864415.2016.1171975
12. Vulkan N, Åstebro T, Sierra MF (2016) Equity crowdfunding: a new phenomena. J Bus Ventur Insights 5:37–49. https://doi.org/10.1016/j.jbvi.2016.02.001
13. Berns JP, Figueroa-Armijos M, da Motta Veiga SP, Dunne TC (2018) Dynamics of lending-based prosocial crowdfunding: using a social responsibility lens. J Bus Ethics:1–17. https://doi.org/10.1007/s10551-018-3932-0
14. Chan CSR, Park HD, Patel P, Gomulya D (2018) Reward-based crowdfunding success: decomposition of the project, product category, entrepreneur, and location effects. Ventur Cap 20(3):285–307. https://doi.org/10.1080/13691066.2018.1480267
15. Hossain M, Oparaocha GO (2017) Crowdfunding: motives, definitions, typology and ethical challenges. Entrep Res J 7(2). https://doi.org/10.1515/erj-2015-0045
16. Stanko MA, Henard DH (2016) How crowdfunding influences innovation. MIT Sloan Manag Rev 57(3):15–17. https://doi.org/10.1080/13648470.2010.493604
17. Honisch E, Harrington RJ, Ottenbacher MC (2017) Crowdfunding: preparation considerations and success factors for the German restaurant sector. Int J Hosp Tour Adm:1–24. https://doi.org/10.1080/15256480.2017.1359733
18. Cho M, Kim G (2017) A cross-cultural comparative analysis of crowdfunding projects in the United States and South Korea. Comput Hum Behav 72:312–320. https://doi.org/10.1016/j.chb.2017.03.013
19. Colicchia C, Strozzi F (2012) Supply chain risk management: a new methodology for a systematic literature review. Supply Chain Manag 17(4):403–418. https://doi.org/10.1108/13598541211246558
20. Hsieh H-F, Shannon S (2005) Three approaches to qualitative content analysis. Qual Health Res 15:1277–1288. https://doi.org/10.1177/1049732305276687
21. Heikkilä K, Ekman SL (2003) Elderly care for ethnic minorities—wishes and expectations among elderly Finns in Sweden. Ethn Health 8(2):135–146. https://doi.org/10.1080/13557850303559
22. Cho JY, Lee E-H (2014) The qualitative report reducing confusion about grounded theory and qualitative content analysis: similarities and differences. Qual Rep 19(32):1–20. http://www.nova.edu/ssss/QR/QR19/cho64.pdf
23. Barbi M, Bigelli M (2017) Crowdfunding practices in and outside the US. Res Int Bus Financ 42:208–223. https://doi.org/10.1016/j.ribaf.2017.05.013
24. Crosetto P, Regner T (2018) It's never too late: funding dynamics and self pledges in reward-based crowdfunding. Res Policy 47(8):1463–1477. https://doi.org/10.1016/j.respol.2018.04.020
25. Hörisch J (2015) Crowdfunding for environmental ventures: an empirical analysis of the influence of environmental orientation on the success of crowdfunding initiatives. J Clean Prod 107:636–645. https://doi.org/10.1016/j.jclepro.2015.05.046
26. Lukkarinen A, Teich JE, Wallenius H, Wallenius J (2016) Success drivers of online equity crowdfunding campaigns. Decis Support Syst 87:26–38. https://doi.org/10.1016/j.dss.2016.04.006
27. Skirnevskiy V, Bendig D, Brettel M (2017) The influence of internal social capital on serial creators' success in crowdfunding. Enterp Theory Pract 41(2):209–236. https://doi.org/10.1111/etap.12272
28. Calic G, Mosakowski E (2016) Kicking off social entrepreneurship: how a sustainability orientation influences crowdfunding success. J Manag Stud 53(5):738–767. https://doi.org/10.1111/joms.12201

29. Oo PP, Allison TH, Sahaym A, Juasrikul S (2018) User entrepreneurs' multiple identities and crowdfunding performance: effects through product innovativeness, perceived passion, and need similarity. J Bus Ventur:1–16. https://doi.org/10.1016/j.jbusvent.2018.08.005
30. Wessel M, Thies F, Benlian A (2017) Opening the floodgates: the implications of increasing platform openness in crowdfunding. J Inf Technol 32(4):344–360. https://doi.org/10.1057/s41265-017-0040-z
31. Allison TH, Davis BC, Webb JW, Short JC (2017) Persuasion in crowdfunding: an elaboration likelihood model of crowdfunding performance. J Bus Ventur 32(6):707–725. https://doi.org/10.1016/j.jbusvent.2017.09.002
32. Li JJ, Chen XP, Kotha S, Fisher G (2017) Catching fire and spreading it: a glimpse into displayed entrepreneurial passion in crowdfunding campaigns. J Appl Psychol 102(7):1075–1090. https://doi.org/10.1037/apl0000217
33. Butticè V, Colombo MG, Wright M (2017) Serial crowdfunding, social capital, and project success. Entrep Theory Pract 41(2):183–207. https://doi.org/10.1111/etap.12271
34. Zheng H, Hung J-L, Qi Z, Xu B (2016) The role of trust management in reward-based crowdfunding. Online Inf Rev 40(1):97–118. https://doi.org/10.1108/OIR-04-2015-0099
35. Courtney C, Dutta S, Li Y (2017) Resolving information asymmetry: signaling, endorsement, and crowdfunding success. Entrep Theory Pract 41(2):265–290. https://doi.org/10.1111/etap.12267
36. Zhao Q, Chen CD, Wang JL, Chen PC (2017) Determinants of backers' funding intention in crowdfunding: social exchange theory and regulatory focus. Telematics Inform 34(1):370–384. https://doi.org/10.1016/j.tele.2016.06.006
37. Kim PH, Buffart M, Croidieu G (2016) TMI: signaling credible claims in crowdfunding campaign narratives. Group Org Manag 41(6):717–750. https://doi.org/10.1177/1059601116651181
38. Kromidha E, Robson P (2016) Social identity and signalling success factors in online crowdfunding. Entrep Reg Dev 28(9–10):605–629. https://doi.org/10.1080/08985626.2016.1198425
39. Yuan H, Lau RYK, Xu W (2016) The determinants of crowdfunding success: a semantic text analytics approach. Decis Support Syst 91:67–76. https://doi.org/10.1016/j.dss.2016.08.001
40. Parhankangas A, Renko M (2017) Linguistic style and crowdfunding success among social and commercial entrepreneurs. J Bus Ventur 32(2):215–236. https://doi.org/10.1016/j.jbusvent.2016.11.001
41. Pietraszkiewicz A, Soppe B, Formanowicz M (2017) Go pro bono prosocial language as a success factor in crowdfunding. Soc Psychol 48(5):265–278. https://doi.org/10.1027/1864-9335/a000319

Literature Review on the Governmental Venture Capital Academic Articles Between 2000 and 2018

Endre Mihály Molnár, Erika Jáki, and Noémi Németh

1 Introduction

Venture capital (VC) financing is a favored financing source for new enterprises, since these investors are willing to embrace the high risk of start-up investments. For this reason, they expect a very high potential return on their investments. This means that only start-ups possessing the highest growth potential can expect to receive VC funding. Historically, these companies were generally technological companies, since start-ups in that sector tend to be very scalable. This also meant that start-ups outside this sector or start-ups having slightly worse scalability often found themselves without funding. This equity gap is what induced governments to step into the early-stage venture financing stage and help prospective start-ups get the financing they need.

Research funded by: *EFOP-3.6.3.-VEKOP-16-2017-00007 "Young researchers from talented students—Fostering scientific careers in higher education"*

E. M. Molnár · E. Jáki (✉) · N. Németh
Business School Faculty, Corvinus University of Budapest, Budapest, Hungary
e-mail: erika.jaki@uni-corvinus.hu

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_16

Literature reviews fall into two broad categories: supplementary literature reviews to empirical studies or literature reviews that make up a coherent whole, an individual article, summarizing the accumulated knowledge on a particular topic. This latter type of literature review can help all researchers that are interested in that topic to get a view of the work that has been done before their entry. This is invaluable for helping researchers to build on one another's works, and not retread old paths.

Small and medium-sized enterprises are recognized as one of the key factors of economic growth. These companies lack financial resources which leads to less SMEs being established. Angels, friends, family and so called 'fools' (3F) are a solution to help these companies get started. Another solution is venture capital investment, this is done by private investors, who establish a capital fund from which financial resources are provided to companies. Innovative startup companies are the typical target of venture capitalists, but even they face problems when entering the market to get funded. Market failures diminish the efficiency of the startup financing market and the European Commission takes it very seriously to implement actions that remedy this in the member states.

Many authors have researched various aspects of state involvement at the venture capital market but only a limited number of those articles can be found in Scimago ranked journals. A smaller part of the researchers studies the government involvement at this market.

Nowadays, due to the numerous EU programmes announced, it is a highly relevant question why and what kind of results could the government intervention bring to the VC market in a worldwide context. Government participation in the countries of EU can be questioned from different point of views. First of all, state subsidy is banned in the EU as it distorts market competition. The state can intervene only if there are market failures in a segment. The EU announced JEREMIE (Joint European Resources for Micro to Medium Enterprises) program for the years 2007–2013. This program was an initiative of the European Commission developed together with the European Investment Fund. JEREMIE promoted the use of financial engineering instruments to improve access to finance for SMEs via Structural Funds interventions. JEREMIE enabled the EU Member States and Regions to put money from the structural funds and also national resources into holding funds that can finance SMEs in a flexible and innovative way through their national or regional managing authorities. The financial resources of JEREMIE were deployed through selected financial intermediaries across the EU, which provided loans, equity and guarantees to SMEs. After the EU launched the JEREMIE program, more studies appeared in the journals investigating government intervention.

In the field of governmental venture capital (GVC) research, only two major literature reviews have been conducted in the past [1, 2]. These literature reviews investigated articles published between 1988 and 2014. Based on Paré et al. [3], we classified these two papers as narrative reviews because both made a narrative summary, didn't document the data collection method and did not employ frequency counts. However, there are other systematic literature review studies in the field of corporate venture capital. The focus of these studies is different from those studies

that investigated the GVC's role. The general research questions found in GVC research are: how can the government intervention be verified and how effective is the governmental intervention?

We aim to give an updated view on the state of the research on this subject. Furthermore, we employ a descriptive literature review process. Descriptive literature reviews aim to reveal trends in the literature of a particular topic. These reviews also provide a quantitative analysis of the investigated articles, showing frequency counts for topics, methods, data collection and the final outcome [3]. The structured search method is also a crucial part of the process. The main approach is to work with the collected literature as a database, treating each paper as a unit of analysis.

2 Method of Review

Our literature review aims to provide an overview of the current research front of Governmental Venture Capital (GVC) between 2000 and 2018. The design of our study follows a systematic scoping approach. In line with published literature reviews, our structured literature review is mainly based on dominant databases as EBSCO Discovery to identify GVC-related articles. To ensure a decent quality of the academic work, only peer-reviewed journal articles written in English were considered. Hence, monographs, Ph.D. theses, working papers, editorial notes, symposia, presentation slides, and book reviews were excluded from the search. The data collection took place on 2018.10.31. Scimago only ranks journals starting from 2000, so our database only consists of articles dated from 2000 to 2018.

The first step in the identification process involved searching for the appearance of the term 'venture capital' and one of the followings: 'government' or 'state' in the title, abstract, or keywords of all articles published up until October 2018. We have narrowed our research to the following content providers: Business Source Complete, EconLit, Academic Search Complete, ScienceDirect. This search generated a list of 128 articles. In the following step we excluded 54 articles which were not ranked by Scimago. This search generated a total of 74 unique articles. We wanted to focus on articles examining the role of GVC investors as providers of financial resources. Therefore, a supplementary analysis was conducted to ensure the inclusion of relevant GVC articles. This was conducted by a careful analysis of the abstracts and we found 48 articles irrelevant. Most of the works were excluded for not being an empirical study, just a conference or workshop review. Additionally, some of the articles did not investigate the governmental venture capital actors. In some cases, the articles investigated the corporate venture capital market and the government was mentioned as a legislator. Finally, all 25 articles were downloaded and categorized with the following categories:

- Geographic: the geographical origin of the data
- Geographical category. We created nine geographical categories
- Published date, period under examination (if available)

- Research question
- Theme category: the main research theme emerging from the article
- Future research direction

We spent considerable time on extracting the main research themes from each article, ultimately ending up with two identified research streams. We examined the articles in light of their chosen research approach, and in the results section, we present the findings about the emerging patterns associated with this combined with the main conclusions of the papers.

3 Results

In this section, we present our findings upon completing this systematic literature review. We will show descriptive statistics about the article database and also show the recognized research themes across the articles accompanied by their specific conclusions and studied geographical area. We analyzed articles published between 2000 and 2018.

The aim of our research is to establish the trends in the literature that deal with government intervention at the venture capital market. By reading through the articles, we identified two major themes across all articles: the reason for government intervention and the effects of government intervention. The following table shows the distribution of the articles across these two themes (Table 1):

Due to the JEREMIE program—as we can see from the table—as many high quality publications appeared in 2007 in the topic of GVC as in the preceding 5 years. After this initial increase in interest, only one publication per year appeared in the topic up to 2011. After 2013, when the JEREMIE programming period ended and the intervention had a solid track record, more Scimago ranked journals

Table 1 Thematic distribution of the articles across the years

Year	Effects of government intervention	Reason for the government intervention
2001		1
2005		1
2007	2	
2008		1
2009	1	1
2011	1	1
2012		1
2014	2	1
2015	4	1
2016	1	
2017	3	
2018	3	
SUM	17	8

Table 2 Geographic distribution of the research

Geographic region								
EU	UK	Asia	Israel	Worldwide	Australia	Canada	Emerging markets	Missing
9	3	3	3	2	2	1	1	1

Table 3 Scimago ranking distribution of the research

Scimago ranking		
Q1	Q2	Q3
14	10	1

published articles in the field of GVC. One year after the JEREMIE programming period, in 2014 four articles were published and in 2015 three articles. 2014 was the most productive year followed by 2015, 2017 and 2007. The table also shows the distribution of research themes across the analyzed years. It is easy to see that the articles about the reason for the government intervention cluster between 2008 and 2015, one article per year (except 2013). The studies focusing on the effects of GVC are present in the 2007–2014 period, but their quantity greatly increases following 2014. This increase can be attributed to the fact that there was accessible exit data for funds sponsored by JEREMIE at this period, since most VC investments take at least around 5 years to reach exit maturity. The first JEREMIE program started at 2007 and more rounds were executed in the following years, thus this could provide researchers with a rich research opportunity. Following 2015, there was no interest in further exploring the reasons for the governmental intervention at the VC market by researchers.

The articles examined data mainly from the EU. The majority of the articles only dealt with data from a single country. The most popular countries to investigate were the UK and Israel. The frequency counts of all investigated geographic areas are contained in the following table. Among the European Union, five articles investigated several EU countries and four articles focused on one individual country such as France, Belgium, Germany and Portugal. The emerging markets were investigated only by one article published in 2014. This article investigated the effects of foreign direct investment, institutional quality, and the size of a government on venture capital (VC) activity. They concluded that governmental spending adversely affects the activities of VC (Table 2).

The articles appeared mainly in journals rated Q1 by Scimago. Eleven Q1 and four Q2 journals' articles appeared between 2014 and 2018, after closing the JEREMIE 2007–2013 programming period (Table 3).

3.1 The Reason for Government Intervention

When we look at papers that are uncovering the reason for the government intervention, we can see different approaches. The most common approach employed by

six articles out of the eight is to try explaining the government intervention in relation to summarizing the current events on the investigated equity markets. Gill [4] examines the activities of the British Business Bank, focusing on how it can alleviate the problems associated with the inequality of demand and supply in the UK. In a similar fashion, Zhang [5] examines the state of the venture capital market and SCLCs in China, using agency costs as a driver of its inquiry. Wonglimpiyarat [6] uses the VC state intervention programs of the US and Thailand to show how the innovation system can be enhanced. Cohen et al. [7] show how the role of the Office of the Chief Scientist supported the development of high-tech companies in Israel and was a governmental answer to market shocks. Heger et al. [8] comments on a study that compared the VC market of Germany and the UK and found that there are supply side gaps in the financing available to young firms, which justifies government intervention. Tung [9] shows how the government intervention at the Taiwanese semiconductor industry was necessary due to the market failures present at that market.

The article of Frenkel et al. [10] aims to differentiate public and private early stage investors and explain the reason for the state intervention by comparing public and private incubators in Israel and trying to uncover the reason why private incubators can't substitute for public ones. Finally, one of the articles employs an entirely different approach, examining the macroeconomic theories behind the intervention of the government to early stage financing [11].

3.2 The Effects of Government Intervention

A primary logic of studying the effects of government intervention on the VC market is to look at how successful are companies before and after receiving the state investment, or whether GVC or PVC backed companies are more successful. However, the main question is how we define the success of these companies or a successful investment in general.

A group of articles consider the realized exits (where the investor sells its shares in the target company to a buyer) as a proxy for successful investments. Milosevic [12] examines French governmental VCs and finds that VC managers that have substantial experience in the investment sector and public sector make better investment decisions. Essentially, governmental background for a VC leads to investments that are more successful. Brander et al. [13] look at the exits of companies in a worldwide dataset with GVC, PVC or a mix of GVC and PVC investment, and find that companies receiving a mix of GVC and PVC funds achieve more exits and receive more funds than companies receiving only one type of investment. Additionally, they do not find evidence for any crowding out effect caused by the GVC investor. Cumming et al. [14], who analyzed the VICO dataset covering the EU, mainly support this conclusion, adding that purely PVC backed companies achieve more successful exits than purely GVC backed companies, but the mix of the two still proves to be superior to either of the two alone.

Another subset of articles chose to identify success with the performance, efficiency and financial ratios realized by the companies receiving the investment. Alperovych et al. [15] looked at data from Belgium and found that firms backed by GVC investment have a significantly lower performance than firms receiving PVC funding in the 3 years following the investment. Grilli and Murtinu [16] made a similar comparison using EU data and found that GVC investees did not have significant sales growth, while PVC investees and investees of PVC led syndicates between the two types of investors did have significant sales growth. Avnimelech et al. [17] tried to find out whether Israeli GVCs and governmental high-tech incubators improved the performance of target companies. They found that the GVCs improved the efficiency of startups better than incubators, but the incubators were able to spread the investments around better in the country geographically. They did not make comparisons to the private sector. Cumming and Johan [18] looks at the Australian pre-seed GVC fund and compares the performance of its target companies with other GVC funds in Australia. They find the fund and thus the program to be successful, and their portfolio companies performing better than other governmental programs in the country. They attribute this to better management and they also recognize a crowding-out effect between the examined fund and other GVC funds.

A different rationale is examined in a cluster of articles, where the effects of government intervention are measured by whether it increases the capital available to startups and the number of investments at the VC market. Herrera-Echeverri et al. [19] find that in emerging countries government spending (counter-intuitively) reduces the amount of VC financing available to startups, supporting a crowding-out effect at the VC market. Baldock and Mason [20] found, however, that the efforts of the UK government helped to reduce the early stage finance gap at the UK VC market by launching GVC programs, thus they deem the government intervention successful. Guerini and Quas [21] used the VICO EU database to show that GVC investment in a firm increases the likelihood of that firm receiving PVC funding as well. They attribute this to the ability of the GVC fund managers to select prospective startups and to the ability of marketing them well to private investors. Similarly, Karsai [22] also did not find evidence of crowding-out. This can be attributed to the fact that she studied the CEE region where PVC activity is currently very low. However, she found the execution of GVC programs in the CEE region to be less efficient than GVC programs in more developed countries.

The article of Standaert and Manigart [23] quantifies the success of the government intervention by looking at whether it increased employment in the investee companies. They found that GVC funds in Belgium were outperformed by PVC funds according to this metric.

Some articles used a combination of different criteria to capture the effect of governmental intervention. Cumming [24] combines the approaches of using the exits and the size of the investment activity as a success indicator. He finds that GVC funds in Australia did not have significantly different exit rates than PVC funds, but they contributed to the development of Australian high-tech startups through providing financing and value-added activities such as professional advice. Tucker et al.

[25] used both exit and return on investment data to evaluate the financing efforts made in the biotechnology sector of Canada. They came to the conclusion that governmental intervention can only be efficient, if it is structured starting with the early-stage investments up to the later stage of development of a company. They also recognize the role of PVC investors as drivers of efficiency at the VC market.

A smaller number of articles carried out only qualitative analysis. Bilau et al. [26] examined the Portuguese early-stage financing market by sending out questionnaires to business angels about the effects of government intervention. They gathered from the responses, that local business angels prefer the government to intervene using tax-reliefs or by playing a passive role in co-investment funds. Wray [27] conducted interviews with investors from the North East of England and concluded that the Jeremie EU governmental program helped that region's startup sector to thrive despite the recession. However, the article of Jung et al. [28] using Q-methodology—a mix of qualitative and quantitative approaches—found the governmental intervention in South Korea to be less successful, as they found the competition for state resources to be unfair, and the related institutional system and political environment to be uncertain.

3.3 Future Research Direction

Several papers consider their own research question to be important for further examination. Brander et al. [13], Baldock and Mason [20], Cumming [24], Standaert and Manigart [23], Cumming and Johan [18] investigated the impact of state interventions on the performance of the VC segment form different aspects between 2007 and 2018. Due to the fact that at the time of publication the government programs have not yet been expired, these authors suggested to expand and refine their models with additional variables or to use their models in other settings (country, timeframe, etc.) to validate or disprove their observations. Obviously, as time goes on, different conclusions can be drawn regarding the effects of government intervention.

In this section, we highlight the future research topics and issues that are more specifically formulated. Milosevic [12] points out that the impact of the network on the VC segment should be further examined. It is also questionable how the professional knowledge and background of the VC fund managements effect the performance of the investee companies.

Avnimelech et al. [17] deemed valuable to investigate the effectiveness of the interaction between VCs and incubators and to identify the geographic concentration of technology and its consequences. According to Heger et al. [8], the region-specific factors' effects on the structure of the VC market could be an important additional research field.

Herrera-Echeverri et al. [19] suggests that not only economic but also cultural factors should be included in the variables of models which explain the dynamics of the VC industry. First of all, the government spending should be categorized to

measure accurately the impact of government spending on the performance of the VC market. In line with this, Guerini and Quas [21] are also focusing on government spending. They believe that it is important to understand and evaluate the social benefits of public spending on the VC segment in a more comprehensive context.

4 Conclusions

In our article, we conducted a descriptive literature review focusing on the governmental venture capital (GVC) research from 2000 to 2018. This topic has importance since a significant component of economic growth is provided by startup companies, and their initial funding can be very problematic due to market failures. Governments around the world are incentivized to intervene at VC markets to try to solve these market failures and help startups secure their needed funding. Since the start of GVC programs, researchers were very interested in the study of this topic, which they examined through different approaches.

We identified two major research streams: the reason for the entry of the government to the VC market and the effects of GVC investment. The articles about the reason for the GVC presence appeared in the years between 2008 and 2015, we think that the major EU GVC program 'JEREMIE' was the catalyst of researchers' interest in this topic. The articles centered on the effects of GVC intervention appear more frequently starting with 2015, which can be attributed to the fact, that exit data from Jeremie investments became available around this time.

We classified the processed articles according to this logic and differentiated groups of articles by their research approach to these questions. We found that the majority of articles dealing with the reason for GVC presence at the VC market followed the events unfolding at the market and approached the governmental intervention as an answer to market conditions. The driving logic of research done on the effects of GVC are not that homogenous, however. We identified articles that mainly tried to compare the success of GVC and PVC (private venture capital) investors. Another approach is to just deal with GVC investors and focus on the success of their investee firms. The definition of success also varied between groups of articles: number of exits, financial ratios of investee firms, number of investments, size of investments and employment growth of investee firms. As governments have varying goals when they decide to launch GVC programs, we propose that future research on this subject should evaluate the effectiveness of GVC programs by employing the success criteria set up by the program under scrutiny to measure the success of the intervention.

Geographically, the articles were very EU centric and only one article examined the effects of GVC in emerging markets. We think that the study of emerging markets in this context could be of much interest, since in those countries the economic growth accumulated by startups is essential, this is an avenue of research

not yet fully explored. To see the similarities and differences of the effects of GVC in developed countries and emerging markets could be very informative.

The main limitation to the investigation about the government intervention at the VC market is that the programs have not yet been expired at the time of publication. This alone is an opportunity for further research and to repeat the examination later and compare the results. Other research issues were also raised by authors. We found the most interesting future research directions the following: the study of the impact of the professional knowledge of VC managers on the success of the startups; a comprehensive monitoring of government spending from the social impact point of view; and the impact of geographic concentration of technology on the VC market.

References

1. Callagher LJ, Smith P, Ruscoe S (2015) Government roles in venture capital development: a review of current literature. J Entrep Public Policy 4:367–391. https://doi.org/10.1108/JEPP-08-2014-0032
2. Colombo MG, Cumming DJ, Vismara S (2016) Governmental venture capital for innovative young firms. J Technol Transf 41:10–24
3. Paré G, Trudel M-C, Jaana M, Kitsiou S (2015) Synthesizing information systems knowledge: a typology of literature reviews. Inf Manag 52:183–199. https://doi.org/10.1016/j.im.2014.08.008
4. Gill DE (2015) Consolidating the gains. Ventur Cap 17:43–58. https://doi.org/10.1080/13691066.2015.1021029
5. Zhang L (2014) Corporate governance of Chinese state-controlled listed companies: a revisit through the lens of venture capital. Eur Bus Organ Law Rev 15:107–139. https://doi.org/10.1017/S1566752914001050
6. Wonglimpiyarat J (2011) The dynamics of financial innovation system. J High Technol Managem Res 22:36–46. https://doi.org/10.1016/j.hitech.2011.03.003
7. Cohen E, Gabbay J, Schiffman D (2012) The office of the chief scientist and the financing of high tech research and development, 2000–2010. Isr Aff 18:286–306. https://doi.org/10.1080/13537121.2012.659082
8. Heger D, Fier A, Murray G (2005) Review essay: regional venture capital policy: UK and Germany compared. Ventur Cap 7(4):373–383
9. Tung AC (2001) Taiwan's semiconductor industry: what the state did and did not. Rev Dev Econ 5(2):266–288
10. Frenkel A, Shefer D, Miller M (2008) Public versus private technological incubator programmes: privatizing the technological incubators in Israel. Eur Plan Stud 16:189–210. https://doi.org/10.1080/09654310701814504
11. Bauer E, Burghof HP (2007) The economics of state subsidies in early stage financing. Int J Econ Bus 14:433–457
12. Milosevic M (2018) Skills or networks? Success and fundraising determinants in a low performing venture capital market. Res Policy 47:49–60. https://doi.org/10.1016/j.respol.2017.09.009
13. Brander JA, Du Q, Hellmann T (2015) The effects of government-sponsored venture capital: international evidence. Rev Financ 19:571–618. https://doi.org/10.1093/rof/rfu009
14. Cumming DJ, Grilli L, Murtinu S (2017) Governmental and independent venture capital investments in Europe: a firm-level performance analysis. J Corp Financ 42:439–459. https://doi.org/10.1016/j.jcorpfin.2014.10.016

15. Alperovych Y, Hübner G, Lobet F (2015) How does governmental versus private venture capital backing affect a firm's efficiency? Evidence from Belgium. J Bus Ventur 30:508–525. https://doi.org/10.1016/j.jbusvent.2014.11.001
16. Grilli L, Murtinu S (2014) Government, venture capital and the growth of European high-tech entrepreneurial firms. Res Policy 43:1523–1543. https://doi.org/10.1016/j.respol.2014.04.002
17. Avnimelech G, Schwartz D, Bar-El R (2007) Entrepreneurial high-tech cluster development: Israel's experience with venture capital and technological incubators. Eur Plan Stud 15:1181–1198. https://doi.org/10.1080/09654310701529078
18. Cumming D, Johan S (2009) Pre-seed government venture capital funds. J Int Entrep 7:26–56. https://doi.org/10.1007/s10843-008-0030-x
19. Herrera-Echeverri H, Haar J, Estevez-Bretón Juan B (2014) Foreign investment, institutional quality, public expenditure, and activity of venture capital funds in emerging market countries. Glob Econ J 14:127–162. https://doi.org/10.1515/gej-2013-0068
20. Baldock R, Mason C (2015) Establishing a new UK finance escalator for innovative SMEs: the roles of the enterprise capital funds and angel co-investment fund. Ventur Cap 17:59–86. https://doi.org/10.1080/13691066.2015.1021025
21. Guerini M, Quas A (2016) Governmental venture capital in Europe: screening and certification. J Bus Ventur 31:175–195. https://doi.org/10.1016/j.jbusvent.2015.10.001
22. Karsai J (2018) Government venture capital in central and eastern Europe. Ventur Cap 20:73–102. https://doi.org/10.1080/13691066.2018.1411040
23. Standaert T, Manigart S (2018) Government as fund-of-fund and VC fund sponsors: effect on employment in portfolio companies. Small Bus Econ 50:357–373
24. Cumming D (2007) Government policy towards entrepreneurial finance: innovation investment funds. J Bus Ventur 22:193–235. https://doi.org/10.1016/j.jbusvent.2005.12.002
25. Tucker J, Chakma J, Fedak PWM, Cimini M (2011) Catalyzing capital for Canada's life sciences industry. J Commer Biotechnol 17:330–348. https://doi.org/10.1057/jcb.2011.26
26. Bilau J, Mason C, Botelho T, Sarkar S (2017) Angel investing in an austerity economy—the take-up of government policies in Portugal. Eur Plan Stud 25:1516–1537. https://doi.org/10.1080/09654313.2017.1328045
27. Wray F (2015) Venture capital and investor readiness in a post-crisis and state-rescaling context: revisiting the North East of England. Local Econ 30:389–404. https://doi.org/10.1177/0269094215582391
28. Jung K, Eun J-H, Lee S-H (2017) Exploring competing perspectives on government-driven entrepreneurial ecosystems: lessons from Centres for Creative Economy and Innovation (CCEI) of South Korea. Eur Plan Stud 25:827–847. https://doi.org/10.1080/09654313.2017.1282083

Do Polish Hospitals Perform Well? Selected Aspects of Financial Performance

Katarzyna M. Miszczyńska

1 Introduction

Health sector is extremely important for economic development of the country. Problems concerning the performance of public healthcare units are widely analysed both by national centres and foreign ones: Alemi and Gustafson [1], Martin and Smith [2], Vanberkel et al. [3], Smith and Topol [4]. Well organized performance of healthcare units is crucial not only from the perspective of patients' satisfaction but also from the perspective of managers. In the literature, it is commonly assumed, that the performance of healthcare sector in Poland is far from satisfactory. This statement is confirmed in the studies conducted by Nojszewska [5, 6], Suchecka [7, 8], Frączkiewicz-Wronka [9], Hass-Symotiuk [10], Susmarski [11].

The main problems of Polish public hospitals are concentrated upon unsatisfactory financial situation connected with growing indebtedness that adversely affects not only the development of healthcare but also quality of medical services provided.

An interesting study, from the point of view of the analysis of the financial condition of hospitals in Poland, was presented by Dubas-Jakóbczyk [12]. In this study, the assessment of the financial condition of university hospitals in Poland was conducted. As a result, it was concluded that the financial situation of university hospitals varied. Over 70% of the hospitals in question were characterized by a high level of indebtedness.

The study connected with the impact of the founding body on the financial efficiency of hospitals in the Lodz region was carried out in 2014 by Krzeczewski [13]. The aim of this study was to indicate some differences in the financial efficiency of hospitals subordinate to various founding bodies. The analysis, carried

K. M. Miszczyńska (✉)
Faculty of Economics and Sociology, Department of Public Finance, University of Łódź, Łódź, Poland
e-mail: katarzyna.miszczynska@uni.lodz.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_17

out in the article has led to the conclusion that the founding body has a significant impact on the financial efficiency of its hospitals.

The use of financial analysis to assess the situation of medical entities was addressed by Łagowski [14]. In this study, indicators from the group of liquidity assessment, indebtedness and profitability were used to analyse the financial situation of medical entities from the Silesian Voivodeship. In the final stage of the study, the Poznań model was used to assess the risk of bankruptcy and the most endangered individuals were identified.

Cygańska [15], in her research, used financial analysis to assess the profitability of hospitals. The aim of the study was to verify whether the financial situation of hospitals operating in the form of capital companies and independent public healthcare institutions differed significantly in terms of statistics. The assessment of the financial standing of hospitals was made by means of sales profitability ratios. As a result, there was no statistically significant relationship between the size of the hospital and the moment of its transformation.

As a results of in-depth analysis of professional literature and economic situation of healthcare sector in Poland, the main subject of the study is referred to the problem of financial stability of public hospitals, which has a negative impact on the quality of services provided and, as a consequence, on the development of health protection. Referring to the subject of the study the following main goals were identified:

- checking whether the results achieved by individual hospitals/voivodeships/ founding bodies varied significantly over time.
- identification of the factors causing indebtedness of hospitals.

According to the goals set in the study, a research hypothesis was made on whether the founding body has any impact on hospitals' indebtedness?

2 Methodology and Data

2.1 Methodology

The study was conducted on public general hospitals operating in Poland in years 2007–2015. The scope of the research period was related to the availability of data. During the analysis, a particular emphasis was put on the features that differentiate the units in question. The founding body was the feature that distinguished the hospitals and constituted the basis for conducting further in-depth analyses. Therefore, the following groups of units were distinguished: Universities (abbr. "U") Poviat-Commune (abbr. "P-G"), Marshal's office (abbr. "W") and Ministry hospitals (abbr. "R").

In order to achieve the goals and verify the hypotheses put forward in the study, a spatial analysis of time-series and a one-way analysis of variance (ANOVA) were carried out. What is more, the analysis of trends in the value of financial ratios,

carried out as a part of spatial analysis of time-series, was made from three different perspectives:

- individually
- divided into homogeneous groups of hospitals from the perspective of the founding body

In order to verify whether the founding body has an impact on the financial condition of the hospital, the ANOVA analysis (one-way analysis of variance) has been conducted. This parametric test examines the differences among many groups, i.e. hospitals with different founding bodies. The ANOVA method is based on comparing the measures of variance in each of the identified groups. ANOVA is carried out in the following steps:

- checking the assumptions of the test and its implementation
- interpretation of a one-way analysis of variance
- conducting a posteriori tests—checking which groups differ.

2.2 Data

The financial hospital characteristics were obtained from the audited annual financial reports originated from the Amadeus database. From these each hospital's financial indicators were calculated. The conducted study was based on liquidity and debt ratios. Benchmarks (reference values) were also assigned to all indicators, which enabled a later assessment of the performance of the analysed hospitals. Table 1 contains a list of indicators with reference values.

For the whole period descriptive statistics of all hospitals in question were calculated. The descriptive statistics for these hospital characteristics are included in Table 2.

Table 1 List of indicators with reference values

Field	Ind.	Formula	Reference value
Indebtedness	Debt-to-Equity [DtER]	$\frac{current liabilities + long - termdebt}{shareholder's funds}$	0.01–0.5
	Debt ratio [DTR]	$\frac{current liabilities + non - currentliab.}{total assets} \cdot 100$	≈30%
	Financing of fixed assets [FFA]	$\frac{long\text{-}term\ debt + shareholder's funds}{fixed\ assets}$	≈1
Liquidity	Current ratio [CR]	$\frac{current\ assets}{current\ liabilities} \cdot 100\%$	1.2–1.7
	Quick ratio [QR]	$\frac{current\ assets - stock}{current\ liabilities} \cdot 100\%$	1–1.2

Table 2 Descriptive statistics for indebtedness and liquidity ratio in the year 2015

	N	Minimum	Maximum	Mean	Stand. dev.
DtER2015	343	–79.194	157.63	1.02	13.3851
DBR2015	343	0.0734	2.9918	0.78	0.43664
FFA2015	343	–5.2632	2.8648	0.45	0.64061
CR2015	343	0.0789	6.8646	0.69	0.74445
QR2015	343	0.0735	6.6846	0.63	0.70235
N observations	343				

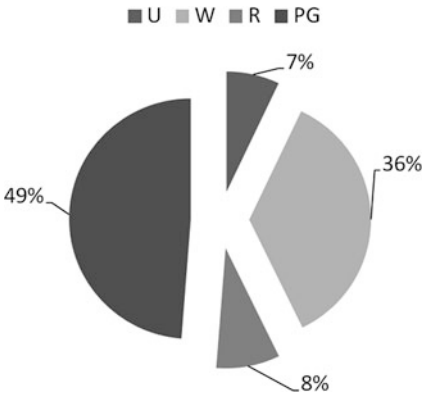


Fig. 1 Public general hospitals—population structure

3 Results

The analysis was conducted on the basis of 343 public general hospitals, from over 600 operating units located in Poland and operating in the years 2007–2015. According to the data collected from the Amadeus database almost 49% from 600 public general hospitals constituted poviat-commune hospitals ("P-G"). Detailed statistics on the population structure is presented in Fig. 1. As it was earlier described hospitals have been divided according to their founding body as follows: Universities (abbr. "U") Poviat-Commune (abbr. "P-G"), Marshal's office (abbr. "W") and Ministry hospitals (abbr. "R").

Due to the fact that the choice of the sample was dictated by the availability of data, it was necessary to verify some assumptions regarding the distributions of both samples. The distribution of the analysed sample is presented in Fig. 2.

This procedure was necessary to generalize the results on the entire population. In order to compare the distribution of those samples, the unit's selection test—χ^2 test was carried out.

The χ^2 test belongs to the group of non-parametric tests, the algorithm of which is based on the comparison of the frequency of events resulting from experience with the expected ones. The condition for the applicability of the test is a large data population, which in case of this study is fulfilled. The χ^2 test was introduced in accordance with the following notation—Eq. (1):

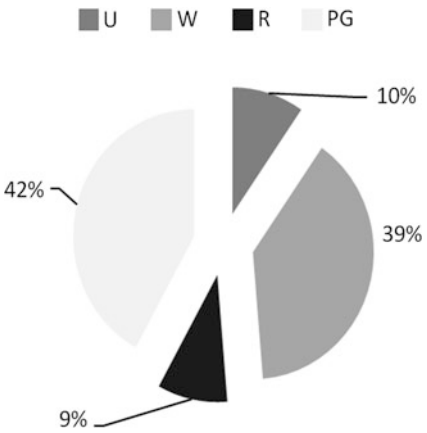


Fig. 2 Public general hospitals—structure of the sample

Table 3 Verification of χ^2 test

Events	U	W	R	PG	Sum
Observed events [Oj]	10	39	9	42	100
Expected events [Ej]	7	36	8	49	100
Eq. (1)	0.9	0.3	0.1	0.9	2.29
$\chi^2_{0.05} = 7.815$					

$$\chi^2 = \sum_{j=1}^{k} \frac{(O_j - E_j)^2}{E_j} \tag{1}$$

where,

Oj—observed events;
Ej—expected events.

The tested hypotheses were as follows:

H_0: Distribution of hospitals according to the founding body in the sample is consistent with the distribution for the entire population.
$H_0 \sim H_1$

The results of conducted χ^2 test are presented in Table 3.

The value χ^2 test was 1.258 and that is why the condition: $\chi^2 < \chi^2_{0.05}$ was fulfilled. Hence, there was no basis for the rejection of the null hypothesis. Thus, with a 95% probability it was stated that the distribution of hospitals according to their founding body in the sample was consistent with the distribution of the entire population. According to these results, the outcomes of the analysis carried out in this study could be generalized to the entire population.

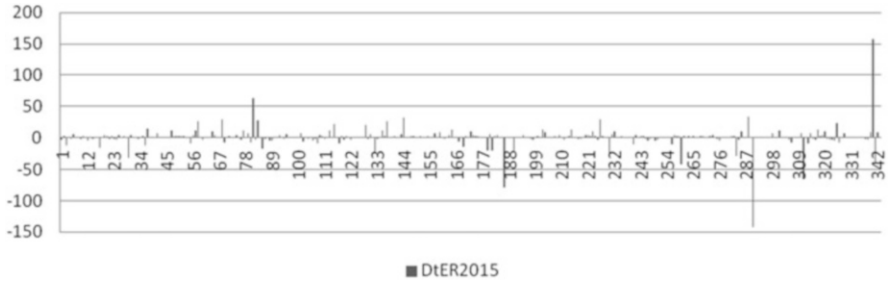


Fig. 3 Public general hospitals—debt-to-equity ratio [year 2015]

Fig. 4 Public general hospitals—debt ratio [year 2015]

3.1 Financial Situation: Individual Entities

The financial situation of the analysed public hospitals did not evolve between years 2007–2015. The hospitals were characterized by alarming indices of indebtedness and liquidity.

The Debt-to-Equity ratio exceeded in most cases the level of 4, which means that those hospitals had the possibility of losing the ability to regulate their liabilities. A similarly large group of units were characterized by index values below 0.0, which indicated lack of ability of effective application of external financing. Units that stand out as to the value of the indicator were poviat-commune hospitals. Negative values of this indicator were connected with negative level of shareholder's funds. On the other hand, extremely high levels related to negative level of shareholder's funds in the previous year and very low level in currently analysed year. Figure 3 presents values of debt-to-equity ratio in the year 2015.

As for the values of debt ratio it should oscillate up to 0.3 and almost all the analysed hospitals exceeded this reference value. In 2015, only 39 out of 344 hospitals did not exceed the reference value. What is more, 35 out of 344 hospitals had an FFA ratio of between 0.9 and 1.1. Figure 4 presents values of debt ratio in the year 2015.

In terms of the current ratio, in 2015, only 33 hospitals were characterized by the values of this ratio within the reference values. What is more, only 16 units acquired the reference values of quick ratio. At the same time, almost all other units had the ratio values under 1.

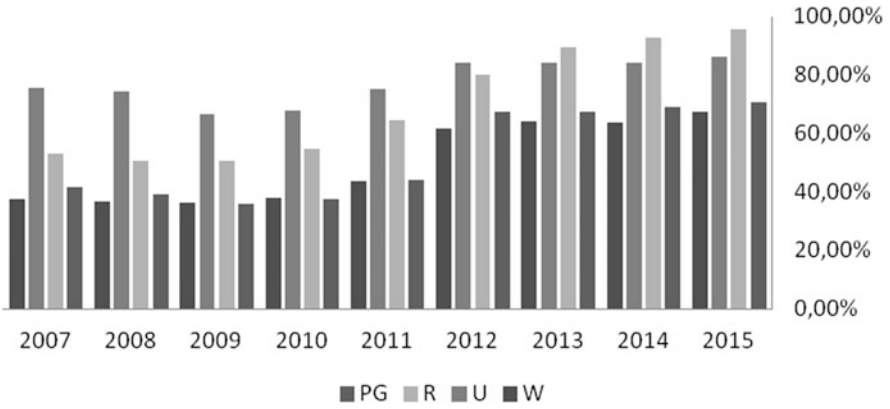


Fig. 5 Public general hospitals, founding body perspective—debt ratio [year 2015]

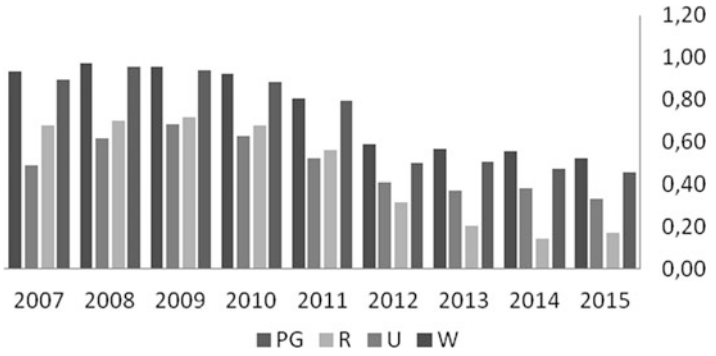


Fig. 6 Public general hospitals, founding body perspective—financing of fixed assets [year 2015]

3.2 Financial Situation: Founding Body Perspective

The financial situation of Polish hospitals was also examined from the perspective of their founding bodies. The hospitals have been attached to homogeneous, in terms of founding bodies, groups.

Neither in terms of the current ratio, nor in terms of quick ratio, the reference level had not been exceeded. This situation confirmed the inability to regulate current liabilities.

As for the indebtedness indicator, none of the analysed groups reached the reference values. All the groups were characterized by the undermining of credibility due to too high values of indicators. Figure 5 presents the detailed results.

As for the financing of fixed assets, none of the analysed groups reached the reference values. None of the units exceeded the reference level, which means that non-current assets were financed by short-term liabilities. This situation could lead to bailiffs' activities. Figure 6 presents detailed the results.

Table 4 Homogeneity of variance test

Year	Levene'a test	df1	df2	Signific.
2015	2.605	3	336	0.052
2014	3.756	3	336	0.011
2013	2.883	3	336	0.036
2012	3.981	3	336	0.008
2011	3.639	3	336	0.013
2010	2.69	3	336	0.046
2009	3.442	3	336	0.017
2008	6.297	3	336	0.01
2007	5.971	3	336	0.011

3.3 Financial Situation: ANOVA Analysis

In order to verify the research hypothesis, whether the founding body has an impact on the financial condition of the hospitals, the ANOVA analysis has been conducted. Before starting the ANOVA procedure, several assumptions have been checked. First of all, the dependent variable was classified as qualitative (financial indicators) and the independent variable was measured on nominal scale with four different values (U, R, W, and PG), which divided the sample into four groups.

In the next step the homogeneity of variance was checked.

The hypothesis stands as follows:

H0: the difference between the variances in the examined groups is homogeneous (or similar)
H1: variances in the studied groups are different.

According to the results of the test there is no basis for rejecting H0 with equality of variance (see Table 4). Therefore, ANOVA can be performed.

In the next step, variance analysis has been performed, according to which:

H0—means in the studied groups do not differ (they are equal),
H1—at least one medium pair is different from one another (we do not assume equality of variance)

The results of the analysis constitute that according to the debt ratio in 2007–2008 the H0 was rejected in favor of H1. It means that at least one medium pair was significantly different from each other (see Table 5).

After the rejection of H0 hypothesis in 2007 and 2008 post hoc tests were conducted. These tests allow us to assess which groups differ from each other. The tests are divided into liberal ones (which do not require restrictive assumptions) to show a statistically significant difference between the means in groups, and conservative ones—requiring such assumptions. In this study a restricted Tuckey test has been applied. Table 6 presents the results.

According to the results obtained in the study, it can be claimed that marshal hospitals differ from university hospitals in terms of the debt ratio in both years: 2007 and 2008.

Table 5 ANOVA test

Year	Sum sq.	df	Mean sq.	f	Signific.
2015	0.378	3	0.126	0.653	0.582
2014	0.693	3	0.231	1.156	0.327
2013	0.511	3	0.17	0.777	0.508
2012	1.429	3	0.476	1.869	0.135
2011	1.814	3	0.605	3.038	0.029
2010	1.715	3	0.572	3.366	0.019
2009	1.642	3	0.547	3.509	0.016
2008	2.497	3	0.832	4.67	0.003
2007	2.677	3	0.892	3.268	0.022

Table 6 Post hoc test [year 2008]

Founding body		Mean difference	Standard err.	Sing.	95% confidence interval	
					Lower limit	Upper limit
U	W	0.297∗	0.0822	0.002	0.084	0.509
	R	0.201	0.1047	0.221	–0.069	0.472
	PG	0.189	0.0815	0.095	–0.021	0.400
W	U	–0.297∗	0.0822	0.002	–0.509	-0.084
	R	–0.095	0.0833	0.663	–0.310	0.120
	PG	–0.107	0.0510	0.154	–0.239	0.024
R	U	–0.201	0.1047	0.221	–0.472	0.069
	W	0.095	0.0833	0.663	–0.120	0.310
	PG	–0.012	0.0825	0.999	–0.225	0.201
PG	U	–0.189	0.0815	0.095	–0.400	0.021
	W	0.107	0.0510	0.154	–0.024	0.239
	R	0.012	0.0825	0.999	–0.201	0.225

∗The average difference is significant at the level of 0.05

4 Conclusions

According to the results of the analysis conducted in this study it should be underlined that the situation of Polish hospitals tends to be alarming. Only a small percentage of the analyzed units achieved the reference values of financial ratios in the analyzed years. Almost 90% of hospitals exceeded the level of 0.3, which undermines the credibility of the hospital. More than 15% of units were characterized by the loss of ability to regulate their commitments, and more than 38% of hospitals were characterized by ineffective use of external financing. Less than 10% of analysed units acquired referenced values of the current ratio and even less of the quick ratio. A great majority of hospitals had low value of liquidity ratios. This indicated lack of ability to regulate current liabilities. Over 14% of hospitals was characterized by excessive liquidity, i.e. inefficient management of the funds possessed, e.g. excessive stocks or overdue receivables.

