

## REGIONAL DIMENSIONS OF PUBLIC VALUE OF ACADEMIC SPIN-OFFS

Magdalena WIŚNIEWSKA

University of Lodz; Magdalena.wisniewska@uni.lodz.pl, ORCID: 0000-0002-4967-9881

**Purpose:** The paper aims at conceptualizing the measurement of the impact of academic spin-offs on the region.

**Design/methodology/approach:** For the purpose of the paper, the desk method was implied. Necessary literature review was presented in the field of public value, Responsible Research and Innovation (RRI) and necessary economic theories on the relationship between human activity and the environment. A set of indicators was presented as an effect of the desk research.

**Findings:** Public value concept as well as RRI are useful approaches to assess the impact of academic spin-offs through a set of metrics which should be implemented by HEIs in innovation strategies. For the proper assessment of the impact, two scopes of the impact were adopted: direct and indirect. The sets of proposed indicators are presented in three dimensions: social, economic and environmental.

**Research limitations/implications:** Further conceptualization is needed to elaborate more adequate and complete system of planning and monitoring R&D and commercialization activity of higher education institutions (HEIs).

**Practical implications:** Presented indicators can and should be incorporated in HEI's innovation strategies to properly plan and control undertaken activities in research and innovation processes. On the planning stage, metrics should be helpful in shaping the research process to achieve publicly valuable results as broadly as possible. Observing the state of a region can also help HEIs to answer most important public issues. In monitoring and control, HEIs can assess their impact on society, economy and environment while fulfilling third mission of contemporary university.

**Social implications:** Understanding the impact of HEIs activities resulting in enterprises creation and possibility to shape such creation with accordance to public value concept and RRI it is possible to focus on research and innovation valuable for the society in long term.

**Originality/value:** Paper adopts already known concept of public value for the purpose of university research and innovation processes.

**Keywords:** public value, Responsible Research and Innovation (RRI), spin-off, knowledge commercialization, university.

**Category of the paper:** Conceptual paper.

## 1. Introduction

Third role of the contemporary university can be fulfilled by creating university-based spin-offs. As these are public financed initiatives, it is worthy to consider, whether they do or/and how they can reflect public interest and create public value. Many innovative processes as well as commercialization projects can result in poor or no public value and, even worse, in public value destruction. When planning such initiatives, it would be probably worthy to include some model of public value accounting system.

Public value concept was first introduced by Mark Moore (1995) and is a useful approach to plan public initiatives. Therefore, it can be used by universities elaborating public-worthy innovation strategies. A helpful and complementary concept is Responsible Research and Innovation (RRI) concept – currently key approach to innovation processes from the point of view of EU policies.

From the point of view of effective management of university innovation strategies in terms of their public value, it is necessary to conceptualize the measurement system which should be a part of strategic planning, control and monitoring process.

To be able to create a measurement system of the influence the university spin-offs can have on public, it is important to understand the idea, character and scope of influence. Therefore some economic mechanisms have to be introduced to be finally able to present a proposition of measures which can be used. For the purpose of the article, the public sphere is considered through regional perspective.

## 2. Methods

The aim of the article is to conceptualize the measurement of the public value of academic spin-offs in the regional dimension in post-launch stage. For such purpose, the desk research method was used.

The article reviews the literature on the concept of public value, including the use of this approach to analyze the activities of enterprises. Due to the nature of spin-off companies, the concept of Responsible Research and Innovation (RRI) was also presented - the currently key approach to innovation processes from the point of view of EU policies. The development of a set of indicators to assess the impact of spin-offs on the regional environment required the presentation of the most important economic concepts on the relationship between human activity and the environment. A set of indicators that can be used to assess the regional public value of the companies in question was presented as an effect of the desk research.

### 3. Third role of the university and academic spin-offs

For a long time universities have been creating and transferring knowledge in the form of scientific publications and teaching. Moreover, at a traditionally understood higher education institution (HEI), if one had contacts with the business world, they usually were not formalized and consisted mainly in (Matusiak, 2010):

- meetings and discussions during conferences,
- contacts within the framework of professional associations,
- guest lectures and consultations,
- flow of graduates, apprenticeships,
- joint publications, study of specialized literature.