As for the research hypothesis it was positively verified in the years 2007 and 2008. It these years the founding body had an impact on the financial condition of hospitals. What is more, marshal hospitals differ from university hospitals in terms of the debt ratio in both years: 2007 and 2008.

To sum up, it should be underlined that an attempt to identify factors that determine the process of units' indebtedness and their financial problems, which was presented in this paper, will be a starting point for further, more advanced studies in the area of financial management of public hospitals in Poland.

Acknowledgements This article is an output from the research project "Multicriteria assessment of efficiency of public hospitals in Poland and identification of determinants of their indebtedness" financed by the National Science Centre, decision number DEC-2016/23/N/HS4/03410.

References

1. Alemi F, Gustafson DH (2006) Decision analysis for healthcare managers. Health Administration Press, Chicago
2. Martin S, Smith PC (2012) Comparing costs and outcomes across programmes of health care. Health Econ 21(3):316–337
3. Vanberkel PT et al (2012) Efficiency evaluation for pooling resources in health care. OR Spectrum 34:371–390
4. Smith J, Topol E (2013) A call to action. Lowering the cost of Health care. Am J Prev Med 44: S54–S57
5. Nojszewska E (2011) System ochrony zdrowia. Problemy i możliwości ich rozwiązań, wyd. Wolters Kluwer, Warszawa
6. Nojszewska E (2012) Racjonalizacja kosztów w ochronie zdrowia, wyd. Wolters Kluwer, Warszawa
7. Suchecka J (2011) Finansowanie ochrony zdrowia. Wybrane zagadnienia, wyd. Wolters Kluwer, Warszawa
8. Suchecka J (2016) Ekonomia zdrowia i opieki zdrowotnej, wyd. Wolters Kluwer, Warszawa
9. Frączkiewicz-Wronka A (2010) Pomiar efektywności organizacji publicznych na przykładzie sektora ochrony zdrowia, wyd. Akademii Ekonomicznej im. Karola Adamieckiego, Katowice
10. Hass-Symotiuk M (2011) Koncepcja sprawozdawczości szpitali na potrzeby zintegrowanego systemu oceny dokonań. WN Uniwersytetu Szczecińskiego, Szczecin
11. Susmarski S (2016) Wybrane problemy oceny efektywności funduszy publicznych na podstawie Oddziałów Wojewodzkich Narodowego Funduszu Zdrowia. Annales Universitatis Mariae Curie-Skłodowska Lublin – Polonia 50(4):467–476
12. Dubas-Jakóbczyk K (2017) Ocena sytuacji finansowej szpitali uniwersyteckich na podstawie sprawozdań finansowych za rok 2014. Zeszyty Naukowe Politechniki Śląskiej 100:99–108
13. Krzeczewski B (2014) Wpływ organu założycielskiego na efektywność finansową szpitali w województwie łódzkim. Zeszyty Naukowe Uniwersytetu Szczecińskiego—Finanse, Rynki Finansowe, Ubezpieczenia 65:569–581
14. Łagowski P (2016) Analiza finansowa kluczowych podmiotów leczniczych w województwie dolnośląskim. Finanse i Rachunkowość—Sytuacja przedsiębiorcy w warunkach pokryzysowych 2:135–150
15. Cygańska M (2015) Wykorzystanie Analizy Finansowej Do Oceny Rentowności Szpitali – Wybrane Problemy. Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu—Teoria rachunkowości, sprawozdawczość i analiza finansowa 388:363–372

Special Aspects of the Loan Agreement in the Conditions of the Slovak Republic

Tomáš Peráček, Boris Mucha, and Lucia Vilčeková

1 Introduction

The cornerstone of any economy is entrepreneurship. It supports economic growth and keeps the economy growing thanks to providing high employment ratio and a real benefit to the export of the country. Especially for this reason, it is in the interest of the Slovak Republic to support companies, make their market entry easier, and support their existence [1]. In particular, external financing sources provided by third parties are used to finance business development activities. These essential external sources of funding include bank loans. The government of Slovak Republic also provides entrepreneurs with various measures and benefits to support their development. One of them should be the legislative protection of businesses (debtors) in the external financing of their activities against unfair creditors. This would certainly improve the business environment [2].

However, loan as one of the external sources of financing is not only economic concept but also a legal one. We understand it as a temporary provision of funds in any form, including factoring and forfaiting [3]. In the Slovak Republic, this type of contract is primarily regulated in the Commercial Code with the legal regulation contained in the Civil Code. In this article, the author focuses on the legislative aspects of the loan agreement, which has found its full potential in banking activities. Despite this fact, the legal theorists do not write a lot about this topic. The authors therefore examine through scientific and doctrinal interpretation the selected provisions of the Commercial Code, the Civil Code and other legal regulations related to the issue of this type of contract. With the help of scientific literature and case law of Slovak and Czech courts, they will provide answers to application problems [4]. Last but not least, they compare legal regulations of the loan agreement and the credit

T. Peráček (✉) · B. Mucha · L. Vilčeková
Faculty of Management, Comenius University in Bratislava, Bratislava, Slovakia
e-mail: tomas.peracek@fm.uniba.sk; boris.mucha@fm.uniba.sk; lucia.vilcekova@fm.uniba.sk

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_18

agreement and point out the differences. The content of the contribution corresponds to the structure of the contribution, which, apart from the introduction and the conclusion, is divided into several chapters, which examine the selected aspect of the loan agreement. Part of the last chapter is devoted to the credit agreement.

2 Objective of the Contribution and Methodology

The main purpose of the contribution is to identify the loan agreement and review its legal regulations in the conditions of the Slovak Republic. Besides the main objective, we also chose several sub-objectives, namely:

- compare credit agreement with loan agreement and identify differences,
- critically name selected provisions of the Commercial Code and propose how to remove them,
- find answers to the research question or to amend the legal framework of the credit agreement to reflect the current needs of the practice and to amend it substantially.

We want to achieve the stated goals with the use of legislation, professional and scientific literature, as well as Czech and Slovak jurisprudence. We also used the analytical method to analyze legal status and legal regulations from the scientific point of view. Using the comparative method, we tried to make different views on the legal regulations and the interpretation of the individual institutes, as well as on the comparison of the loan agreement and the credit agreement. Based on the scientific knowledge of valid and effective law and legal science, we have also used doctrinal and scientific interpretation in some parts of the work.

Several authors or theoreticians in the field of law, including Ovečková [5], Mazák [6], Mura [7], have published their work on this topic in Slovakia, especially university textbooks, professional and scientific papers in commercial law and civil law. Foreign and renowned authors such as guest, Polišenská [8], Rontchevsky [9], Svec and Madlenak [10] are also closely connected to this topic. A special source of knowledge are the decision-making activities of Slovak and Czech courts.

3 Loan Agreement in General

The loan agreement is contained in Sections 497–507 of the Commercial Code, of which only Articles 497, §499 and 509 (1) are binding on Contracting Parties. In other matters, the principle of legality may be fully applied. This in practice means that the parties may depart from the provisions of the law and otherwise agree on mutual rights and obligations. In terms of the legal definition of the loan agreement, the legislator defines the following. It is the creditor's commitment to provide the borrower with a cash amount at his own request and the debtor undertakes to return

and pay interest [11]. This means that the essence of the contract is the creditor's obligation to provide funds to the debtor at his request. However, this also corresponds to the debtor's obligation to repay the provided funds and to pay interest. This is therefore a bilateral obligation on the part of the parties. The essential requirements of the contract are therefore:

1. contracting parties—the creditor and the debtor,
2. the creditor's obligation to provide the debtor, on request, with cash to a certain amount,
3. the debtor's obligation to repay the paid funds and to pay the interest.

Therefore, if there is an agreement on these essential features, a loan agreement will arise between the participants. However, should the loan agreement not have all the required legal requirements, it would be treated as a loan agreement. In the opinion of the Supreme Court of the Slovak Republic [12], it is not decisive as it is mentioned, nor the declaration that it is closed under Section 497 et seq. of the Commercial Code. Critical to the assessment of a contractual type are the terms of the contract which determine which law is decisive for the assessment of such a contract. From a formal point of view, the contract does not require a written form and can therefore be concluded verbally or implicitly. In practice, however, we did not meet this lack of formality and loan agreements are only concluded in writing [7].

As mentioned above, the subject of the loan agreement is to provide the borrower with funds, while the law does not specify the currency. It is also possible for the parties to determine the subject of the contract in a currency other than the Euro, provided that this is not in contradiction with the foreign exchange regulations. However, such a procedure is linked to the acquisition of a special foreign exchange license for the creditor, the award of which is decided by the National Bank of Slovakia. Further, by law, unless the parties have agreed otherwise, the debtor is obliged to return the funds in the currency in which they were given and in the same currency the interest. However, since this is a provision of the law expressing the words "unless the parties have agreed otherwise", the debtor may repay the cash provided as well as the interest in another currency. Of course, provided the contract allows this [9].

Besides the debtor's obligation to pay interest, the repayment of the loan is settled in the loan agreement. It is referred to as the "commitment commission" and is understood to be the fee for the reservation of money resources determined in percentages per year. The possibility of contracting parties to agree on this provision is limited to the mandatory § 499 of the Commercial Code, from which it is not possible to derogate even by the agreement of the parties. Such an agreement is permissible only if the lending is the subject of the creditor's business. In our opinion, the commission can be paid out if two conditions are cumulatively met. The first is that lending is the subject of the creditor's business. The second condition is to settle the loan in the contract. This opinion is based on the judgment of the Supreme Court of the Slovak Republic [13], which stated that the creditor who, under the loan agreement, undertakes to provide the borrower with a cash payment at

his own expense, may not only be a bank or entity providing the loan in the subject business. However, such a creditor cannot demand reimbursement for a loan arrangement.

A loan agreement generally includes a detailed definition of all time limits. The debtor is generally entitled to claim the funds within the term specified in the contract. In practice, there will be timescales determined by days, fixed dates, or rescheduling calendars. Such deadlines are binding for the debtor and their non-compliance relieves the creditor of the obligation to provide him/her with a loan. In practice, a situation may arise that this period is not specified in the contract, but this is only exceptional. However, the legislator remembered such a possibility and decided that in such a case, the debtor may claim the payment of money by the debtor as long as the contract pays. When questioning the formal page of the borrower's request for funds, it is common knowledge that the debtor requests the performance in writing and expressly. However, it is clear from the judgment of the Supreme Court of the Czech Republic (2005) no. 39Odo 1595/2005 [14] that an explicit request is not necessary. The court is of the opinion that the expression of the borrower's willingness to withdraw a loan can also be made implicitly, for example by accepting the performance provided by the bank under the loan agreement or by giving its (and subsequent) conduct a consent to the borrowing of the loan amount.

If the contract is not specified or a special law does not provide for another notice period, the debtor may be terminated with immediate effect by the creditor until the end of the calendar month following the month in which the notice was delivered to the debtor [7]. However, as is apparent from the content of the Act, such a procedure is only applicable in the absence of a contractual arrangement to terminate the contract. Termination of a contract is a unilateral legal act from the point of view of the theory of law, the validity of which does not require the consent of the other party, the effects varying according to whether the creditor or the debtor is the person. But the cancellation of the loan does not relieve the debtor of the obligation to repay the funds provided or to pay the credit intermediation. The legislator did not deal with the formal aspect of the testimony. As a rule, however, a separate agreement is also included in the loan agreement concerning the service of expressions of will by the parties [15]. However, it is clear from the text of the law that the denunciation can be made in written, electronic or oral form. From a practical point of view, however, the oral form is not recommended in particular to prevent the evidentiary need in the event of a dispute.

4 Rights and Obligations of the Parties

The principal obligations of the creditor include the provision of funds to the debtor. However, the condition is that the borrower also proceeds in accordance with the contract and requests funds to be drawn at the agreed time. The creditor is therefore obliged to provide funds at the time specified in the debtor's request. If the term is not specified in the contract, money must be provided "without undue delay". The

phrase "without undue delay" is a general term of commercial law applied in almost all matters. It means that the liable person must perform as soon as possible, but this must be considered according to the circumstances of the particular case. In the event of non-fulfillment of this obligation, the creditor may also delay the fulfillment of his obligation. However, if the opposite is the case that the creditor would have provided the borrower with a loan earlier than his obligation, it would not be the invalidity of the credit agreement under the Judgment of the Supreme Court of the Czech Republic (2005) no. 29Odo 1371/2005 [16].

There are several types of loan, e. g mortgage, which is intended for the purchase of real estate, or purposeless loan, where the debtor does not need to prove its purpose. However, the limitation of the use of funds can only arise from the loan agreement, since the law does not make such a restriction, it only admits it. In the case of a special purpose loan, this means that funds can only be used for a specific purpose. If the loan agreement determines that a creditor provides funds to the debtor for the purchase of a particular property, the debtor may ask the creditor to pay the loan provided directly to the seller's account. However, such a procedure has the effect that the debtor cannot successfully complain that the creditor did not provide him/her with funds for the purchase of real estate [17] in any proceedings for the return of such money.

It is therefore the creditor's right to restrict their being granted only to the debtor's obligations assumed in connection with that purpose, such as the purchase of real estate. Therefore, if the borrower violates contractual arrangements regarding the use of such funds, the lender may apply agreed penalties such as a contractual fine. However, the ultimate solution is the application of § 507 of the Commercial Code, which in this case allows the creditor to withdraw from the contract and demand the return of the provided funds and interest.

5 Interest and Interest on Late Payments

The obligation of the debtor to pay interest represents repayment of the loan and is an essential part of the credit agreement [10]. It follows from the above that the loan is legally remunerated by the contractual type and cannot be negotiated as interest-free. Otherwise, it would be a loan agreement. From the time the money is provided, the debtor is required to pay interest. This means that the law makes this obligation conditional upon the crediting of funds to the debtor's bank account or their payment in cash to his or her hands. The debtor pays interest only for the money actually provided, and not for the money promised. The legislator does not require an agreement on the level of interest for the creation of a loan agreement. However, it prioritizes the agreement of the contracting parties [18]. The interest rate itself can be agreed in several ways. For short-term loans, interest rate fixation is common during the entire repayment period. In the case of mortgage loans, a fixed interest rate is currently preferred over several years. A contractually agreed lender's right may,

however, have the right to unilaterally change the amount of the interest rate, taking into account, for example, the rate of inflation.

In the absence of the agreed interest rate, Article 502 (1) of the Commercial Code stipulating the obligation of the debtor to pay interest at the maximum permitted by law. However, in the legal order of the Slovak Republic, such a standard is absent and it is not in consideration for adoption. In this regard, however, we point to the generally accepted practice that when negotiating interest rates, the principle of fair trading should be respected and interest rates agreed at an appropriate level. However, if the parties negotiated an undue amount of interest, this would also not result in the invalidity of the contract as a whole, but only in parts of the contract relating to the agreed interest rate. As is clear from the judgment of the Supreme Court of the Czech Republic [19], in this case, the borrower would pay interest on which banks provide similar loans. If it is not possible to determine interest either by agreement or by law, the debtor is required to pay the usual interest required for loans provided by banks at the debtor's domicile at the time of the conclusion of the contract. The term "usual interest" refers to misconduct in the lay practice as the average interest rate on the market. However, this is not correct. In professional literature [5] the usual interest rate is the interest prevailing in the practice of the dominant and most frequently used banks. Account shall be taken of the rates of those banks which have a decisive share of the money market and whose rates are also published. This does not fully endorse judicial practice. The Supreme Court of the Slovak Republic [17] considers that the agreed amount of the interest rate, unless it is contrary to the principle of fair trade, may exceed the interest rates charged by banks for the provision of loans.

In particular, in banking practice there is a commonly used rule that the interest rate is linked to 1 year. However, it is also possible for the parties to agree on a different period, such as 1 month. However, this figure must be unconditionally included in the contract because, in case of doubt, it is assumed that the agreed amount of interest relates to the annual period. A special case from practice is the confusion of concepts of interest and interest on delay. However, these terms are well distinguished in economic literature [20]. Interest is, in essence, the price of money that the creditor puts at the borrower's disposal for an agreed period of time. Interest on late payments, however, is a penalty for the debtor's delay in fulfilling his obligation and motivating him to properly discharge his duties. The principle of contractual freedom may also apply to the determination of interest on late payments, but their amount is limited by the principle of fair trade. According to Mazák [6] if default interest is not agreed upon in the contract, the debtor is required to pay statutory interest for late payment. These are determined as the basic interest rate of the European Central Bank increased by eight percentage points. From 16 March 2016, the debtor pays the statutory interest on late payment of 8%.

In general, the obligation to pay interest is payable together with the obligation to repay the used money (principal). However, this rule is only used if the loan is to be repaid on a one-off basis and the maturity period is not longer than one year. Otherwise, interest is payable at the end of each calendar year, regardless of the maturity date of the principal. The repayment of the loan granted can be spread over

several installments, which means that the interest on this repayment is payable on the due date of each installment. In banking practice, however, we also met with the parties' agreement that the interest payable at the end of the year does not apply, but is added to the principal and is further matched with it.

6 Maturity of the Loan

The debtor's right to repay the loan early is contained in Section 503 (3) of the Commercial Code. Therefore it is for the borrower to repay the provided funds before the time specified in the contract. It is important that interest is payable only for the period from grant to refund. However, this is merely a provision of the Commercial Code, and therefore the banks are accustomed to accept it to a limited extent. The borrower generally grants the opportunity to pay an extraordinary repayment of the loan once a year.

A substantial part of the loan agreement is the debtor's obligation to repay the cash provided. The time it takes to do so is the subject of the parties' agreement and is directly negotiated in the treaty. However, the amount of interest is not an essential part of the contract. However, the legislator also remembered this case and determined that if the maturity date is not contractually determined, the debtor must repay the loan within 1 month of the day when the creditor requested it [21]. This particular adjustment is more advantageous for the borrower, in particular in terms of time. If it were lacking, it would be necessary to apply only the general provision of Section 340 (2) of the Commercial Code. According to him, the debtor would have fulfilled his obligation without undue delay after the creditor asked him to do so.

7 Termination of the Loan Agreement

The most common way to terminate a loan agreement is to repay it to creditor properly and on time. However, special attention is paid to the situation if a problem arises on the part of the debtor and deals with three specific reasons for withdrawal from the contract by the creditor.

According to Duľová Spišáková et al. [22] the first reason is the situation when the obligation to repay the provided funds is lost during the duration of the contract. In practice, there will be a situation where the house where the right of lien is established for the benefit of the creditor or the market price falls. In such a case, the debtor is required to add the credit to the original extent. In practice, it compares the original security level with the condition after its deterioration and is added to the original extent by, for example, third party liability. The borrower must do so within a reasonable time. However, its adequacy is always considered separately, there is no generally accepted rule of what time period it is. The decisive circumstances when

determining it are the amount of credit or the extent of the security. However, the legislator does not address the beginning of the passing of this reasonable deadline or the formal aspect of such a challenge. In our opinion, it is advisable to choose the written form of the invitation delivered by mail to the agreed address and to set a minimum monthly time limit. Failure to comply with this obligation is sanctioned by the creditor's ability to withdraw from the contract with the entire loan and interest.

Another reason for withdrawal from the contract by the creditor and the right to immediate repayment of the amount due together with the interest is the debtor's delay. This provision of Section 506 of the Commercial Code is applicable if the loan agreement does not contain a different arrangement and the repayment of the loan was agreed not in the same time but in installments (Grancay et al. [23]. Therefore, the creditor may withdraw from the contract if one of the two conditions is fulfilled. The first is that the borrower is in delay with the return of more than two repayments, which in practice means that he is in delay with payment of up to three installments. The second reason for withdrawal is a minimum 3-month delay with the return of one installment. It follows from the above that the creditor is entitled to withdraw from the credit agreement, subject to a qualifying delay of the debtor with the return of the provided funds. However, in order for a creditor to exercise his right, this negative state must also exist at the time of withdrawal. If the debtor's default has ceased in the meantime, the creditor is no longer entitled to withdraw from the contract for this legal reason. Withdrawal from the contract is addressed by unilateral legal action, the effectiveness of which is necessary to reach the debtor. In order for the effects of withdrawal to take place, the delivery of the withdrawal must be proved, it is not enough to assume that [24].

The provision of Section 507 of the Commercial Code follows the previous provision of Section 501 (2) of the Commercial Code and specifies the specific reason for the creditor's resignation from the credit agreement. The creditor has the right to do so if the borrower has used the funds provided under the contract only for a certain purpose that the debtor did not comply with or could not use for the agreed purpose. The first option addresses the violation of the debtor's obligation to use the funds for the agreed purpose. The right of the creditor to withdraw from the contract is therefore subject to a breach of this obligation by the debtor and is understood as a sanction by the creditor. However, as it follows from the judgment of the Supreme Court of the Czech Republic (2005) no. 29Odo 841/2005 [25], it is at the creditor's will, or if the debtor uses the money for another purpose as he has withdrawn from the contract and requests the refund of the used money together with interest, and also apply the sanctions agreed in the credit agreement. However, the non-use of this right itself cannot be considered as a breach of legal obligation. The second option regulates the situation when it was not possible to use the means for the agreed purpose, for example because of force majeure or changes in legislation.

According to Polišenská et al. [8], in such cases, the law therefore confers on the creditor the right to withdraw from the contract and require the debtor to return unused funds and interest together without undue delay. The debtor must fulfill this obligation without undue delay, after the creditor has notified him that he is using the

statutory option and withdraws from the credit agreement. The obligation on the borrower to reimburse the money is also not affected by the fact that the creditor provided the money to a third party for a purpose.

8 Credit Agreement and Loan Agreement: Differences

In many cases, the loan agreement is incorrectly classified as a bank type of contract such as a bank deposit, a current account maintenance contract or a letter of credit agreement. Unlike these contractual types, not only the bank, but any other natural person or legal entity, may not be the provider of the loan agreement to its contractor. Although the designation of the parties to the contract, the creditor and the debtor, is the same, it is a different type of contract governed by § 657 and 658 of the Civil Code. The borrower's loan agreement resolves the creditor to the debtor, determined by type, but in particular money, and the borrower undertakes to return items of the same kind after the agreed time.

The main difference is that while the loan agreement is a consensual contract type, the credit agreement is a real contract. This means that it is not enough for it to be the only agreement between the parties on its essentials. Necessary condition for the creation of a credit agreement is the real provision of a subject of performance, the form of which may be any. Another difference is that the credit is, in contrast to the loan, generally free of charge. This means that the borrower returns only the amount he has been given by the creditor. However, the law allows contracting parties to agree to pay. In the case of a cash credit, interest is payable and, in the case of a non-pecuniary credit, repayment may rest with the debtor's obligation to return a thing of higher quality or more he has been given [26].

According to Section 261 (6) (d) of the Commercial Code, the loan agreement is an absolute business relationship [27]. This means that the rights and obligations of the parties are governed by the provisions of the Commercial Code, irrespective of whether the parties are entrepreneurs or not. However, the consumer loan agreement where the consumer is borrower is an exception. He is defined by law as a natural person who does not act within the scope of his business or license. As is apparent from the provisions of Article 52 (2) of the Civil Code, the provisions on consumer contracts as well as all other provisions governing the legal relations to which the consumer is a consumer will always be used where this is for the benefit of the consumer party [28]. The legislator, as well as any distinct contractual arrangements or agreements the content or purpose of which is circumventing this provision is sanctioned by invalidity. Furthermore, it stresses that all legal relationships the consumer is subject to will always be subject to the provisions of the Civil Code, even if commercial law standards are otherwise applicable.

9 Conclusion

At first glance, a loan agreement may appear to be a simple and clear contract type without potential pitfalls where there is nothing to explore. The opposite is true, however, and our long-standing practice confirms our opinion. In both theory and practice, the preferred basic advantage, which is the disposability of legislation, seems to us to be a fundamental problem based on our investigation. While it allows the parties to agree on mutual rights and obligations, the Commercial Code declares the equivalence of their status in practice. Banks, which are the most frequent lenders for the most vulnerable, often abuse their position: The terms of the contract include provisions that allow them to unilaterally change agreed terms in key areas. It is common for interest to be fixed at a maximum of 5 years. After its expiry, it is up to the creditor to decide whether to keep or adjust the agreed interest rate at its discretion. In our opinion, the Commercial Code should strictly determine the possibility of adjusting the interest rate, for example, according to the inflation rate or according to the rise in the price level. Another problem is in the absence of a mandatory written form of a loan agreement as well as individual legal acts having a fundamental impact on the rights and obligations of the parties. If the Commercial Code introduces a mandatory written form and, for certain amounts also the official verification of the debtor's signature on the contract, several risks of litigation would be minimized in practice. However, we consider the fundamental lack of legislation to be the disposability of Section 503 (3) of the Commercial Code. The possibility of not applying this provision allows creditors to propose a loan agreement so that the borrower does not have the option of repaying the loan early or only to a limited extent. In doing so, the borrower is in a relatively disadvantageous position and has only two options in reality. Either concludes the contract or rejects it as a whole.

The legislator should also clearly define in the Commercial Code a very vague term "without undue delay" which causes confusion. It should be replaced by a precise time limit e.g. within 60 days. In the case of interest on late payment, we believe that the statutory amount of late payment interest is reasonable and sufficiently motivates the borrower to fulfill his obligation properly and on time. We propose to remove from the Commercial Code the possibility of a contracting party's agreement on their amount.

As part of the review, we also focused on the credit agreement. This is, often understood as the same as the loan agreement. However, there are major differences between them. The first difference is that the loan agreement is an absolute deal. This means that the rights and obligations of the parties may not be governed by the provisions of the Commercial Code, but only by the Civil Code. The second major difference is in the subject matter of the contract, because the subject of a credit can be also other things than money, such as food. The third major difference between a credit and a loan is that the credit is given free of charge. Unless the parties agree otherwise, the borrower returns only as much as he has borrowed.

It is clear from the results of our investigation that the current legislation on the loan agreement does not take into account the needs of the practice and a fundamental adjustment is necessary.

References

1. Dermine J (2015) Bank valuation and value-based management deposit and loan pricing, performance evaluation, and risk. McGraw-Hill, New York
2. Strážovská Ľ, Vitkovič M (1997) Conceptual aspect of mergers and acquisitions analysis and their applicability in the case of credit institutions. Ekonomický časopis 45(11):919–933
3. Act no. 483/2001 Coll. Banking Act
4. Chovancová J (2017) Discussion and understanding of law in 20th century. Bratisl Law Rev 1 (2):137–144
5. Ovečková O et al (2017) Obchodný zákonník Veľký komentár Zväzok II. Wolters Kluwer, Bratislava
6. Mazák M (2018) Competitiveness of Benelux countries. Acta Oeconomica Universitatis Selye 7(1):101–107
7. Mura L et al (2015) Quantitative financial analysis of small and medium food enterprises in a developing country. Transf Bus Econ 14(1):212–224
8. Polišenská P et al (2016) Obchodní právo. Praha, Wolters Kluwer
9. Rontchevsky N (2017) Code de Commerce. DALLOZ, Paris
10. Svec M, Madlenak A (2017) Legal frameworks for the phygital concept. Eur J Sci Theol 13 (6):209–217
11. Hajduová Z et al (2014) Utilizing experiments designed results during error identification and improvement of business processes. Acta Polytechn Hung 11(2):149–166
12. Judgment of the Supreme Court of the Slovak Republic no. 5 Obo 47/2010
13. Judgment of the Supreme Court of the Slovak Republic no. 4 Obo 86/1999
14. Judgment of the Supreme Court of the Czech Republic no. 39 Odo 1595/2005
15. Horecký J (2018) Operation and action of a trade union (in terms of Czech Republic labour law). Cent Eur J Lab Law Person Manag 1(1):17–27
16. Judgment of the Supreme Court of the Czech Republic no. 29 Odo 1371/2005
17. Judgment of the Supreme Court of the Slovak Republic no. 3 Obdo 3/1996
18. Nastišin L (2016) The dependency of online reputation and financial performance of companies in selected industry. Acta Oecon Univ Selye 5(2):127–133
19. Judgment of the Supreme Court of the Czech Republic no. 29 Cdo 4498/2007
20. Mura L et al (2017) Economic freedom—classification of its level and impact on the economic security. AD ALTA—J Interdiscip Res 7(2):154–157
21. Nesterak J, Grodek-Szostak Z (2016) Public funded instruments of support for the internationalisation of innovative enterprises—a case study of Poland and Slovakia. Acta Oeconomica Universitatis Selye 5(2):134–143
22. Duľová Spišáková E et al (2017) R&D in the context of Europe 2020 in selected countries. Econ Comput Econ Cybern Stud Res 51(4):243–261
23. Grancay M et al (2015) Gravity model of trade of the Czech and Slovak Republics 1995-2012: How have determinants of trade changed. Politicka Ekonomie 63(6):759–777
24. Judgment of the Supreme Court of the Slovak Republic no. 6 Obo 283/2003
25. Judgment of the Supreme Court of the Czech Republic no. 29 Odo 841/2005
26. Fekete I (2015) Občiansky zákonník Veľký komentár 4. zväzok Záväzkové právo-zmluvy. EUROKODEX, Bratislava
27. Act no. 513/1991 Coll. Commercial Code as amended
28. Act no. 40/1964 Coll. Civil Code as amended

Bill of Exchange and Its Application Problems in Slovak Republic

Tomáš Peráček, Boris Mucha, and Patrícia Brestovanská

1 Introduction

In the most general sense of the word, the bill of exchange is a security—a document that embodies a certain right of the owner to financially perform against the issuer of the document. From the legal point of view, the bill of exchange is a security that must contain all mandatory particulars. In addition, some optional data may be included in the bill of exchange. In practice, they are clauses excluding the transfer of a promissory note or a guarantee clause [1]. The denomination has an irreplaceable place in closed national and international stores. Its application in practice as a payment and security instrument has several undeniable advantages.

The basic formal source of bills of exchange in the Slovak Republic is Act no. 191/1950 Coll. Bill of Exchange, Bill and Check Bill (hereinafter referred to as "Bill") [2]. From 1951 to this day, this law has not been substantially amended, with the exception of changes to the changeover to the euro. Even with this in mind, we consider the bills to be obsolete and unclear. Therefore, the application of these standards causes a number of problems.

However, the use of bills of exchange also entails certain risks that undermine the undoubted benefits of bills of exchange. Problems arise mainly from the lack of practical experience about bills of exchange. Abuse of bills of exchange, especially by non-bank entities, resulted in several social discussions. Their result was reflected in the recodification of procedural law. The legislator has removed the long-criticized institute of bill of exchange payment orders, which was characterized by extreme rigor. Another measure to mitigate the negative impacts of the bills of exchange on the consumer was the adoption of the unifying opinion of the Supreme

T. Peráček (✉) · B. Mucha · P. Brestovanská
Faculty of Management, Comenius University in Bratislava, Bratislava, Slovak Republic
e-mail: tomas.peracek@fm.uniba.sk; boris.mucha@fm.uniba.sk; patricia.brestovanska@fm.uniba.sk

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_19

Court of the Slovak Republic for lower-level courts in the recovery of bills of exchange. In spite of several interventions and measures taken by the legislator, we consider it necessary to examine the bill of exchange and propose the necessary measures at the conclusion of the contribution.

The main goal of the paper is to identify and analyze the bill of exchange as a security in the context of the current legislation. In addition to the main goal, we set two sub-goals, namely:

- To analyze the application problems that arise when using a bills of exchange as a payment method,
- To propose recommendations and measures to prevent abuse.

Based on the knowledge of the theoretical background of the research, we have determined the following research question: Does the bill of exchange represent a safe tool for the creditor to secure their claim?

The paper is divided into the following parts. In the introduction we explain the choice of topic and point out its topicality and importance. In the literature review, we present domestic and foreign authors who deal with the subject matter. Next, we set out the goals of our paper and describe the scientific methods used. In the Results section we examine the bill of exchange and its essentials and point out the professional opinions of other authors. We analyze the application problems that arise when using a bill of exchange as a means of payment and security. In the discussion we argue with the opinions of experts expressed in the literature used. We critically criticize the possibilities of converting a rectum or the possibility of redemption change. In conclusion, we evaluate the bill of exchange as a whole. We propose recommendations and measures to eliminate abuse and provide a response to the research question.

2 Review of Literature and Methodology

In Slovakia, a number of authors or theoreticians are in the field of law, such as B. Jablonka, O. Ovečková especially in university textbooks, professional and scientific articles are found in the field of law securities, commercial law and civil law. Securities agreements were also analyzed by theoreticians in the other countries, among whom we can mention the renowned authors B. Lachlan, P. Veronesi, J. Dědič and others.

Due to the nature of the paper, we apply several scientific methods of knowledge. These represent a highly skilled human activity aiming at gaining scientific knowledge, from the phenomenon to the essence. The result of this activity is new knowledge that is organized into a certain system. In particular, the use of the logic method that can be used in all sciences, and also the abstraction method, without the use of which, due to its broad scope, could become opaque or chaotic, is particularly suitable for the knowledge of law. The method of logical analysis is also a necessary method for successful processing of bills of exchange. We will use it to

analyze the legal status and legislation. The method of comparison enables us to compare the views of the Slovak and Czech courts. We will also use it to make the various opinions available to the institutions and the interpretation of the institutions. Based on scientific knowledge of valid and effective law and legal science, we use synthesis, deduction and doctrinal interpretation in some parts of the paper.

3 Results

3.1 Bill of Exchange, Its Types and Essential Elements

Various economic functions are connected to bills of exchange by the professional literature [3]. First of all, it is a credit function that consists in the ability of the debtor to guarantee the payment of his obligation by issuing a bill of exchange or by transferring it to the creditor. In such a case, the original contractual relationship shall be terminated, which shall be replaced by the bundling relationship, provided that the creditor agrees with such a procedure. Secondly, it's a payment feature because it's possible to pay through the bill of exchange. The law allows two parties, the creditor and the debtor to agree that paying the bills of exchange in the future will satisfy the creditor's claim, for example, from the loan agreement. The last security function is to provide a certain security to the creditor that the debtor will repay the amount due. This function has proved to be particularly effective in practice as a means of securing repayment of the loan provided.

Despite the fact that neither the valid and effective legal regulation does not contain the legal definition of the bills of exchange, according to the literature [4], we understand it as legal advice, which has the content stipulated by the law. Its essence is the obligation of certain persons (bills of exchange of debtors) to pay the owner of the bill of exchange at the place and time resulting from the document of the amount determined. In addition to the Bills of exchange and Checks Act, two legal acts are applied to legal relationships from bills of exchange, such as the Civil Dispute Settlement and the Civil Code.

The relationship of exchange is legally related to a relative relationship, where, on the one hand, the creditor—natural person or a legal person is entitled to claim financial performance and, on the other hand, a debtor, a natural or legal person, must provide the financial compensation. Therefore, it is necessary to distinguish between active and passive bills of exchange, while by active bills of exchange we understand the ability to be the holder of the duties. Passive bills of exchange means that anyone who is capable of committing themselves to bill of exchange can be bound, while the ability of natural persons to do so is governed by § 8 to § 10 of the Civil Code. In addressing the question of the capability of natural persons, according to Lazar et al. [5] and the courts are of the opinion that, given the formality, unconditionally and in particular, the abstraction of legal acts from bills of exchange, the assumption of passive bill is the full age and legal capacity. The capacity of legal

entities to be holders of rights and obligations from bills of exchange derives from the § 18 to § 21 of the Civil Code and other legal regulations.

The prior formality of a bill of exchange, which results directly from the law, is a written form. The legislator strictly insists on it; it does not allow any exemption at present, such as the electronic form that can be used for book-entry securities. The minimum content requirements are exhaustively listed in the law and are only distinguished by the type of bills of exchange, whether it is a promissory note or a draft [6].

Jablonka [7] defines a draft as legal security containing the requisites provided by the Bills of exchange and Checks Act, in which the exhibitor instructs the third person, called the debtor to pay a certain amount of money to the creditor at a specified time. The draft therefore contains the following data. First of all, it's a written sign that it's a bill of exchange. This designation is included in the actual text of the document and expressed in the language in which the bill of exchange is written. The name of the bill of exchange cannot be replaced by another term. Rontchevsky [8] points to the French bilingual doctrine, which allows the bill of exchange to be written in French and a guarantor clause in the Italian language. We point out that such a procedure does not exclude Slovak legislation as well. An unconditional order to pay a certain amount of money, which is usually expressed by the word "pay", is another mandatory item of the bill. This command must be free of any conditions. The amount of the amount must be fixed. This means that the purchase contract is not allowed instead of the amount to indicate the method of calculation. Even the Supreme Court of the Slovak Republic [9] recommends that both the numerical and verbal expressions of the bill of exchange value to be stated. As stated below, if the amount is given as words or numbers, and if the data does not match, the amount expressed in words applies. If the amount is given a more than once and if the data does not match, the minimum amount is legally valid. The name of the person who must pay, the name of the borrower is most often mentioned below the bold bill content itself. In our opinion, only mentioning their name may not be sufficient and, for the unambiguous identification of a person, we recommend giving their date of birth, birth number if assigned and residence. It is permissible for the debtor to be a debtor and also to be a legal person, indicating, in addition to its name and legal form, an identification number if it is assigned and registered office. If the bill of exchange itself does not explicitly state the place of payment, it is legally valid that the place mentioned with the name of the debtor is also a payment place.

Due date is not an essential part of the bill of exchange. If there is no maturity date in the bill of exchange, it is considered to be payable to be seen, it means the first issue to the debtor by the bailiff. In this case it is "Bill of exchange of sight". However, the change must include the indication of where to pay. Although the law requires only a placement itself, such as Bratislava, in our opinion it is appropriate to give a clear identification of a particular place. Another important part of the bill of exchange is the name of the person to pay or the advice to be paid. It is therefore the name of the person (physical or legal) in whose favor the bill of exchange is issued and which is to be paid by the bill of exchange. Unlike other types of securities, the issuance of the bearer's bill is inadmissible [10] and it would not be a bill of

exchange. As strange, we find the legal possibility that the recipient of the bill of exchange could also be the exhibitor himself usually in the center of the bill of exchange, but in practice, it is rather exceptional cases of exposure to such a security, which is referred to by the professional literature as a "bill of exchange on its own row".

Indicating the date of issue of the bill of exchange is very important, especially with regard to the passing of time limits. The law does not prescribe a date (numeric or written), but it is written in the upper left corner of the bill of exchange. If the place of issue of the bill of exchange is not mentioned, it is based, according to Pauly [11], that if the bill of exchange does not give the place of issue, it is valid at the place indicated on behalf of the issuer. The signature of the exhibitor is the last requisition, which is the end of the bill of exchange creation process. It must be the handwritten signature of the person entitled. The supportive application of the Statutes 40, Paragraph 3 of the Civil Code, stamp imprint is excluded [12]. Bills of exchange are made invalid in such a way that someone signs a person's name. The plenipotentiary must sign in their own name and at the same time include an indication of whom they are signing.

A promissory note is a legal security for a series of legally prescribed documents requiring the exhibitor to pay a certain amount to the creditor at a specified time. As stated by Baumach and Hefermehl [13], the promissory note has the same requirements as the above-mentioned draft, but with two distinctions. Firstly, it does not include the debtor bill of exchange because it is the issuer of bill of exchange. Secondly, an unconditional order for the debtor to pay a certain sum is replaced by an unqualified vendor's promise that he will pay a certain amount to the owner of the bill. The significance of the substantive requirements of the bill of exchange is examined in the fact that if the bill of exchange is missing from the statutory requirement, it is an invalid legal act, unless the law stipulates otherwise (the absence of the place of payment from the bill and the due date of the bill of exchange). The amendment containing the statutory requirements and the statutory form is deemed to be created. However, as is clear from the Judgment of the Supreme Court in Prague [14], from the point of view of the theory of law, it is not enough to create the obligation-legal relationship itself, since it is necessary that it be handed over to the bill of exchange creditor.

3.2 Conversion of Bill of Exchange

Transfer of ownership of a thing or a right is, by law, a change of its owner on the basis of a legal act. Even the bill of exchange representing the property value can be transferred to another person. This is a special written record of the bailiff on the bill of exchange or on its pendant, which must be firmly attached to the bill of exchange. We call it a copy or an indosament. The legislator allows the exhibitor to exclude the transfer of the bill of exchange to a third person by a "non-advice" clause. This revised bill is called "not on row". In this case, in the opinion of the Supreme Court

of the Slovak Republic [15] from the bill of exchange, the name becomes a registered name, which can be transferred to a third person only in a special way. In practice, according to the Judgment of the Supreme Court of the Czech Republic [14], it means that the retortion copy is legally ineffective and is affected by a fault of absolute nullity and therefore no effect. The only way to transfer a it is to use the general law institute of assignment of receivables contained in Paragraphs 524 to § 530 of the Civil Code. Its meaning is the possibility of the creditor to transfer his claim even without the consent of the debtor to another in writing.

The glossary must contain at least the signature of the owner of the bill (indosant), with the law accepting two types of certificates. The filled-out copy contains a conversion clause that the bailiff expresses of his intention to transfer the notes and the rights of the bailiff to another person. Express it by saying: "pay instead of me." It is necessary to mention the new owner of the notes and the signature of the indosant, the owner of the note. A blank indosament, also called "blankoindosament", may be by law in two forms. According to Jahn [16], either it contains an indosation clause along with an indosant signature, or it exists without a clause and contains only his own handwritten signature. It follows from the legislation that the person entitled to transfer the bill is the debtor, the last transferor or, where appropriate, the owner of the bill with blank identification.

The main legal effect of the indosament is the transfer of bills of exchange, as they transfer to the new owner all the rights resulting from the ownership of the bill of exchange. The in dispensation itself must be unconditional, because any condition is deemed by law to be unregistered. The guaranty effect of the bill of exchange is that the converters themselves are among indirect borrowers. If there is no other disclaimer, the transferor is responsible for accepting and paying the bills of exchange. However, the law contains an indosant entitlement expressed by the phrase "without obligation" or the Latin equivalent of "sine obligo", which according to Ovečková et al. [17] of a disguised nature and allows him to discard any liability for billing.

The transferor as well as the exhibitor may prohibit further conversion of the bill of exchange. In this case, it does not correspond to the new owners of the bills in which the bill was transferred in spite of its clause. This is the so-rektaindosament, the purpose of which is to prohibit the further transfer of the bill of exchange. In legal terms, no further transfer of bill of exchange is excluded. What is important, for the transferee himself is to relieve him of the responsibility for the person who would receive the bill of exchange from the person who sold it. However, that clause may not, under any circumstances, disclaim liability against the person who has received the bill of exchange him.

Another effect of the indosament is legitimate, which means that the debtor is the person who holds the bill who can prove their right to the bill of exchange by a continuous set of passes, even if the last one is blankoindosament. There may be a question as to how the endorsement can be canceled. The answer is set by the law: "the exempted indosament is the unregistered one."

There are two steps to the transfer the rights from the bill. The first is the writing of the counterpart and the second subsequent handing over the bill of exchange to the new owner. In blankoindosament the process is even easier because no further

indosament is required and the change of ownership comes by simple physical handing over the bills of exchange to the new owner. This process, which can be repeated several times, is according to Mura et al. [18], called blanketrading.

3.3 Receiving a Draft

The essence of the draft is that the exhibitor instructs the third party to pay a certain amount to the third party for the bill. Apart from the above-mentioned elements, it is necessary for the person under obligation, on the basis of his unconditional declaration, to become a debtor. This legal act is called acceptance (receipt) of the bill of exchange. For the purpose of accepting the bill of exchange, it must be submitted to the debtor in the place of his residence, as is usually done by the owner or by another person who has a bill of exchange in his possession. The day when the bill of exchange is submitted for its adoption is determined by law. However, the date of acceptance may be precisely determined or limited by the statutory provision that "the issuer may also stipulate that the bill may be unsubscribed for acceptance before a certain date."

According to Kotásek [10], one of the possibilities of the exhibitor is also the limitation of the right to submit a receipt for acceptance. The actual receipt of the bill is associated with a significant risk for the future. The debtor is protected by law. This allows them to submit a bill for acceptance again on the day following the first submission. The owner is not obliged to keep the bill submitted for acceptance in the hands of the debtor who has given the legislator sufficient time to think.

The law does not oblige the debtor to accept the bill of exchange, it is only their right. If its acceptance is denied in full or in part, the owner of the bill of exchange shall be entitled to a claim against its issuer, the previous owner or other persons liable for payment of the bill. The refusal to accept the bill itself must have a special form of "protest" prescribed by law.

3.4 Refund of the Bill of Exchange

Excessive stringency is also applied to its reimbursement. The legislator, by a mandatory provision, limited the issuer's ability to determine its maturity because the bill can be displayed only for vision, for a certain time after the sight, for a certain time after the date of exposure, on a certain day. Breach of this provision is sanctioned by a legal fault of absolute nullity, so that no such consequences result from such a bill of exchange.

The change of vision is payable upon submission. By law, they must be submitted for payment within 1 year from the date of their issue, but the issuer is authorized to shorten or extend this period. Even the transferor (indosant) themselves can shorten these deadlines by their decision. Another issuer's right, according to some authors

[19], is the appointment of the earliest date to submit the bill of exchange and in this case, the deadline for submission of the bill begins only from that date. The bill of exchange issued for a certain time after the sighting is counted on the date of its receipt or the date of the protest for non-acceptance. However, if no protest has been made, the legitimate irreconcilable presumption against the recipient is valid in the sense that the undated admission has become the last day of the deadline for submitting the bill of exchange. An exchange issued for 1 month or several months after the date of issue or after the sighting is due on the same day of the month in which it is to be paid. If that day of the month is not existing (for example, February 30), the bill of exchange is payable on the last day of the month.

The bill of exchange itself comes only at the initiative of its owner and therefore the condition of its payment is the submission of the original of the bill of exchange to the debtor or on the due date or one of the following two business days. However, a distinction must be made between the day of submission and the due date, because if the bill of exchange becomes annual on a business day, it is possible to claim payment only on the next business day. All other legal acts relating to the bill of exchange, in particular the submission and protest, may only take place on a business day.

Specialist literature [17] sometimes refers to the bill of exchange as a commemorative security, as it is only at the discretion of the bailiff for the bill of exchange. Even with reference to the simplicity of the transfer of the bill of exchange itself, the borrower does not need to know who is the current bailiff and it would not be possible to ask him fairly to pay for the bill of exchange. The place where the bill of exchange is presented is the place of payment indicated on the bill of exchange. In the event of a lack of indication of a payment place on the bill, the relevant provision of the law, according to which it is the domicile(s) of the debtor, applies.

The rights of the borrower to pay out the bill include a fully justified and logical requirement for the issue of bill bearing the payer's confirmation. The bailiff may not always have the full amount to pay the billing. In such a case, the owner may not refuse partial payment, otherwise it would become deferred as a creditor with possible consequences. Even with partial payment, the debtor can demand that the partial debit will be shown on the bill itself, which is given to him by the creditor, and the bill itself remains in the hands of the debtor until the entire amount is due.

In the case of bill payment, the law does not allow the application of the supportive statutes of the Civil Code or the Commercial Code for early repayment of a bill. The reason is that the owner of the bill is not obliged to accept payment before their juncture and that the debtor who has done so acts at their own risk. The law imposes an obligation to pay the batch amount at maturity, thereby removing the debtor from its commitment. One of the debtor's most important obligations when paying bill is to examine the correctness of the order of indosament, the subsequent transfer of the bill was not omitted by any of its owners. Failure to comply with this obligation can be characterized as gross negligence. When transferring bill to another person, it is not legally required to verify the transferee's signature, which, in our opinion, means that the debtor is not obliged to examine the authenticity of the signatures of the indosant.

It is not an obligation to issue bills of exchange in the currency of the euro. However, as stated in the judgment of the Supreme Court of the Czech Republic [14], if the bill of exchange is exposed to non-existing currency, it is invalid. If there is a currency that is not in circulation at the payment point, the billing amount can be paid in the domestic currency. The value of the note itself is determined by its value at the European Central Bank's maturity date. Defeat of the debtor implies a considerable advantage for the bearer in that he can decide whether the notes will be paid in the currency of the euro according to the exchange rate on the due date of the notes or the rate on the day they are due at their real expense.

3.5 Aval of the Bill of Exchange

Aval is a special institute for securing the bond-legal relations of the notes, protecting the bailiff. Its purpose is to ensure the payment of the whole amount of the note or only part. Such a guarantee may be given by a third party or by the person who has already signed the note, and it must be pointed out that the avalanche must be legally entitled to such an act [20]. The form of the aval is determined by the law that the guarantor's statement is written on the batch or on its pendant and is expressed as "per aval" or other clause of the same meaning and then the guarantor will sign it by hand. Even in the case of aval, the law uses the lawful guilt, because the signature of the guarantor on the face of the notes applies to the fact that it establishes an aval unless it is a signature of the bailiff or issuer.

The statement itself must also include an indication as to who is receiving the aval, because if it was not stated, it is considered to be a liability for the issuer of the note. The importance of the guarantee lies in the fact that the bailiff is bound by the bills of exchange as well as the guarantor [7]. Their undertaking is also valid if the commitment for which it is guaranteed is invalid for any other reason (in addition to the lack of a written form of the guarantor's statement). Upon payment of the bills, the bailiff acquires all rights from the bundle against the guarantor and against all those who are billed to this person, thereby becoming the new creditor [21].

3.6 Bill of Exchange's Sanction

If the note has not been paid properly and in time, the owner has the right to take action against the transferor, the issuer and other persons legally bound. It is necessary to distinguish direct borrowers in bill of exchange and their guarantors, and at the promissory notes—the guarantor. Indirect or resp. the secondary borrowers are the original owners of the bill, the issuer of the bill of exchange and the other legally billed persons.

The refusal to accept the notes or the payment of the notes must be determined by the law "must be ascertained by a public document (protest for non-acceptance or for

non-payment).” The enforcers of the notes are the clients (the person requesting the bills), the person against whom the protest is directed—authority (court, notary or municipality) chosen by the client himself.

To enforce the protest, the law sets deadlines, when they are missed it means the loss of the right of recourse. A protest for non-acceptance must be made within the deadlines set for submission for admission. If the note was first submitted for the last day of the deadline, you can make a protest the next day. A protest for non-payment must be made in the case of a notes on a certain day or at a specific time after the date of the exposure or after seeing one of the following two business days following the due date. With a bill of sight, the law imposes a protest for non-payment within the same time limits as the protest for non-refoulement.

A special situation is in the case of a debtor who has been bankrupted. According to Števček et al. [22], it is sufficient for the protest to submit the decision of the bankruptcy court. The authority issuing a protest note will flag a protest on the note or its tag unless a protest is made for not accepting a note because it is neither necessary to submit a note for payment nor make a protest for its payment. The protest is a custodial legal act under which the right of recourse against indirect debtors is governed. This does not apply to a “no protest” or “no cost” endorsement, which relieves the owner of the obligation to protest against non-acceptance or non-payment.

3.7 Extinction of Obligations from the Bill of Exchange

The legal order of the Slovak Republic, allows for several ways of extinguishing bill of exchange. The most common way is to meet the obligation, which must be done properly, in its entirety and on time. The special reasons for the termination of bills of lading are limitation, missed bills of custody. Legal relations about bills of exchange are governed by special Statutes of the Bills of exchange and Checks Act. First of all, bill against the bailiff are suspended after the expiration of 3 years from the due date of the bill.

Destruction, but the loss of the bill as a security is a special reason for the disappearance of bundling obligations resulting from the character of the bill itself as a security. However, it is possible to avoid this negative consequence, according to Smyčková et al. [23], by special procedure for the amelioration of documents under the Civil Extrajudicial Order.

4 Discussion

In connection with the possibility of transferring the bill of exchange, it is not possible to unequivocally agree with the opinion of the Supreme Court of the Slovak Republic [15]. It stated that the only way to transfer ownership of recertification is to

use the institution of assignment. The Civil Code, as well as applicable law, allows the owner to dispose of his property in another way. In practice, for example, it will be possible to donate a rectum or to confuse it with another thing. It is not explicitly prohibited by the law. A special way of changing the ownership of a rectum, but also a common bill, is a legal event such as death. In this case, the performance of the promissory note constitutes an asset of the inheritance and establishes, regardless of any clause excluding its transferability, the right of the heir to perform. We also consider it necessary, in the discussion, to emphasize that, in the event of bankruptcy of the bills owner's assets, the reclassifier also becomes part of the bankruptcy estate.

In solving the question of the termination of the obligation from the bill of exchange Smyčková et al. [23] is of the opinion that its loss or destruction does not imply the definitive cessation of rights in the bill. This view can only be partially accepted in theory. The civil off-line order recognizes the institute of redeemability of the deed. This is a non-contestation, which may result in a court ruling replacing a lost or destroyed document. However, we can conclude from the experience of lawyers that this is really just a theoretical possibility, because the court in this proceeding does not suffice as proof of issuing a promissory note that the photocopy of the original bill of exchange existed or not. In another way, in our opinion, its existence cannot be proven.

5 Conclusion

By examining the bill of exchange, we found that it was a perfect security, so-called scripture. In our opinion, this means that the rights and obligations of the bills of exchange may only exist with this deed. The right of the owner of the promissory note is inextricably linked to its physical existence. Loss or destruction of the promissory note also extinguishes the right to pay the promissory note. Furthermore, the promissory note represents both a presentation and a payable security. It follows from this finding that it is always necessary to submit a bill of exchange when submitting a bill of exchange. It is to be paid to the obliged person after payment. However, it must always be the original of the promissory note, an officially verified photocopy is not sufficient. Unlike other securities, such as a stock note, the bills of exchange can only be made in money and in an existing currency. The uniqueness and one of the biggest problems of the promissory note is that it is an abstract security. This means that the law does not impose an obligation to state the reason for its creation. From the experience of attorney-at-law, we also consider the possibility of issuing blank notes to be a problem. In conjunction with the abstract of the bill, there is considerable room for dishonest or fraudulent behavior. For this reason, it should come to a change of legislation and the reason for issuing a bill should be its mandatory requirement. We propose to abolish the blank note as a bill of exchange.

However, the main issue of the bill of exchange is in the question of the authenticity of the signature of the promissory note issuer or other promissory note-bound persons. Even now, there have been a number of publicized cases, the

subject of which is the dispute over the authenticity of the signature of the bill of exchange, as well as the date of issue. The benevolence of the legislation also allows former statutory bodies to issue a bill of exchange and thereby acknowledge the fictitious debt incurred at the time of their acting as statutory body. The authenticity of the issuer's signature and the date of issue is also one of the most frequently encountered problems in enforcing a bill of exchange. The court proceedings are extended by expert evidence, where the expert must determine whether it is a handwritten signature of the authorized person and when the bill of exchange was issued. In our opinion, these most serious shortcomings can be easily removed by legislative action. The essential part of the promissory note should be not only the handwritten signature of the issuer but also its official verification by a notary. We also propose such a procedure for bills of exchange and other bills of exchange. The most common doubts would be removed. In response to a research question based on our findings, we believe that a bill of exchange is not a secure tool to secure a creditor's claim.

References

1. Veronesi P (2010) Fixed income securities. Wiley, London
2. Act no. 191/1950 Coll. on Bills of exchange and checks as amended
3. Guest AH (1998) Chalmers and guest on bills of exchange. Sweet & Maxwell, London
4. Polišenská P et al (2016) Právo cenných papíru. Wolters Kluwer, Praha
5. Lazar J et al (2018) Občianske právo hmotné 1 Všeobená časť. IURIS LIBRI, Bratislava
6. Dermine J (2015) Bank valuation and value-based management deposit and loan pricing, performance evaluation, and risk. McGraw-Hill, New York
7. Jablonka B (2017) Zákon zmenkový a šekový Komentár. Wolters Kluwer, Bratislava
8. Rontchevsky N (2017) Code de Commerce. Dalloz, Paris
9. Judgment of the Supreme Court of the Slovak Republic no. Obdo V 82/2003
10. Kotásek J (2012) Zákon směnečný a šekový. Wolters Kluwer, Praha
11. Pauly J (2017) Teoretické a legislativní základy cenných papírů. Wolters Kluwer, Praha
12. Act no. 40/1964 Coll. Civil Code as amended
13. Baumach A, Hefermehl W (1997) Wechselgesetz und Scheckgesetz. C. H. Beck, Munchen
14. Judgment of the Supreme Court in Prague no. 5Cmo 169/2013
15. Judgment of the Supreme Court of the Slovak Republic no. 4Obo 21/2012
16. Jahn U (1999) Bills of exchange. ICC Publishing, Paris
17. Ovečková O et al (2017) Obchodný zákonník Veľký komentár Zväzok II. Wolters Kluwer, Bratislava
18. Mura L et al (2017) Economic freedom – classification of its level and impact on the economic security. AD ALTA J Interdiscip Res 7(2):154–157
19. Nováčková D et al (2016) Global investment projects implemented in public interest in Slovakia. In: Klieštik T (ed) Proceedings of globalization and its socio-economic consequences, Žilina
20. Lachlan B et al (2014) European securities law. Oxford University Press, New York
21. Haentjens M et al (2015) European banking and financial law. Routledge, New York
22. Števček M et al (2016) Civilný sporový poriadok komentár. C. H. Beck, Bratislava
23. Smyčková R et al (2017) Civilný mimosporový poriadok komentár. C. H. Beck, Bratislava

Legislative Aspects of Custody of Securities in the Conditions of the Slovak Republic

Tomáš Peráček, Boris Mucha, and Patrícia Brestovanská

1 Introduction

In a market economy environment, trading securities is an integral part of the economic activity of banks acting as securities traders. As ancillary services to this segment, custody services are offered. Business practice involves the conclusion of contracts for safekeeping, administration, deposit of securities. These bank types provide the client with the supplementary custody of the securities for consideration [1]. The basic legal source of securities law in the position of "lex generalis" in the conditions of the Slovak Republic is Act no. 566/2001 Coll. on securities and investment services, as amended [2]. However, the Securities Act is based on European legislation that leaves individual Member States free to adjust their securities issues to their specific needs. However, national law fully respects European law [3]. We find the legal regulation of all named securities contracts in the second part of the law, while the legislator only deals with custodian contracts in sections §39 to §42. Some securities dealers ignore the law on contracts contained in the Securities Act and propose to clients to conclude e.g. Storage contracts contained in the Commercial Code. In their view, the different types of securities provided in the Securities Act are only "subtypes" and therefore their application can also be replaced by general contracts.

The legal regulation of all mentioned securities contracts is contained in Part Two of the Act, while the legislator deals only with § 39 to § 42. As the examination of the issue of custodial securities contracts is neglected for a long time by legal theorists in the field of commercial law and securities law, and the purpose of the authors of this

T. Peráček (✉) · B. Mucha · P. Brestovanská
Faculty of Management, Comenius University in Bratislava, Bratislava, Slovak Republic
e-mail: tomas.peracek@fm.uniba.sk; boris.mucha@fm.uniba.sk; patricia.brestovanska@fm.uniba.sk

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_20

contribution is to review the legal arrangements for caretaking treaties and give them a holistic view.

The structure of the paper also reflects our intention. It consists of an introduction, including a goal, a review of literature and a methodology, discussion, conclusion and results—three key chapters. Each of these chapters comprehensively examines one type of contract.

The main aim of the paper is to thoroughly identify individual contracts and to review their legal regulation from 2015 to the present in the area of Slovak Republic. In addition to the main goal, we have also chosen two sub-goals, namely:

- find answers to the problems of application practice,
- to confirm or reject the hypothesis that a contract for the custody of paper securities, a contract for the administration of securities and a contract for the deposit of securities represent separate contractual types in Slovak securities law.

2 Review of Literature and Methodology

In Slovakia, a number of authors or theoreticians are in the field of law, such as J. Lazar, O. Ovečková and especially in university textbooks, professional and scientific articles are found in the field of law securities, commercial law and civil law. Securities contracts are also analyzed by theoreticians in other countries. We can mention the renowned authors B. Lachlan, P. Veronesi, J. Dědič, J. Kotásek, P. Polišenská and others.

Due to the nature and complexity of the studied subject, we applied several scientific methods of knowledge. According to Chovancová et al. [4] this is a highly qualified human activity aimed at acquiring scientific knowledge as well as penetrating the phenomenon to its core. As a result of this activity, new knowledge will be organized into a system. In our research we consider it particularly appropriate to use the logic method, which sets certain rules of human judgment, which have been formed by many years of experience and their observance guarantees the order of thoughts, its correctness and under certain assumptions, its truthfulness. From the scientific methods of knowledge, we apply an analytical method to analyze the legal status and legal regulations, a method of comparison to compare the views of Slovak and Czech courts. Based on scientific knowledge of valid and effective law and legal science, we used synthesis, deduction, and doctrinal interpretation in some parts of the work.

3 Agreement on the Custody of Documentary Securities

A contract for the safekeeping of documentary securities as a named contractual type is contained in the § 39 and § 40 of the Securities Act without reference to the supportive application of the Act no. 513/1991 Coll. Commercial Code or the Act no. 40/1964 Coll. Civil Code [5, 6]. However, since it is a contractual contract type, it is subject to the statutes of Part Three of the Commercial Code on Commercial Obligations in matters not specifically governed by the Securities Act. However, as already mentioned, the Securities Act does not refer to the supportive use of any of the contractual types explicitly regulated by the Commercial Code. For this contract are applied provisions of Paragraphs 261 to 408 of the Commercial Code.

The opening Statute of Paragraph 39, Section 1 of the Securities Act contains the legal definition of the contract being analyzed. By means of a custody document, the custodian undertakes to take a written security to be deposited in a separate or collective custody and the bailiff undertakes to pay him retaliation. The contract must include the designation of the persons authorized to dispose of the security deposited. Using the deduction we can determine the essential requirements of the contract, namely:

1. designation of the parties, who is the custodian and who is the constituent,
2. Determining the custodian's obligation to take a written security to be deposited in a separate or collective custody,
3. determination of people authorized to dispose of authorized securities,
4. determination of the Complainant's obligation to pay, if they are not specified in the contract determines that the payer has the usual remuneration at the time of conclusion of the contract.

From a formal point of view, the contract requires a written form. The misconduct of the parties in the formal aspect of the contract, only the oral conclusion of the contract resulted in its invalidity, it means that the contract would not have arisen.

As stated by Ovečková et al. [7], only documentary securities can be the subject of a custody of securities. In accordance with the legal orders of other European countries, we recognize the two types of safe deposit of a security, namely separate custody and collective custody. Bulk custody is crucial for securities trading as it allows for faster transfers of securities, thereby reducing the cost of operations with these securities.

In the custody of a repository security, the law determines that its custodian may be only a securities dealer, a foreign securities broker or a central depository. In the opinion of the Supreme Court of the Slovak Republic (1Obdo 36/2004), if there was a situation in which the custodian would not have mentioned the safekeeping of documentary securities in the subject of business, it would not result in an absolute nullity of such a contract for contradiction with Paragraph 39 of the Civil Code [8]. Unless otherwise stipulated in the agreement, an embossable security deposit is deposited in a bulk custody and an irremovable documentary deposit into a separate custody, which the law defines as depositing a documentary security of one of the

adjudicators separate from the securities of the other constituents. The principal duty of the custodian is, therefore, to return the same depositary security to the depositary, which has been entrusted to the depositary. At the same time, it is directly liable for damage to the deposited document, except in the event that the damage cannot be avoided even when all professional custody has been exercised.

Under the term "mass custody", we mean the joint deposit of the dealer's representative repository security with the repository securities of other fillers, in which the custodian handed over to the filing agent a writable security. In this case, the Complainant no longer has the right to return the same security deposit. The responsibility of the custodian for the damage incurred is equal to that of the separate custody.

Representable documentary securities held in collective custody are the common assets of the composers. Each shareholder's share of such joint assets is determined in a specific manner. According to Peráček [9], it is the ratio of the sum of the nominal values of its embossable documentary securities deposited in collective custody to the sum of the nominal values of all the embossable securities in the collective custody. Not every piece of securities must have a nominal value. Instead of a nominal value, the number of pieces of paper is used in this case. The legislature strictly excludes the possibility of applying the § 136 to § 142 of the Civil Code on co-ownership, and each member is entitled to exercise his rights vis-à-vis the custodian himself. As Lazar et al. [10], if the law did not include this provision, the constituent could not claim rights via the custodian individually, but the parties to the dispute would have to be all constituents under Paragraph 139, Section 1 of the Civil Code. In practice, this situation would prolong proceedings in court. Keeping evidence of every depositary security deposited is an integral part of the custodian's duties. If the document is not deposited with the custodian at the time of the conclusion of the contract, he is obliged to take over and save it immediately. At the same time, he is required to protect him with professional custody before possible loss, destruction, damage or depreciation. The rights of the Complainant also include the possibility of requiring the custodian to hand over a paper security at any time and to surrender it back if the deposited contract has not yet ceased to be deposited.

The expiration of the time for which the contract was concluded causes its termination. However, it may also be terminated by agreement between the parties. In this regard, we want to point out that the agreement on termination of the contract does not have to be in writing. In practice, therefore, there were cases where the parties agreed to terminate the contract only verbally. Unilateral termination options include denunciation, such as the legal act of one of the parties to terminate the contract. This right can be used by the custodian and by the co-receiver. However, the difference is effective. If the contract does not specify a notice period, the custodian may terminate the contract only by the end of the calendar month following receipt of the notice. The Dealer can do so with immediate effect. Another possibility of termination of the contract is the failure to collect the deposited securities by the depositor within the stipulated time, except if the contract or the will of the adjudicator solves the situation otherwise [11].

The custodian's guarantee for securing his rights under the contract and, in particular, for the payment of his remuneration, is also secured by the statutory lien on the deposited documentary securities held by him.

By declaring bankruptcy for the property of the custodian, serious problems arise as it involves some interference with the property of the depositor. This problem has also been the subject of several lawsuits. These were caused by the insolvency administrator's claim that all assets available to the bankrupt are subject to bankruptcy. We disagree with this view and point to the diction of the law. In order to secure the assets of the bankrupt (the custodian) and to satisfy the creditors' claims, the bankruptcy trustee is obliged by law to take all necessary steps to hand over the physical securities deposited in a separate or collective custody and to hand them over to the individual depositors according to their shares. If it would not be possible to return all the paper securities, because of an obstacle to the changed address of the depositor, even the insolvency administrator is required by Ovečková et al. [7] to deposit unsigned securities with another custodian under similar conditions as they were deposited. However, the cost of such safekeeping is always borne by the bankrupt (the custodian).

The last unresolved issue of the custody of a paper security is the right of the custodian to hand over the received security paper to a third party (another custodian) without the consent of the agent, which the law describes as secondary custody. The purpose of the legal regulation of secondary safekeeping is to allow the centralization of the safekeeping of documentary securities by persons specializing in this activity, regardless of who the owner of the security has entered into a custody agreement. However, with reference to the principle of flexibility, the contract may exclude this possibility. The transfer of a security deposit to another custodian according to Kotásek [12] does not mean that the original custodian's liability ceases. For any damage it corresponds as if the security had always been available.

4 Contract on Securities Administration

The Securities Administration Contract as a synalagmatic engagement of two contracting parties is contained in Paragraph 41 of the Securities Act without reference to the supportive application of the Commercial Code or the Civil Code. Synalagmatic engagement understands the theory of private law [13] as a bilateral contractual obligation under which the law of one contracting party is always the responsibility of the other party to the legal relationship. The Securities Administration Contract is understood by legislator as a trustee's obligation to perform all legal acts necessary for the performance and preservation of the rights attached to a certain security for the duration of the contract and the owner of the security undertakes to pay him the reward. Based on the above definition, we can determine the essential requirements of the contract. This is the determination:

1. of the parties, who is the trustee and who owns the security,
2. an obligation on the part of the trustee to perform all legal acts necessary for the management and maintenance of the rights attached to a certain security for the duration of the contract,
3. the obligation of the security holder to pay the receiver a remittance which, if not specified in the contract, is considered to be the usual remuneration to the trustee at the time of the conclusion of the contract.

In this case, the law strictly insists on the written form of the contract. The assignment of an administrator, who may be an investment firm or a central securities depository, may also, without the instructions of the security holder, take all necessary action to exercise and safeguard the rights attached to the security. This is in particular to require the fulfillment of securities-related obligations, the management of exchange rights or the pre-emptive rights attached to the securities, unless the securities management agreement speaks otherwise. According to Dermine [14], the trustee is also responsible for meeting the securities owner's instructions, which must be in writing. However, the Securities Administration Agreement may also allow for a different form of ordering, such as telephone, electronic (e-mail), etc. It is the duty of the manager to properly and timely notify the owner of the incorrect instructions.

If the nature of the act to be performed by the trustee requires the security holder to hand over the security or the power of attorney to the trustee, the owner of the security is obliged to do so without delay. According to Polišenská et al. [15], when managing the book-entry security, it is the duty of the security holder, when called upon by the administrator, to take timely steps to allow the administrator to make orders to handle the book-entry securities to the extent necessary. Ownership of a certain type of security also involves the right to vote, the exercise of which may be entrusted by the owner to the administrator and to give him the necessary power of attorney. However, when granting a power of attorney, the administrator may also receive instructions on how to vote, and these instructions are binding on him.

The holding period of the security in this case is limited to the necessary time because it is the duty of the trustee to hand over the received security paper to its owner without delay following an act that the trustee has had to hold a security in his possession unless the nature of the act other. The trustee's liability for damage to the security during the tenure is determined by the law that the trustee is liable for the damage to the listed security paper, unless it cannot avert it when exercising professional care. When reimbursing the costs associated with the administration of a security, the manager's remuneration also includes the costs incurred by the manager in fulfilling his obligation.

In general, the trustee carries out legal acts relating to the management of a security on behalf of the security holder and the account of the holder, while the provisions of the Commercial Code on the Mandate Agreement are used to determine the rights and obligations of the parties under the Securities Act. As stated by Rontchevsky [16], the provisions of the Commercial Code on the Custodian and the

Securities Act are applied when the trustee under the contract carries out a legal transaction in his name and on the account of the security holder.

Judicial practice states (Supreme Court of the Slovak Republic [17]) that the termination of a contract on securities management may take place on the basis of several legal facts. The most common method is the expiration of the period for which the contract was concluded or the agreement of the parties to terminate the contract. The law as a unilateral legal act of termination of the treaty is governed solely by the termination of either of the parties. Reasons and deadlines may be agreed by the parties. If this does not happen, the matter of termination of the contract for securities administration is governed by the Paragraph 41 paragraph, Section 10 of the Securities Act, which refers to the provision of Paragraph 39 Section 8 of the Securities Act. Under this provision and if the contract does not specify a notice period, the administrator may terminate the contract only by the end of the calendar month following receipt of the notice [18].

The owner of the security can do so with immediate effect. Another option to terminate a contract is to not take the managed securities to the owners within the specified time, except when the contract or the will of the owner resolves the situation otherwise. The administrator's guarantee to secure his rights under the contract and in particular the payment of his remuneration is also ensured in this case by the statutory lien on the managed securities.

5 A Depository of Securities Agreement

The contract for the deposit of securities is a special contractual type regulated in the provisions of Paragraph 42 of the Securities Act without the supportive application of the Commercial Code or the Civil Code. It is a contractual type on the basis of which the safekeeping and management of securities is to be performed jointly. With the depository agreement, the caretaker undertakes to take over the security to deposit and manage it and the depositor undertakes to pay for it. The essential requirements of the contract are:

1. the parties, who is the caretaker and who is the depositor,
2. the custodian's undertaking to take over the security to deposit and administer it,
3. the depositor's obligation to pay the reimbursement to the caretaker.

The formal condition for the validity of the contract is a written form. According to Strážovská and Vitkovič [19] the treaty establishes the duty of a guardian, who can only be a securities trader, to take a written security for the purpose of depositing and administering it, and an obligation on the depositor to pay the remittance for these activities. If a situation arises in practice that the contract for the deposit of securities would have been concluded as a free contract, that shortcoming would not be sanctioned by the absolute nullity of the legal act. Pursuant to the provisions of the first sentence of Article, Paragraph 41a, Section 2 of the Civil Code, this would also be a contract of attorney.

As can be seen from the wording of the first sentence of Article, Paragraph 42, Section 1, only documentary securities can be deposited, and in this case it is not possible to distinguish between collective and separate custody as in the previous contractual type, since in this case only individually-determined securities can be managed. Dědič and Pauly [20] further argue that the second difference between the depository and securities custody contracts is by law explicitly not required by the statutory requirement of the contract, which is the indication of the persons authorized to handle deposited securities. It therefore follows from the above that the depositary and the persons empowered with it can handle them. Also, the contract for the deposit of a security is a separate type of repayable contractual type and therefore, in addition to the statutes of the Securities Act, it is subject to the regime of the third part of the Commercial Code. With reference to the fact that, in essence, it is a mixed type of contract, j. such a contract type that reconciles the contract for the administration of securities with the deposit of a security paper, the law in this case does not regulate all rights and obligations [21]. It refers to the appropriate application of § 39 to § 41 of the Securities Act, which, according to the case law (Supreme Court of the Czech Republic [22]), removed the duplication of rights and obligations of the parties. In particular, the provision of Section 42 (3) of the Securities Act, according to which the Securities Depository Agreement is a subject to provisions governing the Securities Depository and the Securities Management Agreement.

The special duty of the guardian under the Supreme Court of the Slovak Republic [23] is to report to the depositor on a yearly basis the status of his deposited securities so that the legal scientist understands not only to provide information about the physical condition of the securities but above all information about the acts leading to the exercise of rights resulting from the security the results of these activities.

As in the previous contract types, even with this contractual type, the depositor has the right to demand the issue of his security at any time, and if the document is handed over to him at his request, the custodian is no longer required to administer it and is not responsible for it.

The principal duty of the depositor is to pay reimbursement in the amount, time and manner specified in the contract, which, if not specified in the contract, holds the payer as usual at the time of the conclusion of the contract. The Securities Act also contains a special possibility for the depositor, by unilateral legal action, to limit the duties of the custodian that result from the custody of the securities or the administration of the securities, as a result of which the agreed or customary remuneration is reduced accordingly. However, the Securities Deposit Agreement does not cease to exist. According to the Supreme Court of the Czech Republic [24], this change can therefore be interpreted only as a temporary one, allowing the depositor to restore the original scope of rights and obligations of the custodian of the security, including the right to the original remuneration.

The mandatory provision of Paragraph 42, Section 7 of the Securities Act, without any doubt, limits the right of the guardian to store the subject of custody at any time by allowing them to transfer the documentary security to the secondary custody or administration only with the written consent of the depositor. It also

prohibits people from exercising the voting rights attaching to that secondary securities.

Jablonka [25] considers that the termination of the contract usually occurs after the expiry of the time for which it was concluded or by the parties' agreement, which in this case may not be concluded in writing. Another option to terminate a contract is to leave the contract, by any party, to terminate the security, or death, respectively disappearance of the guardian.

6 Discussion

Despite the general lack of interest about securities issues, we believe that some space should also include expert discussion on the possibility of using general business conditions as part of individual procurement contracts. In our opinion, legal theorists could also address this issue. Although it is a commercial law institute, contractual freedom is limited in their creation and subsequent application. We should realize that if they were in breach of the principle of fair trade, it would not be possible to enforce such an agreement in court.

In the case of bankruptcy of the securities custodian [7] claim that they bear the costs of such custody from their bankrupt. However, this view is not particularly relevant to the insolvency of the bankrupt. From practice, we can say that it is the consignor who is obliged to pay the costs incurred to the administrator according to the proportions of their shares. Consequently, the law grants them the right to recover these costs from the bankrupt (the custodian) in bankruptcy proceedings. Since these are mostly insecure creditors, their chances of success are minimal.

Neither of the legal theoreticians addresses the issue of a remuneration claim for a securities dealer in the event of its destruction during the term of the contract. In our opinion, this question will be directly dependent on the fact that it was destroyed. If it was destroyed by force majeure, e.g. the earthquake, the claim for remuneration is clear.

7 Conclusion

We can state that the legislation on custodial security contracts is chaotic, unclear, and "scattered" in other legislation. Practice implies that this atomization of legislation creates many ambiguities, the resolution of which is often up to courts with more than uncertain results. The biggest deficiency is the slogan of the legislation on custodial securities treaties. The Securities Act, in contrast to the part regulating the procurement contract, does not directly refer to the support application of the provisions of the Civil Code and the Commercial Code. However, the content of the contribution shows that their use is essential. Without the application of these two basic codes of private law, it could not be dealt with, for example, the question of

compensation for the damage caused, the settlement of the maturity of the agreed remuneration or the possibility of termination of the contract other than by termination.

Through the research in the Collection of Laws of the Slovak Republic we found out that during the period under review, the Securities Act was amended 16 times. Neither change affected the adjustment of securities contracts. From our point of view, it is not only appropriate, but especially necessary to amend the second part of the Securities Act. Furthermore, we propose to adequately complement the general provisions on individual contract types. Such a procedure would also, in the conditions of the Slovak Republic, create a comprehensive legal regulation that respects the needs of the declining but existing capital market. In particular, banks operating in the financial market as well as securities traders would lose many worries due in particular to inadequate staffing. It is generally known that bank employees are rarely legally trained and have practical experience in this field. Therefore, we reject the hypotheses listed in the introduction that the legislation on custody of securities is sufficient and there is no need for the legislator to supplement the legislation.

Despite the many shortcomings of the legislation, we are of the opinion that the contractual types examined by us, despite the very strict legal regulation and the necessity to apply the Commercial Code, represent separate contractual types. In particular, our view is based on the existence of a legal definition of each contractual type. It is always possible to determine obligatory terms of a contractual type, which is sufficient for a legal theory to be defined as a separate contractual type. On the basis of the facts we have gained, we confirm the hypothesis that the Securities Contract, the Securities Management Contract and the Securities Deposit Agreement are separate contractual types.

References

1. Veronesi P (2010) Fixed income securities. Wiley, London
2. Act no. 566/2001 Coll. on securities and investment services as amended
3. Funta R (2018) Extraterritorial application, of us-antitrust law on global cartels from comparative (EU LAW) perspective. Lawyer Q 8(3):214–223
4. Chovancová J et al (2018) Antológia k dejinám politického a právneho myslenia. Wolters Kluwer, Bratislava
5. Act no. 40/1964 Coll. Civil Code as amended
6. Act no. 513/1991 Coll. Commercial Code as amended
7. Ovečková O et al (2017) Obchodný zákonník Veľký komentár Zväzok II. Wolters Kluwer, Bratislava
8. Judgment of the Supreme Court of the Slovak Republic no. 1 Obdo 36/2004
9. Peráček T (2015) Zmluvy o cenných papieroch. Univerzita Komenského, Bratislava
10. Lazar J et al (2018) Občianske právo hmotné 1 Všeobená časť. Iuris Libri, Bratislava
11. Langenbucher K (2011) Aktien- und Kapitalmarktrecht. C. H. Beck, München
12. Kotásek J et al (2013) Právo cenních papíru. C. H. Beck, Praha
13. Lachlan B et al (2014) European securities law. Oxford University Press, New York
14. Dermine J (2015) Bank valuation and value-based management deposit and loan pricing, performance evaluation, and risk. McGraw-Hill, New York

15. Polišenská P et al (2016) Právo cenných papíru. Wolters Kluwer, Praha
16. Rontchevsky N (2017) Code de Commerce. Dalloz, Paris
17. Judgment of the Supreme Court of the Slovak Republic no. 4 Obo 569/2012
18. Pauly J (2017) Teoretické a legislativní základy cenných papírů. Wolters Kluwer, Praha
19. Strážovská Ľ, Vitkovič M (1997) Conceptual aspect of mergers and acquisitions analysis and their applicability in the case of credit institutions. Ekonomický časopis 45(11):919–933
20. Dědič J, Pauly J (1999) Cenné papíry. Prospektrum, Praha
21. Haentjens M et al (2015) European banking and financial law. Routledge, New York
22. Judgment of the Supreme Court of the Czech Republic no. 3 Cdo 47/2016
23. Judgment of the Supreme Court of the Slovak Republic no. Obdo V 82/2003
24. Judgment of the Supreme Court of the Czech Republic no. Cmo 169/2013
25. Jablonka B (2017) Zákon zmenkový a šekový Komentár. Wolters Kluwer, Bratislava

Liquidity of the European Indices: The Developed Versus the Emerging Markets

Barbara Będowska-Sójka

1 Introduction

The various index agencies as FTSE Russel or MSCI Liquidity categorize markets on the basis of their individual features, including liquidity of the markets. Liquidity itself is unobservable and thus approximated with many proxies. It is an elusive and multidimensional concept, because it encompasses many transaction properties observed on the markets [1]. The index providers deal with the problems of liquidity measurement in different ways. In 2013 MSCI introduced LiquidityMetrics, that is used in order to quantify the liquidity risk of financial instruments (https://www.msci.com/www/blog-posts/measuring-liquidity-risk/0248187846). The methodological issues are not revealed to the broad audience, however. This paper shows that besides the approach undertaken by the index providers, a maturity of the market can be recognized in the statistical features of the financial series.

This paper aims to compare statistical properties of liquidity measures obtained for indices calculated for the stock markets in different stage of development. We consider liquidity measures calculated for indexes from different markets and based on the generally available daily data. The blue chips indices, calculated for the biggest and most actively traded stocks, are used. We examine, if there exist any similarities in the liquidity measures among the indexes within any of these two groups of markets, the developed and the emerging ones.

Liquidity is one of the crucial concepts in contemporary finance. There are over 100 liquidity ratios presented in the literature, that might be classified into different categories [2–5]. Two main approaches are often distinguished: percent-cost proxies and cost-per-dollar-volume proxies [6]. Our choice of liquidity proxies is determined

B. Będowska-Sójka (✉)
Poznań University of Economics and Business, Poznań, Poland
e-mail: barbara.bedowska-sojka@ue.poznan.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_21

by the availability of data. We focus on measures that are derived from daily data and are available on different markets. Thus we mix these two types of measures and are more focused on making this remarkable complex issue simple and thus useful for investors. For further discussion on the liquidity measurement and best proxy search see e.g. [7–9].

The sample is based on the stocks listed in the countries included in two broad stock market indexes from MSCI group: emerging Europe and Europe developed. The first represents the performance of large and mid-cap equities across Russia, Turkey, Hungary, Czech Republic, Poland and Greece, while the second represents stocks from developed European countries with the highest country allocation: United Kingdom, Germany, France, Switzerland, Belgium and Netherlands. We use the principal component analysis to extract the main factors lying behind the liquidity dynamics. Our findings show that time-series properties are similar for both developed and emerging markets, although higher persistence (long memory) is observed in case of the developed markets. Also for these markets the strong common sources of variability of liquidity are found, while in the emerging markets they are much less pronounced.

2 Methodology

The main research question is: do emerging and developed markets differ in terms of statistical properties, that is stylized facts, in the liquidity series? Thus we consider several descriptive statistics and examine, if there are any differences between the developed markets and the emerging ones. We specifically answer the question within the random walk framework by considering different features of these series. The objectives of this paper are twofold: first, to examine and justify the presence of stationarity, long memory and autocorrelation (via various tests) and to examine if there are any differences between the developed and emerging markets. Second, we conduct the principal analysis of the liquidity series to examine if there are the common sources of variability and create dendrograms that show relationships between selected liquidity measures for indices based on the adopted criterion.

In order to answer these questions we conduct different tests for returns, volatility and four liquidity proxies. These measures are calculated in the following way: returns (RET) are obtained as continuously compounded log returns, $RET = \ln(P_t) - \ln(P_{t-1})$, where P_t is price in day t. Volatility is approximated by the realized variance within a given month (RV), calculated as the sum of the squares of daily returns, $RV = \sum_{t=1}^{T} r_t^2$ [10]. Four liquidity proxies commonly used in the literature are calculated: turnover [11], illiquidity [12], high-low range of prices [13] and effective spread estimator [14]. The liquidity proxies are calculated as follows: $VOLU$ is the turnover measured as the product of prices and volumes, for Amihud illiquidity we obtain $ILLIQ = |r_t| / \ln(VOLU)$, high-low range is calculated as $HLR = 2(H_t - L_t)/(H_t + L_t)$ where H_t and L_t are the high and the low values of the

index within the day. Finally Corwin and Schultz spread estimator [14] is calculated as $CS = \left(2e_t^{\alpha} - 1\right)/\left(1 + e_t^{\alpha}\right)$. For further details please see paper of Corwin and Schultz [14]. We use the estimator with adjustment for non-negative spreads and overnight returns. At the end returns and four liquidity proxies are averaged within the month. The calculations and graphs are obtained from G@rch 6.1 [15] and *R*.

As for the testing if the series follow random walk, we examine the stationary, non-correlation and long memory. Thus with respect to the first one we conduct augmented Dickey Fuller test for stationarity [16]. The rejection of the null hypothesis appears in cases where the series are stationary. In order to test long memory we use the R/S statistics proposed by Hurst and implemented by Geweke and Porter-Hudak [17]. This method has no particular assumptions about the underlying distribution of the series and thus is easy to implement. It also answer the question if there is a long memory or not, but does not provide any specific measure. We also use two further tests based on Hurst exponent: Mandelbrot test for autocorrelation and Lo test for long memory [15]. In both cases we obtain empirical statistics—if they are within the confidence interval, the null hypothesis of no autocorrelation and no long-term dependence cannot be rejected.

In the second step we conduct the principal component analysis in order to examine, if they are any common variability sources in the liquidity indices. We focus on the number of components that allows to explain 95% of overall variability.

In the last stage we graph dendrograms—they allow to recognize the clusters among liquidity indices. Thus we are able to examine the homogeneity of the liquidity indices in both developed and emerging markets.

3 Sample

Our sample consists of the series of 12 European indices, six from the emerging markets and six from the developed, according to the MSCI classification at the end of 2017. These indices are calculated on the basis of the large-cap equities.

We calculate four liquidity measures as well as returns and realized variance on the basis of daily data and aggregate them into monthly measures. Our sample starts on January 2002 and ends up in September 2018. Minor differences are caused by the data availability: volume data for the BIST30 index and for PX are available from January 2004 and April 2007, respectively. Moreover, as a result of the Greek debt crisis the Athens Stock Exchange was closed on 27 June 2015 and reopened on 3 August 2015 (www.wikipedia.org). In order to have the series of similar length, this missing monthly observation was added as an average of the neighboring observations. The description of the indices used in the study is presented in Table 1.

Figure 1 presents the dynamics of monthly effective spread measures of Corwin and Schultz [14] for the indices. It shows similar behavior of indices from the developed countries (from AEX to SMI). The spreads for emerging markets are much more differentiated. The highest spreads are observed for the MOEX, followed by BIST30 index, while the lowest are reported for BEL20, SMI and WIG20.

Table 1 The description of the indices used in the study

Developed markets			Emerging markets		
Country origin: stock exchange	Index	No of stocks	Country origin: stock exchange	Index	No of stocks
Netherlands: Euronext Amsterdam	AEX	25	Greece, Athens Exchange	ATG	60
Belgium: Euronext Brussels	BEL20	20	Turkey, Borsa İstanbul	BIST30	30 (TRY)
France: Euronext Paris	CAC40	40	Hungary: Budapest Stock Exchange	BUX	14 (HUF)
Germany: Deutsche Börse	DAX	30	Russia: Moscow Stock Exchange	MOEX	50 (RUB)
United Kingdom: London Stock Exchange	FTSE	100 (GBP)	Czech Republic: Prague Stock Exchange	PX	12–19 (CZK)
Switzerland Swiss Exchange	SMI	20 (CHF)	Poland: Warsaw Stock Exchange	WIG20	20

Note: Indices calculated in different currency than EUR are shown in the brackets

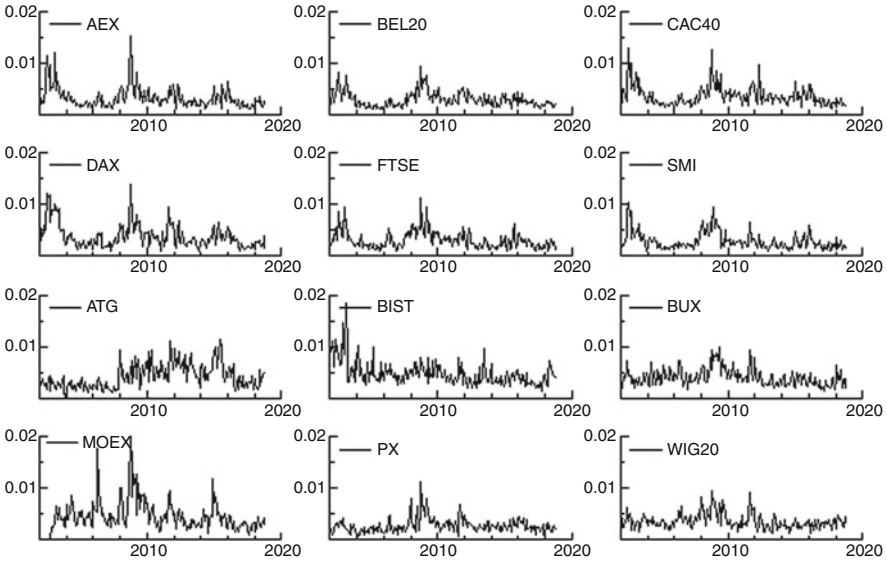


Fig. 1 The dynamics of monthly effective spread measures of Corwin and Schultz [14] for twelve indices. Top two lines show the spreads on the developed markets, bottom two lines on the emerging ones

4 Results

The empirical part is divided into three sections: in the first one the results for stationarity, long memory and autocorrelation tests are presented. In the second the principal analysis for the spreads of indices is shown. The third part reports the results of the dendrogram analysis for the effective spreads.

4.1 Descriptive Statistics of the Measures

The presented test allows to examine if the considered spread series are following the random walk. First, we examine stationarity with augmented Dickey-Fuller test. The values of test statistics for all examined series are presented in Table 2. Not surprisingly, the returns for all indices are stationary, while volumes are not. For the remaining series in majority of cases the null hypothesis of non-stationarity is rejected. There are only two exceptions, one for HLR (DAX index) and one for CSA (BEL20).

In the next step we conduct the long memory test of Geweke and Porter-Hudak [17]. Table 3 shows the results: there is a long memory in return series of some indices. For all liquidity proxies and realized variance d parameter is statistically significantly different from zero, showing the persistence (long memory) in the series. There are some differences between the developed markets and emerging

Table 2 The results of the Augmented Dickey Fuller test for stationarity

	RET	VOLU	HLR	CSA	ILLIQ	RV
AEX	−6.77**	−2.66	−3.50**	−4.21**	−4.13**	−5.04**
BEL20	−6.83**	−1.72	−3.68**	−3.22	−4.52**	−5.53**
CAC40	−7.34**	−2.81	−3.51**	−4.03**	−4.43**	−5.50**
DAX	−7.15**	−1.73	−3.28	−3.51**	−3.82**	−4.89**
FTSE	−7.70**	−2.57	−3.80**	−3.97**	−4.51**	−5.49**
SMI	−6.61**	−2.64	−3.91**	−4.04**	−5.03**	−5.97**
ATG	−6.57**	−2.91	−3.57**	−3.65**	−4.14**	−5.86**
BIST30	−7.84**	−1.25	−3.67**	−4.70**	−4.34**	−5.57**
BUX	−7.24**	−2.58	−4.15**	−4.46**	−4.57**	−5.73**
PX	−6.66**	−3.01	−4.04**	−4.43**	−3.70**	−6.52**
WIG20	−7.25**	−2.08	−3.77**	−4.27**	−4.18**	−4.64**
MOEX	−7.12**	NA	−4.15**	−4.29**	NA	−5.13**

Note: Null hypothesis states that the series is non-stationary

** Signifies that the null is rejected at $\alpha = 0.01$. For BIST30 and PX the sample dates for variables VOLU and ILIIQ start from 2002–01 and 2007–04 respectively. For MOEX volume series are not available. The remaining ADF statistics are calculated for the whole sample (from 2002-01 to 2018-09)

Table 3 The long memory test: Geweke and Porter-Hudak

	RET	VOLU	HLR	CSA	ILLIQ	RV
AEX	0.15	0.68**	0.67**	0.42**	0.71**	0.61**
BEL20	0.20**	0.80**	0.64**	0.51**	0.63**	0.53**
CAC40	0.07	0.65**	0.68**	0.34**	0.68**	0.58**
DAX	0.11	0.84**	0.75**	0.47**	0.66**	0.54**
FTSE	0.06	0.66**	0.72**	0.37**	0.71**	0.60**
SMI	0.12	0.70**	0.72**	0.56**	0.68**	0.45**
ATG	0.14	0.78**	0.51**	0.38**	0.43**	0.46**
BIST	−0.04	0.99**	0.56**	0.41**	0.44**	0.37**
BUX	0.19*	0.78**	0.54**	0.39**	0.45**	0.42**
PX	0.19*	0.66**	0.61**	0.45**	0.65**	0.34**
WIG20	0.06	0.93**	0.63**	0.45**	0.63**	0.54**
MOEX	0.22**	NA	0.75**	0.52**	NA	0.76**

Note: Table presents estimates of d parameter from the log-periodogram regression. Null hypothesis states that there is no long memory in the series
** and * signify that the null is rejected at $\alpha = 0.01$ and $\alpha = 0.05$, respectively

ones: when HLR is considered d parameters of all developed markets are statistically significantly higher than for the ATG, BIST, BUX that belongs to the emerging markets. Similar case is observed for ILLIQ, where again the same three indices show less persistence that is observed on the remaining markets. We might conclude that PX and WIG20 behaves more like the developed markets. As far as realized variance in considered the differences are not that straightforward.

We also consider two test of Hurst exponent that allow us to examine, if there is the autocorrelation in the series and the long term dependence. When considering the results of Hurst-Mandelbrot test [18] that are presented in Table 4 we observe no autocorrelation in returns in all series and no autocorrelation of realized variance for developed markets. The liquidity series are all, but in two cases, correlated significantly. The values of statistics in case of HLR, CSA and ILLIQ are higher for the emerging indices than for the developed ones.