Such traditional role of universities insufficient from the perspective of the contemporary economy. HEI may involve in the process of knowledge sharing, knowledge transfer and technology commercialization (Howard, 2005):

- diffusion of knowledge: universities and research institutions generate economically and socially useful knowledge through supporting the broadly understood adaptation of scientific achievements to the industry by means of communications, education, training, creation of production and distribution norms and standards;
- creation of knowledge: universities and research institutions create knowledge which is useful from the social and business point of view by selling or licensing research results. Knowledge gains the character of a commodity for sale – intellectual property is directly used in the market. It is a standard commercialization model;
- creation of knowledge relations: universities and research institutions create economically useful knowledge by providing services indirectly using intellectual property. Platforms are established for the exchange of expertise, know-how, and the so-called “tacit” knowledge. Emphasis is put on cooperation, common undertakings, partnerships;
- transfer of knowledge through involvement – useful knowledge is treated as a secondary product of a community of interests of universities and their environment. The goal is to go beyond traditionally understood boundaries of the functioning of universities in order to develop joint initiatives with various stakeholders of the socio-economic system.

Knowledge transfer and commercialization usually take place by means of (Matusiak 2010):

- joint and targeted research projects implemented in collaboration with the business sector,
- contract and commissioned research carried out at the request of enterprises,
- enriching the technology market with new patent applications, know-how,

- graduates, didactic processes, doctoral and postgraduate studies,
- scientific and popular science publications, patent descriptions,
- conferences, seminars, fairs, courses and training,
- informal contacts of scientists,
- staff mobility programs (from academia to business and vice-versa),
- opinions, reviews, expertise,
- provision of licenses and know-how.

At present, it is also possible to indicate other ways of technology transfer and knowledge commercialization (Matusiak, 2010):

- development of specialized institutions acting as intermediaries in the technology transfer,
- academic entrepreneurship and creation of small technological companies,
- support for innovative undertakings conducted in the small and medium enterprise sector,
- innovative collaboration and cooperation networks, development of network structures (such as clusters, innovative environment).

Academic spin-offs are one of many listed above ways, that university knowledge can be provided to economy. Academic spin-off can be understood as companies formed by separation from the parent entity (here: HEI) in order to undertake economic activity that were difficult or even impossible to implement within that entity.

As all these activities are based on publicly funded activity of universities, it is justified to have an insight of their short- and long-term results disclosed in the society, economy and environment.

#### **4. Public value and Responsible Research and Innovation (RRI)**

A popular concept for evaluating the performance of public organizations is the concept of public value. This value is generated when the society, which is at the same time the one that incurs expenditure on the activities of public organizations, and thus (by analogy to the enterprise sector) are their "shareholders" in a way, obtains the status of meeting the collectively expressed needs through their activities and acceptance their actions (Wiśniewska, 2018). This concept was introduced in 1995 by Moore (Moore, 1995) and was developed in the following years (Mahdon, 2006; Blaug et al., 2006; Stoker, 2006; Bozeman, 2007; Botterman et al., 2008; O'Flynn, Alford, 2009, Kelly et al., 2002).

Public value can be viewed analogously to shareholder value in the private sector (Coats, Passmore, 2008). Adopting it as the main goal of the organization allows public managers to define their activities more precisely - what is the value for citizens in the services provided and how these services can be optimized. This makes it possible to improve the quality of the decision-making process, prompting public managers to cooperate with service users and wider stakeholders – this way it is possible to ensure greater trust in public institutions and meet the growing expectations of citizens. According to Coats and Passmore, adopting public value as a determinant of the actions of public managers comes down to three questions (Coats, Passmore, 2008):

1. What is my organization for?
2. To whom is it liable?
3. How do you know that we operate successfully?

The answer to the above questions cannot be given by public managers alone, but together with the "shareholders" of the public organization, and therefore the society. On the part of society, it is necessary to obtain "authorization" of the actions taken. A common process of determining what is a value and whether it is achieved through these and not other activities is essential.

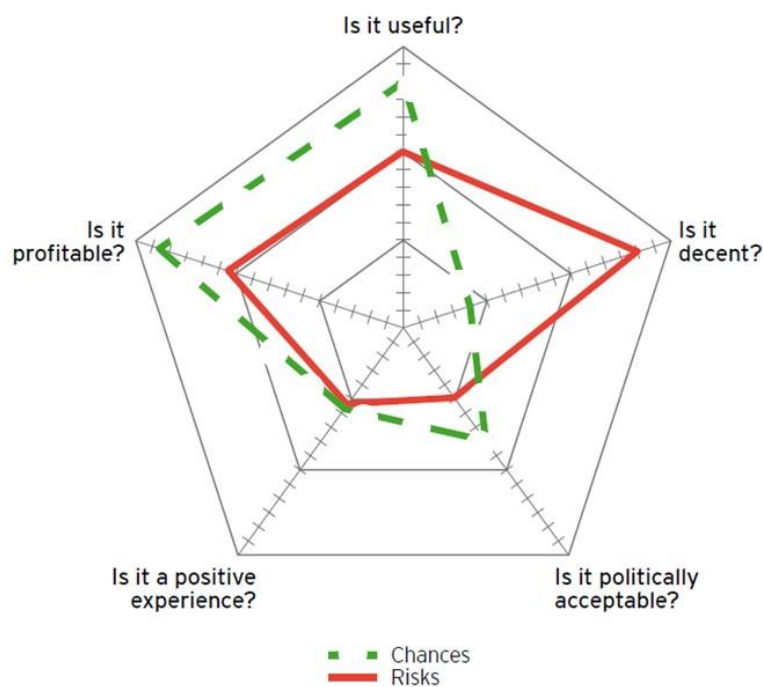
Public action will be valuable when the outlays incurred by the society (financial resources, but also giving up certain freedoms, orders in the name of the common interest) lead to a result exceeding, in the public opinion, these costs incurred and when the authority receives a mandate from the society for a specific action. In the opinion of the authors of the concept, the results of the political elections are not sufficient. There is a need for continuous interaction with stakeholders and ongoing approval by them of the actions of public authorities.