The results of Hurst-Lo test [19] for long term dependence are included in Table 5. It shows that there is no long-term dependence for returns in all markets. Also the null of no long-term dependence cannot be rejected for Amihud illiquidity ILLIQ and realized variance in all developed markets. In the latter case two emerging markets show also no long-term dependence (BUX and PX). Again, when considering HLR, CSA and ILLIQ, the difference between emerging and developed countries is visible (although there is long memory detected in case of BEL20 and FTSE).

In sum the results show some differences between the descriptive statistics of the series from developed and emerging markets.

Table 4 The results of Hurst-Mandelbrot test for autocorrelation

Mand R/S	RET	VOLU	HLR	CSA	ILLIQ	RV
AEX	1.16	3.77**	2.28**	2.08	2.17**	1.92
BEL20	1.47	5.11**	2.79**	2.74**	2.44**	1.95
CAC40	1.21	4.00**	2.67**	2.35**	2.26**	1.88
DAX	1.29	5.27**	2.37**	2.46**	2.26**	1.75
FTSE	1.02	5.26**	2.98**	2.86**	2.64**	2.01
SMI	1.42	3.72**	2.37**	2.51**	2.01	1.61
ATG	1.50	3.57**	5.27**	4.92**	4.98**	3.78**
BIST	1.07	5.37**	3.91**	3.19**	3.15**	2.72**
BUX	1.38	4.60**	3.47**	3.38**	3.06**	2.45**
PX	1.66	3.54**	2.99**	3.09**	2.89**	1.86
WIG20	1.24	5.46**	3.22**	3.33**	3.29**	2.98**
MOEX	1.21	NA	3.50**	3.16**	NA	2.13**

Note: Table presents the statistics of Hurst-Mandelbrot tests (1972). Null hypothesis states that there is no autocorrelation in the series
** and * signify that the null is rejected at $\alpha = 0.01$ and $\alpha = 0.05$, respectively

Table 5 The results of Hurst-Lo test for no long term dependence

Lo R/S	RET	VOLU	HLR	CSA	ILLIQ	RV
AEX	1.11	2.81**	1.7	1.65	1.63	1.49
BEL20	1.31	3.68**	2.11**	2.15**	1.87	1.56
CAC40	1.15	3.01**	2.00	1.89	1.71	1.47
DAX	1.24	3.8**	1.76	1.89	1.69	1.36
FTSE	1.01	3.9**	2.24**	2.31**	2.02	1.58
SMI	1.30	2.71**	1.79	1.94	1.56	1.31
ATG	1.43	2.62**	4.00**	3.87**	3.87**	3.05**
BIST	1.11	3.84**	3.04**	2.62**	2.53**	2.30**
BUX	1.29	3.31**	2.68**	2.78**	2.42**	2.01
PX	1.54	2.66**	2.30**	2.52**	2.25**	1.57
WIG20	1.25	3.91**	2.46**	2.71**	2.53**	2.33**
MOEX	1.10	NA	2.61**	2.45**	NA	1.65

Note: Table presents the statistics of Hurst-Lo tests. Null hypothesis states that there is no long-term dependence
** and * signify that the null is rejected at $\alpha = 0.01$ and $\alpha = 0.05$, respectively

4.2 Principal Component Analysis

The principal component analysis is used here to indicate the primary variables that have an impact on the appearance of the homogenous groups. It might be used as a tool in finding the commonality of variability sources. In our case we apply PCA to examine if there are any differences between the developed and emerging markets. Table 6 shows the aggregated variance up to first three components for two measures of liquidity, high-low range and effective spread (HLR, CSA) as well as returns

Table 6 The aggregated variance obtained in principal component analysis for three principal components (PCs) for all countries, the developed and the emerging ones

	All	Developed	Emerg.	All	Developed	Emerg.
	HLR			RET		
PC1	69.96	95.59	62.98	66.04	85.44	63.86
PC2	81.45	97.57	80.93	75.11	90.05	73.71
PC3	90.17	98.77	90.26	80.13	93.75	83.32
	CSA			RV		
PC1	54.28	82.98	46.62	76.39	94.70	69.04
PC2	67.92	87.98	67.32	84.05	96.96	83.28
PC3	77.12	92.40	79.98	90.44	98.55	93.24

Note: PC denotes principal component, and PC1 is the first principal component. *Developed* stands for developed countries included in the study: United Kingdom, Germany, France, Switzerland, Belgium and Netherlands, and *Emerg.* denotes emerging countries included in the study, that is: Russia, Turkey, Hungary, Czech Republic, Poland and Greece

Table 7 The weights on variables in the principal component analysis for high-low range and effective spread

	PC1	PC2	PC3	PC1	PC2	PC3
	HLR			CSA		
AEX	−0.33	−0.24	0.07	−0.36	0.19	0.09
BEL	−0.33	−0.16	0.16	−0.35	0.10	0.15
CAC	−0.33	−0.18	0.17	−0.35	0.16	0.23
DAX	−0.32	−0.29	0.04	−0.34	0.23	0.10
FTSE	−0.33	−0.09	0.07	−0.34	0.10	0.01
SMI	−0.32	−0.21	0.03	−0.34	0.13	0.02
ATG	−0.15	0.29	0.73	−0.10	−0.37	0.65
BIST	−0.21	−0.27	−0.51	−0.18	0.40	−0.36
BUX	−0.28	0.36	−0.17	−0.24	−0.36	−0.32
PX	−0.30	0.32	−0.04	−0.29	−0.35	0.08
WIG20	−0.28	0.28	−0.28	−0.25	−0.23	−0.46
MOEX	−0.22	0.53	−0.19	−0.21	−0.50	−0.19

Note: In table the numbers given are the weights that are allocated to each principal component

(RET) and realized variance (RV). The number of components is chosen on the basis of Kaiser criterion: in case of HLR and CSA for all markets there are three eigenvalues higher than 1, for RET there are two, while for RV there is only one.

In case of joint analysis of all markets the variability of the liquidity proxies for the first three components is similar to that obtained by emerging markets. However, if the developed markets are separated, then first three components better explain the variance of the original variables. Thus we conclude there is more homogeneity in the developed markets than in the emerging ones.

Table 7 presents first three eigenvectors in PCA for two index liquidity measures: high-low range (HLR) and effective spread (CS). For both proxies the sign of the

first vector is negative for all markets: there is one common factor that influence all the markets in the similar way. In case of HLR the second component has different signs for the developed markets and the emerging ones (with one exception of BIST, that has the opposite sign than the other emerging markets). Similar situation is observed for the third component: there is again division between two groups of the markets, but this time ATG has exceptionally positive sign. For CSA second component gives similar results, in the third there is one more market (PX) with the sign different from the rest of the indices from given region.

4.3 Dendrograms

In the last empirical section we show two dendrograms, the diagrams in the forms of trees, for liquidity measures, HLR and CSA. They represent how the series cluster on the basis of similarities among them. Figure 2 presents the dendrogram for CSA, while Fig. 3 shows the dendrogram for HLR.

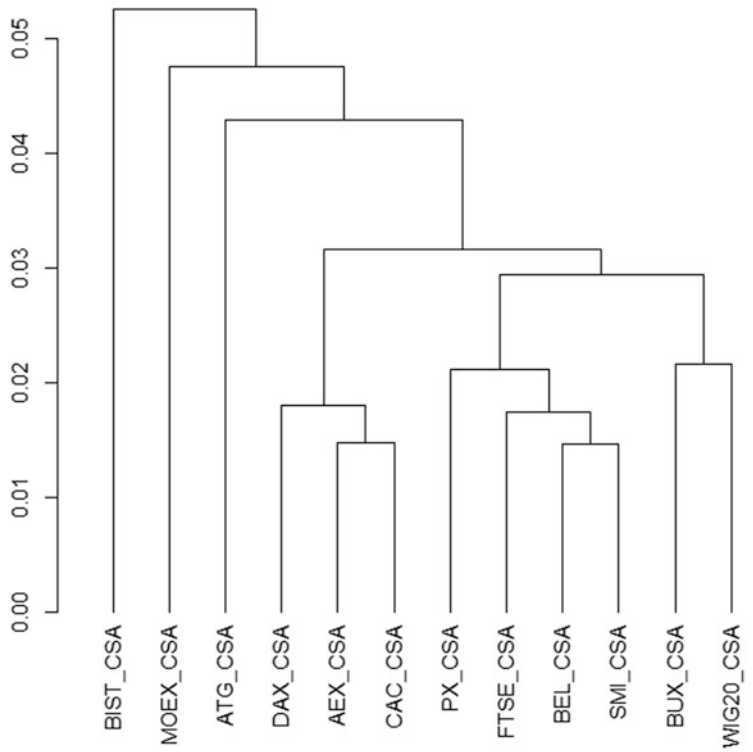


Fig. 2 Dendrogram for spread estimator of Corwin and Schultz [14]

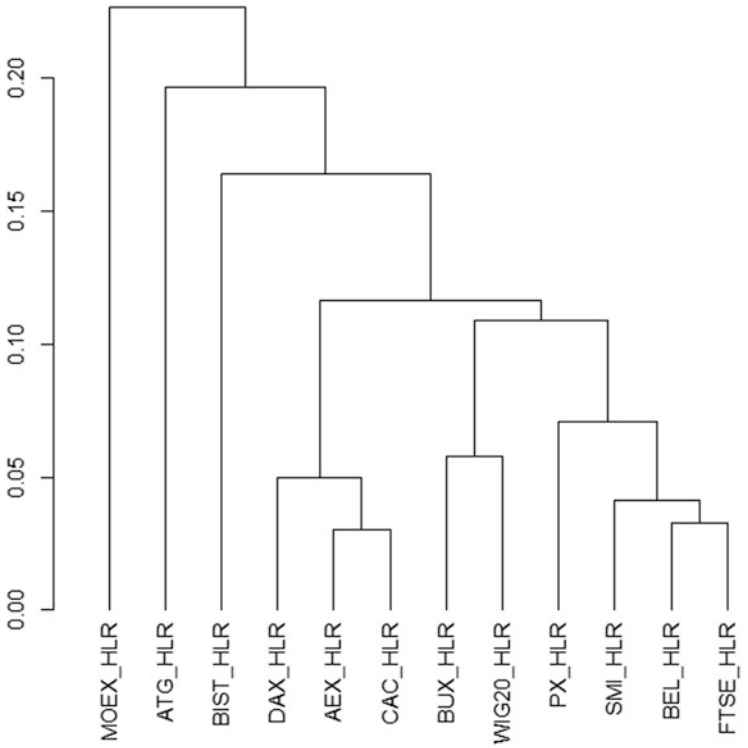


Fig. 3 Dendrogram for high-low range (HLR)

For both spread estimators the clusters look very similarly. Three indices, ATG, MOEX and BIST30 are separated—they form the group of outliers (single leafs) and are featured by the highest level of dissimilarities with other indices. On the other side of the tree there are two main branches: on the first one CAC40, AEX and DAX are together, while on the second branch there are two subbranches: BUX and WIG20 form the first one, while SMI, BEL20, FTSE and PX belong to another. Both trees give the consistent picture of the dependencies, and the differentiation between two market categories, the developed and the emerging, are visible.

5 Conclusions

This paper is aimed to compare statistical properties of the liquidity measures among different stock markets. The liquidity measures are calculated *en bloc* for the blue chips indices. We expect that besides the rules and regulations that allow to include the stock market into a given category, the maturity of the market can be also recognized by purely statistical features. We find that there are some differences

between the developing and emerging European countries when one considers the liquidity proxies for indices. We focus on stationarity, autocorrelation and long memory: the examined series in majority of cases are stationary. The liquidity series are not only autocorrelated, but also featured by the long memory. There are no fundamental differences among liquidity measures in each of these two groups of markets, but some differences occur between these two groups.

Further, the principal component analysis shows that the sources of variability are highly concentrated for developed countries. The three first components also allow to almost perfectly discriminate between the emerging and developed markets. The dendrograms show that at least three markets, the Russian, the Greek and the Turkish, behaves differently, while the other emerging markets, that is Czech, Hungarian and Polish, show some similarities to the developed markets.

Acknowledgments This work was supported by the National Science Centre (NCN) in Poland under the grant no. UMO-2017/25/B/HS4/01546. The paper was presented during 9th Annual Financial Market Liquidity Conference in Budapest in 2018 as well as during Finance and Sustainability Conference ZAFIN at the Wroclaw University of Economics and Business in 2018. I'm very grateful for the insightful and beneficial comments received from two anonymous Reviewers.

References

1. Kyle AS (1985) Continuous auctions and insider trading. Econometrica 53:1315–1335. https://doi.org/10.2307/1913210
2. Ahn H-J, Cai J, Yang C-W (2018) Which liquidity proxy measures liquidity best in emerging markets? Economies 6:67. https://doi.org/10.3390/economies6040067
3. Ahn HJ, Cai J, Hamao Y, Ho RYK (2002) The components of the bid-ask spread in a limit-order market: evidence from the Tokyo Stock Exchange. J Empir Finance. https://doi.org/10.1016/S0927-5398(02)00003-8
4. Goyenko RY, Holden CW, Trzcinka CA (2009) Do liquidity measures measure liquidity? J Financ Econ 92:153–181. https://doi.org/10.1016/j.jfineco.2008.06.002
5. Olbryś J (2018) Testing stability of correlations between liquidity proxies derived from intraday data on the Warsaw Stock Exchange. In: Jajuga K, Locarek-Junge H, Orłowski L (eds) Contemporary trends and challenges in finance. Proceedings from the 3rd Wroclaw International Conference in Finance. Springer Proceedings in Business and Economics. Springer, Cham, pp 67–79
6. Fong KYL, Holden CW, Trzcinka CA (2017) What are the best liquidity proxies for global research? Rev Financ:1–47. https://doi.org/10.1093/rof/rfx003
7. Będowska-Sójka B (2018b) The coherence of liquidity measures. The evidence from the emerging market. Financ Res Lett. https://doi.org/10.1016/j.frl.2018.02.014
8. Fong KYL, Holden CW, Tobek O (2017) Are volatility over volume liquidity proxies useful for Global or US research
9. Olbrys J, Mursztyn M (2019) Measuring stock market resiliency with discrete Fourier transform for high frequency data. Phys A Stat Mech Appl 513:248–256. https://doi.org/10.1016/j.physa.2018.09.028
10. Andersen TG, Bollerslev T, Diebold FX, Labys P (2001) The distribution of realized exchange rate volatility. J Am Stat Assoc 96:42–55. https://doi.org/10.1198/016214501750332965
11. Domowitz I, Glen J, Madhavan A (2001) Liquidity, volatility and equity trading costs across countries and over time. Int Financ 4:221–255. https://doi.org/10.1111/1468-2362.00072

12. Amihud Y (2002) Illiquidity and stock returns: cross-section and time-series effects. J Financ Mark 5:31–56. https://doi.org/10.1016/S1386-4181(01)00024-6
13. Będowska-Sójka B (2018a) The coherence of liquidity measures. The evidence from the emerging market. Financ Res Lett 27:118–123. https://doi.org/10.1016/j.frl.2018.02.014
14. Corwin SA, Schultz P (2012) A simple way to estimate bid-ask spreads from daily high and low prices. J Finance 67:719–759. https://doi.org/10.1111/j.1540-6261.2012.01729.x
15. Laurent S (2010) G@rch 6.0 help. Timberlake Consultants Limited, London
16. Dickey DA, Fuller WA (1981) Likelihood ratio statistics for autoregressive time series with a unit root. Econometrica 49:1057. https://doi.org/10.2307/1912517
17. Geweke J, Porter-Hudak S (1983) The estimation and application of long memory time series models. J Time Ser Anal 4:221–238
18. Mandelbrot B (1972) Statistical methodology for nonperiodic cycles: from the covariance to R/S analysis. Ann Econ Soc Meas 1:259–290
19. Lo AW (1991) Long-term memory in stock market prices. Econometrica 59:1279. https://doi.org/10.2307/2938368

ESG Awareness and Perception in Sustainable Business Decisions: Perspectives of Indian Investment Bankers vis-à-vis Selected European Financial Counterparts

Ria Sinha, Manipadma Datta, and Magdalena Zioło

1 Introduction

The role of business enterprises has become extremely fundamental and critical for the growth of sustainable business and development as a whole. The interface of business and sustainability issues is hugely complex and the impact is causal. Corporations across the globe are increasingly becoming aware of the fact that the present day business cannot be exclusively motivated by considering only profits. On the contrary there are other situational factors which are persistently posing challenges. In other words, it's being understood that the other 'non-financial' factors which a business would normally ignore for its success are gradually becoming important and strategic. The interdependence and causality of business and sustainability relationship is evident from the fact that the economic costs incurred due to ignoring sustainability also affect business in the long run.

Sustainability as a concept is extremely broad-based and multifaceted. More recently the emphasis is not only on environmental factors but also social and corporate governance (ESG) factors which are being increasingly used to measure it. Hence, for the purpose of the paper, we limit ourselves to ESG factors as a proxy measure to sustainability. However, to a certain extent, the terms sustainability and ESG are used interchangeably in this paper.

The gamut of what constitutes the ESG factors is not only broad but is infinite. Environmental factors such as increased GHG emissions, water scarcity, water

R. Sinha · M. Datta
Department of Business and Sustainability, TERI School of Advanced Studies, New Delhi, India
e-mail: manipadma.datta@terisas.ac.in

M. Zioło (✉)
Faculty of Economics and Management, University of Szczecin, Szczecin, Poland
e-mail: magdalena.ziolo@usz.edu.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_22

pollution, biodiversity and land conversion etc. can pose immediate threats to business. Social and governance risks include health of workers, labour unrests, retention of employees, gender balance, independent directors on board, gender representation on board of directors, number of meetings held, sustainability reports published etc. to name a few. As already mentioned these risks can affect businesses in a large number of ways, affecting investment decisions, consumer behavior and government policies etc. However, factoring of ESG risks leads to significant value addition. Hence businesses are likely to suffer in the longer run if they fail to recognize these factors.

However, the major challenge lies in deciphering whether there are sufficient choices or financial instruments in the market to leverage upon this change. Thus the basic question relates to market preparedness and the readiness of the market to attach a premium to these issues. Here the market entails the role of fund managers, investment bankers and companies who take pertinent and informed decisions related to their business portfolios. The efficacy and success of these efforts depends on how far the ESG risks are managed and factored into their business portfolios. It is this interface of ESG factors with the corporate sector that will decide the future of a viable sustainability market. Although the role of institutional investors and asset owners are still getting increased attention in developed and some of the developing economies, the potential role of the investment bankers especially in developing countries is yet to be rightly addressed. Considering these facts, the research questions addressed in this paper are mentioned as under:

1. What is the role of investment bankers in a developing country like India to influence ESG integration in investments?
2. What are the structural differences in ESG investing from a developing versus developed country comparative scenario?
3. What are the prerequisites to finance and contain sustainable efforts by investors and the business community in general?

To this, the paper comprises of the following sections. Section 2 presents the pertinent ESG risks to businesses and its importance to investments. The value enhancing potential of ESG issues and sustainability practices by companies is highlighted in Sect. 3. The interface of ESG Factors and the investment community is elucidated in Sect. 4 including the research methodology and key findings. Section 5 presents the results and discussion while Sect. 6 concludes with the pertinent recommendations.

2 ESG Risks to Business

Research on ESG issues gained momentum in the early 2000s with HSBC being the first sell-side brokerage firm to offer ESG research. Since then there has been a rapid growth in mainstreaming ESG factors into traditional investment analysis. Apart from the UN PRI's, the Enhanced Analytics Initiative (EAI) was launched in the year

2003. This platform facilitates international collaboration between asset owners and asset managers to better investment research by integrating extra-financial issues. There are reports addressing environmental risks to business, climate change and GHG emissions being one of the most significant among them. The threats vary across geographical domains, regulations and in accordance to the level of ESG integration into business operations in BRICS countries [1]. According to Koehler and Hespenheide [2], poor corporate strategy, differences in corporate culture and business legislations pose severe threats. Several ESG factors such as labour management, labor issues, health and safety can be potential sustainability risks for businesses. A KPMG study categorizes all the ESG risks as regulatory, physical, competitive, legal and reputational risks. According to their study, physical risks are often cited, with 72% of the respondents agreeing upon regulatory risks as the other cited risks [3]. Risks of litigation and tort liability are some of the forms of risk concerns for firms [4]. Adverse consequences of not addressing these risks may result in losing market hold and brand value coupled by stakeholder pressure. The channels of impact may be loss in shareholder value and supplier value. The other potential risks posed by ESG factors include operational and supply chain disruptions, higher cost of food items, damage to shared public infrastructure, market shifts toward "greener" products, reduced opportunity for new product breakthroughs, limitations on access to land, increasing pressure to protect critical natural resources [5].

3 ESG Factors and Value Addition to Companies

As is understood, ESG factors have found to have a profound impact on the corporate sector across the globe. This section highlights some of the studies undertaken by the academia, research organizations and consulting agencies to comprehend the value adding potential of ESG issues and CSR activities across business operations.

The business sector across the globe has undertaken philanthropic activities since long. The entire gamut of efforts took a new shape with the companies adopting corporate social responsibility (CSR) efforts. Economists have often juggled to understand the basic premises as to why the companies should engage in CSR and other sustainability efforts. A somewhat extreme starting point was provided by Friedman in 1970. According to him, "*There is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say engage in open and free competition without deception or fraud*[1]". This neo-classical view considers deception by the business sector as a moral hazard and hence companies

[1]Friedman, M. (1970). The Social Responsibility of Business is to Increase its Profits. The New York Times Magazine.

should adhere to this less they lose their reputation. After decades of operations there appears to have business-oriented reasons for companies' involvement in corporate responsibility which is much beyond the philanthropic activities undertaken earlier. As the business sector is expanding due to increased economic globalization, there is more pressure on companies to conduct business operations in a much responsible manner [6].

Boheim and Hochgatterer [7] tested the impact of CSR on firm's profits by taking 551 firms from the Dow Jones Global Index. The study established significant positive correlation between CSR and profits of the firm. However, the study would have yielded different results as it was undertaken during the onset of the global financial crisis. In another study conducted in the Indian context, significant positive correlation was established between corporate financial performance and corporate sustainability efforts undertaken. The findings suggest that the companies large in size, having less leverage, are business group affiliated, have higher R&D and advertisement expenses, and are operating in environmentally sensitive industries are likely to be superior in sustainability. The superiority in financial performance is captured through certain indicators such as ROA, ROE and Tobin's Q ratio [8]. To ascertain how the consumer products (CP) industry is using the ESG factors into their business operations, Deloitte conducted a study to understand the key drivers and trends of sustainability and found that majority of US consumer based products focus on managing financial risks and a meager fraction leverage upon the sustainability risks to create a price differential through competitive positioning [9].

To decipher the extent of ESG integration into business strategies, McKinsey conducted a study with CEO's of companies participating in the United Nations Global Compact (UNGC) initiative. 90% of the companies were found to contribute much more in incorporating ESG issues in their strategic operations, compared to what they did five years ago. The main findings indicate that talent constraints, poor public governance and climate change are the most important ESG factors worthy of consideration [10]. In another review conducted by EIRIS [11], gender equality at workplace in North America, Europe, Australia, New Zealand; stringent human rights policies in Norway, the Netherlands, the UK and Finland, community involvement is prevalent in almost all companies surveyed. The study though exhaustive does not cover several employee issues which might pose a huge social risk to business. ATOS Origin [12] studied the business case of environmental issues in the manufacturing and retail sectors with 165 European companies and trade associations. The findings indicate that the business case for environmental issues is real and environmental sustainability leads to value addition for companies through profits and creating competitive advantages.

Very few studies have been conducted which emphasizes on the materiality of ESG factors sector-wise. The fact that ESG factors are material and can create value to both investors and corporations has already been elucidated in the previous sections and sub-sections. RobecoSAM had conducted a study on the pharmaceutical sector to assess which ESG factors is material to the sector. It established the importance of ESG factors for the pharma industry included product quality and safety, business ethics, innovation management, human capital management, talent

attraction and retention, quality of earnings and corporate governance. The study established that quantification of ESG factors is possible and is an extremely valuable exercise that ensures critical thinking [13].

4 Interface of ESG Factors and Investment Community in India and European Counterparts

Investors resort to several methodological approaches to integrate ESG factors into their traditional financial analysis. The varied methods include qualitative analysis, quantitative analysis using cash forecasting, company valuation models, scenario analysis, discount factor adjustment, smart beta strategies, using portfolio construction with heuristic and optimization based weighting methodologies, passive and enhanced passive strategies [14].

4.1 Emerging Role of Investment Bankers in ESG Investment Decisions[2]

In India, ESG factors have gained prominence since the introduction of market indices, viz. S&P ESG in 2008 and BSE Greenex in 2012, the latter being an active market portfolio. Since institutional investors are custodial investors and are prime movers in the market, it becomes imperative to investigate into the width and breadth of ESG acceptance among these custodial investors.

The role and importance of investment banking in sustainable investments are yet to generate enough interest among academicians across the globe. In fact, relevant literature still remains quite inadequate. With increasing recognition to ESG investing in developing economies the role of the investment bankers to move beyond the known periphery to include ESG needs to be ascertained.

As already postulated by Gill [15], the conventional role of an investment banker includes raising long term capital from investors on behalf of governments and corporations in the primary market, engaging in brokerage activities, market making and portfolio management, issuing short-term negotiable instruments such as treasury bills, government bonds, certificates of deposit, promissory notes etc., providing advisory services to corporations relating to mergers & acquisitions (M&A), project financing, identifying and selecting sources of finance, dealing with governmental agencies, financial restructuring, identifying project risks etc., providing professional advice to their clients, majorly, mutual fund managers, pension fund

[2]The survey findings on investment bankers have been presented at the International Symposium on Emerging Trends in Social Science Research, Chennai, India, April, 2015 and has been published in the conference proceedings. The citation is listed in 'References' section.

managers, individual investors etc. on portfolio management and assisting entrepreneurs to raise venture capital.

In 1999, Union Bank of Switzerland (UBS) was the first investment banking firm to incorporate environmental issues in their mainstream business. They adopted Global Environmental Risk Policy for investment banking activities, which was the first such initiative by a major bank [16]. The most extensive example of an investment banking institution taking a constructive attitude towards environment is the Salomon Brothers Inc. The bank focuses on providing information on legislation, key business risks, environmental management and other aspects which help judge the quality of business management. Another notable example is that of the European Investment Bank which provides funds for the development of environmental projects [17]. Wendt [18] mentions that, "*investing and finance does not imply a trade-off between social outcome and financial returns, but rather a dual objective which supports the simultaneous creation of both social and financial returns*". According to her, responsible investment banking refers to a broad array of investment and finance practices, including internationally recognized frameworks and standards like Equator principles, principles for responsible investment, ISO 26000, OECD common approaches, IFC performance standards, UN guiding principles for human rights in business, ILO standards and the like. Although these standards emphasize on different aspects, the ultimate goal is same. They all recognize that the generation of long term sustainable returns is only possible with a stable, well governed, environmentally and socially sustained economic system. The prerequisite for this would be to incorporate ESG issues in business and financing decisions.

4.2 Methodological Approach

Research Design

The research methodology pertains to an exploratory case study with a qualitative method approach. The exploratory case study approach allows for an in-depth, multi-dimensional exploration of the interface between relevant ESG issues and the investment bankers. Implementing a case study method has resulted in studying the relevance and prominence of ESG perception of investment bankers' in India along with comparing it with European counterparts. The exploratory nature of the case study has allowed determining the best research design, data-collection methods and selection of the respondents. Application of qualitative techniques has enabled to analyze data accrued from both primary and secondary sources. The purpose has been to comprehend the extent of ESG absorption in the Indian financial market especially by investment bankers' vis-à-vis the chosen European counterparts of Germany, Austria and Switzerland. The aim is not to establish a benchmark for the Indian financial market, but majorly to elucidate upon the structural differences in terms of ESG investing in India and developed European

counterparts. However, it is to be noted that direct comparison between India and the European economies has not been possible owing to the fact that access to the European financial market has been limited during the period of the study.

Sampling Methodology

For the Indian case, a primary survey based on a purposive sampling has been undertaken in Mumbai, the country's financial capital. The sample of Indian investment bankers has been chosen from the Association of Investment Bankers in India (AIBI). The survey in India has been undertaken in two phases. First, a detailed questionnaire along with the purpose of the survey was mailed to all the Chief Financial Officer's (CFO) and/or Chief Investment Officer's (CIO) of 57 listed investment banking firms in AIBI to obtain their responses. In the second phase one to one interviews were conducted with 23 key persons who had expressed their interest. In order to comprehend the ESG awareness scenario in the European countries, a purposive sampling followed by one to one interviews with 20 financial experts has been conducted with academicians, NGO's and ESG rating agencies in Berlin, Frankfurt and Hamburg.

Data Analysis

The questionnaire consisted of multiple choice questions with multiple responses, descriptive questions and perception based questions ranked on an ordinal scale from 1 to 5 to understand their perception of ESG factors towards sustainable investing.[3] The reliability of the perception based questions has been tested with a Cronbach's alpha. To assess the ESG perception level of the investment bankers, a composite score has been obtained through linear summation of the individual scores. A semi-structured and open ended questionnaire has been used for the European case to obtain better responses. ESG investing data pertaining to Switzerland and Austria has been accrued from several secondary sources. For both cases, the data has been appropriately coded and made suitable for analysis.

4.3 Institutional Characteristics of Respondents

The structure of the investment banking category is illustrated in Fig. 1. Figure 2 provides the classification of European financial experts.

Bank affiliated investment banks are full service investment banks which engage in underwriting, trading, merchant banking etc. Boutique investment banks are

[3]The questionnaire has been provided as an appendix

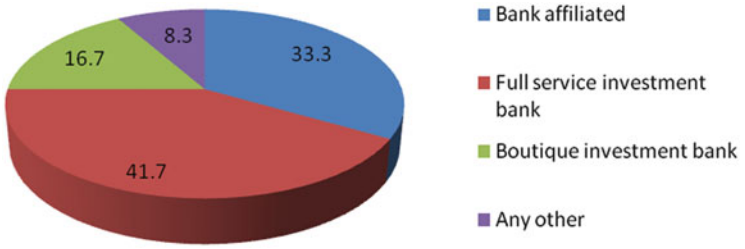


Fig. 1 Structure of investment banking category

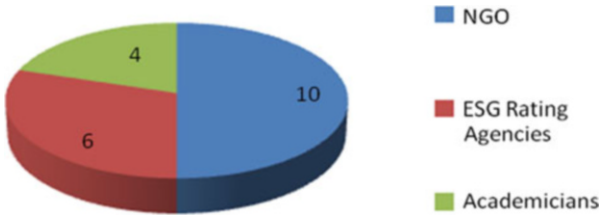


Fig. 2 Classification of European Experts

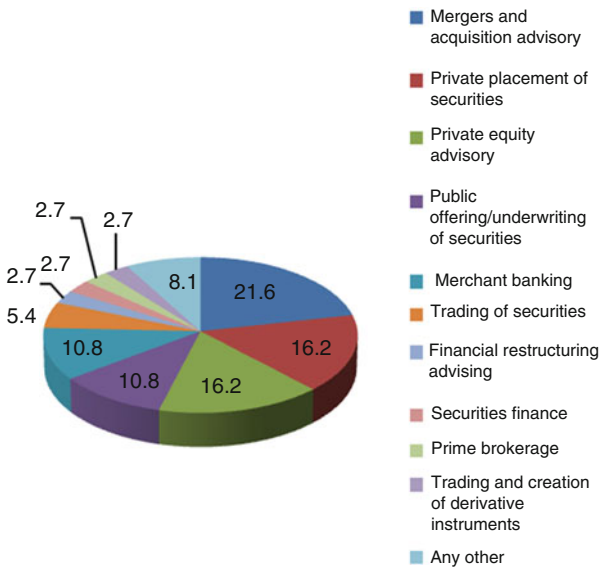


Fig. 3 Key activities of the investment bankers

non-full service and small sized investment banks which normally focus on a particular aspect of investment banking, usually corporate finance. The primary activities of boutique investment banks include capital raising, mergers & acquisitions, restructuring and reorganization.

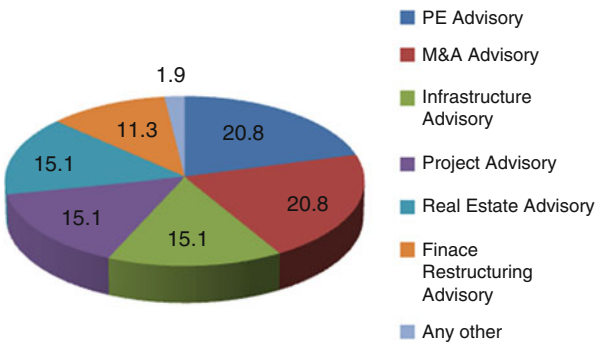


Fig. 4 Key advisory services

The classification of the key activities of the investment bankers surveyed is illustrated in Fig. 3 and the key advisory services are illustrated in Fig. 4.

4.4 Key Findings

ESG Based Perception of Indian Investment Bankers

The composite ordinal scores have been illustrated graphically to understand the ESG perception of investment bankers. Higher the score of the investment banker on the ordinal scale, lower is his/her understanding on ESG related issues in investing (Fig. 5).

Some of the investment bankers believed that ESG factors can be incorporated into traditional financial analysis by developing a realistic framework for the inclusive valuation of ESG factors in investment portfolio. However, most of the banker's either did not have any perception relating to this or they did not believe in this proposition. It is partially evident that investment bankers in India consider the strategic importance of ESG factors in their project financing and advisory services with governance issues already having caught their active attention. Ordinal scores, as used, have measured these custodial investors' perceptions vis-à-vis ESG factors. Although the evidences are stronger in cases of bigger investment firms with smaller counterparts yet to catch up, this is however no little a fact to be ignored. The leaders in the industry are surely to be followed in the days to come. These firms could be known as trendsetters for obvious reasons. It can be reasonably expected that ESG factors will emerge fast in the days to come as major variables along with others in greater proportions. However, ESG premium in return might take a longer time in the Indian market in the given circumstances.

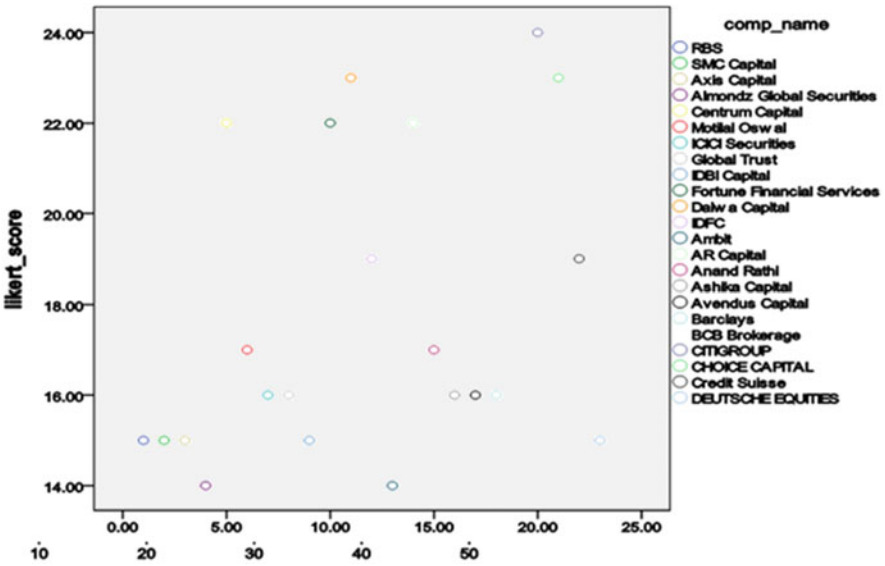


Fig. 5 Perception level of Investment Bankers based on Composite Likert Scores

Extent of ESG Integration by Indian Investment Bankers vis-à-vis European Counterparts

The investment bankers surveyed undertake several activities such as assisting and counseling clients with their investment portfolios, however, the extent to which sustainable factors forms a part of their consideration is of concern. Table 1 highlights some of the perceptional differences in ESG investing between Indian and German speaking IB's located in Germany, Austria and Switzerland.

ESG Investment Choices in India vis-à-vis European Counterparts

The above discussion leads us to highlight four structural differences in sustainable investing patterns between India and the selected European counterparts. First, the number of sustainable investment choices available in the Indian financial market is abysmally low as compared to the European financial market. There is presence of sustainability funds, mandates and structured products in the latter, while, Greenex, Carbonex and ESG India Index are the only green and sustainable indices available in the Indian market. There has also been a considerable growth in the sustainable AuM's in corporate and public pension funds, endowments, mutuals, insurance companies, religious and charitable institutions of the selected European counterparts. Second, European investors adhere to a myriad of approaches while investing sustainably such as positive screening, negative screening, best-in-class, exclusion criteria, Eurosif criteria, norms based, engagement etc., as compared to the Indian

Table 1 Perceptional differences in ESG investing between Indian and German speaking IB's

Extent of sustainability consciousness	Indian IB's	European IB's
Assisting and counselling clients	88.2% of the investment bankers consider the stability in returns of the stock; 11.8% consider corporate governance factors like reputation and history of the promoter, NOC's from the Central Pollution Control Board (CPCB); 75% do not consciously counsel clients to include ESG criteria in portfolios	Consciously counsel clients based on ESG indicators; 80% assist institutional investors with ESG integration
Financial and ESG factors considered for portfolio evaluation	46.2% consider financial benchmarks; 23.1% consider environmental factors; 15.4% consider macroeconomic factors; 11.5% account for corporate governance; 3.8% take into account social factors	Almost all the respondents agreed to the fact that a fine balance between financial and ESG factors are maintained in portfolio evaluation
Reporting on ESG factors	42.9% report financial factors; 32.1% report corporate governance factors; 10.7% of the investors report environmental factors and social factors each	ESG factors are reported on a regular interval by all listed companies; ESG reports are separately maintained
International Frameworks considered	64.3% do not consider any partnership with sustainable international frameworks; 14.3% have partnerships with the Equator Principles; 7.1% have partnerships with the Climate principles and Carbon Disclosure Project; 7.1% consider international partnership with other frameworks such as Carbon credit assessors; Do not consciously encourage their clients to become signatories of such frameworks	55.6% are signatories to the UNPRI; 33.3% of the respondents believed that the 'Key Performance Indicator's' (KPI's) were the most important framework for considering the specific ESG factors in investment portfolios; ESG rating agencies have their own specific indicators which are sector specific and are maintained confidentially
ESG Factors considered for M&A	Include synergies btw acquirer and acquire (22.2%); Intent of acquisition, post integration setup and positioning (19.4%); Perceive long term benefits from sustainable factors (11.1%); Match of vision and long term plans (5.6%); Due diligence and compliance with regulator (5.6%); Corporate governance factors (5.6%); HR factors (2.8%)	Potential ESG factors are considered as determined by ESG rating agencies
ESG Frameworks used for due-diligence	55.6% do not have any tangible framework which can be embedded in their mainstream	UNPRI and the KPI's are considered strictly

(continued)

Table 1 (continued)

Extent of sustainability consciousness	Indian IB's	European IB's
	assessment; 22.2% have a checklist of ESG factors; 11.1% adhere to environmental and social due diligence; 11.1% have performance standards framework for evaluation.	
ESG Research	50% are considering conducting research on ESG issues; 25% consider it important, however, they do not conduct any research; 16.7% were unsure; 8.3% neither consider it important nor conduct any form of research on ESG issues	Almost 95% are considering conducting research on ESG issues
Feasibility of developing an ESG framework for valuation	66.7% believed that there can be a realistic framework for the inclusive valuation of ESG factors; 33.3% found difficult to comment upon	More than half of the respondents have developed ESG framework for evaluation (55.6%); 11.1% did not agree; 22.2% were 'not sure'; 11.1% were 'indifferent' or 'neutral'
Motivations	Financial value addition to clients (25.8%); Generate long term financial returns (25.8%); Reputational concerns (19.4%); Inclusive growth and considering long term sustainability (12.9%); Philanthropic concerns (12.9%); Aspirational concerns to work with foreign institutional investors (3.2%).	Long value addition in the form of profits (27.3%); Diversification of potential risks (22.7%); Security in investments from any economic or financial crisis (18.2%); Reputational concerns (13.6%); ESG is considered to be a major contributor to sustainable development (9.1%); Increasing market perception relating to ESG (4.3%); Peer pressure (4.3%)
Barriers	Uncertainty related to long term profitability of ESG investing (29.2%); Lower returns considering the cost involved (20.8%); Uncertainties in the regulatory framework (20.8%); Absence of market (16.7%), lack of a proper ESG framework (4.2%); Red tapism concerns (4.2%).	Lack of a proper framework to integrate ESG factors; Lack of methods to evaluate ESG risks in portfolios; Lack of ESG awareness among institutional investors; Lack of adequate empirical evidence related to materiality of ESG investing; Lack of enforcement from industries and supplier; Assumption of negative returns from ESG investments by institutional investors

Source: Based on primary surveys and secondary research in India, Germany, Austria and Switzerland, 2014

institutional investors who focus mostly on negative screening while considering investments. Third, there has been a marked increase in the number of ethical and green banks in the European capital market, which is not much evident in the Indian financial market. Fourth, the most prominent driver for socially responsible investments in Europe emanates from risk perception related to ESG factors, whereas in India, it is mostly based on reputational considerations.

5 Results and Discussion

This study emphasizes majorly on the role of investment bankers in promoting sustainable investing in India. Hence understanding their perception on ESG factors and the extent to which they are factored in their decision making has been of utmost importance. The small sample survey carried out in Mumbai, India is highly indicative of the growing awareness and concern of investment bankers towards these issues. Although the major emphasis for these investors has been financial benchmarks, governance factors such as due-diligence and compliance with the regulating agencies are paid proper attention to while undertaking mergers and acquisitions. However, consciously counseling their clients are meekly carried out by a handful. Although the investment bankers accepted the value adding potential of ESG investing, high costs, uncertain regulatory framework and absence of a market are stated as the potential barriers.

As compared to the Indian firms, German, Swiss and Austrian firms are much ahead. The sustainable investment market in these developed nations is huge and is quantified in some research reports. Apart from being aware of the implications of 'E', 'S' and 'G' factors, there is abundant empirical evidence indicating to the positive correlation of these factors and financial performance. Hence, for them, 'ESG' is already a hedging tool. Even the retail and church investors take account of ESG issues. The significant increase in the number of green banks and ESG rating agencies especially in Germany corroborate the facts. Corporate pension funds are the most prevalent investors in Switzerland and Austria, while in Germany, religious institutions and charitable organizations account for the major share in sustainable investments.

6 Conclusion and Recommendations

The study pertains to explain the role of investment bankers to facilitate ESG market in developing countries like India. There are several policy implications of this study. First, the results of the study suggest that Indian investment bankers have started to understand and accept the role of ESG factors within the periphery of reputational concerns and regulatory risks. However, they are yet to integrate these in portfolio advisory. Hence, the responsibilities of policy makers and regulators have become all the more pertinent to facilitate the establishment of a sustainability

market in India. Second, the market participants can only be interested in investing in sustainable business if and only if adequate sustainable investment choices available. Herein, the stock exchanges and regulators need to put in their efforts to come out with innovative and unconventional investment choices such as the Greenex and Carbonex. Third, the paper is likely to have an impact on the business decision making related to ESG efforts.

Finally, the study emphasizes on the following recommendations:

1. *Increased perception and awareness about ESG factors by market participants*
   Institutional investors and investment bankers need to acknowledge and incorporate sector specific ESG factors into their portfolios. It is by far the most essential and fundamental condition for the successful operation of ESG factors in business.
2. *Availability of sustainable investment choices in the market*
   Sinha and Datta [19, 20] argues that the crucial disparity between the sustainable markets of developed and developing economies lie in the availability of investment choices. Developed markets usually have several investment choices in the form of sustainable funds and mandates contrary to the limited choices in developing countries. For e.g., the European markets of Germany, Switzerland and Austria have witnessed a rapid increase in the corporate pension funds, structured products, sustainability indices, bonds and mandates, which provides adequate choices to investors.
3. *Integrating ESG principles in the Mission, Vision and Statement of the Company*
   Businesses need to be signatories of the International frameworks such as UNPRI, Carbon Disclosure Project (CDP), Equator principles etc. to highlight a few. All the business processes starting from supply chain to the end product till it reaches the customer, need to maintain ESG standards. If ESG virtues get instilled in the mission, vision and statement of the company, a sustainable investing atmosphere can be generated.
4. *Creating sustainable investment choices in the Debt market*
   Majority of the studies have dealt with the impact of ESG factors in equity markets. Generally speaking, the debt market exhibits a considerable weight for sustainable corporate finance, for which creditors should basically play a significant role in the transmission of CSR into valuation of financial instruments [21]. However, due to lack of adequate empirical evidence, inconclusive results relating to the impact of ESG factors on risk premium in bond market and insufficient data on individual terms of bank loans etc., this area still remains highly unexplored.
5. *Role of Policy makers and Market Regulators in facilitating and driving demand for sustainable products*
   Apart from the investors, policy makers, market regulators and operators play a crucial and critical role in accentuating the ESG market. Environment and corporate governance regulations need to be framed in such a manner so as not to create any impediment to the business atmosphere of the country. Rather, the focus should be on incentivising the process instead of levying hefty fines and

penalties. Efforts need to be taken to fill the loopholes in existing legal framework so as to minimize evasion. Frameworks for sustainability disclosures need to be incentivized.

Acknowledgements The authors are highly grateful to DAAD funded German-Indian Climate Change Dialogue Programme for funding the costs of research stay of 3 months at Freie University in Berlin, Germany, April, 2014. Research results are an element of the project implemented by the National Science Center Poland; the grant OPUS13 no UMO-2017/25/B/HS4/02172.

References

1. Sustainalytics (2012) Bridging the gaps: effectively addressing ESG risks in emerging markets. www.sustainalytics.com
2. Koehler DA, Hespenheide EJ (2013) Finding the value in environmental, social and governance performance. Deloitte Rev 12(1):101–102
3. KPMG (2008) Climate changes your business: climate change risk perception and management. Review of the Business Risks and Economic Impacts at Sector Level. www.kpmg.com
4. Knobloch NC, Leurig S (2010) Climate change risk perception and management: a survey of risk managers. CERES 4–10
5. UNEP (2013) GEO-5 for business: impacts of a changing environment on the corporate sector. www.unep.org
6. Drauth, CM (2010) Closing global governance gaps through corporate social responsibility. Working Paper Hertie School of Governance, 54. www.hertie-school.org
7. Boheim R, Hochgatterer C (2007) Does CSR increase firms' profits? Evidence from DJSI firms. http://wwwap.wu.ac.at/inst//fsnu/budapest/papers/hochgatterer.pdf
8. Ghosh A (2013) Corporate sustainability and corporate financial performance: Indian context. IIM Calcutta Working paper series No. 721:4–34
9. Deloitte (2007) Sustainability balancing opportunity and risk in the consumer products industry. www.gmaonline.org
10. McKinsey (2007) The business case for sustainability. www.businessperformance.org
11. OECD, EIRIS 2007 Corporate responsibility practices of financial institutions in OECD and important non-OECD countries. http://www.oecd.org/daf/inv/mne/38569307.pdf
12. ATOS Origin (2009) The business case for environmental excellence is real. www.natcapsolutions.org
13. RobecoSAM (2015) What are the financially material ESG factors in the pharma sector? Insight 3. www.robecosam.com
14. van Dijk-de Groota M, Nijhof AH (2015) Socially responsible investment funds: a review of research priorities and strategic options. J Sustain Fin Invest 5(3):s.178–s.204. UNPRI2016. Retrieved from http://www.unpri.org//
15. Gill D (1980) Role of investment banking in developing countries. Savings Dev 4(3):196–218
16. Jeucken MHA, Bouma JJ (1999) The changing environment of banks. GMI theme issue: sustainable banking: The greening of finance. www.sustainability-in-finance.com
17. Delphi International (1997) The role of financial institutions in achieving sustainable development. Report to the European Commission by Delphi International Ltd. in association with Ecologic GMBH, Nov 1997
18. Wendt K (2015) Will there be such a 'think' as responsible investment banking one day? The World Financial Review. www.responsible-investmentbanking.com
19. Sinha R, Datta M (2015) Institutional investors and sustainable investment decisions: a survey on Indian financial sector as against select European counterparts. In: Proceedings of the

international symposium on emerging trends on social science research. www.globalbizresearch.org
20. Sinha R, Datta M (2013) Business and changing climate: a commentary on the evolution of regulatory framework in India. AIMS Int J Manag 8(3):169–191
21. Menz KM (2010) Corporate social responsibility: is it rewarded by the corporate bond market? A Critical Note. J Bus Ethics 96(1):117–134

Influence of Deregulation on Sustainable Development of Sector of Professional Financial and Accounting Services in Poland: An Empirical Study

Michał Buszko and Marlena Ciechan-Kujawa

1 Introduction

Financial and accounting activity is a base for recording and valuation of business operations, and allows for the collection, processing and analysis of financial information used in the management of enterprises and non-profit entities. Its professional performance allows to create a faithful and correct financial image of entities that conduct both economic and non-economic activities. Collecting and reporting financial data consistently with the law, in a objective, reliable, unquestionable as well as professional way allows for making rational decisions by both internal and external stakeholders.

In economic practice, the obligation of financial and accounting records may be carried out independently by the entrepreneur, a person or a team of persons employed for this purpose (accounting department) or may be performed by outsourced entities, i.e. accounting offices, auditors' offices or tax advisors, which are particularly useful in supporting of small and medium-sized enterprises, who do not have accounting and financial structures. In particular, in the last case, it is crucial to ensure adequate quality, reliability and integrity on the part of entities engaged in professional accounting and financial activities. Questions about both the possibility of maintaining the appropriate quality of accounting services and the development directions of the entire sector of entities offering professional accounting and financial services appeared along with the adoption in 2014 of the Act on facilitating access to certain regulated professions in Poland [1]. This Act, in principle, lifted most of the restrictions on access to the accounting profession,

M. Buszko (✉) · M. Ciechan-Kujawa
Nicolaus Copernicus University in Toruń, Toruń, Poland
e-mail: mibus@umk.pl; marlenac@umk.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_23

including the need to meet the requirement of education, experience or possession of appropriate certificates.

The research objective of the study is to evaluate the attitude and consequences of the deregulation onto the sustainable functioning and development of the sector of professional accounting services. The evaluation will be made taking into account the perspective of accounting offices in Poland. The research is aimed at finding dependencies between variables characterizing accounting offices and seven main areas of their functioning after the deregulation as well as identifying factors determining negative effects of deregulation.

To achieve the research goals, the authors of the study used research methods such as: literature analysis, legal act analysis, survey method as well as statistical methods (tests and logistic regression).

2 Background for Research and Review of Literature

Professional performance of financial and accounting activities until 2014 was a subject to numerous formal restrictions and was subject to regulations aimed at ensuring their appropriate substantive level and quality. This activity was therefore defined as a regulated profession, under which there was a limited number of entities on the market and barriers to enter the sector on the part of new persons were maintained. The introduction in 2014 of the Act on facilitating access to certain regulated professions has created new conditions for the operations of accounting offices. Its assumption was to enable a more intensive development of professional accounting and financial services, opening the market to new persons and entities, i.e. increasing the number of units operating in this profession, and, as a result, reducing the prices of services. The last argument was aimed at supporting the establishment of own business, the wider use of advisory services by small and medium-sized entities, and finally the increase in competition between the accounting office themselves. The requirements regarding entitlements necessary to, for example, bookkeeping and tax records, providing tax advice or drawing up declarations, which were binding until 10 August 2014, in particular in the area of the necessity to meet substantive criteria, constituted a significant barrier to entry into the profession. The Act on facilitating access to certain regulated professions adopted on 9 May 2014, which deregulates the professional profession of financial and accounting services, has introduced the liquidation of an accounting certificate and thus the examinations necessary to obtain it. After entering into deregulation, providing bookkeeping services, providing advice, opinions and explanations regarding tax obligations, keeping tax books and making testimonies and tax declarations, which were reserved for tax advisers, advocates and legal advisors, statutory auditors or entrepreneurs performing providing bookkeeping services in accordance with art. 76a paragraph 2 of Accounting act [2], has become possible for any person who is not among the above-mentioned. The condition for running professional services has only been to have full legal capacity, no criminal record

for offenses against the credibility of documents, property, trade, money and securities, for fiscal offenses and specified in the Accounting act. A person running a professional activity should also have third party liability insurance (OC). An example of activity still reserved for tax advisors, lawyers or legal advisers is representing taxpayers before public administration and in the scope of judicial inspection of administrative acts.

It should be noted that partial legislative changes in field of providing certain financial services have already been introduced in some European countries, for example, in 1994 they were introduced in the United Kingdom, in 2006 in Denmark, in 2007 in Finland, in 2008 in Sweden and Malta. However, there is a lack of research that would present the consequences of these changes for the companies offering professional financial or accounting services as well as for their clients. Generally, the authors of various studies pointed out unfulfilled expectations regarding the effects of deregulation in financial and accounting professions, in particular the lack of expected improvement of pro client orientation or the introduction of innovations in products and services processing [3–5]. One should also emphasize that the effects of deregulation were not studied in a complex way. In general, just selected aspects such as the impact on pricing, scope of services as well as changes in promotion strategies were investigated [6–9]. The interest of authors was particularly focused on the issue of audit services. In this field, the influence of the level of regulation on the concentration of the auditing market was examined by Simunic [10], Maijoor et al. [11], Deis and Giroux [12], Beattie and Fearnley [13], Willekens and Achmadi [14], Basioudis and Ellwood [15], Buijink et al. [16]. Pierce and Sweeney [17] investigated internal work processes and systems for the management and control of audit companies. Researchers explain the lack of critical changes in the strategies of accounting services providers by high demand for accounting services delivered currently [18, 19] and by oligopolistic behaviors of some companies, especially audit firms, which offer their services acting in collusion or duplicating patterns of operation [20]. The broadest studies on the results of deregulation were carried out in Sweden, but in this case just small changes in the market of professional financial services were shown [21]. Surprising was in particular observed increase of prices of accounting services but not their decrease, as one could expect. In addition, small changes in the area of cooperation between companies and their clients as well as their approach to the promotion of services have been diagnosed. The authors described the changes in professional accounting services in Sweden as minor, but they analyzed the effects of deregulation just one year after the introduction changes and pointed to the possibility of a certain inertia of the market in reaction to new regulations.

3 The Research Methods

To examine in detail the impact of the new legal regulations on the activities of entities providing financial and accounting services and prospects for their development, the authors of this study conducted a survey on a group of accounting offices

registered in Poland. The study was carried out by the CAWI technique in April 2017. There was used purposive (heterogenous) sampling technique on the total group of 200 accounting offices which addresses were obtained from web pages and social portals devoted to Polish professional accounting services. The authors obtained filled questionnaires from 133 respondents. The questionnaire consisted of totally 10 questions characterizing the profile of the respondent and 4 questions related to their opinions. Two of the 4 questions were related to seven and nine sub-questions respectively.

The respondents have been characterized accordingly to the: Age [AGE] (<30, 31–40, 41–50, >50), Education level of the accountant [EDU] (secondary, higher, higher with postgraduate course, higher in finance and accounting, other), [EXP] Experience in accounting (<3, 4–10, 11–15, >15), [PER] period of activity of accounting office (<2, 2–5, 6–10, >10), Legal form [LEG] (sole proprietorship, civil partnership, limited liability partnership, joint-stock company, other), Number of employees [EMP] (0, 1–10, 11–20, >20), Dominant customers [CUS] (micro, small, medium, large), scope of offered products and services [OFF] (1–10). The presented variables were used for the association and correlation analysis with Pearson's Contingency (C) and Kendall's Tau-c[1] (τ) coefficients as well as in the model of the multivariate logistics regression. All the statistical calculations were made by using IBM SPSS Statistics vol. 25.

The research methods were used primarily to find out the subjective effects of the deregulation and determinants of the opinions about legal changes. The authors aimed to investigate how the age of the accountants, their education level, experience in accounting, period of activity of accounting office, legal form, number of employees, type of prime customers and scope of products influenced the evaluation of changes in functioning and development of accounting offices in Poland after deregulation.

In the paper the authors put forward three hypotheses:

H1: The accounting offices which did not supported the deregulation in the past currently evaluate it negatively

H2: The deregulation of professional accounting services threatens the sustainable development of the accounting offices in Poland

H3: The negative effects of deregulation affect mostly the small accounting offices (with the lowest employment level)

[1]The authors used Kendall's Tau-c statistics i.e. nonparametric measure of strength and direction of relation between two variables, containing adjustment for table size and ties between pairs of observations, as it gives more information than commonly known Spearman's Rho correlation coefficient.

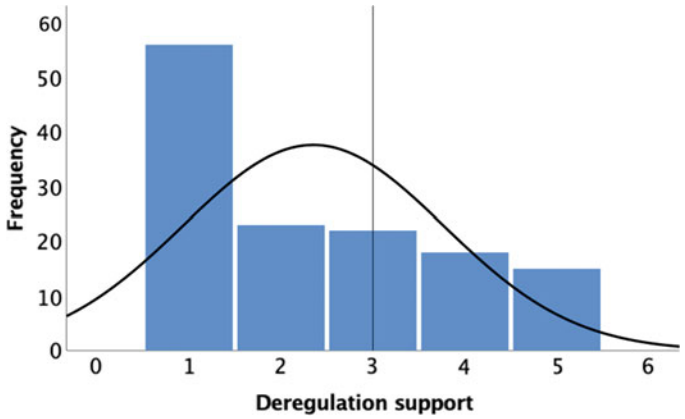


Fig. 1 Approach of accounting offices to the deregulation. M = 2.35, Sd = 1.43, Min = 1, Max = 5, N = 133

4 Results

The respondents were asked about their general attitude toward supporting the legislative change (deregulation) of professional accounting services. They could indicate grade from 1 (definitively against) to 5 (definitively for). Most responses confirmed a negative approach of accounting offices to the deregulation (Fig. 1). Among the respondents which were against the legislative changes, there i.a. those established after deregulation came into force (approx. 10%).

After investigating the general approach to support legislative changes (deregulation) the authors aimed at finding associations between variables characterizing the respondents (AGE, EDU, EXP, PER, LEG, EMP, CUS, OFF) and selected aspects of deregulation such as: (1) Change of prices of accounting services (CPRI), (2) Change of the level of competition (CCOM), (3) Change of the quality of services (CQUA), (4) Change of facilitation of the performance of the accounting profession (CFAC), (5) Change of bad practices (CBPR), (6) Change of the salaries of accountants (CSAL), (7) Change of the safety of economic activity (CSAF). The associations were investigated with coefficient C and χ^2 test as well coefficient τ (for ranked data). The results (only statistically significant associations at $\alpha = 0.05$) are presented in the Table 1. In most cases of estimations, the τ correlation was not statistically significant (except AGE_CCOM, EDU_ CPRI, OFF_CPRI) at $\alpha = 0.05$. That may confirm, that despite finding the statistical relationship between characteristics of respondent's and effects of deregulation, in majority one cannot find the direction of changes between variables.

The data presented in the Table 1 confirm association between change of prices of accounting services (CPRI) due to deregulation and the level of education, the scope of the offered (representing negative and statistically significant correlations) as well as type of serviced customers. Change of the level of competition (CCOM) turned

Table 1 Dependencies between variables measured by coefficients C and τ

Var.	CPRI	CCOM	CQUA	CFAC	CBPR	CSAL	CSAF	Stat.
AGE	–	**0.371**	–	–	–	–	–	C
	–	**(0.047)**	–	–	–	–	–	p-val.
	–	**−0.152**	–	–	–	–	–	τ
	–	**(0.029)**	–	–	–	–	–	p-val.
EDU	**0.450**	–	**0.410**	–	–	–	–	C
	(0.006)	–	**(0.043)**	–	–	–	–	p-val.
	−0.218	–	**−0.182**	–	–	–	–	τ
	(<0.001)	–	**(0.002)**	–	–	–	–	p-val.
EXP	–	–	**0.438**	**0.405**	–	–	–	C
	–	–	**(0.002)**	**(0.011)**	–	–	–	p-val.
	–	–	−0.103	−0.077	–	–	–	τ
	–	–	(0.142)	(0.241)	–	–	–	p-val.
PER	–	–	–	**0.376**	–	–	–	C
	–	–	–	**(0.038)**	–	–	–	p-val.
	–	–	–	−0.080	–	–	–	τ
	–	–	–	(0.293)	–	–	–	p-val.
LEG	–	–	**0.551**	–	–	–	–	C
	–	–	**(<0.001)**	–	–	–	–	p-val.
	–	–	−0.057	–	–	–	–	τ
	–	–	(0.249)	–	–	–	–	p-val.
EMP	–	–	**0.417**	–	–	–	–	C
	–	–	**(0.005)**	–	–	–	–	p-val.
	–	–	−0.038	–	–	–	–	τ
	–	–	(0.554)	–	–	–	–	p-val.
CUS	**0.334**	**0.360**	–	–	**0.380**	–	–	C
	(0.033)	**(0.011)**	–	–	**(0.004)**	–	–	p-val.
	0.019	0.025	–	–	−0.005	–	–	τ
	(0.749)	(0.676)	–	–	(0.943)	–	–	p-val.
OFF	**0.617**	**0.644**	–	**0.491**	–	**0.462**	**0.513**	C
	(<0.001)	**(<0.001)**	–	**(0.042)**	–	**(0.021)**	**(0.012)**	p-val.
	−0.143	0.106	–	0.004	–	−0.090	-0.065	τ
	(0.024)	(0.101)	–	(0.951)	–	(0.221)	(0.314)	p-val.

C Pearson's contingency coefficient estimates; *τ* Kendall's Tau coefficient estimates, α = 0.05, N = 133

out to be associated with the age of the respondent, type of served customers and the scope of the offer. Just the age represented negative statistically significant correlation. One could also find a statistically significant association between the change of the quality (CQUA) and education level, experience in accounting, legal form and number of employees. For all of the variables the correlations were negative, however just the first one was statistically significant. Facilitating of the performance of the accounting profession (CFAC) turned out to present statistically significant

relationship with the experience and period of activity of the accounting office as well as the scope of the offer. The two first cases represented negative correlation and the last positive, however all of the τ values were not statistically significant. Change of bad practices (CBPR) showed statistically significant association with the type of customers, while change of salaries of accountants (CSAL) and change of economic safety (CSAF) presented association with the type of customers and the scope of the offer. The all three τ correlations for the analyzed three relationships were not statistically significant. Summarizing the investigation of the relationships between changes caused due to the deregulation and characteristics of the respondents, one may find the largest influence of the scope of the offer (i.e. number and diversity of offered products and services). Moreover, just for EDU_CPRI, EDU_CQUA, OFF_CPRI and AGE_CCOM correlations measured by τ were statistically significant, what may confirm, that in majority one cannot find the direction of the relationships.

To deepen the analysis between variables, the authors investigated dependencies between seven aspects of deregulation finding their mutual associations. In particular, there were noticed interesting results of correlations of the variable CCOM (i.e. changes of competition). CCOM was positively correlated to CBPR and negatively to CPRI, CSAF, CQUA and CSAL.[2] Such results may confirm that in the opinion of accounting offices the increase of competition due to deregulation is associated with simultaneous increase of bad practices as well as decrease of pricing, safety, quality of services and salaries of accountants.

Apart from identifying the associations of the changes in functioning of accounting offices, the authors aimed to evaluate the influence of deregulation on the whole sector of professional accounting services. The evaluation was made upon the answers of the respondents given in the seven categories CPRI, CCOM, CQUA, CFAC, CBPR, CSAF, CSAL. The respondents were allowed to grade from 1 to 5.[3] The total value of the gradings of all seven categories was named as deregulation index and it ranged between 7 (minimal value 7×1) and 35 (maximal value 7×5). Figure 2 presents the distribution of the index.

Figure 2 confirms negative evaluation of changes of deregulation in the sector of professional accounting services with mean 15.48 falling below neutral assessment of the deregulation at 21 (7×3). The χ^2 test (p-value $= 0.007$) confirmed statistically significant relation between the value of the index and attitude of the respondents towards supporting of deregulation. It shows that those offices which did not supported the deregulation before, currently evaluate it negatively. Such result confirms the hypothesis H1.

To deepen the knowledge about negative assessment of the deregulation by accounting offices, the authors tended to find variables and parameters determining

[2]The τ correlations were respectively: 0.353, −0.396, −0.140, −0.232, −0.366. P-value of all of the ratios was <0.05.

[3]Grades 1 and 2 were associated with negative influence of deregulation, grade 3 was neutral while grades 4 and 5 indicated positive influence of the deregulation onto sector of professional accounting services.

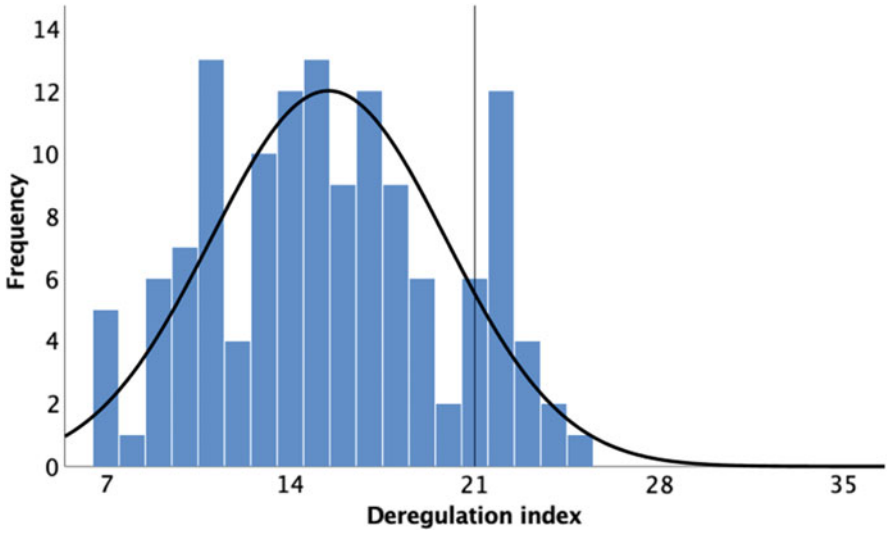


Fig. 2 Distribution of deregulation index. M = 15.48, Sd = 4451, N = 133, Min = 7, Max = 25

the negative perception of deregulation. As the negative effects (Yj) there were chosen: Y1—decrease of prices (DPRI), Y2—increase of competition (ICOM), Y3—decrease of quality of services (DQUA), Y4—decrease of salaries of accountants (DSAL), Y5—no facilitation of the performance of the profession of accountant (NFAC), Y6—increase of bad practices (IBPR), Y7—decrease of safety of economic activity (DSAF). To find the relationships, the authors used multivariate logistic regression model at $\alpha = 0.1$ with independent variables such as: AGE, EDU, EXP, PER, LEG, EMP, CUS, OFF. Equation (1) presents the formal model.

$$Logit\ \mathrm{P}(Y_j = 1|\boldsymbol{X}) = \beta_0 + \beta_{1j} \cdot AGE + \beta_{2j} \cdot EDU + \beta_{3j} \cdot EXP + \beta_{4j} \cdot PER + \beta_{5j} \cdot LEG + \beta_{6j} \cdot EMP + \beta_{7j} \cdot CUS + \beta_{8j} \cdot OFF + \varepsilon_j, \quad (1)$$

where $j = 1, \ldots, 7$.

The estimation of the parameters was performed with Wald variable backward elimination. The results (only statistically significant) are presented in the Table 2.

Table 2 shows that more respondents indicate the occurrence of negative effects of deregulation for six out of seven categories of changes than positive or neutral. In particular they indicated the decrease of prices, quality and salaries of accountants as well as increasing of competition and bad practices.[4] Those indications may confirm that accounting offices find deregulation as bringing primarily negative effects, which create risk to their sustainable development. The sustainable development

[4]The respondents indicated also decrease of economic safety (75 versus 58 indications), however the parameters of the estimation of (Y7) DSAF turned out to be statistically insignificant.

Table 2 Models of logistic regression of negative effects of deregulation

Variables	β	St. Error	p-val.	Exp (β)	(−) 95%	(+) 95%
(Y1) DPRI YES (1) = 92, NO (0) = 41						
EDU (High Fin. & Acc.) BASE			0.019			
EDU (Second)	−1.992	0.633	0.002	0.136	0.039	0.471
EDU (High)	−0.999	0.506	0.048	0.368	0.137	0.992
EDU (High Postgrad.)	−0.999	0.545	0.067	0.368	0.127	1.073
Intercept	1.404	0.298	<0.001	4.071		
H-L Test = 1.000						
R2 Cox-Snell = 0.107						
R2 Nagelkerkeg = 0.15						
(Y2) ICOM YES (1) = 102, NO (0) = 31						
AGE (>50) BASE			0.015			
AGE (31–40)	1.897	0.597	0.001	6.667	2.067	21.501
AGE (41–50)	1.386	0.582	0.017	4.000	1.278	12.519
H-L Test = 1.000						
R2 Cox-Snell = 0.076						
R2 Nagelkerkeg = 0.115						
(Y3) DQUA YES (1) = 79, NO (0) = 54						
AGE (>50) BASE			0.096			
AGE (31–40)	1.465	0.722	0.042	4.328	1.051	17.815
AGE (41–50)	1.585	0.668	0.018	4.879	1.318	18.064
PER (>10)			0.041			
PER (<2)	−2.003	0.709	0.005	0.135	0.034	0.542
H-L Test = 1.000						
R2 Cox-Snell = 0.11						
R2 Nagelkerkeg = 0.148						
(Y4) DSAL YES (1) = 86, NO (0) = 47						
PER (>10) BASE			0.028			
PER (<2)	−1.609	0.612	0.009	0.220	0.060	0.664
H-L Test = 0.970						
R2 Cox-Snell = 0.184						
R2 Nagelkerkeg = 0.253						
(Y5) NFAC YES (1) = 28, NO (0) = 105						
AGE (>50) BASE			0.006			
AGE (<30)	−3.335	1.250	0.008	0.036	0.003	0.413
AGE (31–40)	−2.489	0.754	0.001	0.083	0.019	0.364
AGE (41–50)	−1.954	0.719	0.007	0.142	0.035	0.580
EDU (High Fin. & Acc.) BASE			0.097			
EDU (Second)	−2.138	0.994	0.031	0.118	0.017	0.827

(continued)

Table 2 (continued)

Variables	β	St. Error	p-val.	Exp (β)	(−) 95%	(+) 95%
EDU (High)	−1.719	0.796	0.031	0.179	0.038	0.852
Intercept	1.185	0.698	0.900	3.270		
H-L Test = 0.977						
R2 Cox-Snell = 0.131						
R2 Nagelkerkeg = 0.204						
(Y6) IBPR YES (1) = 88, NO (0) = 45						
EDU (High Fin. & Acc.) BASE			0.063			
EDU (Second)	−1.235	0.605	0.041	0.291	0.089	0.953
EDU (High)	−0.994	0.493	0.044	0.370	0.141	0.973
EDU (High Postgrad.)	−1.034	0.532	0.052	0.356	0.125	1.008
Intercept	1.235	0.284	<0.001	3.437		
H-L Test = 1.000						
R2 Cox-Snell = 0.068						
R2 Nagelkerkeg = 0.095						

N = 133

should be considered here as the development without significant and unpredictable changes of pricing, quality, accessibility, structure, reliability and efficiency of the accounting services. The indications of the respondents positively verify the hypothesis H2.

The logistic regression models confirmed that there is quite narrow and homogenous set of variables influencing the negative perception of deregulation in all seven areas, including age, education level and period of running of accounting office. The education level determined the perception of decrease of pricing, lack of facilitation of the accounting profession and increase of bad practices. In all three cases there was a smaller chance to obtain negative opinion from respondents with secondary and higher education than respondents educated in finance and accounting. Age of the respondents turned out to be significant in determining increase of competition, decrease of quality and lack of facilitation of the accounting profession as consequences of deregulation. In these cases, younger people were determining the decrease of prices and the older generation set the decrease of quality and lack of facilitation of the accounting profession. Period of running of the accounting office was determining negative opinions about decrease of quality and decrease of salaries. In both cases the offices with longer period were more eager to indicate the decrease comparing to the offices with less than 2 years of functioning. The above-mentioned variables may indicate that negative evaluation of the deregulation is dependent primarily on individual features of respondents but not objective characteristics of accounting offices such as size, type of serviced clients, scope of the offer or legal form. As the logistic regression models do not confirm statistical

influence of the number of employees (size) of the accounting offices onto indication of negative effects of deregulation, hence they negatively verify the hypothesis H3.

After giving opinions about the attitude toward deregulation and evaluating the changes in the seven areas of operating of accounting offices sector after deregulation, the respondents indicated if they noticed any changes in functioning and development of own accounting offices. Among 133 units approx. 38% confirmed occurrence of changes as the effect of deregulation, 17% indicated changes but not related to deregulation and 45% didn't find any changes.[5] The analysis by χ^2 test confirmed statistical significance of the distribution of opinions at $\alpha = 0.05$ (p-value = 0.007) however there were no statistically significant dependencies between the opinions and the variables: AGE, EDU, EXP, PER, LEG, EMP, CUS, OFF.

5 Conclusions

The deregulation of the performing professional accounting services as such tended to facilitate coming into the profession by new persons, to increase the number of entities in the sector and in effect to reduce the prices of the professional accounting services. The ultimate goal was to support more intensive use the services especially by SME companies and make professional accounting services more accessible. From the perspective of the accounting offices the deregulation is in general negatively assessed, what is not particularly surprising. None of the respondents presented overall good or very good evaluation of this process, and in six out of seven major areas of functioning of professional accounting services there were dominating negative gradings of changes. Such results may indicate that from the perspective of accounting offices there is a threat to their sustainable functioning and development. Such attitude is in line with a general low support of the process of deregulation by accounting offices. When evaluating the process of deregulation and its consequences, one may find that the scope of offered products and services is linked with the highest number of areas of functioning of accounting offices affected by legal changes. Less important are types of serviced customers, experience in accounting or period of activity of accounting office. The models of negative effects of deregulation characterized by accounting offices indicate that there is no universal set of variables determining occurrence of negative effects in all seven areas of influence of deregulation. The logistic regression models show that in most cases the negative perception is related to personal features of the respondents such as education level, experience in accounting or age but not the legal form, number of employees, type of served customers or scope of the offer. Just in case of indication

[5]The structure analysis contained all the accounting offices, including those established after 2014, as they could be affected indirectly by the deregulation e.g. through adjustment to the new law of the whole sector of professional accounting services.

of decrease of quality and decrease of salaries the statistically significant was the period of activity as the feature characterizing the accounting office as institution. Such results may point out rather subjective character of negative perception of the process of deregulation.

The results presented above do not fill all the gap related to evaluation of influence of deregulation onto sustainable development of the professional accounting offices in Poland. They just represent the subjective view over the problem of deregulation and should be confronted with official market data presenting e.g. the pricing of services, number of competitors, level of salaries of accountants or number of registered bad practices of accounting offices. Moreover, the results should be confronted with the evaluation of the deregulation presenting a perspective of clients of the accounting offices, which would confirm or deny the idea of negative effects of legislative changes in professional accounting services.

References

1. Act of 9 May (2014) on facilitating access to certain regulated professions. Journal of Laws of 2014, item 768
2. Act of 29 September (1994) on accounting. Journal of Laws of 2018, item 395
3. Kinney WR Jr (2005) Twenty-five years of audit deregulation and re-regulation: what does it mean for 2005 and beyond? Audit J Pract Theory 24:89–109. https://doi.org/10.2308/aud.2005.24
4. Seow JL (2001) The demand for the UK small company audit – an agency perspective. Int Small Bus J 19(2):61–79. https://doi.org/10.1177/0266242601192004
5. SOU 2008:32 (2008) Avskaffande av revisionsplikten för sma företag. Abolition of the statutory audit for small firms. Justitiedepartementet, Stockholm
6. Crittenden VL, Davis LR, Simon DT, Trompeter G (2011) Deregulation of professional accounting services in the United Kingdom: integrating marketing and accounting. J Strateg Mark 11(1):37–53. https://doi.org/10.1080/0965254032000069757
7. Hay DC, Knechel WR, Wong N (2006) Audit fees: a meta-analysis of the effect of supply and demand attributes. Contemp Account Res 23:141–191. https://doi.org/10.1506/4XR4-KT5V-E8CN-91GX
8. Mayhew BW, Wilkins MS (2003) Audit firm industry specialization as a differentiation strategy: evidence from fees charged to firms going public. Audit J Pract Theory 22(2):33–52
9. McMeeking KP, Peasnell KV, Pop PF (2007) The effect of large audit firm mergers on audit pricing in the UK. Account Bus Res 37(4):301–319. https://doi.org/10.1080/00014788.2007.9663314
10. Simunic DA (1980) The pricing of audit services: theory and evidence. J Account Res 18 (1):161–190
11. Maijoor S, Buijink W, Witteloostuijn A, Zinken M (1995) Long-term concentration in the Dutch audit market: the use of auditor association membership lists in historical research. Abacus 31(2):152–177
12. Deis DR, Giroux G (1996) The effect of auditor changes on audit fees, audit hours, and audit quality. J Account Public Policy 15(1):55–76
13. Beattie V, Fearnley S (1998) Audit market competition: auditor changes and the impact of tendering. Br Account Rev 30(3):261–289
14. Willekens M, Achmadi C (2003) Pricing and supplier concentration in the private client segment of the audit market: market power or competition? Int J Account 38(4):431–455

15. Basioudis IG, Ellwood S (2005) An empirical investigation of price competition and industry specialisation in NHS audit services. Financ Account Manag 21(2):219–247. https://doi.org/10.1111/j.1468-0408.2005.00216.x
16. Buijink WFJ, Maijoor SJ, Meuwissen RHG (1998) Competition in auditing: evidence from entry, exit, and market share mobility in Germany versus The Netherlands. Contemp Account Res 15(3):385–404
17. Pierce B, Sweeney B (2004) Cost-quality conflict in audit firms: an empirical investigation. Eur Account Rev 13(3):415–441. https://doi.org/10.1080/0963818042000216794
18. Chung S, Narasimhan R (2001) Perceived value of mandatory audits of small companies. Manag Audit J 16(3):120–123. https://doi.org/10.1108/02686900110385551
19. Tabone N, Baldacchino PJ (2003) The statutory audit in owner-managed companies in Malta. Managerial Audit J 18(5):387–398. https://doi.org/10.1108/02686900310476855
20. Moizer P, Turley S (1989) Changes in the UK market for audit services: 1972–1982. J Bus Financ Acc 16(1):41–53. https://doi.org/10.1111/j.1468-5957.1989.tb00003.x
21. Ahlberg J, Yrjö Collin S, Lazarevska A (2011) Audit firm adaption to expected deregulation of statutory auditing: the Swedish experience. The Corporate Governance Research Group at Linnæus University, Working Papers Series In Corporate Governance 2011:1

Private Insurance and Unmet Health Needs

Paulina Ucieklak-Jeż, Agnieszka Bem, and Paweł Prędkiewicz

1 Introduction

Inequality in health means unnecessary and avoidable differences in health status that are considered as being unfair. Health needs are defined as a disturbance in the health or social well-being, which require intervention in the form of medicinal action, rehabilitation or social assistance, as well as preventive actions [1–3]. Unmet health needs affect the population's health and lead to health inequalities that derive from social factors [4–7], the mechanisms and sources of funding, health system's organization [8] or the equitable distribution of human resources [9, 10]. In fact we can talk about the simultaneous interaction of biological and social determinants and the impact of health system' funding mechanisms [11]. The literature suggests a very diverse set of definitions that focus on selected organizational and functional aspects of private health insurance. M. Kawiński [12] proposes a model split of existing insurance mechanisms:

- public insurance is a business arrangement initiated and organized by the state, which compensates for the losses the from public funds;
- private insurance is a business arrangement initiated and organized by the state, which compensates for the losses the from private funds.

P. Ucieklak-Jeż
Jan Dlugosz University of Czestochowa, Częstochowa, Poland

A. Bem (✉)
Department of Corporate and Public Finance, Wrocław University of Economics and Business, Wrocław, Poland
e-mail: agnieszka.bem@ue.wroc.pl

P. Prędkiewicz
Wrocław University of Economics and Business, Wrocław, Poland
e-mail: pawel.predkiewicz@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_24

Currently, the differences between public and private insurance are largely imprecise [13]. Terms used by the OECD, such as private health insurance, private social health insurance or social health insurance do not have the exact definitional boundaries [14]. The following characteristics enable to classify the particular solutions as public or private insurance:

– requiredness insurance,
– a way of premiums' calculating (risk-dependent, flat-rate contribution, depending on income),
– managing entity (commercial, private non-profit, public) [15].

Private insurance to meet an important role in the system of healthcare financing by being its basis or serving as a complementary or supplementary mechanisms. However, systems based to a large extent on private insurance, especially when a premium is risk-dependent, can lead to the exclusion of not only people with lower income, but also those whose health needs are greater. As a result, it can be a source of unmet health needs.

The aim of the research is to examine the impact of a level of income on the unmet health needs in countries, where health systems are to a greater, or lesser, extent based on the private insurance schemes.

2 Theoretical Background

Although Europe is an area with relatively best health care coverage [16], there are still groups which cannot obtain necessary health benefits (elderly, kids, women, ethnic minorities, poor individuals). The differences in the level of unmet health needs can be observed not only between social subgroups [17] but also among countries.

The concept of "unmet medical needs" is defined as the lack of services which are assessed as necessary to avoid negative health consequences [18] or as the differences between services perceived as necessary and the services actually received [19, 20]. According to Kim et al. [18] the concept of unmet needs is linked to three categories: (1) availability of services, (2) accessibility and (3) acceptability of available services. Originally Carr and Wolfe [19] suggest that the unmet health needs can be measured using both "clinical" and "subjective" approach. The clinical approach refers to situations when health needs may not be met because there is no treatment that could improve patient's state of health or even bring some relief [21]. That's way nowadays the "subjective approach" is widely prevalent. According to that each of the presently existing definition emphasizes this subjective nature of the phenomenon of unmet needs. As far as the existing inequalities in access to healthcare, particularly potential, have the objective nature, unmet health needs are strongly influenced by individual's character. Next to the classic factors (like for example a social gradient) which may cause that a patient does not receive the appropriate care, other factors, such as fear of treatment or religious beliefs may be also important. It is also important that the fact of health needs' feeling is not always strictly related to the current state of health.

Previous research suggests that the construction of the health care system is linked to the level of reported unmet health needs—the elderly in certain countries (among them in Poland) use fewer services and demonstrate a higher level of unmet care needs when compared with other countries [22]. Preliminary studies suggest that health systems create barriers in a different way—while a system based on health insurance generates mostly financial barriers, a system based on free public healthcare cumulates the unmet needs due to long waiting lists [23–26].

The private health insurance are based not only on the individual health state's assessment but also on the ability to pay. Assuming that lower income means weaker access to health benefits, a greater share of out-of-pocket health spending, which is typical for the system of private health insurance, reduces the chance to meet health needs. This relationship is confirmed in a few studies [27]. Generally out-of-pocket payments create a very important barrier for low income groups [28], while from a point of view of higher income groups this is also a chance to avoid long waiting lists [20]. On the other hand the cost of insurance premium can be unacceptably high for social groups characterised by lower income, higher aged or affected by chronic diseases.

3 Methodology and Data

The research is based on the data coming from the European Health Interview Survey (EHIS),[1] covering the years 2008–2016, for 24 European countries split into two subgroups [29].

- Group A—countries, where private health insurance plays a significant role in healthcare benefits' financing: Netherlands, Switzerland, Slovakia, Belgium, France, Ireland, Slovenia, Austria, Germany, Portugal;
- Group B—countries, where private health insurance plays an insubstantial role in healthcare benefits' financing: Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Italy, Norway, Poland, Spain, Sweden, Turkey, United Kingdom.

In the analysis we assume that a system where private insurers participate in a general health system belongs to the private insurance. Therefore, systems of countries such as the Netherlands, Slovakia and Switzerland are treated as private ones—those countries are, without a further analysis earmarked as the countries with an important role of private insurance. In the case of other countries we employ the cluster analysis, based on the method of k-means in order to split them into the groups A and B. Then the centres of gravity of the two groups, using the Euclidean

[1]The European Statistics of Income and Living Condition (EU-SILC) survey contains a small module on health, composed of 3 variables on health status and 4 variables on unmet needs for health care.

distance, have been determined and each point has been assigned to the nearest group. Calculations of distances and the iterative assignment to groups have been repeated for 30 times. Because the method split the observations (countries) into two subgroups without any qualitative differentiation, during the last step the with a higher level of average private current expenditure on heath have been qualified into the group A, while the others—into the group B. Due to the fact that the final assignment may be dependent on the initial one, this procedure has been repeated for 1000 times, calculating the frequency of the assignment into groups.

We pose the following research hypothesis (H1): *in the group A the health inequality expressed by the level of unmet health needs by social groups characterised by different disposable income is smaller when compared with the group B*.

We analyse the variables representing the perceived availability of health care services in five groups depending on the total disposable income:

- (Q0_20)—the first group of quintile income;
- (Q20_40)—the second group of quintile income;
- (Q40_60)—the third group of quintile income;
- (Q 60_80)—the fourth group of quintile income;
- (Q80_100)—the fifth group of quintile income.

The subjective availability of the health care services is expressed by the level of unmet health needs analysed using the three characteristics:

- ZQ1—unmet needs for medical examinations due to too high costs;
- ZQ2—unmet needs for medical examinations due to the spatial availability (lack of service providers);
- ZQ3—unmet needs for medical examination related to the long waiting time.

To assess the inequality expressed by the level of unmet health needs depending on income the Gini coefficient is used. Gini index, a statistics measure often used to assess the level of concentration (inequality) of random variable distribution [30–32]. Technically, by dividing the interval [0, 1] into three sections: <0–0.3 (3)>, <0.3(3)–0.6(6)> and <0.6(6)–1>, we may assign the following interpretation to the values of the Gini coefficient, respectively: low, moderate and high level of inequality [33].

4 Results and Discussion

In the first stage of the research we analyse the descriptive statistics for variables ZQ1, ZQ2 and ZQ3 expressing the unmet health needs by income groups (Table 1).

In the case of ZQ1 and ZQ2 (group A) we can observe to simultaneous tendencies: the level of unmet medical needs decreases along with the increase of income and, in the same time, increases with time (2016 comparing with 2008) for all income groups. Also in the case of ZQ2 the level of unmet medical needs is higher

Table 1 Descriptive statistics for variables ZQ1 ZQ2 ZQ3 by income quintiles in the group A countries

	(Q0_20)		(Q20_40)		(Q40_60)		(Q60_80)		(Q80_100)	
	2008	2016	2008	2016	2008	2016	2008	2016	2008	2016
ZQ1										
Kurtosis	−0.11	2.87	−0.57	−0.95	1.33	0.24	2.81	1.07	1.05	3.43
Skewness	0.88	1.67	0.65	0.64	1.29	1.19	1.51	1.29	1.49	1.85
Stand. Dev.	1.43	2.26	0.61	0.93	0.73	0.66	0.36	0.38	0.23	0.18
Mean	1.78	2.08	0.93	1.04	0.72	0.68	0.40	0.33	0.21	0.13
Volatility (%)	81	108	66	90	102	98	91	117	110	142
ZQ2										
Kurtosis	6.55	−0.15	6.34	5.36	8.33	5.37	10.00	1.41	10.00	2.82
Skewness	2.43	0.78	2.41	2.27	2.85	2.25	3.16	1.78	3.16	1.98
Stand. Dev.	0.17	0.07	0.12	0.09	0.12	0.15	0.03	0.08	0.03	0.10
Mean	0.12	0.06	0.07	0.05	0.05	0.09	0.01	0.04	0.01	0.05
Volatility (%)	143	111	170	184	241	168	300	200	300	205
ZQ3										
Kurtosis	−1.25	3.21	3.49	1.17	−1.38	3.57	−0.81	7.01	1.02	0.07
Skewness	0.49	1.87	1.75	1.62	0.36	1.93	0.96	2.54	1.37	1.11
Stand. Dev.	0.31	0.58	0.32	0.59	0.21	0.41	0.25	0.46	0.16	0.2
Mean	0.38	0.43	0.29	0.46	0.24	0.36	0.23	0.31	0.16	0.19
Volatility (%)	81	136	110	127	88	113	110	147	98	106

for the groups characterised by lower disposable income. At the same time the volatility of ZQ2 can be assessed as extremely large, and for ZQ3—very large. The lowest dispersion is shown for the ZQ1 variable. The lowest level of asymmetry (0.49) can be observed in the case of ZQ1 and ZQ3 within the population with lowest income (Q0_20). The value of the skewness for ZQ1 and ZQ3 increases in the year 2016 (Table 1).

In the case of group B the level of unmet medical needs generally decreases for the higher income groups (except of ZQ3 for Q60_80 in 2008). In contrast with the A group we can observe that the values of ZQ1, ZQ2 and ZQ3 are lower for 2016 than for the 2008—the level of unmet medical needs decreases with time. At the same time the average values for all variables (ZQ1, ZQ2 and ZG3) are higher in the group B, as well as the volatility. The skewness exceeds 1 and, for some observations, even achieves values higher than 2 for ZQ2 variables (Table 2).

To conclude—with the increase in income both in the group A and B decreases the level of unmet medical needs. In the countries of group B the mean values are, for all observations, much higher than in the group A.

During the next stage of our research we study the Gini coefficient for variables ZQ1 (Table 3), ZQ2 (Table 4) and ZQ3 (Table 5), separately for the countries from the group A and the group B.

In the case of unmet needs related to financial barriers (ZQ1) the Gini coefficient suggest the inequality of medium to high strenght, with the highest values for people from the highest income group (Q80_100). In all income groups the inequality indicators are higher for countries from the group B (Table 3).

In the case of unmet health needs, which caused by the spatial availability of healthcare providers (ZQ2), Gini coefficients also take the value from medium to high, with higher values can be observed in the countries of the group A than form the Group B. In the A group countries the highest level of inequality applies to the group of income Q60_80 and in B group countries—the group with highest income (Q80_100).

When it comes to inequality in the level of unmet health needs due to the long waiting times, in both groups (A and B) the Gini coefficients indicate the medium level of concentration. We can only conclude that the level of inequality increases in all income groups in the year 2016 comparing to the year 2008 (Table 5).

During the analysed period (2008–2016), the level of inequality in the majority of social groups increases. The comparison of the average level of inequalities for countries A and B indicates that in the countries of the A group spatial availability is the main cause of unmet health needs, while in the countries of the B group—financial barriers and waiting time seems to be more important (Table 6).

The results presented in above allow us for at least partial adoption of the H1 hypothesis. The study confirms that in countries where the health care financing system more heavily relies on private health insurance the disparities in the level of unmet needs are, on average, lower if they derive from financial barriers or long waiting times. In countries where private insurance are less developed financial barriers and waiting times are, on average, the more important cause of unmet health needs while the providers' network plays not so important role.

Table 2 Descriptive statistics for variables ZQ1 ZQ2 ZQ3 by income quintiles in the group B countries

	(Q0_20)		(Q20_40)		(Q40_60)		(Q60_80)		(Q80_100)	
	2008	2016	2008	2016	2008	2016	2008	2016	2008	2016
Z_{Q1}										
Kurtosis	8.46	10.19	7.87	9.12	6.69	7.02	9.4	1.8	8.93	3.22
Skewness	2.73	3.11	2.66	2.93	2.47	2.66	2.91	1.72	2.82	1.99
Stand. Dev.	6.56	8.86	4.39	4.02	2.97	2.54	1.66	0.79	0.75	0.27
Mean	4.5	4.26	2.8	2.06	1.86	1.31	1.06	0.54	0.51	0.15
Volatility (%)	146	208	157	195	160	194	156	147	146	181
Z_{Q2}										
Kurtosis	3.61	8.87	1.13	1.87	−0.31	−0.15	0.23	0.92	7.95	−1.84
Skewness	1.85	2.83	1.41	1.49	1.01	1.11	1.13	1.13	2.66	0.67
Stand. Dev.	0.65	0.44	0.52	0.24	0.25	0.18	0.21	0.12	0.26	0.05
Mean	0.55	0.25	0.47	0.18	0.24	0.15	0.22	0.1	0.16	0.04
Volatility (%)	118	175	110	132	105	120	94	120	157	134
Z_{Q3}										
Kurtosis	6.47	8.59	5.35	7.57	6.89	8.86	5.33	10.87	3.23	11.04
Skewness	2.35	2.82	2.22	2.69	2.48	2.86	2.23	3.2	1.94	3.24
Stand. Dev.	1.3	3.62	1.49	3.8	1.45	3.2	1.52	3.29	1.23	3.34
Mean	1.14	2.2	1.2	2.11	1.11	1.92	1.21	1.8	1.09	1.71
Volatility (%)	113	165	124	180	131	167	126	183	113	196

Table 3 Gini coefficient for the concentration of unmet needs for medical examination due to high costs (ZQ1) in the years 2008–2016

	2008	2009	2010	2011	2012	2013	2014	2015	2016
A									
Q0_20	0.44	0.46	0.35	0.40	0.40	0.41	0.44	0.58	0.55
Q20_40	0.36	0.44	0.49	0.44	0.42	0.47	0.46	0.57	0.50
Q40_60	0.54	0.54	0.52	0.50	0.56	0.49	0.56	0.61	0.51
Q60_80	0.47	0.56	0.56	0.51	0.61	0.62	0.61	0.60	0.61
Q80_100	0.90	0.80	0.83	0.80	0.83	0.75	0.80	0.75	0.82
B									
Q0_20	0.63	0.66	0.66	0.63	0.58	0.64	0.59	0.60	0.78
Q20_40	0.68	0.67	0.70	0.64	0.60	0.66	0.66	0.68	0.76
Q40_60	0.70	0.71	0.71	0.65	0.63	0.71	0.67	0.67	0.77
Q60_80	0.65	0.72	0.68	0.60	0.62	0.72	0.63	0.74	0.69
Q80_100	0.62	0.70	0.71	0.67	0.63	0.70	0.62	0.66	0.79

Table 4 Gini coefficient for the concentration of unmet needs for medical examination due to spatial availability (ZQ2) in the years 2008–2016

	2008	2009	2010	2011	2012	2013	2014	2015	2016
A									
Q0_20	0.63	0.68	0.59	0.66	0.53	0.56	0.55	0.66	0.57
Q20_40	0.73	0.62	0.74	0.81	0.61	0.55	0.67	0.73	0.78
Q40_60	0.86	0.85	0.79	0.80	0.60	0.83	0.70	0.81	0.74
Q60_80	0.90	0.86	0.90	0.74	0.90	0.80	0.66	0.74	0.80
Q80_100	0.49	0.55	0.66	0.61	0.58	0.51	0.63	0.69	0.56
B									
Q0_20	0.58	0.46	0.49	0.56	0.53	0.51	0.48	0.56	0.73
Q20_40	0.57	0.48	0.52	0.45	0.53	0.48	0.46	0.47	0.67
Q40_60	0.56	0.56	0.57	0.62	0.57	0.52	0.52	0.53	0.62
Q60_80	0.49	0.45	0.62	0.63	0.54	0.62	0.68	0.57	0.61
Q80_100	0.68	0.66	0.67	0.74	0.66	0.69	0.78	0.66	0.64

At the level of the whole sample with increasing income the decline in the average level of unmet medical needs caused by high costs can be observed. However at the same time in the group with the highest income we confirm the greatest inequality, particularly in countries with the greater role of private insurance.