The enterprise sector can and should be included in the concept of public value for several reasons: a) as important stakeholders; b) as providers of public goods commissioned by the public sector; c) as entities creating public values through their activities especially while the enterprises are created on the basis of publicly produced and financed knowledge. The activities of enterprises can also be a source of public value (Meynhardt, Gomez, Schweizer, 2014; Moore, 2003; Talbot, 2011). The concept of value is no stranger to the literature on the enterprise sector. The terms used are economic value, added value, shareholder value, total and marginal utility, customer value, stakeholder value or the perspective of corporate social responsibility (CSR).

Meynhardt, Gomez and Schweizer (2014) do not consider the impact of enterprises on society as one of the many aspects of their activities. They believe that this influence is an inherent feature of their functioning, both through influencing the interactions on the part of consumers and internally, through the organizational culture. "Viable" society, in their opinion, is the result of interactions in which business plays a significant role. These authors propose an approach that allows capturing the contribution that enterprises make to social life in the form of an impact on public values. The Public Value Scorecard (PVSC) was developed at the

University of St. Gallen. PVSC is indicated as an improvement of the balanced scorecard, it is based on the psychological theory of needs. Public value is understood here as values characterizing the relationship between an individual and "society", determining the quality of this relationship (Meynhardt, 2012). The assessment is made on the basis of five dimensions (Figure 1).

Therefore, the PVSC enables the assessment of the company's activity not only from the point of view of utility, but also from the point of view of politics and morality. As Meynhardt writes (2012), the lack of a financial dimension would not be accepted by practitioners. The use of PVSC is based on the assessment of five values through a survey questionnaire that may be applicable to the evaluation of a given project, product or other initiative. Two profiles are created based on five dimensions: one for opportunities and one for risks.



**Figure 1.** Public Value Scorecard.

Source: Meynhardt, T., Gomez, P., Schweizer, M. (2014). The Public Value Scorecard: what makes an organization valuable to society? *Performance*, 6(1), pp. 2-9.

Compatible with public value concept, but strictly related to research and innovation process is a concept of Responsible Research and Innovation. Responsible Research and Innovation (RRI) is a concept that has gained particular prominence over the past decade in the European Union (EU) and refers to a research and development process that integrates research into a wider social context (Owen, 2013; von Schomberg, 2013). RRI promotes open, multilateral collaboration involving scientists, citizens, policy makers, businesses, third sector organizations, etc., to discuss how science and technology should be shaped in the best possible way, not only to contribute to solving today's problems, but also create a world that will be desired for future generations. More specifically, von Schomberg (2013) defines RRI as "a transparent, interactive process by which societal actors and innovators become mutually

responsive to each other with a view on 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”(von Schomberg, 2013, p. 9). The European Commission has formulated seven ‘Grand Challenges’ as one of the three main pillars of the Horizon 2020 program. To support European policy, R&I endeavors should contribute to finding solutions for these societal challenges ([https://ec.europa.eu/commission/presscorner/detail/en/MEMO\\_13\\_1085](https://ec.europa.eu/commission/presscorner/detail/en/MEMO_13_1085)):

1. Health, demographic change and wellbeing.
2. Food security, sustainable agriculture and forestry, marine, maritime and inland water research, and the bioeconomy.
3. Secure, clean and efficient energy.
4. Smart, green and integrated transport.
5. Climate action, environment, resource efficiency and raw materials.
6. Inclusive, innovative and reflective societies.
7. Secure & innovative societies.