Previous studies support a strong relationship between unmet health needs and poverty, indicating that this effect is stronger in the case of private insurance [9, 34]. A costsharing that is typically a part of private insurance can be a source of this effect [35, 36]. At the same time, patients having the lowest income usually wait longer for health benefits [37–39].

Table 5 Gini coefficient for the concentration of unmet needs for medical examination due to long waiting times (ZQ3) in the years 2008–2016

	2008	2009	2010	2011	2012	2013	2014	2015	2016
A									
Q0_20	0.45	0.52	0.49	0.50	0.54	0.47	0.63	0.49	0.65
Q20_40	0.55	0.48	0.51	0.57	0.56	0.50	0.58	0.60	0.60
Q40_60	0.49	0.51	0.55	0.61	0.53	0.49	0.52	0.61	0.54
Q60_80	0.58	0.62	0.47	0.60	0.46	0.62	0.59	0.67	0.65
Q80_100	0.49	0.55	0.66	0.61	0.58	0.51	0.63	0.69	0.56
B									
Q0_20	0.53	0.51	0.52	0.57	0.56	0.61	0.56	0.62	0.68
Q20_40	0.56	0.62	0.68	0.59	0.60	0.60	0.61	0.65	0.72
Q40_60	0.59	0.50	0.54	0.56	0.58	0.59	0.62	0.56	0.68
Q60_80	0.59	0.53	0.52	0.60	0.61	0.64	0.63	0.65	0.69
Q80_100	0.54	0.49	0.57	0.64	0.61	0.62	0.64	0.66	0.73

Table 6 Average values of Gini coefficient for concentration of unmet needs for medical examination due to high costs (ZQ1) in the years 2008–2016

	A	B
ZQ1	0.57	0.67
ZQ2	0.69	0.58
ZQ3	0.56	0.60

Our study confirms that both higher income is related to lower financial barriers and shorter waiting times but surprisingly this effect seems to be visible in the countries where the health systems relies more on the private insurance. In this sense, the results are consistent with research showing that in the case of outpatient care a greater share of private funds improves system efficiency [40].

5 Conclusions

The presented results can be considered as a little but surprising. Usually it is considered that a greater share of public funds improves access to health benefits, particularly in the case of social groups characterised by higher health needs or excluded due to income or education.

Although the results confirm a negative relationship between income and unmet health needs, at the same time suggest that the level of unmet health needs is higher in countries where health benefits are financed primarily from public funds. Studies also indicate that activities which aim to improve access to health services should be

employed in all social groups, while the high-income groups face higher inequality of unmet heath needs.

This research has several limitations—the more important is that the problem of unmet health needs is limited to the ambulatory care.

References

1. The World Health Report (2000) Health systems: improving performance. World Health Organisation, Geneva
2. Topór-Mądry R, Gilis-Januszewska A, Kurkiewicz J, Pająk A (2002) Szacowanie potrzeb zdrowotnych. Uniwersyteckie Wydawnictwo Medyczne "VESALIUS", Kraków
3. World Bank (2004) Quantitative techniques for health equity analysis: technical notes #7
4. Acheson D (1998) Niezależne badanie nierówności w raporcie o zdrowiu. Biuro Stacjonarne, London. https://www.healthknowledge.org.uk/public-health-textbook/research-methods
5. Ucieklak-Jeż, P (2017) Koncentracja dostępu opieki zdrowotnej a nierówność zdrowotna, In P. Ucieklak-Jeż (red.), Prace naukowe Akademii im. Jana Długosza w Częstochowie. Pragmata tes Oikonomias, Wydawnictwo im. Stanisława Podobińskiego Akademii im. Jana Długosza w Częstochowie, Częstochowa, 11, doi: https://doi.org/10.16926/pto.2017.11.13
6. Ucieklak-Jeż P (2018a) Szacowanie koncentracji potrzeb zdrowotnych związanej ze statusem społeczno-ekonomicznym. Przedsiębiorczość i Zarządzanie 19(3.2):287–301
7. Ucieklak-Jeż P (2018b) Inequality of macro-social factors determining health. Prace Naukowe Akademii im. Jana Długosza w Częstochowie. Pragmata tes Oikonomias
8. Ucieklak-Jeż P, Bem A (2015) Wpływ niefinansowych zasobów systemu ochrony zdrowia na stan zdrowia kobiet i mężczyzn w Polsce. In: P. Ucieklak-Jeż (red.), Prace naukowe Akademii im. Jana Długosza w Częstochowie. Pragmata tes Oikonomias. Wydawnictwo im. Stanisława Podobińskiego Akademii im. Jana Długosza w Częstochowie, Częstochowa, 9, 8–20. doi: https://doi.org/10.16926/pto.2015.09.13
9. Nyman JA (1999) The value of health insurance: the access motive. J Health Econ 18 (2):141–152
10. Rój J (2019) Improvement of equality in the distribution of human resources in Polish healthcare. Preprints. https://doi.org/10.20944/preprints201902.0052.v1
11. Gavurová B, Kováč V, Šoltés M (2019) Medical equipment and economic determinants of its structure and regulation in the Slovak Republic. In: Advanced Methodologies and Technologies in Medicine and Healthcare. IGI Global, pp 351–364
12. Kawiński M (2007) Ubezpieczenia publiczne i prywatne. Próba definicji, Rozprawy Ubezpieczeniowe nr 1(2):104
13. Saltman RB (2003) Melting public–private boundaries in European health systems. Eur J Public Health 13(1):24–29
14. OECD (2004) Proposal for a taxonomy of health insurance, Paryż s. 12
15. Savedoff W, Sekhri N (2004) Private health insurance: implications for developing countries, WHO Discussion Paper no. 3, WHO, Geneva, s. 4
16. Lasser KE, Himmelstein DU, Woolhandler S (2006) Access to care, health status, and health disparities in the United States and Canada: results of a cross-national population-based survey. Am J Public Health 96(7):1300–1307
17. Chaupain-Guillot S, Guillot O (2015) Health system characteristics and unmet care needs in Europe: an analysis based on EU-SILC data. Eur J Health Econ 16(7):781–796
18. Kim Y-S, Lee J, Moon Y, Kim KJ, Lee K, Choi J, Han S-H (2018) Unmet healthcare needs of elderly people in Korea. BMC Geriatr 18(98)
19. Carr W, Wolfe S (1976) Unmet needs as sociomedical indicators. Int J Health Serv 6 (3):417–430

20. Fjaer EL, Stornes P, Borisova LV, McNamara CL, Eikemo TA (2017) Subjective perceptions of unmet need for health care in Europe among social groups: findings from the European social survey (2014) special module on the social determinants of health. Eur J Pub Health 27 (Supplement 1):82–89
21. Sandman L, Hofmann B (2018) Why we don't need "unmet needs"! On the concepts of unmet need and severity in health-care priority setting. Health Care Anal 1–19
22. Bień B, Mckee KJ, Dö Hner H, Triantafillou J, Lamura G, Doroszkiewicz H et al (2013) Disabled older people's use of health and social care services and their unmet care needs in six European countries. Eur J Pub Health 23(6):1032–1038
23. Sanmartin C, Houle C, Tremblay S, Berthelot J-M (2002) Changes in unmet health care needs. Health Rep 13(3):15–21
24. Zhu H (2015) Unmet needs in long-term care and their associated factors among the oldest old in China. BMC Geriatr 15–46
25. Bem A, Prędkiewicz P, Ucieklak-Jeż P (2015) Effectiveness of allocation of health system non-financial resources. In: Brătianu C, Zbuchea A, Pînzaru F, Vătămănescu EM, Leon RD (eds) Strategica. Local versus Global. Faculty of Management, Bucharest, pp 647–656
26. Bem A, Ucieklak-Jeż P (2015) Nierówności w zdrowiu na terenach wiejskich. In: Andrzejak R (ed) Zdrowie dla regionu. Wydawnictwo Uczelniane Państwowej Wyższej Szkoły Zawodowej im. Angelusa Silesiusa, Wałbrzych, pp 59–66
27. Kaminska ME, Wulfgramm M (2018) Universal or commodified healthcare? Linking out-of-pocket payments to income-related inequalities in unmet health needs in Europe. J Eur Soc Policy. https://doi.org/10.1177/0958928718774261
28. Cleemput I, Devriese S, Kohn L, Westhovens R (2018) A multi-criteria decision approach for ranking unmet needs in healthcare. Health Policy 122(8):878–884
29. Prędkiewicz P (2014) Wpływ prywatnych ubezpieczeń zdrowotnych na charakterystykę systemu zdrowia w wybranych krajach OECD, Zeszyty Naukowe Uniwersytetu Szczecińskiego nr 802, "Finanse, Rynki Finansowe, Ubezpieczenia" nr 65, Wydawnictwo Naukowe Uniwersytetu Szczecińskiego, Szczecin, s. 1–11. www.wneiz.pl/frfu
30. Kennedy BP, Kawachi I, Glass RI, Prothrow-Stith D (1998) Income distribution, socioeconomic status, and self rated health in the United States: multilevel analysis. BMJ 317:917–921
31. Navarro V, Muntaner C, Borrell C, Benach J, Quiroga Á, Rodríguez-Sanz M i et al (2006) Politics and health outcomes. Lancet 368:1033–1037. https://doi.org/10.1016/S0140-6736(06)69341-0
32. Szajt M (2014) Przestrzeń w badaniach ekonomicznych, Sekcja Wydawnictw Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa
33. Kurowska A (2011) Dynamika nierówności dochodowych w Polsce na tle innych krajów – najważniejsze wnioski z badań i statystyk. Analizy Instytutu Polityki Społecznej Uniwersytetu Warszawskiego 2:2
34. Van Doorslaer E, Masseria C, Koolman X (2006) Inequalities in access to medical care by income in developed countries. CMAJ 174(2):177–183
35. Freeman HE, Corey CR (1993) Insurance status and access to health services among poor persons. Health Serv Res 28(5):531–541
36. Saini V, Garcia-Armesto S, Klemperer D, Paris V, Elshau AG, Brownlee S et al (2017) Drivers of poor medical care. Lancet 390(10090):178–190
37. Kaarboe O, Carlsen F (2014) Waiting times and socioeconomic status. Evidence from Norway. Health Econ 23(1):93–107
38. Moscelli G, Siciliani L, Gutacker N, Cookson R (2018) Socioeconomic inequality of access to healthcare: does choice explain the gradient? J Health Econ 57:290–314
39. Monstad K, Engesæter LB, Espehaug B (2014) Waiting time and socioeconomic status—an individual-level analysis. Health Econ 23(4):446–461
40. Prędkiewicz P, Bem A, Ucieklak-Jeż P, Siedlecki R (2019) Public or private? Which source of financing helps to achieve higher health system efficiency? In: Jajuga K, Locarek-Junge Hermann, Orlowski LT, Staehr K (red.) Springer Proceedings in Business and Economics. Springer, Cham

Can We Own the Energy Transition? From Policy to Practice Within the Framework of Psychological Ownership Theory

Bożena Ryszawska, Anna Haczkowska, and Piotr Szymański

1 Owning the Energy Transition: The Literature Review

The energy transition process grounded in building mass awareness about climate change can be described as aimed to create a feeling of psychological ownership towards the environment. On one hand, it may sound illogical because neither the environment is an object that one can possess, nor such ownership can be referred to legal or economic norms of possession. But in fact, the definition of psychological ownership clearly highlights that to induce the feeling of ownership both these intuitive requirements do not have to be met. As opposite to more formally defined notions of possession, psychological ownership refers to the *relationship* that can be established between an individual and an object, which can be explained as "*the state in which individuals feel as though the target of ownership or a piece of that target is 'theirs'*" [1, p. 86]. Although the word 'object' can naturally imply something physical, the long history of academic researches proves, this specific relation can be experienced in relation to something intangible, digital or even abstract. A variety of contexts in which psychological ownership was investigated includes i.e. personal data [2], digital technology [3], virtual goods [4], brands [5] or jobs [6]. Also, the mechanisms leading to establish the feeling of ownership are confirmed within the theories grounded in various social disciplines, starting from sociology, ending at development psychology [7]. Regardless of the context, the mechanism is replicable

B. Ryszawska (✉) · A. Haczkowska
Department of Corporate and Public Finance, Wroclaw University of Economics and Business, Wrocław, Poland
e-mail: bozena.ryszawska@ue.wroc.pl

P. Szymański
Department of Economics and Organization of Enterprises, Wroclaw University of Economics and Business, Wrocław, Poland
e-mail: piotr.szymanski@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_25

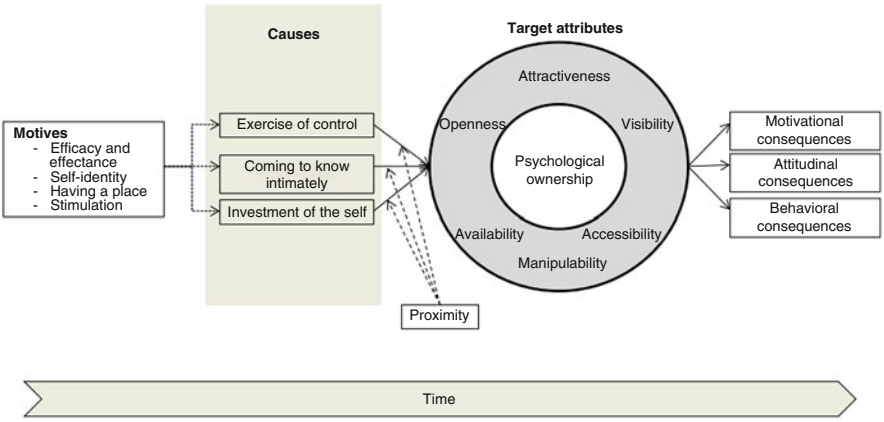


Fig. 1 The theory of psychological ownership [7]

although the role of key determinants may be different. As pictured below (Fig. 1), the deep motives behind developing psychological ownership towards surrounding objects or concepts are always related to the self of the owner and his/her personal benefits. As a result, the initial needs such as to feel effective, define own identity, feel 'at home' and seek stimulation are satisfied by specific motivational, attitudinal and behavioral implications of this process. Also, the three 'routes' leading to establishing this relation are constant. They are: through exercising control over the object, getting to intimately know the object and making personal investments into the object [1, 8, 9].

In contrast to the already mentioned aspects, the towards object proximity become the most important contextual factor influencing to what extent the psychological ownership may develop and what the consequences might be. The psychological ownership framework was already identified as a potentially valuable tool to analyse the barriers hindering the popularization of sustainable behaviors, such as lack of perceived efficacy, responsibility, relevance and immediate benefits accompanied at the same time with the necessity to pay immediate costs [10]. Moreover, as Suessenbach and Kamleitner point out that establishing the relation of ownership between an individual and environment may tackle these barriers and help in resolving the attitude-behavior gap. As the proximity issue was not yet discussed in detail, in this article the conceptual framework of PO is used to analyze the energy transition process in contrasting contexts of low proximity (on the mass, political and international scale) and juxtaposed with a single case study analysis where high proximity between objects and target may be observed. Analyzing the process of transformation in this contrastive contexts provides deeper insights on how the three interrelated routes to establish PO function and what are the key success factors of PO theory in supporting change management.

1.1 Owning the Problem Once Knowledge Has Got the Public Attention

It is hard to deny that for years the topics such as the greenhouse effect or energy crisis were outside the public discourse. As long as the ecology issues were perceived as distant and vague, raised by a very small and thus insignificant group of activists and scientists, their impact on the everyday life of a typical human being was rather low. The common goal of the initial steps taken in order to change it was to get public attention by presenting incontrovertible proofs that human actions, such as wasting natural resources and polluting the atmosphere, influence the environment negatively, which will backfire sooner and on a greater scale than one could imagine. Over the next years of persistent actions, thousands of information campaigns and scientific research, the topics such as global warming and air pollution finally reached the breaking point and were introduced to mass awareness and political decision-making process. Following the initial route to 'own' this problem—acquiring deeper and broader knowledge as well as disseminating it across the globe took decades, but according to PO theory was an indispensable stage preceding further actions. The years of increasing interest to assess our impact on the environment and presenting its concerning results in the public discourse brought not only the feeling of ownership towards the planet but concurrently the feeling of responsibility.

When mentioned outside of the humans-planet context, intuitively the feeling of responsibility rooted in owning something does not imply negative emotions—quite the opposite "*psychological ownership for a particular target may also promote feelings of responsibility that include feelings of being protective, caring, and nurturing, and the proactive assumption of responsibility for the target*" [1]. But, in this particular situation, this notion is apparently very close to "blame", "fault" and "guilt". On this negative and scary media coverage outlining the already visible and inevitable future loses and harms, the feeling of responsibility for the environment was supposed to grow on a mass scale. Once established, this responsible attitude built on a variety of hard evidence confirming the gap between current and necessary actions should motivate societies to create environmentally friendly solutions and present sustainable behaviors. The basics of cognitive dissonance theory [11], as well as many later theories explaining altruistic behavior [12], imply, that when facing an important discrepancy (between two facts or our normative belief and the situation) one feels an internal drive and motivation to resolve and/or erase it. Although there are many internal and external factors influencing the final decision, it is proven that the bigger the gap between desirable and actual situation is, the bigger the motivation to resolve it. Consequently following through the 'knowledge route' and facing a growing number of information about negative outcomes of pollution and wasting natural resources, it is expected to automatically switch to 'control route' through taking quick and decisive actions taken to resolve it. But it appears this motivation does not lead directly to making real changes in how society and industry act in relation to the environment. Does it mean the process was

not successful and after all these efforts we still do not feel the owners of the problem? Not necessarily.

1.2 Owning the Solution Through Experiencing Control Over Strategies, Budgets and Action Plans

Human beings felt 'the owners' of the planet along before the ecological topics were discussed. Since centuries this feeling was grounded in the anthropocentric Cartesian philosophy enforced with religious beliefs. The perception of ourselves as the most developed species on the whole planet Earth was directly linked with the assumption that we should get to know and learn how to control its resources in order to achieve own goals and benefits [13]. As we can see on our own example in relation to the environment, these positive motives resulting from 'owning the problem' and the expected consequences to become *protective, caring and nurturing* may not appear automatically and even if raised, may still not influence actual behavior.

Among many possible explanations mentioned in altruistic behavior and psychological ownership literature, the notions of competence seem crucial in the context of sustainable behavior. It is because it connects both the aspect of knowledge about the target and how to behave in relation to it and the aspect of perceived efficacy of these actions: "*If people feel efficacious and competent, they tend to develop psychological ownership of the object being "influenced*"" [1]. Considering the long history of "blaming" discourse and a vast number of examples proving our damaging influence on the environment, the consequences for our feeling of competence seems obvious: we are highly effective in destroying and harming our planet, but not in taking care of and protecting it. As a result, the initial positive motivation, that could be derived from feeling responsible for environment, clashes with the perception of low competence preventing us from taking actual actions. Apparently, the initial phase of proving negative consequences has raised the overall awareness about climate change high enough to prevent us from settle at this stage. Once spotted, the evidence appeared to be substantially convincing and troubling to keep the motivation to find and implement solutions up and result in taking some major attempts to take control over building new competencies and finding appropriate solutions.

At the first UNFCCC Conference of the Parties (COP 1), which was held in Berlin in 1995, the participants accepted the first common aims in order to take international pro-climate action. The Kyoto Protocol established during COP 3, in 1997 in Japan, outlined the greenhouse gas emissions reduction commitments along with the standards related to emissions trading, the clean development mechanism and joint implementation, known as the Kyoto mechanisms. Transition to renewable energy resources supports achieving the goals of a low-emission economy and contributes to mitigation and adaptation to climate change, which is important in the context of the Paris Agreement and Strategy Europe 2020. Sustainable growth based on energy and resources efficiency accompanied by increased renewable

energy production are the essence of the strategy. European countries have jointly accepted the common goal stated in this energy policy: reaching 27% share of the energy coming from renewable resources in the total energy consumption [14] and are already planning to raise it to at least 32% in the nearest future [15]. In order to achieve this goal, the member states face precisely defined milestones defined until 2020: 20% reduction of CO2 emissions, 20% increase of green energy production and achieving 20% share of renewable energy in total energy consumption (in relation to the 1990 base year). It is worth mentioning that the importance of these priorities is still raising as our perception of efficacy grows—in new financial perspective 2021–2027 the share of funds dedicated to climate and energy transition across all EU programs in the total EU expenditures will be raised from 20% in 2014–2020 to at least 25%.

Achieving these ambitious goals will revolutionise the energy landscape as *there is no historical precedent for transforming energy systems at this scale and at this speed* [16]. On one hand, recent data confirm growing public approval towards the energy transition: 82% of Europeans (and 78% of Poles) agree that more public financial support should be allocated into switching on green energy resources [17, p. 479], what may prove that these actions are generally evaluated as effective. On the other, we can observe an attitude-behavior gap—the contradiction between actual actions and beliefs or attitudes which appears often in the context of behaviors perceived as socially desirable [18]. In this particular case, it is proved by increasing acceptance and declared support for sustainability, which at the same time is not reinforced by taking more sustainable actions on a daily basis.

Although important, popularization of new ways of thinking and introducing new attitudes is still not enough and the two mutually supporting routes of disseminating knowledge and building mechanisms of control are not sufficient to trigger societal changes. As long as the change takes place only on declarative level—as commonly repeated opinions and supportive attitudes—even if massive, it stays an empty slogan. When seen through the lenses of responsible innovation, the energy transition cannot be limited simply to providing political frameworks, sharing information and creating new business models. To increase the pace as well as the scale of impact, it needs to be enforced with a social change through democratic governance of innovation: "*a transparent, interactive process by which societal actors and innovators become mutually responsive to each other with a view to the (ethical) acceptability, sustainability and societal desirability of the innovation process and its marketable products (in order to allow a proper embedding of scientific and technological advances in our society)*" [19]. To achieve measurable effects these declarations made on a political level have to actually influence the decision-making process and find support in real actions and commitments. What else is necessary to switch to the third route to establish psychological ownership and initiate commitments, investments, and actual behavioral change? When translated into the local context, are the above-mentioned public discourses, strategies, and funding mechanisms a sufficient impetus of social change?

2 Is Owning the Problem and the Solution Enough?

Despite the fact that the topic is highly present in public and political discourse, the energy transition in Poland has not yet gained momentum comparable to Western countries. Public opinion express the acceptance of renewable energy, but in practice, the transition is happening slowly. There is a contradiction between positive attitudes towards the development of renewable energy and initiatives undertaken to meet the commitments to limit emissions and increase the share of renewable energy resources in energy production. The crucial question is no longer if we should support energy transition with actions aimed at increasing social involvement, but how to reduce this attitude-behavior gap to do it more effectively? A potentially important support instruments are the public subsidies and co-financing programs dedicated to renewable resources investments.

Unquestionably the EU financial programs offer unique opportunities to support renewable energy transition and achieve defined energy efficiency standards in the member states. Over 2014–2020, the financial support is available under the European Structural and Investment Funds, where more than 23 billion euros was voted only for the 'Transition to a low-carbon economy' objective, which includes renewable energy resources' popularization. As one of the members states Poland receives funds programmed in the EU budget. The Partnership Agreement between Poland and the EU states that Poland will receive 82.5 billion euros from the budget of cohesion policy for 2014–2020, what makes European funds the most significant source of financing the investments in energy transition and green economy sectors in Poland.

In the Partnership Agreement, several Operational Programs and decentralized Regional Operational Programmes (ROP) were designed to manage the process of distributing the funds across the country and various groups of beneficiaries. The Operational Program Infrastructure and Environment (the allocation of 27.41 billion euros) is governed on the national level, whereas the ROPs (the allocation of 16 billion euros) have fully decentralized responsibility for the implementation of development policy to the voivodeships and local governments.

Surprisingly, despite this massive financial support, Poland clearly is underachievers in terms of the pace of energy transition. As pictured below, the share of energy from renewable resources in final gross energy consumption does not increase significantly but actually has started to shrink (from 11.74% in 2015 to 10.97% in 2017, which was the lowest rate since 2013). Although the trend line is rising, it also predicts that Poland will not be able to achieve (already less ambitious than defined for the whole EU) goal of 15% share in 2020. It was confirmed by the European Commission's warning issued in 2015, stating that the jointly-agreed goals for 2020 may not be met in Poland and Hungary. This warning was an unprecedented situation because the other state members, as well as the EU in total, seem to overrun the targets (with an average annual growth rate ca. 8% over the last decade) [20].

Moreover, the opinion of the Polish Supreme Audit Office, after analyzing Polish energy policy and EU regulations implementation process was also negative [21]. The audit has confirmed the inhibition of the energy transition process, especially the stagnation in electric power sector growth. The crucial factors identified as influencing the process negatively include the lack of consistent state policy, delays in implementing European regulations, the unstable and unfavorable legal environment, renewable energy investments evaluated as insecure and unpredictable.

The Eurostat data indicate that in respect to the renewable sources share in final energy consumption Poland finishes at the 21st place among 28 EU countries with 11.6% share. Most importantly, this ratio is significantly smaller than the average value for the whole EU (17%). When compared with other countries in terms of the pace of change, Poland is situated similarly low—on 23 positions with +63.8% growth over 2004–2016 [22]. Apparently following the route of individual commitments and investments is not triggered automatically, as, besides approving international agreements "*Poland is taking action and initiatives in the energy sector that are not part of the EU energy policy and in many cases even hinder the achievement of its key objectives. They are intended primarily to defend energy sovereignty and keep energy prices at the lowest possible level*" [23].

3 Establishing Psychological Ownership Through Local Renewable Resources Initiatives: The Case Study

Although energy transition is a widely discussed topic and the public discourse, as well as political decisions, are aimed at building the attitude that it is a common problem which influences each human being, it is not obvious that small scale actors and individuals actually 'own' this problem. Even though global warming and pollution are scientifically investigated, the negative consequences proven, the ambitious goals established and complemented with financial support, it still seems not enough to kick-start the actions on the local and personal level, because "*People's willingness to support and engage in climate solutions is likely to increase if they can relate them to local experiences or if they see the relevance to their own health and well-being*" [24].

Referring to the routes to establish psychological ownership towards energy transition goals, it seems that following the path of disseminating knowledge and ensuring control on a mass scale does not translate automatically into local-scale decisions and particular investments and the third route stays 'inactive'. The analysis of the transition within the framework of PO leads to the conclusion that although it appears successful in resolving the lack of perceived efficacy, responsibility, relevance and immediate benefits accompanied at the same time with the necessity to pay immediate costs mentioned by Suessenbach and Kamleitner, the attitude-behavior gap persists and the missing route might be responsible for that. Therefore

the initial question of how does this process flows on local-scale initiatives and how it differs from the political level appears crucial. To answer this question we discuss the success story of the biggest in Poland (and Europe!) distributed solar power plant, installed on 35 high residential buildings situated in the center of Wrocław. As a framework to this analysis, the crucial barriers in taking sustainable actions identified by Suessenbach & Kamleitner are juxtaposed with the description of specific actions and decisions leading to this success in relation to psychological ownership theory.

3.1 Methodology

Our methodological approach is qualitative, based on a case study, and it combines a theory-driven approach together with an empirically based approach in the discussion and conclusions stages. The case study is the Housing Cooperative Wroclaw (HCW). During the research, two methods were used to gather the information: semi-structured interviews, participatory observation and documents' analysis were used to gather the information. A total number of nine semi-structured interviews were conducted with key actors, including two interviews with Management Board and Project Team members and seven interviews with inhabitants and other partners. Research covered seven internal stakeholders: one cooperative management board member—vice Chairman of the Board, one cooperative supervisor board member—Chairman of the Board and one CEO and four cooperative members as well as external two stakeholders: one CEO from Voivodeship Fund for Environmental Protection, one CEO of Talo Energy company—Photovoltaic system provider. The projects' documentation, administrative and official papers and press releases were analyzed and the. the participatory observation was carried out between December 2018 and May 2019.

3.2 With Knowledge Comes the Responsibility for Change: Case Analysis

HCW manages 10,500 flats in 102 buildings where about 35,000 inhabitants live. At the beginning of twenty-first century, the HCW management board initiated the process of buildings insulation and heat energy monitoring and management. Thanks to this first project HWC reduced heat energy consumption by 40% and significantly decreased heating bills of the housing cooperative members.

Both the modernized installations themselves as well as the consumption-tracking solutions have caused significant financial savings. Beside ensuring environmental benefits related to total heat consumption reduction, these initiatives were beneficial both for the HC (reduction of maintenance costs) and the residents

(improved technical parameters and thus decreased individual consumption, more accurate costs predictions and consequently significantly lower payments).

But these initial investments brought additional advantages which—although are not easily measurable—played a crucial role in the upcoming decisions. First of all, the actors had a chance to feel a personal responsibility for their resources consumption. Over the years the residents were passive and dependent, cursed with lump-sum payments and continuous raises. But suddenly, after these investments and launching precise consumption tracking analysis, they finally got an opportunity to actually observe and influence their expenditures. Through making better decisions concerning heating and water usage in their private households and experiencing the results of general technical improvements, they could make sure that rational resources management is not only feasible but also beneficial.

Secondly, these initial actions brought an important shift in HC Management Board perception of its role and long term goals. Housing cooperatives are not formally obliged or forced to invest in cost-cutting energy solutions—from their point of view, such initiatives may be perceived as imposing unnecessary financial risk, demanding additional workload and technical competences. Instead of being proactive, it could easily hold such decisions over, wait until the technical conditions or pressure from the residents' side triggers some actions. Even when facing such external pressure, the management could still try to keep the scale of investments at the lowest possible level and do only what seems inevitable, to avoid risk and the necessity of adapting to changes. This attitude resembles the former situation of residents, being prone and reactive in relation to the uncontrolled external pressures, lacking the feeling of real impact on future events or responsibility. But taking these bold decisions HC Management Board was reassured that the strategy of investments and improvements is far more beneficial than only protecting the status quo and that long-term residents satisfaction can be achieved only with a proactive and sustainable resources management plan. Moreover, these initial projects have helped to win residents' trust and revealed the potential (or even directly expressed expectation) to consider subsequent cost-cutting initiatives.

It seems that the entry level the barriers of sustainable behaviors identified by Suessenbach and Kamleitner were significantly decreased by the small-scale steps taken before the analyzed project was even planned. The detailed knowledge, followed by the already established feeling of personal and joint responsibility for resources consumption was enriched with the experience related to monetary and non-monetary benefits resulting from sustainable investments. At this stage, both the HC and the residents have already acquired knowledge, gained control and proven some efficacy in implementing eco-friendly solutions to their closest surrounding. But tracking and decreasing consumption are just the first steps towards actual sustainability, necessary, but not sufficient. Getting back to the psychological ownership theory, this stage may be seen as 'owning the problem'—building a common understanding among HC authorities and residents that the strategic, international and national pro-ecologic goals can be translated onto local, small-scale decisions. But once the problem is 'owned', is the motivation to search, find and actually 'own the solution' naturally triggered?

3.3 Responsibility May Not Imply Efficacy

The social pressure of residents demanding further cost-cutting initiatives, enforced with more and more unstable energy prices on the market drawn HC's attention to green energy solutions and photovoltaic (PVC) in particular. At that time, PVC technology was slowly getting the public attention as an alternative to wind energy solutions—more financially accessible and less interfering with local surrounding, but rarely used in a bigger scale energy production initiatives. Available end-customer funding mechanisms and technical solutions established the image of PVC as an appropriate choice for individual house owners living in rural areas, who want to decrease the energy costs and become less reliant on power suppliers.

It appeared to be the first important barrier the HC representatives faced when analyzing the available technologies and assessing the specific requirements. Not only the scale of investment but also the technical conditions turned out to be highly demanding to potential suppliers. Finding a company who already has the necessary experience proven with the successful implementation of similar projects was uneasy and really time-consuming. Overbroad research and consultations with suppliers eager to take up this challenge, two aspects appeared to be crucial to this choice: ensuring installation security and stable, continuous exploitation over time. Although both these expectations seem equally important when choosing the provider of solutions dedicated to individual households, in this particular situation both requirements were tightened up. Searching and analyzing the solutions that fit these needs made the HC Management Board aware that the external funding is necessary to cover the total costs and that the financial indicators must be estimated for at least 10 years period of time.

But actually, for years there was no financing mechanism dedicated to group initiatives or public entities eager to implement PVC technology on co-owned or shared, as well as communal or public buildings. Moreover, there was no legislation concerning the possibility to sell the energy surplus what made the financial aspects and possible returns on such investments less encouraging. But, in 2015, after wide consultation and quite hectic legislation process, the situation has finally changed.

Once new legislative solutions were implemented on the national level, the entities such as housing cooperatives were finally included as beneficiaries of new funding mechanisms and could have considered implementing renewable energy sources used to both produce energy for own needs and sell it back to the energy market. As a result, when such preferential loans and subsidies became available, not only the individual but group initiatives became feasible and the HC welcomed this opportunity to implement the already considered project of installing PVC on residential buildings' roofs. In this particular situation, launching the PROSUMENT program made it possible to move forward from 'owning the problem' to 'owning the solution' phase. As long as the estimated costs of the considered investment in PVC were perceived as overwhelming by the Management Board, the project was postponed—although legitimate, it appeared to impose too high level of financial risk. As long as there were no available refund mechanisms, this financial entry

barrier was used as a justification to delay the actual actions. But the financial support offered in PROSUMENT became a useful tool for the HC Management Board to finally overcome the attitude-behavior gap. After re-assessing the necessary costs and possible returns on investments with the refund included, the entry barrier appeared to decrease substantially. Defensive strategy of denying responsibility was no longer applicable and all the declarations, knowledge and feeling of responsibility could have finally been put into practice, through launching the actual actions aimed not only at reasonable resources consumption but also sustainable energy production.

3.4 Even if Shared or Illusionary, the Feeling of Control Triggers Acceptance

After analyzing the legal conditions of PROSUMENT program and making sure that the already prepared project meets all the requirements. The Management Board has decided to share the idea with residents and ask for their opinion and approval. It is worth mentioning that legally HC was not obliged to run a wide information campaign and consultation process with residents before presenting the project on the Annual General Assembly. Their formal approval expressed through final voting would have been sufficient in terms of Polish legislation referring to decision making processes in housing cooperatives. Although HC has already earned residents' trust through previous investments, highly innovative nature of this project raised concerns about how this idea will be welcomed by predominantly older and not familiar with green energy production issues residents. Moreover, discussing the technical, financial and exploitation details on this stage could have been a valuable opportunity to identify potential incoherence, challenges, and obstacles in order to take adequate precautions. For these reasons, a two-steps informative campaign was undertaken.

Firstly the HC has selected the change agents—influential and trusted opinion leaders in every 35 buildings—and presented them with a detailed project description during face-to-face meetings, answered their questions and asked for approval. Although the change agents welcomed the project with a high level of trust and enthusiasm, HC Management Board was still very anxious about the other residents' opinions. The main reason behind this uncertainty was that all the previously realized infrastructural investments were not linked with using such innovative technology. In comparison to the insulation or wiring replacements projects, which were widely taken by many housing cooperatives, this idea seemed revolutionary. There was no other example to present, no already realized the project of similar scale, implemented in the city, including installing solar panels on buildings of this height. Even for a small group of highly pro-ecologic, affluent and open to innovations people, this conditions could have had presented a significant threat and raised reluctance, let alone for a community of 15,000 mainly elderly and indigent people

who probably did not know much about energy efficiency and PVC installations. For that reason, during the second phase except the informal actions taken by change agents, the information booklets were distributed and group meetings with Management Board's and technology provider's representatives organized in each block of flats. According to the opinions given during individual interviews, the residents were impressed by both the detailed presentation of financial calculations and the possibility to know more about considered installation and operating solutions. To HC's representative's surprise, the most frequently asked questions did not relate to 'why or what for' types of concerns (which could prove that the residents do not perceive the initiative as reasonable and potentially beneficial), but addressed the long term utilization aspects and safety issues. Finally, when the idea was presented on the Annual General Assembly meeting, an impressive number of 100% of participating residents voted on installing PVC on the 35 selected buildings.

This strong support enabled the HCW management board to introduce a pilot project. The pilot project was financed by the Voivodeship Fund for Environmental Protection. For pilot project purposes the HCW management board has chosen buildings where residents were the most enthusiastic and where HCW estate manager was engaged. On this preliminary stage, some technical problems emerged. Lack of experience in the scope of photovoltaic panel fixing system on roofs over 30 m in height made that this fixing system was changed two times.

When seen through the lenses of psychological ownership theory, these actions may be described as disseminating deep knowledge and creating the opportunity to exercise control over the project in order to empower residents and establish stronger ownership relation towards this initiative. This intuitive strategy was widely investigated in the fields such as motivation theory [25] and consumer behavior [26], proving that the possibility to experience control through participation in decision making and influencing the outcome significantly increases the feeling of ownership, which in result may enhance positive emotions and favorable behaviors.

It is worth mentioning that in this particular situation, the level of participation and control offered to the residents was not actually high. Although the initiative would have not to be realized without their approval, the residents did not have a chance to influence the crucial aspects of the project. The HC Management Board took the responsibility for calculating and scheduling the actions, applying for funds, choosing the specific buildings and technology solutions, sourcing the installation provider and finalizing all formal agreements. Once all these issues were thought over and the conditions specified, the final project was presented to the public for yes-or-no voting. As a matter of fact, neither an extended information campaign about the ecological value of PVC installation nor deepened the technical comparative analysis of several solutions available on the market was necessary to make the final decision. Nevertheless, the residents voluntarily took the risk related to taking a long-term preferential loan secured with a mortgage and agreed to continue with paying previously raised exploitation costs.

This aspect clearly differentiates the initiatives realized by group or public entities from those realized by private households. As the project owner—here HC Management Board—was responsible for the organizational and financial aspects as well

as sourcing the appropriate technical solution and providers, final beneficiaries were not overwhelmed by the numerous decisions and activities necessary to plan, prepare and realize such an investment. This intermediary agent took the heat off the residents through acquiring broader technology-related knowledge, assessing technical conditions, calculating costs and resources and scheduling all the actions. At the same time, this division of responsibilities did not influence the fact, that the installation as well as the results present value directly to the residents. Using the notions grounded in PO theory one may say that the intimate knowledge gained over the consultation process did not have to relate to the ecological value of this particular technology, but only to the project-specific aspects. Similarly, the opportunity to exercise control did not have to be extended to joint decision making on all preparatory stages of the project and discussing all the choices made before finally setting up the actions. Although limited to final approval, asking residents for permission and eagerness to hear their opinion was enough to create the feeling of cooperation in order to achieve a common goal. Through openness and knowledge sharing attitude, HC was able to reassure the residents that the best solutions were chosen and that the estimated benefits are worth the risk. At the same time, the monetary and awareness-related results of previously realized infrastructural investments such as mutual trust, perceived efficacy, and responsibility on both HC and residents' side have ensured the smooth realization of this consultation process.

In relation to the barriers hindering sustainable behaviors defined by Suessenbach and Kamleitner, there is another significant difference between jointly-decided versus individual households' investments of this kind—perceived relevance. Concerning many types of sustainable behaviors, the perception of scale and real, significant influence on the environment becomes most widely spread obstacle to convincing individual people (and households) to change their routines and habits. As far as the topic of green energy consumption and production is concerned, this process seems even more difficult. One may easily question own responsibility and efficacy to start a change, thinking that any decrease in individual consumption of heat, water or energy (which are either way produced and distributed on such a mass scale) would be invisible and totally irrelevant. Although it can prevent many individual households from the action, collectives, such as housing cooperatives, can overcome this obstacle much easier. On one hand, the decision to approve the HC Management Board project was an individual choice made by each household separately and independently. On the other hand, it was perfectly clear to each voter, that the whole community will be influenced by the final result, the total number of these individual choices. When related to estimated financial and ecological results of the whole project, this simple act of voting became a really powerful tool to achieve visible and significant results. In fact, the residents did not vote to make any personal commitments that could be perceived as irrelevant when evaluated on the scale of a whole city or country energy-efficient behaviors. They were voting to launch a large-scale initiative described in impressing numbers of over 2771 solar panels of 0.5 ha total surface and 739 kWp of total power, 633 tonnes of CO2 emission reduced annually and 15,000 inhabitants directly benefiting from the implemented solutions. Even the malcontents could not deny the relevance and

significant 'impact factor' of this initiative. Through this collective effort, the barrier of perceived low relevance and efficacy of individual decisions towards energy transition simply diminished.

3.5 How the 'Sustainability Calculus' Unlocks the Potential of Taking Actual Actions

But when it comes to making final and actionable decisions, all the already mentioned aspects related to the feelings of responsibility, efficacy, and relevance are just one side of the coin. As proven with the analysis of strategic international and national energy transition process, even when successfully established, these declarative attitudes may result in refraining from real action and the attitude-behavior gap. According to PO theory, one more route to build the feeling of ownership is still absent on this stage—the personal investment with the 'owned' object. The PO concept states that to develop the feeling of ownership, the subject decides to 'invest' own resources of various types into the relation with the object.

Behind each such investment, there is a—more or less conscious—calculus of potential costs and benefits. Through making multiple decisions on the type of involvement, its duration, intensity and bearing necessary costs, the subject shapes own relation with the object and get access to all the benefits the feeling of ownership brings. As mentioned by Suessenbach and Kamleitner, when analyzed in relation to sustainable behaviors, the costs/benefits calculus becomes a crucial and most challenging aspect behind making the everyday choices more sustainable. They pointed out that the majority of such choices can be characterized as decision making in a situation of high risk and contradictory time perspectives one needs to consider. In the cost/benefit calculus, the costs must be paid immediately. When making a decision, the individual needs to be aware and agree to pay both the psychological costs of changing routines, breaking habits and learning new behavioral scripts, as well as time and sometimes to make significant monetary investments, which are necessary to switch into completely new technologies or buy appropriate tools and devices. At the same time, the majority of analyzed benefits—no matter if intangible or monetary—is much vaguer, seem postponed and unsure, as does not appear immediately, but is expected to appear in the future. As a result, the immediate investments of own resources have to be juxtaposed the potential benefits that might happen with some, often hard to precise measure, probability and in more (or less) close future. To make this calculus even more complicated, the individual has to face not only the different time perspectives but also various agents involved. Both the costs and the benefits can be considered on a personal level as well as in relation to the surrounding. Including the additional wide-scale benefits of own sustainable behaviors seems encouraging and the feeling of actual influence on other people, animals, and whole environment well-being seems rewarding. On the other hand, these positive consequences appear to be clearly 'psychological' and distant—

intangible, impossible to measure or observe personally. The costs, however, are not only easier to calculate and define, but also are focused directly and personally on the individual—cannot be shared with or shifted on other entities. To sum up, we can generalize the most common 'sustainability calculus' as a competition between immediate, substantial and personal costs one has to pay both actually and psychologically in order to achieve future, vague and often intangible benefits of often highly unpredictable 'rewarding value'. But is this generalization always true? Is it possible to redefine the perception of costs and benefits and change the overall evaluation, so that the benefits would overweight the costs?

There is no need for scientific proofs to imagine that this calculus is highly individual and thus flexible and that its results depend on many internal and situational characteristics, cultural norms and beliefs, as well as the ability (and willingness) to analyze various perspectives and contexts. But, if so, how was it possible that in the analyzed case study this impressive proportion of 100% of residents—obviously representing diverse normative backgrounds, economic situations, and pro-ecologic attitudes—voted 'yes' launch the PVC installation investment? How was their individual calculus influenced or was there anything common behind the method they have used to weigh all the pros and cons?

The HC Management Board put a lot of effort to precisely count and present the benefits resulting from implementing the project to all residents. Besides meeting the requirements relating to calculating the project's ecological impact phrased by the PROSUMENT coordinating institution, the specific financial aspects were discussed in detail during the consultation process. As a matter of fact, this detailed assessment of what costs have to be paid, when and by whom revealed that actually there is no 'personal investment' on the side of individual households. How was that possible? With regard to the non-monetary costs such as time and effort to acquire knowledge, choose technological solutions and the provider, apply for funds and coordinate the initiative in a timely and cost-efficient manner, the role of residents was decreased to the necessary minimum. After taking part in the consultation process and approving the already prepared project's framework, each individual household was not expected to make any other commitments. Throughout the whole implementation phase as well as later, during the initial exploitation period, the residents were influenced by neither executive nor coordination tasks. Also, the barrier of anxiety related to investing own property or resources was significantly decreased in comparison to individual household PVC installation process. Firstly, the infrastructural circumstances were substantially different—no devices nor wiring was installed in private flats, only the common space (roofs, basements, staircases) was necessary. Secondly and most importantly, no personal financial commitment was necessary to capitalize on this investment. The HC could benefit from both the aspects of the PROSUMENT founding mechanisms—obtain a significant cost refund as well as get access to preferential, long-term bank loan secured with a mortgage. From a financial point of view, the only commitments appearing on the residents' side were to accept the mortgage conditions and to continue paying an—already increased before—renovation fund dues. Apparently, all the entry costs and potential risks were either totally moved from residents to HC or shared among the community as a

whole so that each individual household could focus on presented benefits instead of barriers and obstacles. The unique opportunity to include housing cooperative as an intermediary agent and apply for financial support from PROSUMENT program appeared to totally change the cost-benefit calculus and decrease the perceived immediate costs.

And what about the other part of the calculus—the benefits? Obviously, both the HC Management Board as well as the residents can experience various non-monetary benefits. On one hand, participating in such an innovative project may influence their 'personal' image by experiencing pride, efficacy, independence, and pro-activity. Other positive feelings may also appear when thinking about the long term ecological impact on local surrounding, environment, future generations, etc. But the benefits are not limited to these intangible aspects—the project was supposed to prove its economic value and present significant savings to the flats' owners. As stated in the project's budget and financial forecasts, with the given production power, energy prices and exploitation costs, the monetary savings were expected to repay the bank loan over the first 10 years. After that, the total return on investment is going to be shared equally among all residents and will result in substantial decreases in energy payments as well as renovation fund dues. With regard to the barriers usually appearing in 'sustainable calculus', the crucial issue with benefits—the fact that they are delayed in time—is still present. At the same time, the other aspects are clearly different: as a result of detailed planning, the financial returns are precisely calculated and most importantly, they are explicit and will be experienced by each individual household. Moreover, it is important to mention that the forecasts and estimates needed on the application stage were highly conservative and cautious, as they did not consider significant changes in external factors such as energy prices. Now, after the first year of exploitation and analyzing the available production-consumption data in detail, the HC Management Board has revised the initial forecasts. The updated calculation including both the higher than expected production efficiency as well as general increases of energy prices on the market estimate that the first returns on investment can be expected earlier than planned (after 8–9, not 10 years).

4 Conclusions and Recommendations

The psychological ownership theory framework has been implemented to analyze and evaluate an example of successfully realized energy transition innovative project in HC Wroclaw. The three routes to establish the feeling of ownership, which were first described on a social and political level, were then translated onto a local-scale PVC investment. The analysis shows that the road to PO including acquiring and disseminating knowledge, experiencing control and making personal investments towards the target is very similar for both societies and the individual and group agents. The crucial differences seem to be related to the fact how the object of ownership is defined on each level of analysis and—as a consequence—which route-

specific actions play a crucial role. As the presented case study proves, when moving down from international to a local perspective, the funding mechanisms and their reasonable distribution are crucial to activating local agents of change. When equipped with appropriate and available financial support, they are highly motivated to take the lead: acquire the necessary knowledge, take responsibility and coordinate even technically demanding long-term infrastructure investments. Subsequently, when moving from this intermediary stage of collective agents onto the level of individual households' decisions, the energy transition issues need to be translated onto cost-benefits language and the 'sustainability calculus' has to be carefully managed. To influence and ensure social approval in similar consultation processes the managing institutions should focus on creating a feeling that the necessary entry costs and risks are shared (co-owned by numerous agents), so that they could be personally evaluated as low and insignificant and at the same time the potential benefits—even if postponed—are carefully calculated (or even precautionary underestimated) and precisely communicated.

Analysis of the case of Housing Cooperative Wroclaw-South led us to the conclusion that future strategy and priorities to finance renewable energy initiatives in order to reach the 15% target in Poland should be dedicated in more proportion to legal entities like housing cooperatives and municipal housing communities. On one hand, such entities seem more effective in applying for funds, are capable to prepare and coordinate projects smoothly, are highly motivated to source high-quality contractors and supervise the technical and infrastructural aspects of investments. On the other, when realized on a community level, such projects achieve a large scale influence: include unquestionably bigger groups of beneficiaries (also those, who could not afford participation in private-households investments), ensure effective cost management (when negotiating with banks, suppliers, etc.) in relation to final ecological value. Acting as an intermediary agent, such entities contribute to achieving social effects through establishing the relations of trust, responsibility, confidence, and efficacy between community members and simultaneously, improve own positive image in the local surrounding. Moreover, addressing the financial support to collective agents may improve the distribution and achieving more substantial results because, as compared with individual investments, in such projects:

- it is easier to obtain social acceptance because the final individual beneficiaries are deciding on the common resources' involvement. Their risk of territorial/defensive behaviors towards the infrastructure is decreased and distributed equally among many agents and not focused on individual resources;
- "institutional" agents have several concurrent interests in joining such initiatives (financial, social, related to image creation), while single households are more financially motivated;
- large-scale of effects are significant—when management and coordination costs are compared with ecological effects per capita, both the savings and environmental impact are substantial as compared with individual investments;
- the social awareness impact seems bigger—when the individual household investments in energy transition initiative may encourage only the limited number

of closest neighbors to follow the example, collective entities can influence other members as well as similar intermediary agents in the city and accelerate resemblant actions of various external parties;
- the impact on local/regional government and thus influencing the rules of funds' distribution may be achieved—the decision-makers at the regional level may investigate and benefit from similar practices to launch new financing methods, improve the funds' availability and effectiveness.

The psychological ownership theory should not be neglected in planning and implementation the energy transition initiatives. Taking into consideration the concept of "ownership", we should, therefore, care for such initiatives that build a sense of shared and co-owned costs and risks, and at the same time providing personally visible profits and benefits. The public system should empower projects and funding methods which are aimed at reducing initial cost and risk for final beneficiaries and maximizing profits occurring at many levels, for many entities at the same time. We believe that when the number of such projects increases, globally it will enable Poland to achieve climate goals faster and more efficiently.

Acknowledgments The publication was prepared in the project Scaling Up Co-creation: Avenues and Limits for Integrating Society in Science and Innovation. The project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 788359

References

1. Pierce JL, Kostova T, Dirks KT (2003) The state of psychological ownership: integrating and extending a century of research. Rev Gen Psychol 7(1):84–107
2. Kamleitner B, Mitchell V-W (2017) Can consumers experience ownership for all their personal data? From issues of scope and invisibility to agents handling our digital blueprints. https://doi.org/10.1007/978-3-319-77158-8_6
3. Kirk C, Swain S (2017) Consumer psychological ownership of digital technology. https://doi.org/10.1007/978-3-319-77158-8_5
4. Mardon R, Denegri-Knott J, Molesworth M (2015) The relationship between ownership and possession: observations from the context of digital virtual goods. J Mark Manag 32:1–27. https://doi.org/10.1080/0267257X.2015.1089308
5. Chang H, Kwak H, Puzakova M, Park J, Smit EG (2015) It's no longer mine: the role of brand ownership and advertising in cross-border brand acquisitions. Int J Advert 34(4):593–620. https://doi.org/10.1080/02650487.2015.1009351
6. Brown G, Pierce JL, Crossley C (2013) Toward an understanding of the development of ownership feelings. J Organ Behav 35(3):318–338. https://doi.org/10.1002/job.1869
7. Jussila I, Tarkiainen A, Sarstedt M, Hair J (2015) Individual psychological ownership: concepts, evidence, and implications for research in marketing. J Mark Theory Pract 23:121–139. https://doi.org/10.1080/10696679.2015.1002330
8. Pierce JL, Kostova T, Dirks KT (2001) Towards a theory of psychological ownership in organizations. Acad Manag Rev 26(2):298–310. https://doi.org/10.5465/amr.2001.4378028

9. Pierce JL, Jussila I (2010) Collective psychological ownership within the work and organizational context: construct introduction and elaboration. J Organ Behav 31(6):810–834. https://doi.org/10.1002/Job.628
10. Süssenbach S, Kamleitner B (2016) Psychological ownership as a facilitator of sustainable behaviors. https://doi.org/10.1007/978-3-319-77158-8_13
11. Festinger L (1957) A theory of cognitive dissonance. Bibliovault OAI Repository, University of Chicago Press, Chicago, p 72. https://doi.org/10.2307/1420234
12. Schwartz SH (1977) Normative influences on altruism. In: Berkowitz L (ed) Advances in experimental social psychology, vol 10. Academic Press, New York, pp 222–280
13. Ponikowska-Cichoń K (2015) Świadomość ekologiczna – źródła i manifestacje. In: Bartoszek A, Fice M, Kutrowska E, Sierka E (eds) Prosumenckie społeczeństwo a energetyka prosumencka. Uniwersytet Śląski w Katowicach, Katowice, p 52
14. European Commission (2014) Political framework 2020–2030 for climate and energy Brussels 4.2.2014 r. COM(2014) 15 final/2, p 5
15. European Commission (2019) Clean energy for all Europeans. https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans
16. Jenkins K, Sorrell S Hopkins D, Roberts C (2019) New directions in energy demand research. In Jenkins K, Hopkins D (ed) Transitions in energy efficiency and demand the emergence, diffusion and impact of low-carbon innovation. Earthscan from Routledge, New York
17. Special Eurobarometer 479 (2018) Future of Europe – climate change, October and November 2018, Wave EB 90.2 – Kantar Public, p 479. http://ec.europa.eu/commfrontoffice/publicopinion
18. Jonge J, Fischer A, Trijp H (2014) Marketing and sustainable development: a social marketing perspective. In: Trijp H (ed) Encouraging sustainable behavior. Psychology Press, New York
19. Von Schomberg R (2012) Prospects for technology assessment in a framework of responsible research and innovation. In: Dusseldorp M, Beecroft R (eds) Technikfolgen Abschätzen Lehren. VS Verlag für Sozialwissenschaften, Wiesbaden, pp 39–61
20. European Commission (2016) Energy from renewable sources. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_from_renewable_sources&oldid=278442
21. NIK (2018) Rozwój Sektora Odnawialnych Źródeł Energii, Warszawa 2018, KGP.430.022.2017 No. 171/2017/P/17/020/KGP. www.nik.gov.pl
22. Statistics Poland (2017) Energy from renewable sources in 2017. Warsaw 2018
23. Motowidlak T (2018) Poland's dilemmas in implementing the European Union's energy. Energy Policy J 21(1):5–20
24. Sawitri DR, Hadiyanto H, Hadi SP (2015) Proenvironmental behavior from a social cognitive theory perspective. Procedia Environ Sci 23:27–33
25. Csikszentmihalyi M, Rochberg-Halton E (1981) The meaning of things: domestic symbols and the self. Cambridge University Press, Cambridge
26. Agarwal S, Ramaswami SN (1993) Affective organizational commitment of salespeople: an expanded model. J Pers Sell Sales Manag 13(Spring):49–70

Eco-labeling as a Tool to Implement the Concept of Corporate Social Responsibility: The Results of a Pilot Study

Dorota Teneta-Skwiercz

1 Introduction

Corporate social responsibility is a management concept that assumes that companies will build long-term positive relationships with stakeholders. It is running a business in a way that minimizes its negative impact on social and natural environment. The growing importance of CSR from year to year results from the fact that this concept is increasingly perceived as an effective tool for risk management, image improvement, cost reduction, and generation of income growth. In the literature studies of the subject, one can often find that the concept not only stimulates the processes of organizational learning and innovation of enterprises, but also, by enabling effective implementation of social and environmental goals, contributes to strengthening the brand as responsible company and improving its competitive position. The CSR concept can be implemented using various tools. In addition to ethics programs, social marketing, socially engaged marketing, philanthropy, socially responsible investments, it can also be employee volunteering, responsible management of supply chains, and finally eco-labeling. This study focuses on identifying the role that eco-labeling plays in the process of implementing the CSR concept. The first part of the article contains considerations regarding the essence and basic functions of eco-labels. In the second part, a literature review was conducted to show the role of ecological markings in the process of communicating corporate social responsibility. The third part contains the results of own research, the main objective of which was to identify the impact of CSR implementation, and in particular the influencing of eco-labelling by enterprises on purchasing decisions of respondents. Using the syllogistic reasoning in the process of analyzing the results of the aforementioned research, the authors also tried to answer the question: Can

D. Teneta-Skwiercz (✉)
Wroclaw University of Economics and Business, Wrocław, Poland
e-mail: dorota.teneta@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_26

eco-labelling be an effective tool for implementing CSR? The application of research methods is the analysis of literature, surveys. The terms eco-labeling, ecological designations, eco-labels, ecological labels will be used interchangeably.

2 The Essence and Functions of Eco-markers

It is increasingly common to find in the literature today that enterprises should use economic instruments that stimulate the efficient use of resources and protect the ecosystem from degradation [1]. One of such instruments is the eco-marking, which the ISO 14020 standard defines as giving the environmental label in the form of a symbol, a graphic sign or a statement placed on the product or a special sticker visible on the packaging, in technical guides or in advertising and digital or electronic media such as the Internet. The purpose of awarding environmental labels is to provide verifiable, precise and reliable information on the ecological properties of the manufactured products. It is required that products with an environmental label contribute to environmental pollution to a lesser extent than products without a label [2].

Ecolabelling entered the mainstream of environmental policy in 1977, when the German government set up the Blue Angel program. Since then, eco-labels have become one of the more well-known market tools to achieve social and environmental goals. Sources of growth in the popularity of eco-labels can be sought in the growing concern of governments, enterprises and the global community for environmental protection. For enterprises, using this type of markings may prove to be a source of market advantage. Such messages as "recycling", "eco-friendly", "low energy" and "recycled materials" may attract consumers who are looking for ways to reduce their carbon footprint. Therefore, it is not surprising that the commercial sector is involved in the process of ecological product labeling. Ecological labels are awarded to products or services considered to be more environmentally friendly, human health than other goods within a given product or service category.

Eco-labels are usually awarded by standardization organizations of countries (government agencies) or non-governmental organizations, but also by business associations or individual companies. The International Organization for Standardization (ISO) has distinguished three major categories of eco-labels [3]: Type I—awarded by independent entities after appropriate tests and controls; confirm the fulfillment of environmental criteria; voluntary, based on many criteria, a program under which the third party grants a license authorizing the use of environmental labels on products that are environmentally friendly throughout their life cycle; Type II—are attached by companies (manufacturers, importers, distributors, etc.) to the offered goods based on their own ecological standards related to the selected aspect of products, e.g. the possibility of their recycling; they are a type of informational internal environmental declarations; Type III—are declarations of compliance with environmental requirements approved by independent entities; these are voluntary programs that provide quantified environmental data about the product, according to

Table 1 Features of ecological labels

Environmental functions	Social functions	Commercial functions
– Enterprise environmental indicators – A tool to protect the environment as part of public and corporate environmental policy – An instrument to improve the efficiency of the use of natural resources	– A tool to inform consumers about the impact of their purchasing decisions on the environment – A tool to increase consumers' environmental awareness – A tool to promote social progress	– A way to differentiate yourself from the competition – The "ecological marketing" tool (ethical marketing and the so-called greenwashing) – Reputation risk management tool, image improvement – A tool to improve product perception – Mechanism for rewarding enterprises for their social and/or environmental involvement (increase in revenues from sales)

Source: Own study

established parameter categories, set by a qualified third party. They are based on the life cycle assessment. They are issued by national standardization organizations (government agencies) or non-governmental organizations, but also by business associations or individual companies.

The eco-labels can be assigned with three basic types of functions: environmental, social and commercial (Table 1). Considering their impact on the natural environment, it should be noted that such indications are indicators of the company's greening, helping consumers to assess the friendliness of products to the environment and thus making socially responsible, sustainable purchasing decisions. Eko-labels encourages the effective management of renewable resources, encourages the re-use and recycling of industrial, commercial and consumer waste, and thus can contribute to the protection of ecosystems and species diversity. Eco-labeling schemes can also serve to raise consumer awareness of environmental issues and the effects of their purchasing decisions. Research by Kuna-Marszałek and Misiak shows that social and ecological labels are a tool to promote social progress and protect the natural environment by inducing changes in users' behavior [4]. In general, eco-labels are indicators of the environmental performance of an enterprise. They can be a tool for communicating to the public pro-social business engagement, encouraging environment-friendly innovations. By offering products that reduce the negative impact on the environment, companies can establish or strengthen market niches, build a positive image among consumers, thus obtaining a competitive advantage [5]. Eco-labels can be a tool for risk management and improvement of the perception of products offered by a given company.

3 The Importance of Eco-marking in the Process of Communicating About Corporate Social Responsibility: A Review of Literature

The use of environmental labels and declarations is an important activity in the field of ecological marketing, which in today's world can bring numerous benefits to producers [6]. Most empirical studies indicate a strong negative impact of irresponsible company activities (e.g. child labor, human rights violations, air and water pollution) on attitudes towards the company [7, 8], as well as intentions of purchase [7]. Consumers expect companies to be ethical to their stakeholders and are willing to pay higher prices for products made in an ethical manner [9]. Thogersen points out that, especially in the food sector, communicating about CSR through eco-labels can be an effective tool to positively influence consumer reactions [10]. Rashid's research shows that eco-labels are attractive instruments for informing consumers about the impact of their purchasing decisions on the environment [11]. In turn, Sorqvist et al. they noticed that environmentally friendly, organic products are idealized and receive more positive ratings than less environmentally friendly alternatives. For example, people may prefer the taste of coffee marked as environmentally friendly instead of the taste of another, not having an eco-friendly alternative, even if the coffee is actually identical [12]. According to the United Nations Environment Program—UNDP, eco-labeling remains one of the most accepted ways in which a company can communicate environmental data. Enterprises use eco-labels as part of their competitive strategy, which makes it easier for them to distinguish themselves from competitors in the eyes of consumers, government agencies, investors, employees and other stakeholders [13].

4 Problems Related to the Dissemination of Eco-labels

The final choice of tools for implementing the concept of corporate social responsibility should be preceded by an analysis of the effectiveness of their application. This efficiency—in the case of eco-labeling—will be influenced by such factors as the recognition of eco-labels, the trust and recognition of consumers for labels and the demand for labeled products. Meanwhile, due to the ever-growing number of eco-labels, based on their own statements of companies or statements made by an external third party, consumers will encounter difficulties in identifying truly responsible companies, which in turn may imply lower effectiveness of CSR initiatives. Some authors claim that often ecologists do not meet the requirements of copyright and the trademark law, as well as have nothing to do with the ecological character of production [14]. Three main eco-labels have been developed in Poland: Ecoland (organic food production), Eco-sign (organic production) and Green Lungs (regional). In the opinion of the World Bank, none of them has been successful on a large scale, because it focuses only on consumers whose knowledge about these

characters is very low. As a result, they do not provide a visible financial return for companies that use them. Moreover, labeling initiatives have a limited scope and potential impact because they are limited to specific niches in the retail market and often only apply to imported products [3].

In 1999 and 2002, the University of Economics in Krakow conducted research in the field of knowledge of selected ecological characters and the impact of signs on consumer purchasing decisions. Studies have shown that the general knowledge and recognition of ecological marks is very poor. Respondents when buying goods were guided primarily by: quality of goods, price, name of the manufacturer and fourth place safety for the environment [15]. A team of scientists from the University of Zielona Gora and the University of Kiel came to similar conclusions. Based on jointly carried out in 2011 comparative research on the knowledge of the problem of eco-labeling and the criteria of consumer choices used by the students of these two universities formulated the conclusion that respondents do not show interest in purchasing products with an eco-label and know poorly ecological marks [16].

5 Results of Pilot Studies

In Poland, the subject of pro-social and pro-ecological attitudes of buyers, in particular students, is relatively poorly explored. The analysis of previous studies shows that their authors usually focused on two aspects of attitude: the emotional aspect (positive affection for environmental issues) and cognitive (knowledge and beliefs about the environment), and less frequently their research is related to the behavioral aspects. The existence of a research gap in this area may be noticed and assumed then.

The following research problem was formulated for the need of the own survey: How does the socially responsible activity of the company, and in particular the eco-labeling, affect purchasers' purchasing decisions? The main objective of the research was to determine the significance of eco-labels in the context of the implementation of the CSR concept. The research tried to answer the following research questions:

1. How does the information about the social responsibility of a given company translate into purchasing decisions of buyers? Does this information influence equally women's and men's purchasing decisions?
2. Does the product's social or ecological designation constitute an incentive to buy such a good? Are there differences between men and women in this area?
3. What is the level of knowledge of eco-labels among women and men?
4. Can eco-labelling be an effective tool for implementing CSR?

To answer the above questions a pilot survey was conducted, direct from primary sources. As part of the targeted selection, three faculties of the Wroclaw University of Economics were selected. In November 2017, the University signed the

Table 2 Characteristics of the research sample by gender and the Faculty (N = 410)

The Faculty	Gender		In total
	Women	Men	
The Faculty of Economic Sciences	209	79	288
The Faculty of Management, Information Systems and Finance	49	22	71
The Faculty of Engineering and Economics	42	9	51

Source: Own study

Table 3 Characteristics of the test sample due to age (N = 410)

Age	Women	Men	In total
18–24	282	99	381
25–30	13	7	20
31–40	4	3	7
41–50	1	1	2
>50	0	0	0

Source: Own study

Declaration of Social Responsibility[1] and thus officially committed to taking into account and applying the principles of social responsibility in all areas of its activity and disseminating these principles among its stakeholders, including students.

The method of data collection was an audience survey. A questionnaire was used as a measurement tool. The study was attended by people who, due to previously completed courses such as: Management and understood the essence of the concept of sustainable development and corporate social responsibility. The respondents assessed their attitudes and behaviors using the five-point intensity scale described verbally (I disagree, rather disagree, hard to say, rather agree, agree). The study was conducted in January 2018. The sample size was 410 students (410 questionnaires were distributed, all surveys were correctly filled out). The majority of respondents were students of the Faculty of Economic Sciences (70.3%). Women prevailed in each of the studied faculties (Table 2).

Both men and women aged 18–24 were dominant (93%). The second largest group were people aged 25–30 (4.9%). None of the respondents exceeded 50 years of age (Table 3).

The research was conducted among students of full-time and extramural studies, the vast majority being full-time students (78%). In the first question, the respondents were asked to respond to the statement: "When I find out about the social responsibility of the company, I decide to buy the company's products". In response, 40.6% of women agreed with this statement (the sum of the answers "I agree rather" and "I agree"). 18.1% answered in the negative (the sum of the answers "I disagree" and "I rather disagree"). In the case of men, this was respectively: 31% of affirmative

[1] A national initiative addressed to all higher education institutions in Poland to enable dissemination of the idea of sustainable development and social responsibility.

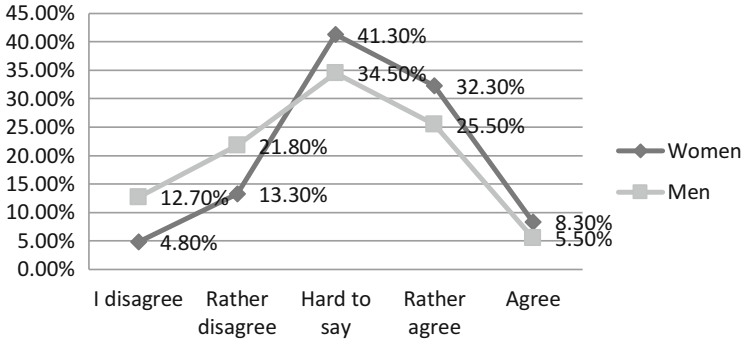


Fig. 1 The ratio of respondents to the statement: "When I find out about the social responsibility of the company, I decide to buy products of this company". Source: own study

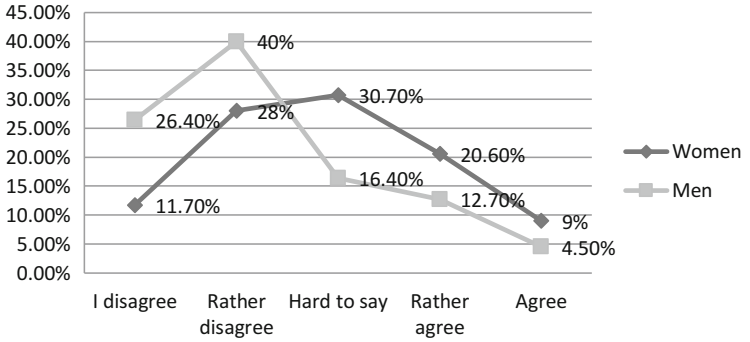


Fig. 2 Respondents' attitude to the statement: "When shopping, I am guided by the fact that the product has a social or ecological designation". Source: Own study

answers and 34.5% of the negative answer. The neutral variant of the answer ("hard to say") was chosen by 41.3% of women and 34.5% of men (Fig. 1).

The next question concerned the significance when making decisions regarding the purchase of a given product, having a social or ecological label. 29.6% of women and 17.2% of men said that shopping is guided by the fact that the product has a given designation. 39.7% of women and 66.4% of men declared that ecologists do not affect their purchasing decisions. 30.7% of women and 16.4% of men could not express a clear position on this issue (Fig. 2).

During the study, the knowledge of 26 examples of social eco-labels/signs were also checked, serving both product designations and organizations actively supporting the dissemination of pro-social and pro-environmental practices. The numbers and logos included in the Eco-label survey are given in Table 4.

For the needs of the study, five intervals were adopted to assess the level of knowledge of eco-markers, related to the percentage of respondents declaring knowledge of a given eco-label. A very low, low, medium, high and very high knowledge of the eco-symbol were distinguished (Table 5).

Table 4 Numbers and logos included in the survey of eco-labels

No	Logos	No	Logos	No	Logos	No	Logos
1		8		14		21	
2		9		15		22	
3		10		16		23	
4		11		17		24	
5		12		18		25	
6		13		19		26	
7				20			

Source: Own study

Table 5 The intervals for the assessment of knowledge of eco-labels

The percentage of respondents declaring knowledge of a given eco-label	The degree of knowledge of eco-label
Up 20% inclusive	Very low
Ebove 20–40%	Low
Ebove 40–60%	Medium
Ebove 60–80%	High
Ebove 80–100%	Very high

Source: Own study

Respondents were asked to mark all the eco-labels they knew. Among the five characters enjoying the highest recognition in the group of women were: Green Point, Euro-leaf, Non-testing n animals, Energy Star, Ecological Mark EKO. In turn, in men in the group of five best-known characters, four out of five indicated by women appeared, albeit in a slightly different order. And so, the first place was occupied by the Green Point, the next Energy star, Ecological Mark, ECO, Euro-leaf and Fairtrade. Demeter was used to identify natural cosmetics as well as food and

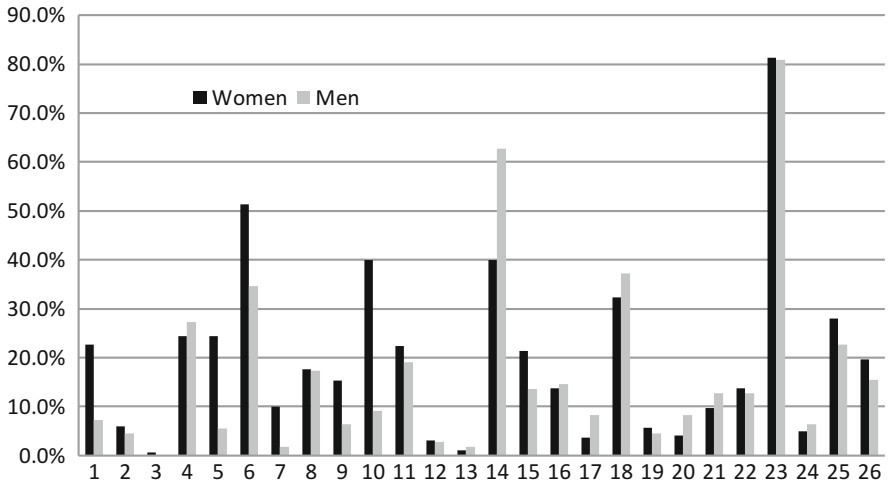


Fig. 3 Recognition of eco-labels by respondents in%. Source: Own study

Table 6 The level of recognition of eco-labels among women and men

The degree of knowledge of eco-label	Number of eco-labels known to women	The number of eco-labels known to men
Very low	15	20
Low	9	4
Medium	1	0
High	0	1
Very high	1	1

Source: Own study

products made of wool and cotton from crops without the use of chemical fertilizers and chemical plant protection agents in both groups (Fig. 3).

The research shows that among women, a very low level of familiarity with marks was noted in the case of 15 determinations, among men—20 (Table 6). The low level of recognition in the group of women concerned 9 characters, among men—4. Knowledge of only one eco-label with the number 23 (Green Point) was at a very high level in both groups of respondents.

The conducted research shows that messages on the social responsibility of a given company arouse consumers' desire to purchase products of a responsible entity. The percentage of women deciding to buy the goods of a socially responsible company was greater than the percentage of men. The vast majority of respondents—regardless of gender—stated that the product's social or ecological label does not affect their purchasing decisions. Studies have exposed the very low level of knowledge of eco-markers among respondents, while the level of ignorance of men in this area was greater than that of women. The conclusions formulated above coincide with the results of research conducted in 1999 and 2002 at the Cracow

University of Economics, and in 2011 by a team of researchers from the University of Zielona Gora and the University of Kiel.

A low level of knowledge of eco-labels on the one hand, combined with the treatment of eco-labels as the inferior criterion of purchase decisions, questions the efficiency of eco-labeling as a tool for the implementation of the CSR concept. However, it should be emphasized that a reliable assessment of the effectiveness of the eco-labeling will require an examination of the recognition of eco-labels and the demand for products bearing them among wider groups of buyers, both individual students who are not students of Wrocław University of Economics and Business, as well as institutional and corporate buyers.

6 Summary

In order to benefit from socially responsible activities consisting in offering products with an ecological designation, effective and transparent CSR communication, a high level of eco-label recognition and consumer demand for products with an eco-label are important. Meanwhile, both own research and studies conducted by other scientific centers have not confirmed the existence of conditions conducive to the effective use of eco-labels in the process of implementing the CSR concept. It turns out that the knowledge of the fact that a given company undertakes socially responsible activities, in particular, participates in the eco-labeling program, does not guarantee a decision to purchase products of that company.

Finally, the limitations of the tests carried out, should be mentioned. The research—due to the selection and size of the sample—was not representative, so the conclusions can only be applied to the respondents. There were some restrictions of the identification of behaviors in specific situations (the descriptive nature of research) without penetrating the causes of observed phenomena. It seems necessary to broaden the research perspective, both in the subjective and objective sense. For example, what should be examined: what are the reasons for poor recognition of eco-labels in Poland? Why do buyers who know the mark do not decide to buy the product with it?

References

1. Malara Z (2006) Przedsiebiorstwo w globalnej gospodarce. Wyzwania współczesnosci. PWN, Warszawa
2. The Polish Committee for Standardization (Polski Komitet Normalizacyjny – PKN) (2005) PN-EN ISO 14020:2003. Etykiety i deklaracje srodowiskowe. Ogolne zasady. PKN, Warszawa
3. The World Bank (2006) CSR implementation guide non-legislative options for the Polish government (English). World Bank, Washington, DC. http://documents.worldbank.org/curated/en/614061468776732229/CSR-implementation-guide-non-legislative-options-for-the-Polish-government. Accessed 10 Jan 2019

4. Kuna-Marszałek A, Misiak M (2016) Ekologia w biznesie na przykladzie systemow zarzadzania srodowiskiem i ekooznaczen. In: Buczkowski B, Kuna-Marszałek A (eds) Biznes we współczesnej gospodarce. Uniwersytet Lodzki, Lodz, pp 137–159
5. Global Ecolabelling Network (GEN) (2004) Information paper: introduction to ecolabelling. https://globalecolabelling.net/. Accessed 28 Jan 2019
6. Kowalska A (2016) Etykiety i deklaracje srodowiskowe – zarys problemu. J Mark Mark Stud 4:21–29
7. Murray KB, Vogel CM (1997) Using a hierarchy-of-effects approach to gauge the effectiveness of corporate social responsibility to generate goodwill toward the firm: financial versus nonfinancial impacts. J Bus Res 38(2):141–159
8. Folkes VS, Kamins MA (1999) Effects of information about firms' ethical and unethical actions on consumers' attitudes. J Consum Psychol 8(3):243–259
9. Creyer EH, Ross WT (1997) The influence of firm behavior on purchase intention: do consumers really care about business ethics? J Consum Mark 14(6):421–433
10. Thogersen J (1999) The ethical consumer. Moral norms and packaging choice. J Consum Policy 22(4):439–460
11. Rashid NRNA (2009) Awareness of eco-label in Malaysia's green marketing initiative. Int J Bus Manag 4(8):132
12. Sorqvist P, Haga A, Holmgren M, Hansla A (2015) An ecolabel effect in the built environment: performance and comfort effects of labeling a light source environmentally friendly. J Environ Psychol 42:123–127
13. United Nations Environment Programme – UNDP (2005) The trade and environmental effects of ecolabels: assessment and response. http://wedocs.unep.org. Accessed 10 Jan 2019
14. Zarębska J (2014) Znakowanie ekologiczne towarow a swiadomość ekologiczna mlodziezy. Gen Prof Educ 4:86–94
15. Adamczyk W (2004) Ekologia wyrobów. PWE, Warszawa
16. Gawron M, Kitta E, Zagajewski A, Shageev A (2011) Europejski system ekoznakow i jego rola w ograniczaniu zagrozen przemyslowych. Manag Syst Prod Eng 3(3):10–15

Corporate Social Responsibility Activities and The Firm's Value: The Case of Containers and Packaging Industry Sector

Tomasz Słoński and Goksin Ilbasmis

1 Introduction

For some decades, there have been an increasing attention by business publications and academia about the CSR programs, performances and implications of companies in almost all sectors and industries. There is already a large research domain and extent literature which proves that CSR activities can play an important role to increase the firms' value. We asked the question whether the CSR activities lead to be a competitive advantage and another value creator element for container and packaging companies.

"These activities may involve all stakeholders of these companies. like: consumers, customers, co-workers, suppliers, business groups, industry bodies, investors, governments, regulators, communities and the environment itself. Some of these activities are such that: (1) Environmental Activities: GHG (Greenhouse Gas) Emission and lowering energy consumption, operational and post-consumer waste, and pollution, then increasing air quality, (2) Sustainability Activities: Sustainable Material Management, (3) Social Activities: Public Policy and Education, Ethics & integrity, Employee Attraction and Engagement" [1]. Other container and packaging industry giants [2, 3] follow similar trend.

The customers of these companies also have CSR activities. Especially big corporates are planning and implementing CSR Programs which may have direct effect on the prosperity of people in many countries and may have powerful impact to shape society's future formation in some ways. As an example, "Mondelez

T. Słoński (✉)
Wrocław University of Economics and Business, Wrocław, Poland
e-mail: tomasz.slonski@ue.wroc.pl

G. Ilbasmis
Mondelez International R&D Packaging Development, East Hanover, NJ, USA
e-mail: goksin.ilbasmis@mdlz.com

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_27

International launched Cocoa Live Program in 2012 investing USD400 million by 2022 to empower minimum 200,000 cocoa farmers and reach more than 1,000,000 community members. Program includes six countries: Ghana, India, Cote d'Ivoire, The Dominican Republic, Indonesia and Brazil. The main activities are to help farmers learn how to farm better, gain knowledge and skills to improve livelihoods, strengthen their communities and inspire support next generation of cocoa farmers. There are basically five focus areas to transform: Farming, Community, Youth, Livelihoods, Environment".

Our research objective is to identify and validate the link between the CSR actions of container and packaging industry global players and their financial performance with respect to the country of their origin. The design of our study is structured as following: we initially set out in detail what is the context of CSR and how CSR projects can help a firm to create value and then develop four hypotheses for three strategic dimensions, (environmental, social and corporate governance), that seem to have an impact. After that we analyze the valuation of a firm, why and how the valuation is exercised. We then discuss about the Research Methodology. Finally, Findings, Data Description and Analysis will be the subject of the next section. The last section planned for Discussion and Conclusions. In the end, we conclude with suggestions for a future research.

2 Literature Review on CSR

2.1 Definition of CSR

There have been many disputes for a clear and unbiased definition of CSR Activities. The companies who are looking for a formal approach, can use internationally recognized principle and guidelines.

1. "Organization for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises, especially for large companies" [4]: "The responsibility of enterprises for their impacts on society; respect for applicable legislation, and for collective agreements between social partners, is a prerequisite for meeting that responsibility. To fully meet their CSR, enterprises should have in place a process to integrate social, environmental, ethical, human rights and consumer concerns into their business operations and core strategy in close collaboration with their stakeholders, with the aim of, maximizing the creation of shared value for their owners and for their other stakeholders, identifying, preventing and mitigating their possible adverse impacts". Brussels, "25.10.2011 COM (2011) 681 final"
2. United Nations Global Compact 10 Principles: platform for business and non-business actors to engage in discussions around transnational policy issues such as global warming, human rights and anti-corruption [5].

3. ISO 26000 Guidance Standard: "Social Responsibility is the responsibility of an organization for the impacts of its decisions and activities on society and the environment through transparent and ethical behavior that contributes to sustainable development, including the health and welfare of society, takes into account the expectations of stakeholders, is in compliance with applicable law and consistent with international norms of behavior, and integrated throughout the organization and practiced in its relationships. Sustainable development is about meeting the needs of society while living within the planet's ecological limits and without jeopardizing the ability of future generations to meet their needs" [6].

There are seven core subjects and issues pertaining to social responsibility: (1) organizational governance, (2) human rights, (3) labor practices, (4) environment, (5) fair operating practices, (6) consumer issues, and (7) community involvement and development. The top management of the companies are also aiming to integrate socially responsible behavior into their organization.

2.2 The Classification of CSR Theories

After the Second World War, the companies, organizations and governments had a lot of debates about the definition, measures and implementation of CSR activities. The book "Social Responsibilities of the Business" [7] discusses the terminology and the aspects in general. "Since then the field has grown significantly and nowadays contains a great proliferation of theories, definitions. approaches and terminologies. Some of the descriptions are like Society and business, Social Issues Management, Corporate Accountability, Public Policy and Business, Stakeholder Management. Some scholars compared the recent concepts with the classic notion of CSR, corporate sustainability" [8] and "Corporate Citizenship" [9].

Some theories combine different approaches and use same terminology with different meanings. Carroll, who is one of the most prestigious scholars in this discipline, characterized the situation as "an electric field with loose boundaries, multiple memberships and differing training and perspectives, broadly rather than focused, multidisciplinary, wide breadth, brings in a wider range of literature and interdisciplinary" [10].

There have been some attempts made to address the deficiency. Frederick [11] outlined a classification based on a conceptual transition from the ethical–philosophical concept of CSR (what he calls CSR1), to the action-oriented managerial concept of social responsiveness (CSR2). He then included a normative element based on ethics and values (CSR3) and finally he introduced the cosmos as the basic normative reference for social issues in management and considered the role of science and religion in these issues (CSR4). In a more systematic way, Heald [12] and Carroll [13] have offered a historical sequence of the main developments in how the responsibilities of business in society have been understood.

Other classifications have been suggested based on matters related to CSR, such as Issues Management [14, 15] or the concept of Corporate Citizenship [16]. An alternative approach is presented by Brummer [17] who proposes a classification in four groups of theories based on six criteria: motive, relation to profits, group affected by decisions, type of act, type of effect, expressed or ideal interest. Garriga and Mele present the most relevant theories on CSR and related matters, trying to prove that they are all focused on at least one of the aspects namely [18]: instrumental, political, integrative, ethical.

2.3 The Value Enhancing Capabilities of CSR: Scope, Concept and Measurement

We can describe the value of a firm as an economic measure that reflect the value of entire business to be allocated to the shareholders and debtors. That is the ratio between equity market value and equity book value. This value can be calculated by using different methods of measures like, net book value (Total Assets minus total liabilities), Market Value of all its outstanding shares, Relative Valuation etc. These methods will be analyzed in detail in the next section. CSR can also be a function of firm's behavior against its different stakeholders as shown in Table 1 [19]. CSR benefits may influence firm value directly or indirectly in different forms. Figure 2, [19], shows the most common areas, where companies usually practice and gain benefits when employing these specific initiatives.

2.4 CSR and Firm Financial Performance

Abbott and Monsen's [20] research is one of the early studies that designed a corporate social involvement disclosure scale based upon content analysis of annual reports and an investigation of the effects of CSR disclosures on firm profitability. "Some research show that there is a negative association or no clear association at all between CSR and a firm's financial performance. However, some research demonstrates that CSR and firm performance are positively associated" [21]. "In line with other contingency based perspectives of CSR's impact on CFP we see no theoretical reason to justify the a priori assumption that there is one type of relationship between CSP and CFP across industries and other analytical contexts" [22].

Some researches use different accounting measures like Return on Investment (ROI), Return on Assets (ROA) and Return on Sales (ROS).

To reduce the accounting illusion effect [23] we incorporated, simplified Tobin's Q (the book value of assets approximate replacement costs) [24] and PE ratio, in the research, as a proxy of transitory effect of the current earnings change. It is important to know how CSR disbursements are recognized in accounting system. If capitalized

Table 1 Typical CSR activities and theirs value enhancing capabilities

Stakeholder	Firms typical CSR activities	Sources of value enhancing capabilities of CSR
Customers	– Differentiate Products – Offer Better Customer Care – Improve Brand Equity	– Create Brand Value – Expand Customer Loyalty – Increase Sales Revenues
Suppliers	–Ensured Secure Work Environment – Support Diversity and Minority – Pay Decent Price	– Reduce Supplier-Buyer Cost – Promote Diversity – Build Corporate Reputation
Employee	– Meeting Labor Demand – Giving Better Health Care – Training and Improvement – Offering Higher Wages	– Improve Productivity – Build Employer Reputation – Attract Better Personnel
Investors	– Improve Reporting Quality – Ensure Better Governance – Promote Corporate Ethics	– Increase Market Return – Reduce Risk and Cost of Capital – Reduce Information Asymmetry – Improve Operating Performance
Regulators	– Contribution to Political Parties – Reduce Corruption and Controversy – Comply Regulatory Requirement	– Receive Favorable Treatment – Influence Policy Development – Reduce Litigation Risk
Community	– Increase Corporate Charity – Contributing Disaster Relief – Giving NGO Support	– Build Corporate Branding – Get favorable Media Coverage – Convey Positive Managerial
Environment	– Saving Water and Energy Cost – Reduce Carbon Emission – Reduce Hazardous Disposal – Green Building and Plantation	– Reduce Regulatory Fines – Signal Managerial Skills – Build Corporate Reputation

Source: Based on [19]

it will be recognized in Tobin's Q as a change in book value of assets. If expensed it will affect firm's earnings and therefore impacts PE ratio. It gives the additional reason of using Tobin's Q and PE ratio. The financial performance is reflected in market value of company and is operationalized by two measures that complement each other.

We can identify some causes of inconsistent associations between CSR and firm performance like, stakeholder influence capacity and misspecification of econometric models. Endogeneity has been identified as an important problem. Al-Tuwaijri [25] used 2 stage model and demonstrated positive association between CSR (environmental) performance and Corporate economic performance. However, Aupperle et al. [26] failed to demonstrate a positive relation. "Varying Levels of Social Orientation were not related with firms' economic performance differences. The discussions on definition of CSR activities and different measuring tools are main causes for inconsistent findings. Overall the literature accepts that superior quality of CSR activities results increase in firm economic performance" [27].

3 Data Description, Research Design and Methodology

Professional financial Institutes like Thomson Reuters, Morgan Stanley Capital International (MSCI), Kinder, Lydenberg and Domini (KLD), Risk Metrics, Bloomberg, Dow Jones and Pearson are collecting and publishing listed companies' data including indexes of CSR activities. For the empirical analysis, we took the companies' CSR and financial data from Thomson Reuters datastream ASSET4 database about publicly traded companies from the container and packaging sector. We assumed that 19 companies' data would be enough to represent the sample group, in following 5 years-time perspective from 2012 to 2016. All the local currencies are converted to USD as of December 31st of the year.

In this study the main topic we will be looking for is to understand whether CSR Activities influence the firm value either positive, negative, or neutral? So, we can set our hypothesis as below:

Hypothesis: Do Corporate Environmental, Social and Governance Activities have a significant influence on Corporate Financial Performance by region of container and packaging industry?

To analyze our hypothesis, we will be looking for two dependent variables, (Tobin's Q) value and (PER) value. The region, where the companies are located added as a categorical variable (control parameter, C1) for the regional perspective, mainly Europe, North America and Asia. Relationships between X1, X2, X3, C1, and Y1 or Y2 variables are tested using the MiniTab Statistical Software for multiple regression analysis [28]. Where:

X1 is Environmental Score, X2 is Social Score, X3 is Governance Score, Y1 is Tobin's Q value, Y2 is PER (Price to Earnings Ratio) value, C1 is Region as a control variable.

When we collect data, we can randomly sample items and then record their X values or we can only sample items with predetermined X values that we set beforehand. Collect a random sample of items that are representative of the process.

We estimated two regression models, both as the dependent variables: simplified Tobin's Q, model(1) and PER, model(2). Following Guenster et al. [24]. The mathematical notation of the model is as follows:

$$\begin{aligned} \text{Value}_i = {} & \alpha_0 + \alpha_1 \text{Environmental Score}_i + \alpha_2 \text{Social Score}_i \\ & + \alpha_3 \text{Governance Score}_i + \sum_{j=1}^{3} \beta_j \text{Region}_{i,j} + \varepsilon i \end{aligned} \tag{1}$$

where:

Value_i, valuation proxy for a company i;

Environmental_i, Social Score_i, Governance_i as well as Economic_i—are the scores (ranging from 0 to 100) for particular pillars of the Reuters ASSET4 CSR ranking;

$Region_{i,j}$, 3 dummy variables, distinguishing the country of registration of the company between North America, Europe and Asia;

Additionally, we use trimmed (the procedure ensures a limited effect of outliers) dependent variables in logs. The trimming procedure eliminates potential outliers in the extreme left and right 0.5% of the distribution.

4 Findings and Analysis

Hypothesis is tested with 79 data points, using Tobin's Q Mark as Output Y with 3 variables X1, X2, and X3 namely Environmental Score, Social Score and Governance Score respectively, if there is a significant relationship between Y and X variables (with "region" used as a categorical X variable).

Tobin's Q Mark's Multiple Regression Analysis Figure 1 shows the Model Equation and Fig. 2 shows a strong relationship with R^2 Correlation Coefficient of *86.45%* between three variables, namely, X1—Environmental Score, X2—Social Score, and X3—Governance Score. Due to strong linear correlation results of the statistical analysis, a prediction model or multiple regression model equation can be used to derive future Tobin's Q variable if three variables X1 (Environmental Score), X2 (Social Score), and X3 (Governance Score) are available, vice versa by region (Asia, Europe and North America).

Figure 3 shows the interaction of Effects of the X Variables against Y—Tobin's Q Value output. The Environment Score has common effect in all three regions, where increasing environmental scores from 0 to 60, may decrease the Tobin's Q value and later after reaching score of 70, environmental score, tend to increase and gives a positive effect in the company's Tobin's Q Value. This is mainly due to the fact, that 0–60 environmental score is perceived as start up or a poor score, therefore has decreasing tendency.

We observe that the trends are different between the three regions. For example, Europe's Tobin's Q score has positive trend-effect, towards increasing Social Scores, but for Asia and North America it is completely opposite effect.

Multiple Regression for Tobin q Mark
Model Equations Report

X1: ENVIRONMENTA X2: SOCIAL SCORE X3: GOVERNANCE S X4: Region

Region			Final Equations
Asia	Tobin q Market	=	2.525 - 0.06855 X1 - 0.00451 X2 + 0.03651 X3 + 0.000491 X1^2 - 0.000253 X2*X3
Europe	Tobin q Market	=	2.581 - 0.07451 X1 + 0.02047 X2 + 0.01064 X3 + 0.000491 X1^2 - 0.000253 X2*X3
North America	Tobin q Market	=	1.463 - 0.05650 X1 + 0.00326 X2 + 0.02387 X3 + 0.000491 X1^2 - 0.000253 X2*X3

Fig. 1 Multiple regression model report for Tobin's Q (Source: Own preparation)

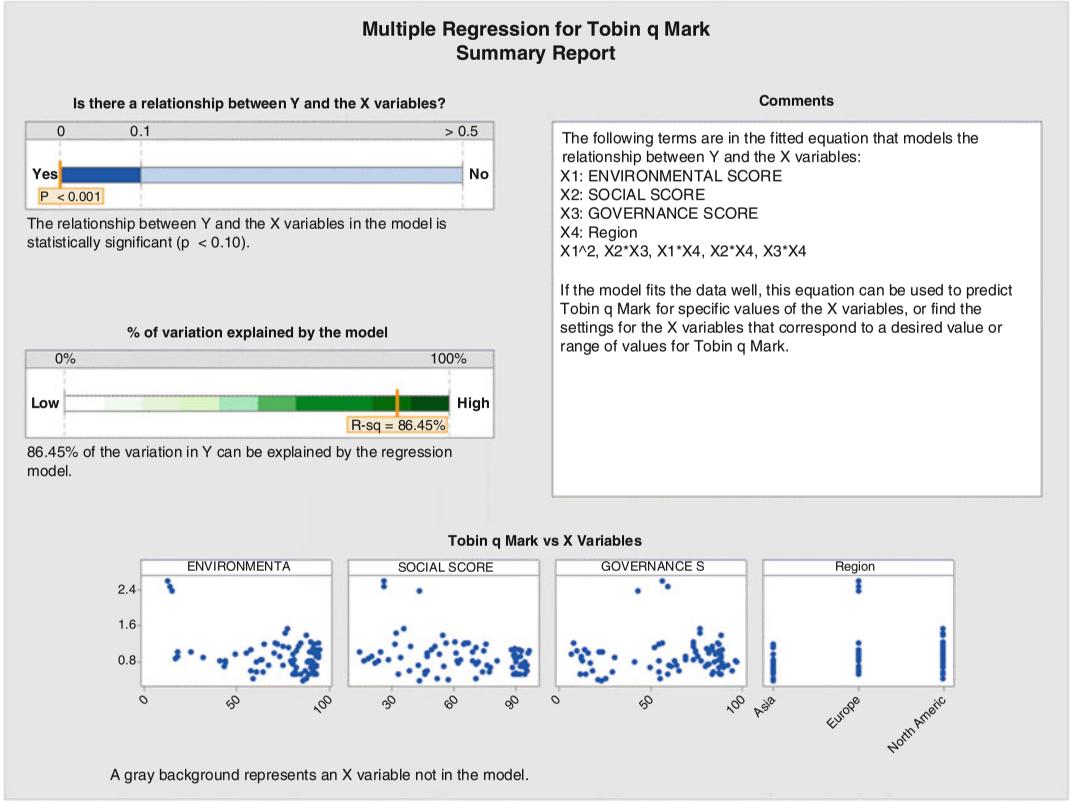


Fig. 2 Multiple regression for Tobin's Q summary report (Source: Own preparation)

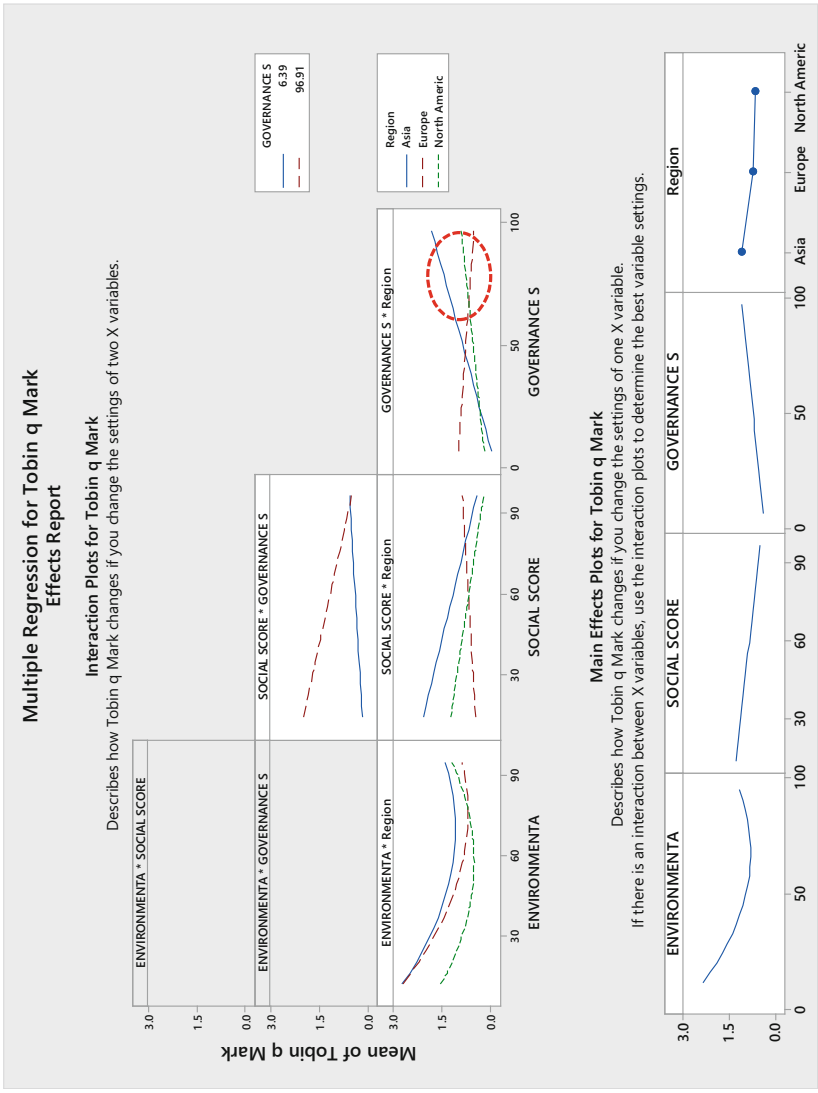


Fig. 3 Multiple regression for Tobin's Q effects report interaction plot (Source: Own preparation)

Multiple Regression for PER
Model Equations Report

X1: ENVIRONMENTA X2: SOCIAL SCORE X3: GOVERNANCE S X4: Region

Region	Final Equations
Asia	PER = 10.64 + 0.0472 X2
Europe	PER = 12.60 + 0.0472 X2
North America	PER = 18.05 + 0.0472 X2

Fig. 4 Multiple regression model equation report for PER (Source: Own preparation)

On the other hand, increasing Governance Score in Asia and North America has increasing positive effect in Tobin's Q Value. Unlike Europe, increased governance score may decrease or reduce the Tobin's Q Mark of the company.

Governance Scores per each region, overlaps between points 32, 49 and 62—meaning if we are within this area, we are in the equilibrium within the other one to three regions.

The chart of the effects of each variable simply shows that for Governance and Social Scores, Asia and North America behaves the same but is opposite versus the Europe region. Nevertheless, results show that when it comes to Environmental Score, all regions show the same pattern and similar trends hence Environmental Score has the largest influence or incremental impact on the Tobin's Q Value. Base on the above statistical multiple regression analysis report, environmental has the most contributing factor into the model as it has direct impact as well in the increased correlationships versus other variables.

Price Earning Ratio (PER) Multiple Regression Analysis There is also significant difference but the correlation coefficient is not as strong as established in using Tobin's Q Value. The P value is less than <0.01 hence significant relationship between X variables and Y (PER). While R^2 is 39.6%, we are not able to use the prediction model to predict what will be the potential Y output if we have all three X variables available (Figs. 4 and 5).

5 Summary and Future Recommendations

Strategic Managers can prioritize which of the ESG (Environment, Social, and Governance) factors will have an influence in the firm value. They can firstly prioritize environment related activities, which has generally positive effects in firm value in all regions provided that minimum environmental requirements are met due to increasing focus on circular economy for packaging Industries and

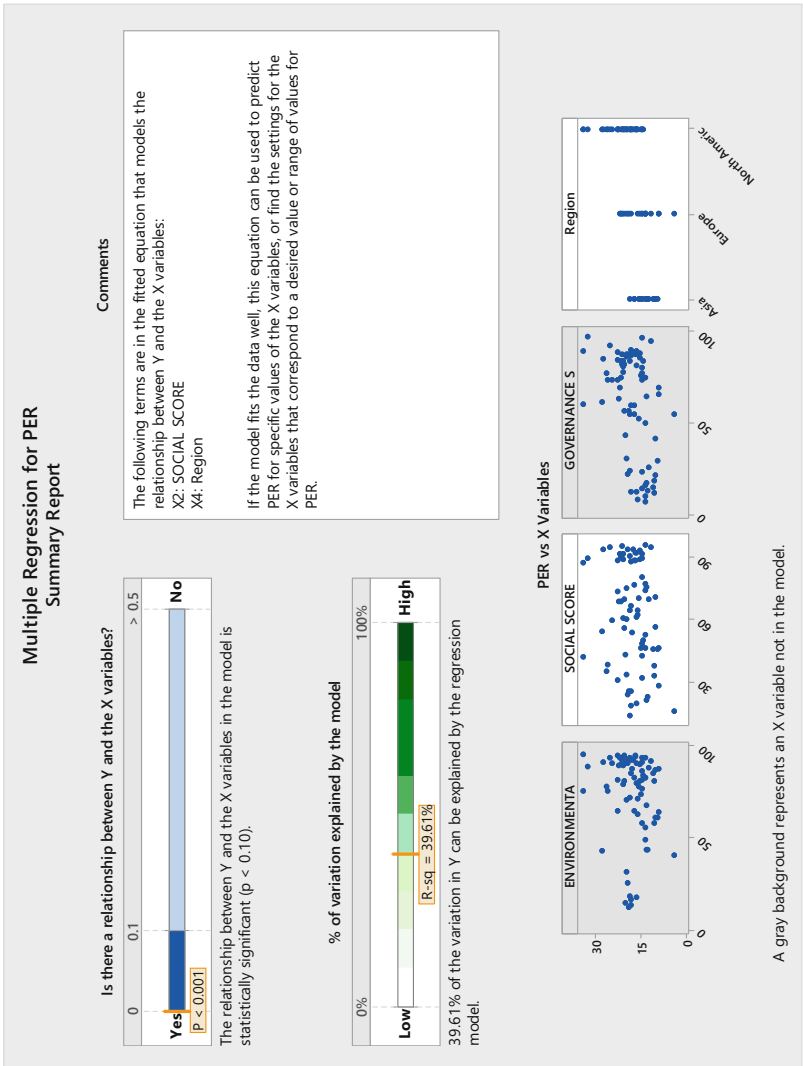


Fig. 5 Multiple Regression for PER Summary Report (Source: Own preparation)

increasing regulatory requirements. This is followed by Social (region like Europe) and Governance related activities. It is also critical that container and packaging companies take into account the regions where the company is based, as regions is also having a significant relationship in achieving better Tobin's Q results. Moreover, none of the ESG variables should be ignored or excluded as a result of the multiple regression model where the three components have significant influence and are all interrelated in improving financial perfomance on each region. With our multiple regression model, it is possible to estimate potential effect in Tobin's Q value actual R^2 result is equal to 86.45% and P value less than 0.001.

For future research, it is recommended that a different statistical modelling be explored when building relationship of each variables—ESG versus Price to Earnings Ratio (PER) specially the multiple regression R^2 correlation coefficient is less than 80% and understand the reasons behind the sample points which have high residuals.

Acknowledgments This paper was prepared based on research financed from the scientific grant for years 2012–2014 from Polish National Center of Science no 2011/03/B/HS4/05359 entitled "Impact of CSR activities of the firm on its value".

References

1. Amcor Sustainability Review (2017). https://www.sustainability-review.amcor.com/
2. Mondelez Inc. Report 2017. https://www.cocoalife.org/the-program/approach
3. SK Sustainable Development Report (2016). https://resources.smurfitkappa.com/vHome/com/Pages/Default.aspx
4. Gordon K (2001) The OECD guidelines and other corporate responsibility instruments. OECD, Paris
5. Rasche A, Waddock S, McIntosh M (2013) The United Nations global compact: retrospect and prospect. Bus Soc 52(1):6–30
6. ISO 26000: 2010 Clause 2:18; Clause 3.3.5. https://www.iso.org/iso-26000-social-responsibility.html
7. Bowen HR (1953) Social responsibility of the business. Calif Manag Rev 18(3):49–58
8. Van Marrewijk M (2003) Concepts and definitions of CSR and corporate sustainability: between agency and communion. J Bus Ethics 44(2–3):95–105
9. Logsdon JM, Wood DJ (2005) Global business citizenship and voluntary codes of ethical conduct. J Bus Ethics 59(1–2):55–67
10. Carroll AB (1994) Social issues in management research: experts' views, analysis, and commentary. Bus Soc 33(1):5–29
11. Frederick WC (1998) Moving to CSR: what to pack for the trip. Bus Soc 37(1):40–59
12. Heald M (1970) The social responsibilities of business: company and community 1900–1960. Transaction, New Brunswick
13. Carroll AB (1999) Corporate social responsibility: evolution of a definitional construct. Bus Soc 38(3):268–295
14. Wartick SL, Rude RE (1986) Issues management: corporate fad or corporate function? Calif Manag Rev 29(1):124–140
15. Wood DJ (1991) Social issues in management: theory and research in corporate social performance. J Manag 17(2):383–406

16. Altman BW (1998) Corporate community relations in the 1990s: a study in transformation. Bus Soc 37(2):221–227
17. Brummer J (1991) Corporate responsibility and legitimacy. Greenwood Press, New York
18. Garriga E, Melé D (2004) Corporate social responsibility theories: mapping the territory. J Bus Ethics 53(1–2):51–71
19. Malik M (2015) Value-enhancing capabilities of CSR: a brief review of contemporary literature. J Bus Ethics 127(2):419–438
20. Abbott WF, Monsen RJ (1979) On the measurement of corporate social responsibility: self-reported disclosures as a method of measuring corporate social involvement. Acad Manag J 22 (3):501–515
21. Porter ME, Kramer MR (2019) Creating shared value. In: Lenssen GG, Smith CN (eds) Managing sustainable business. Springer, Dordrecht, pp 327–350
22. Barnett ML (2007) Stakeholder influence capacity and the variability of financial returns to corporate social responsibility. Acad Manag Rev 32(3):794–816
23. Hoepner AG, Yu PS, Ferguson J (2010) Corporate social responsibility across industries: when can who do well by doing good?
24. Guenster N, Bauer R, Derwall J, Koedijk K (2011) The economic value of corporate eco-efficiency. Eur Financ Manag 17(4):679–704
25. Al-Tuwaijri SA, Christensen TE, Hughes Ii KE (2004) The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach. Acc Organ Soc 29(5–6):447–471
26. Aupperle KE, Carroll AB, Hatfield JD (1985) An empirical examination of the relationship between corporate social responsibility and profitability. Acad Manag J 28(2):446–463
27. Daszyńska-Żygadło K, Słoński T, Zawadzki B (2016) The market value of CSR performance across sectors. Inz Ekon (Eng Econ) 27(2):230–238
28. MiniTab Inc. (2000) MINITAB statistical software. MiniTab Release 13

Corporate Social Performance in Construction Industry: In the Search for Added Value

Karolina Daszyńska-Żygadło, Svetlana Mjakuškina, and Anna Dziadkowiec

1 Introduction

Construction industry has an impact on countries' national economy. The development of the construction industry plays an import socio-economic role in every nation. The construction industry is responsible for creating, modifying and improving the living environment of humanity. On the other hand, construction and buildings have considerable environmental impact. Buildings construction and operation are accounted for 36% of global final energy use.

Today the quality has become one of the most important criteria for evaluation of successful services as well as social responsibility and sustainability under the influence of globalization processes [1].

The theoretical framework of the role of sustainability in construction industry is analysed based on comparison and analysis of literature and views published by various researches. Case study analysis is conducted in order to compare how most recognized and sustainability oriented construction industry company—Skanska—reports activities that match the views presented in the literature. On the top of that

K. Daszyńska-Żygadło (✉)
Department of Corporate and Public Finance, Wrocław University of Economics and Business, Wrocław, Poland
e-mail: Karolina.zygadlo@ue.wroc.pl

S. Mjakuškina
Faculty of Engineering Economics and Management, Institute for Quality Engineering, Riga Technical University, Riga, Latvia
e-mail: svetlana.mjakuskina@rtu.lv

A. Dziadkowiec
Institute of Financial Management, Wrocław University of Economics and Business, Wrocław, Poland
e-mail: anna.dziadkowiec@ue.wroc.pl

K. Daszyńska-Żygadło et al. (eds.), *Finance and Sustainability*, Springer Proceedings in Business and Economics,
https://doi.org/10.1007/978-3-030-34401-6_28

we propose corresponding financial statements items to investigated the scope of impact of sustainability activities on particular company financial performance.

The aim of this paper is to investigate up-to-date findings in literature in the scope of sustainability of construction industry and application of sustainability activities on different levels of construction process in order to develop a framework for measuring and monetizing sustainability activities undertaken by construction companies. This will serve as intermediary goal towards measuring the value added as a result of sustainability performance of construction industry companies. It will also act as a base for improvement of the construction supervision process.

The paper is constructed as follows. In Sect. 2, the authors provide literature review for determining and defining the theoretical framework of sustainability in construction industry and the link between corporate social performance and corporate financial performance; Sect. 3 in order to address the research questions presents a case study analysis on how a company from construction industry assesses its duties towards sustainability. After a case study analysis, the authors provide a qualitative content analysis of the literature review to confront the practice with scientific findings. Sect. 4 offers the authors' conclusions.

2 Literature Review

2.1 Significance of Construction Industry

The construction industry plays a significant role in every national economy. It has an impact on countries' economic growth. The construction industry is responsible for creating, modifying and improving the living environment of humanity. On the other hand, construction and buildings have considerable environmental impact.

Environmental Impact

Buildings play a dominant role in the clean energy transition. Buildings construction and operation are accounted for 36% of global final energy use and nearly 40% of energy-related carbon dioxide (CO_2) emissions in 2017 [2]. The construction industry uses a lot of raw materials. Approximately 65% of total aggregates (sand, gravel and crushed rock) and approximately 20% of total metals are used by the construction sector. The EU27 consumed between 1200 and 1800 million tonnes of construction materials per annum for new buildings and refurbishment between 2003 and 2011. Construction and demolition (C&D) waste is estimated to make up 33% of total waste generated annually in the EU [3]. In the EU27, approximately 850 million tonnes of C&D waste are generated per annum [4]. The construction industry has a major impact on environment. The environmental impact of the construction industry in the developing countries is more serious than that in the developed countries [5, 6].

Action Taken

Within the existing circumstances the construction sector started to recognize the impact of their activities on sustainable development. The businesses understand the purpose of process improvement and its positive influence [7–9] Nowadays the "green building" concept is incorporated into regulations of different countries. The built environment is in the centre of worldwide strategies and measures towards a more sustainable future. Many assessment methods, tools such as BREEAM in UK, LEED in USA, SB Tool in Canada, HQE in France, BEE in Finland, and other have been developed in order to evaluate the sustainable performance and to develop the "sustainable construction" [10, 11]. Large construction companies draw more attention to the integration of sustainability and environmental awareness in the corporate processes [8, 9, 12]. Majority of construction companies adopted proactive environmental strategies such as waste reduction and prevention of pollutants at source [13, 14]. 90% of top 20 international construction companies have adopted sustainability reporting practices where 58% of them release standalone sustainability reporting annually [15].

2.2 Theoretical Framework of Sustainability in Construction Industry

The development of the construction sector, draws social and economic changes because it creates the new wealth for society [16, 17]. Sustainability is recognized by definition provided by the World Commission on Environment and Development "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [18]. Sustainable construction is a creation of a healthy built environment using efficient, ecologically based principals [19–21]. There is no common definition that covers all aspects of the sustainable construction. Most of the authors are highlighting the main three aspects: environmental, social and economic [13, 22]. The sustainable construction has been described as a result of collaboration and common efforts of the participants in the construction processes and society [17, 23, 24]. This is a collaboration between various elements such as changes in the legislation, implementation of new technologies, enhancement of awareness and understanding of the principles not only from the side of the participants of the construction projects, but also from the society. The activities within the sustainable construction cover a full building lifecycle, starting from the mining of raw materials, followed by construction products until the end of life of the building i.e. its demolition [25, 26]. Through literature review the authors have found that there exists a large number of research papers with analysis of various aspects of the sustainable construction in different phases of the building lifecycle. This implies additional efforts to integrate sustainable processes in different activities of construction projects. In order to identify sustainable activities at the

different levels of construction process, there is a need to identify all the activities within the sustainable construction. The authors performed literature overview in order to identify activities that are included in the scope of sustainable construction.

2.3 Corporate Social Performance: Corporate Financial Performance Link

Companies' sustainability-oriented activities might not only improve natural environment and human well-being but also foster companies' financial performance. There is a number of studies that seek to measure the relationship between corporate social performance (CSP) and corporate financial performance (CFP). Their authors aim at validating the related scientific theories [27] as well as finding implications of the research for practitioners, including companies' managers, investors and market regulators. Even though the topic has been under researchers' scrutiny for several decades, the results on the relationship are mixed. However, in the research based on a meta-analysis of more than 2000 studies on the CSP-CFP relationship [28], a large number of the studies shows a positive impact of CSP on CFP.

The existing research also reveals that the impact of CSP on CFP differs across industries [29–31]. In our study, we focus exclusively on construction industry and therefore the following literature relates only to this. Some studies for the industry were carried out on international samples. Wang et al. [32] conducted a research on the sample of 30 construction firms from all around the world in the period of 2007–2013. The authors measured CFP both with accounting-based measures, including return on assets (ROA) and earnings per share (EPS), and with market–based ratios, i.e. price per earnings (P/E) and stock returns. Corporate social performance in this research was expressed with Environmental, Social and Governance Intangible Value Assessment index. The results reveal that the relationship for ROA and EPS is curvilinear. This means that companies from construction sectors do not benefit from low levels of CSR efforts, but positive financial impact unfolds only after the company's CSR activities reach a certain level. At the same time, according to this research, at some point it does not pay off to increase CSR spending as it does not bring any further improvements of company's financial indicators. Authors' conclusions stay in line with the findings of other research focused on different economic sectors [33, 34].

In contrast, Liao et al. [35] found a negative relationship between CSP and CFP in the study conducted on a sample of international contractors from the years 2009–2014. Though, the authors measured the effect of CSR-related activities on firms' profitability with the use of a content analysis of CSR reports. Whereas the above studies focus on international datasets, some authors investigate the CSP-CFP relationship in construction industry exclusively on a country-specific data, like China [36].

Based on the results described above, there is no straightforward answer to the question what exactly is the relationship between corporate social performance on corporate financial performance in construction industry. A limited number of studies related to social performance and its impact on financial performance in constructions industry calls for further research on the topic. It is worth noting that identification of material issues and sustainability-oriented impacts on specific financial measures within the construction industry could serve as an important reference for practitioners that are interested in creating value from the sustainability-oriented decisions. Therefore, we formulate two research questions (RQ) in our study.

RQ1 Which sustainability-oriented activities are material for construction companies?

RQ2 Is there a relationship between corporate social performance and corporate financial performance?

3 Methodology and Results

In order to address the research questions, we performed a case study analysis and literature review.

3.1 Business Case Approach

In the first step, we have examined how a company from construction industry assesses its duties towards sustainability. We analysed the Annual and Sustainability Report 2018 published by Skanska [37]. We believe this supplements the answer to our research questions as it adds a business case approach.

Skanska, headquartered in Sweden, is one of the world's leading construction and project development companies, focused on selected home markets in the Nordic region, Europe and USA. The company positions itself as a sustainability leader and strongly highlights this aspect of the business when it describes itself as an investment target. The company's motto is 'We build for a better society'. Skanska also underlines its sustainability-oriented approach in the company's values, including Care for Life, Act Ethically and Transparently, Be Better Together and Commit to Customers. The company was rewarded with the following sustainability-oriented rewards in 2018: OMX Stockholm 30 ESG Responsible Index, MSCI AAA and CDP Climate Change A. We can therefore conclude that the company sees sustainability-related activities as the key competitive advantage that enhances the value for shareholders and stakeholders.

In the first step we analysed the company's materiality assessment in the context of sustainability (Fig. 1).

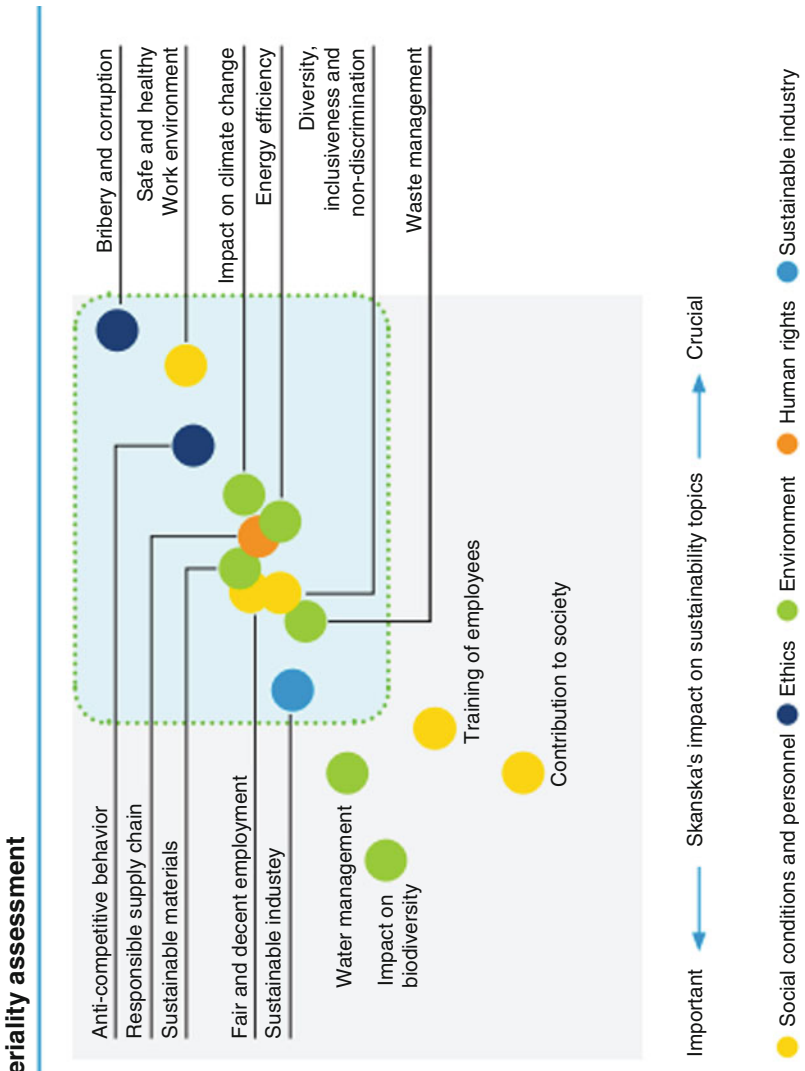


Fig. 1 Materiality assessment—Skanska (Source: Skanska Annual and Sustainability Report 2018, p. 71)

We see that the three most crucial aspects include bribery and corruption, safe and healthy work environment as well as anti-competitive behaviour, which means that ethics remains the company's priority. Environment-related issues are material as well, with the highest importance attributed to impact on climate change, energy efficiency, sustainable materials, and waste management. Less important, both from the perspective of Skanska's stakeholders and the company itself, is water management and impact on biodiversity, along with some aspects related to social conditions and personnel, including training of employees and contributions to society.

Besides a broad qualitative assessment of subsequent sustainability aspects, Skanska also reports sustainability measures, which increases transparency and improves comparability of the impact of the company's business activities to other companies from the construction business. In the Table 1 we present sustainability-oriented measures reported by the company along with our interpretation of their potential impact on financial performance.

3.2 Scientific Literature Analysis Approach

After a case study analysis, we have performed a comprehensive literature review process to confront the practice with scientific findings. In the literature review process, our research object was sustainable construction, whereas research subject—activities of sustainable construction.

The review consisted of several steps performed in four stages. In the first step, we determined sources for study selection. Nowadays the digital libraries are the most commonly used source of academic articles. In the performed study the following sources were used:

- Science Direct
- SCOPUS
- EBSCOhost
- Web of Science
- IEEE Xplore Digital Library

The selected digital libraries publish wide range of scientific academic articles related to the topic of interest of the performed research. The identified sources of studies support the advanced search of their database. The next stage was to identify keywords that were used to search for papers. In order to constrain the scope of the research, the following terms were used "sustainable construction", "Sustainable building", "Sustainability AND construction". The identified keywords were used to select studies in previously identified digital libraries. As a result, 238,056 studies collected became a subject to an inclusion and an exclusion criterion to filter out the studies deemed not relevant to our literature overview. This stage of the research was critical in order to ensure that relevant and sizable number of the studies were selected.

Table 1 Sustainability-oriented measures—Skanska

Measure	Definition	Sustainability aspect according to GRI Standard[a]	Measurable impact on financial performance	Non-measurable impact on financial performance
Legal proceedings related to corruption allegations	Assets pledged, contingent liabilities and contingent assets	Anti-corruption (Social)	Non-recurring items (costs/profit), (Profit&Loss)	Reputation impacting stock prices
Lost Time Accident Rate	Number of employees lost-time accidents multiplied by 1m hours divided by total labour hours	Safe and healthy work environment (Social)	Additional costs for replacement staff (Profit&Loss)	Delays in realising the contracts
Fatalities	Number of fatalities on Skanska project sites	Safe and healthy work environment (Social)	Additional costs for replacement staff, higher insurance costs due to higher risk assessment (Profit&Loss)	Reputation impacting stock prices, delays in realising the contracts
Green revenue	% of total construction revenue that is green and deep green, according to the Skanska Color Palette[b]	Sustainable industry (Environmental and Economic)	Revenues (Profit&Loss)	Reputation impacting stock prices
Green market value	% of commercial property development market value from green and deep green projects	Sustainable industry (Environmental and Economic)	Revenues (Profit&Loss)	Reputation impacting stock prices
Total energy usage and energy intensity	MWh values with subdivision into non-renewable and renewable sources	Energy efficiency (Environmental and Economic)	No direct impact	Potential reputation impact
Direct and indirect emissions	Tonnes of CO_2 e	Energy efficiency (Environmental)	No direct impact	Potential reputation impact
Self-generated waste to landfill	As per the measure's name	Waste management (Environmental)	Operating costs (Pofit&Loss)	Potential reputation impact
Green financing	% of total central debt that is Green according to the Skanska Green Bond Framework or other investor green demands	N/A (Environmental and Economic)	Cost of financing—cost of interest (Pofit&Loss)	Reputation impacting stock prices

(continued)

Table 1 (continued)

Measure	Definition	Sustainability aspect according to GRI Standard[a]	Measurable impact on financial performance	Non-measurable impact on financial performance
Employees by gender	As per the measure's name with subdivision into category	Diversity, Inclusiveness and non-discrimination (Social)	No direct impact	Gender balance might positively impact work efficiency

Source: Authors' work based on Skanska Annual and Sustainability Report 2018, pp. 70–91
[a]In parenthesis our classification of the issues; GRI stands for Global Reporting Initiative
[b]Colour Palette defines Skanska's classification of Green and Deep Green projects according to four areas: energy, carbon, materials and water

Inclusion criteria:

- The study is written in English
- The study available in full text, open access
- The study published in scientific journal
- Review articles

Exclusion criteria:

- The title or abstract provides evidence to indicate that the study is not relevant to the areas of sustainable construction practices.

The total of 68 papers, published between 2006 and 2018, were selected for a full text analyses. As a result of the detailed analysis of the selected papers, 34 key papers were identified. Figure 2 presents an overview on this exclusion process.

Through the literature overview the authors found that the sustainable construction includes wide range of different activities such as planning and integration of sustainable construction principles into construction activities. Project management that ensures the balance between protecting the environment and effective project development as well takes into the account the needs and demands of people for equity, prosperity and quality of life. The most popular activities that influence the environmental aspects of sustainable construction are efficient use of natural resources and reduction of resources (heat, electricity, water) consumption. In addition, healthy environment management is created through efficient land use, enhancement of resource reuse, use of renewable or recyclable resources, decreased waste, emissions and pollution. Activities to increase the knowledge and enhance social awareness of environmental concerns and community involvement in the process of achieving sustainable construction. Use of low impact materials, reduction of material use, optimization of construction techniques and implementation of new technologies, smart and green building designs. Reduction of maintenance and operational cost, optimization of building lifespan and optimization of end-of-life process. Changes in the legislation, as well as, involvement of multiple stakeholders and their activities are all part of the activities in sustainable construction.

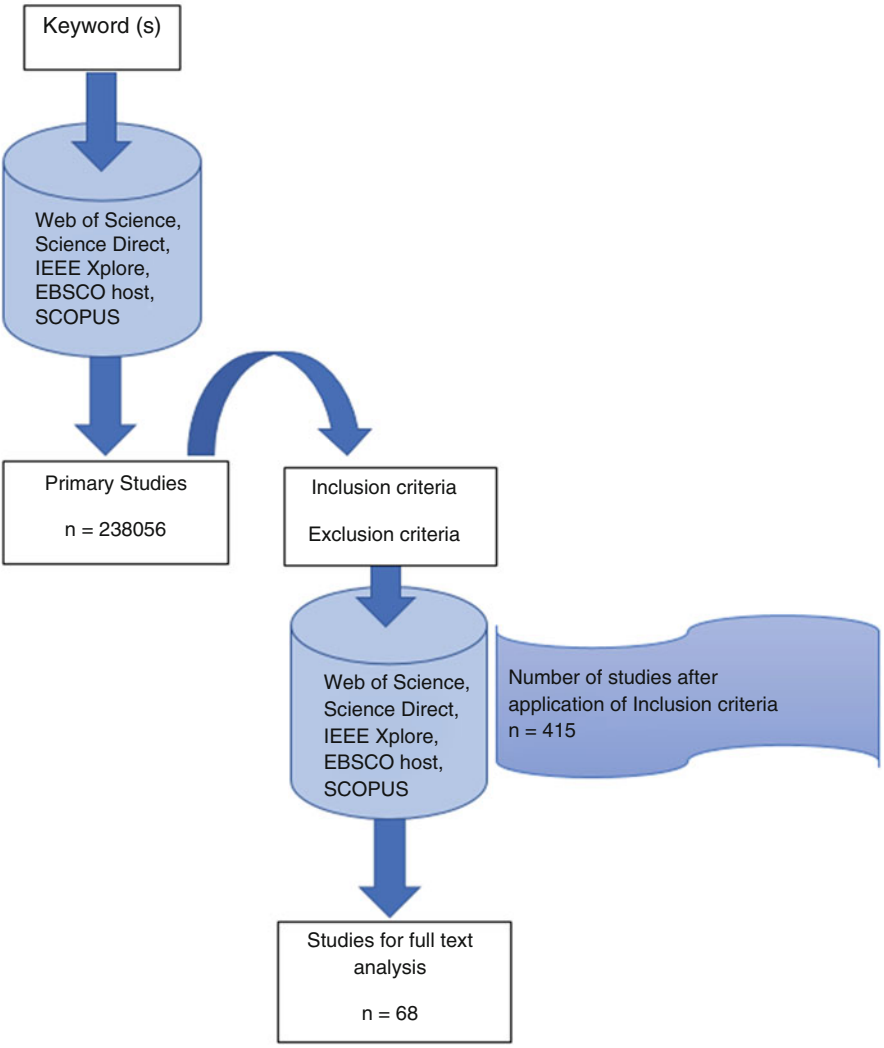


Fig. 2 Overview of the flow of research results (PRISMA flow diagram)

Table 2 provides a comprehensive summary of the main activities included in the sustainable construction based on our literature review process and case study analysis.

Based on the analysis we conclude that the main part of the activities within the sustainable construction influence the environmental aspect of sustainability. At the same time most of the activities influence more than one aspect of sustainability.

Upon collection and analysis of information on the activities within the sustainable construction, we also conclude that it is the role of a constructor to integrate all

Table 2 Activities within the sustainable construction

Key references	Activities of sustainable construction	Environmental	Social	Economic	Addressed by Skanska[a]
[26, 38]	Use of low impact materials	X			Yes (qualitative)
[13]	Use of energy-efficient equipment and appliances/ use of energy efficient appliances with timing devices	X		X	Yes (qualitative, initiatives)
[26]	Reuse water onsite	X			Yes (qualitative)
[25, 39, 40]	Reduce consumption of raw materials	X		X	Yes (qualitative)
[20, 25, 38, 39, 41–43]	Efficient use of resources	X		X	Yes (qualitative)
[16, 20, 21]	Creation of a healthy environment		X		Yes (qualitative, initiatives)
[23]	Balance between protecting the environment and effective project development	X		X	Yes
[16]	Enhancing the social health of the community		X		Yes (qualitative, initiatives)
[16]	Enhancing the economic development of the community		X	X	Yes (qualitative, initiatives)
[24–26]	Efficient land use	X			No
[24, 26, 39]	Reduce water consumption	X		X	Yes (qualitative, initiatives)
[24, 38, 44–46]	Minimizing construction and demolition waste	X		X	Yes (quantitative)
[13, 24, 41]	Promote/ use of renewable resources	X			Yes (qualitative)
[24]	Promote/ use of alternative energy systems	X			Yes (quantitative)
[24, 41, 47]	Scientific and technological innovation	X			Yes (qualitative, initiatives)
[24, 26, 38, 44]	Construction practices that reduce pollution emissions	X			Yes (quantitative)
[24]	Impact evaluation of the construction project on the environment during project planning, construction and operation stages;	X			Yes (qualitative)

(continued)

Table 2 (continued)

Key references	Activities of sustainable construction	Environmental	Social	Economic	Addressed by Skanska[a]
[24, 40]	Establishment and improvement of corporate environmental management system;	X			Yes
[24–26]	Appropriate waste disposal and recycling processes.	X		X	Yes (quantitative)
[24, 45, 47]	Adoption and compliance with environmental laws and regulations	X			Yes
[24, 41–43, 46]	Corporation engages in R&D of building designs that improve the energy efficiency	X			Yes (qualitative, initiatives)
[24, 41–43, 46]	Corporation engages in appropriate R&D that encourages green construction (e.g. green building design, green materials, new construction methods)	X			Yes (qualitative, initiatives)
[46, 48]	Involvement of multiple stakeholders		X		Yes (qualitative)
[49]	Occupational Health and Safety of employees		X		Yes (quantitative)
[43]	Reduced maintenance and operational costs			X	Yes (quantitative)
[38, 43]	Extended lifespan of builder			X	No
[40, 47, 50]	Raising the level of knowledge/public awareness	X	X	X	Yes (qualitative)
[40, 42]	Financing sustainable construction projects			X	Yes (quantitative)

Source: Authors' own work

[a]In parenthesis we indicate if the aspect was reported in (1) only qualitative, (2) qualitative and showing initiatives, (3) including the former and also quantitative measures

the identified activities within the processes in the organization to ensure a sustainable construction.

Analysis in reference to comparison with case study results show that majority of activities included in literature related to sustainable construction where included in the report of Skanska. The analysis also shows that 16 out of 28 aspects were reported in qualitative way, out of which only 8 indicated some initiatives. Only two were not reported. Seven were reported in quantitative way and the remaining three give positive answer to yes/no categories. That indicates that dominant majority of sustainability-oriented activities presented in literature are material for Skanska, the leading construction industry representative.

4 Conclusions

The construction industry plays an important role in every national economy. The construction industry is responsible for creating, modifying and improving the living environment of humanity. At the same time construction and buildings have considerable environmental impact. The construction industry in the past years has focused more attention on decreasing its impact on environmental and ecological aspects. The concept of sustainability and sustainable construction is becoming more and more popular within the industry. The concept of sustainable construction entails activities aiming to create healthy construction environment using efficient, ecologically based principals. There is no common definition that covers all aspects of the sustainable construction. Most of the authors are highlighting the main three aspects: environmental, social and economic. Through literature review the authors have found that there is a significant number of research papers that focus on the analysis of various aspects of sustainable construction in different phases of building lifecycle. Through the review the authors have found that the sustainable construction includes wide range of different activities such as planning and integration of sustainable construction principles into construction activities. The activities within the sustainable construction cover a full building lifecycle, starting from the mining of raw materials, construction products until the end of life of the building i.e. its demolition. Based on the analysis of the survey results it can be concluded that the main part of the activities within the sustainable construction influence the environmental aspect of sustainability. At the same time most of the activities influence more than one aspect of sustainability.

Our literature research and case study analysis allowed us to select sustainability-oriented activities that are material for construction industry companies. Initial list was created based on literature review and then it was verified with the activities listed and described in the biggest construction company sustainability report (Skanska). Therefore, research question number 1 (RQ1) was verified positively.

Respectively, the case study analysis of Skanska has shown that majority of investigated sustainability activities interact with financial results, either in positive or negative way, creating additional costs or benefits for the company. Analysed sustainability activities could have both positive and negative impact on financial results, mainly impacting profit and loss statement directly. Indirectly, in a non-measurable impact of financial performance, it exemplifies in impact on reputation that could be reflected in increase/decrease of stock price i.e. market value. Therefore, we could conclude that a relationship between sustainability activities and corporate financial performance exists. This part of the study provided answer for research question number 2 (RQ2) in a qualitative way.

Conclusions based on this research create room for further investigation whether sustainability activities serve as value adding or value destroying ones.

Future research will focus on identifying sustainability drivers of value added for construction companies, including types of activities at the various levels of construction companies' processes.

Acknowledgments This paper was prepared based on research financed from the scientific grant for years 2012–2014 from Polish National Center of Science no 2011/03/B/HS4/05359 entitled "Impact of CSR activities of the firm on its value".

References

1. Mežinska I, Lapiņa I, Mazais J (2015) Integrated management systems towards sustainable and socially responsible organisation. Total Qual Manag Bus Excell 26(5–6):469–481
2. Global Alliance for Building and Construction (2018) Global status report. https://wedocs.unep.org/bitstream/handle/20.500.11822/27140/Global_Status_2018.pdf?sequence=1&isAllowed=y
3. European Environment Agency, Copenhagen (2011) Annual report 2010 and Environmental statement 2011
4. ECORYS (2014) Resource efficiency in the building sector. Final report. Rotterdam; 23 May 2014, p 128. http://ec.europa.eu/environment/eussd/pdf/Resource%20efficiency%20in%20the%20building%20sector.pdf
5. Gan X, Zuo J, Ye K, Skitmore M, Xiong B (2015) Why sustainable construction? Why not? An owner's perspective. Habitat Int 47:61–68
6. Wang N (2014) The role of construction industry in China's sustainable urban development. Habitat Int 44:442–450
7. Kavosa M, Lapiņa I (2018) Risk analysis in certification process in the field of energy construction: case in Latvia. Total Qual Manag Bus Excell 29(9–10):1129–1142
8. Mjakuškina S, Lapiņa I (2018) Evaluation of market surveillance implementation and sustainability. In: Global value chains, flexibility and sustainability. Springer, Singapore, pp 257–269
9. Mjakuškina S, Lapiņa I (2018) Product conformity assessment within the integrated management system: manufacturing compliance and customer safety. In: Proceedings of the 22nd world multi-conference on systemics, cybernetics and informatics (WMSCI 2018), vol 3, pp 19–24
10. Barbosa MTG, Almeida M (2017) Developing the methodology for determining the relative weight of dimensions employed in sustainable building assessment tools for Brazil. Ecol Indic 73:46–51
11. Ortiz O, Castells F, Sonnemann G (2009) Sustainability in the construction industry: a review of recent developments based on LCA. Constr Build Mater 2391:28–39
12. Neppach S, Nunes KR, Schebek L (2017) Organizational environmental footprint in German construction companies. J Clean Prod 142:78–86
13. Abdellatif M, Al-Shamma'a A (2015) Review of sustainability in buildings. Sustain Cities Soc 14:171–177
14. Kavosa M, Lapiņa I, Briņķis K (2017) Certification of persons: empirical study in the field of energy construction in Latvia. Cogent Bus Manag 4:1–14
15. Zuo J, Zhao ZY (2014) Green building research—current status and future agenda: a review. Renew Sust Energ Rev 30:271–281
16. Li H, Zhang X, Ng ST, Skitmore M (2018) Quantifying stakeholder influence in decision/evaluations relating to sustainable construction in China—a Delphi approach. J Clean Prod 173:160–170
17. Pietrosemoli L, Monroy CR (2013) The impact of sustainable construction and knowledge management od sustainability goals. A review of the Venezuelan renewable energy sectors. Renew Sust Energ Rev 27:683–691
18. Brundtland GH (1987) Report of the World Commission on environment and development: "our common future". United Nations Geneva. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf

19. Chen X (2015) Sustainable construction solution for China's public rental housing: industrialized building adoption. Int J Res Commer Manag 6(7):6–10
20. Durdyev S, Ismail S, Ihtiyar A, Bakar NFSA, Darko A (2018) A partial least squares structural equation modeling (PLS-SEM) of barriers to sustainable construction in Malaysia. J Clean Prod 204:564–572
21. Yu T, Shi Q, Zuo J, Chen R (2018) Critical factors for implementing sustainable construction practice in HOPSCA projects: a case study in China. Sustain Cities Soc 37:93–103
22. Pancovska Z (2017) Construction manager's perception for sustainable construction contributing factors: analysis using support vector machine. TEM J 6(2):391–399
23. Wibowo MA, Sholeh MN, Adji HS (2017) Supply chain management strategy for recycled materials to support sustainable construction. Procedia Eng 171:185–190
24. Zhao ZY, Zhao XJ, Davidson K, Zuo J (2012) A corporate social responsibility indicator system for construction enterprises. J Clean Prod 29:277–289
25. Adamczyk J, Dylewski R (2017) The impact of thermal insulation investments on sustainability in the construction sector. Renew Sust Energ Rev 80:421–429
26. Yılmaz M, Bakış A (2015) Sustainability in construction sector. Procedia Soc Behav Sci 195:2253–2262
27. Garriga E, Melé D (2004) Corporate social responsibility theories: mapping the territory. J Bus Ethics 53(1–2):51–71
28. Friede G, Busch T, Bassen A (2015) ESG and financial performance: aggregated evidence from more than 2000 empirical studies. J Sustain Financ Invest 5(4):210–233
29. Baird PL, Geylani PC, Roberts JA (2012) Corporate social and financial performance re-examined: industry effects in a linear mixed model analysis. J Bus Ethics 109(3):367–388
30. Daszynska-Zygadlo K, Slonski T, Zawadzki B (2016) The market value of CSR performance across sectors. Eng Econ 27(2):230–238
31. Hoepner AG, Yu PS (2010) Corporate social responsibility across industries: when can who do well by doing good? Available at SSRN 1284703
32. Wang H, Lu W, Ye M, Chau KW, Zhang X (2016) The curvilinear relationship between corporate social performance and corporate financial performance: evidence from the international construction industry. J Clean Prod 137:1313–1322
33. Barnett ML, Salomon RM (2006) Beyond dichotomy: the curvilinear relationship between social responsibility and financial performance. Strateg Manag J 27(11):1101–1122
34. Trumpp C, Guenther T (2017) Too little or too much? Exploring U-shaped relationships between corporate environmental performance and corporate financial performance. Bus Strateg Environ 26(1):49–68
35. Liao PC, Shih YN, Wu CL, Zhang XL, Wang Y (2018) Does corporate social performance pay back quickly? A longitudinal content analysis on international contractors. J Clean Prod 170:1328–1337
36. Xiong B, Lu W, Skitmore M, Chau KW, Ye M (2016) Virtuous nexus between corporate social performance and financial performance: a study of construction enterprises in China. J Clean Prod 129:223–233
37. Skanska (2019) Annual and sustainability report 2018. https://group.skanska.com/investors/. Accessed 10 Mar 2019
38. Murtagh N, Roberts A, Hind R (2016) The relationship between motivations of architectural designers and environmentally sustainable construction design. Constr Manag Econ 34 (1):61–75
39. Safinia S, Al-Hinai Z, Yahia HA, Abushammala MF (2017) Sustainable construction in sultanate of Oman: factors effecting materials utilization. Procedia Eng 196:980–987
40. Babashamsi P, Md Yusoff N, Ceylan H, Md Nor N, Salarzadeh Jenatabadi H (2016) Sustainable development factors in pavement life-cycle: highway/airport review. Sustainability 8(3):248
41. Ingrao C, Messineo A, Beltramo R, Yigitcanlar T, Ioppolo G (2018) How can life cycle thinking support sustainability of buildings? Investigating life cycle assessment applications for energy efficiency and environmental performance. J Clean Prod 201:556–569

42. Shan M, Hwang BG, Zhu L (2017) A global review of sustainable construction project financing: policies, practices, and research efforts. Sustainability 9(12):2347
43. Darko A, Chan AP (2016) Critical analysis of green building research trend in construction journals. Habitat Int 57:53–63
44. Zolfani SH, Pourhossein M, Yazdani M, Zavadskas EK (2018) Evaluating construction projects of hotels based on environmental sustainability with MCDM framework. Alex Eng J 57 (1):357–365
45. Ghisellini P, Ji X, Liu G, Ulgiati S (2018) Evaluating the transition towards cleaner production in the construction and demolition sector of China: a review. J Clean Prod 195:418–434
46. Yin BCL, Laing R, Leon M, Mabon L (2018) An evaluation of sustainable construction perceptions and practices in Singapore. Sustain Cities Soc 39:613–620
47. Bonenberg W, Kaplinski O (2018) The architect and the paradigms of sustainable development: a review of dilemmas. Sustainability 10(1):100
48. Pan M, Linner T, Pan W, Cheng H, Bock T (2018) A framework of indicators for assessing construction automation and robotics in the sustainability context. J Clean Prod 182:82–95
49. Zuo J, Zillante G, Wilson L, Davidson K, Pulen S (2012) Sustainability policy of construction contractors: a review. Renew Sust Energ Rev 16(6):3910–3916
50. Brooks A, Rich H (2016) Sustainable construction and socio-technical transitions in London's megaprojects. Geogr J 182(4):395–405