The goal of RRI is to create a society where R&I practices and outcomes are committed to achieving sustainable, ethically acceptable, and socially desirable outcomes. According to RRI approach, all people and institutions that are influenced and committed to research and innovation are responsible for our future. RRI is about predicting the future outcomes of research and innovation processes. The results are not determined individually, but rather result from and/or are present in the description of the process requirements. Therefore, attention should be paid to the integrated nature of the processes and results in practicing RRI.

## **5. Nature and scope of university spin-offs influence on the region**

The reason why to take into consideration indirect influence of spin-offs creation on wider economy or society lays in the theory of economy (externalities theory, spill overs theory, multiplier effect theory).

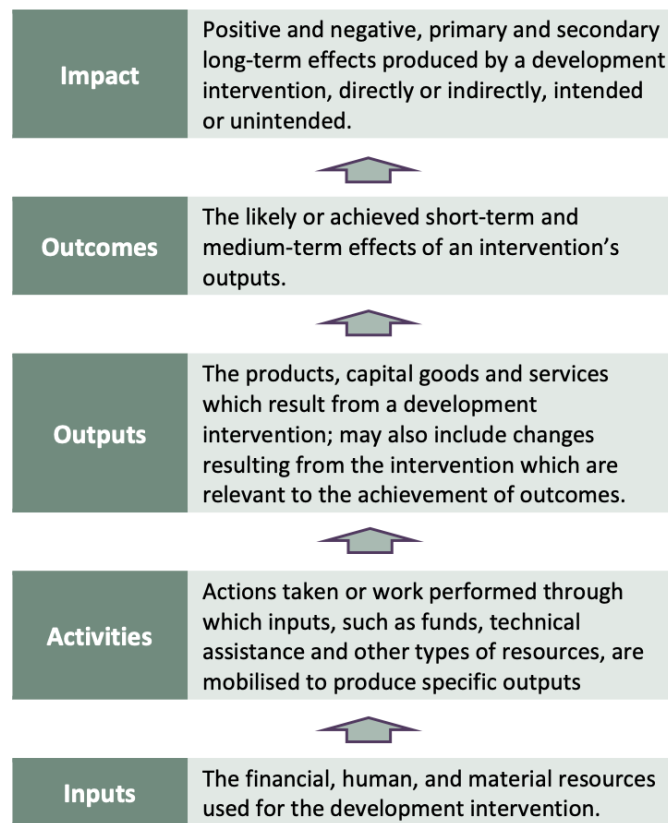
The impact of any social (including economic) activity of a human being can be described by externalities theory (Hołuj, 2021). An externality originates from the production or consumption of a good or service, resulting in a cost or benefit to an unrelated third party – this means they occur and impact an entity which is not directly related to the production or consumption of a given good or service. Externalities can be both positive or negative. In this section of a toolkit only positive externalities are taken into consideration – in terms of regional development as a positive result of spin-offs.

„Externalities are always accompanied by spillovers. {...} In general, spillover effects occur when a phenomenon spreads (usually it is knowledge) in various spatial systems or structures in an uncontrolled, unconscious, unintentional, and freeway. Spillover effect may concern experience, prediction skills, good practices, or local customs. Spillovers effects can occur on several different levels and in different configurations. They can be individual, private, mixed, social, or economic spillover effects, generated by individuals or businesses” (Hołuj, 2021).

The effect that a creation of a spin-off can have on a regional economy can also be described in terms of multiplier effect. “A regional economic multiplier is defined as the total economic effect that occurs in a region per unit of the direct economic change that caused the effect”. (Stevens, Lahr, 1988). In other words, the multiplier effect indicates that an implementation of new spending (e.g. exports, public spending or investment) can lead to new and spendings and investment, which is because a part of the new spending will itself be spent, creating income for other entities (enterprises, individuals, local governments). The latter will also spend a proportion of their own income and it again creates income for other. For instance, “every time a local economy generates a new job by attracting a new business, additional jobs might also be created, mainly through increased demand for local goods and services” (Moretti, 2010). Also “the input of science and technology innovation factors leads to the multiplier effect of economic development” (Cheng Hui, Wang Bei, 2019).

People’s or public bodies’ activities have an impact on regional environment. Impact is the “demonstrable contribution that excellent research makes to society and the economy” (Science Foundation Ireland and Economic and Social Research Council). Impact is a change in an outcome caused by an organisation. An impact can be positive or negative, intended or unintended, also direct or indirect. The latter characteristic of impact being a consequence of the nature of economic mechanisms described before, can be illustrated by impact value chain (Figure 2).





**Figure 2.** Impact value chain.

Source: International NGO Training and Research Centre (INTRAC). (2017). Outputs, Outcomes, and Impact, <https://www.intrac.org/wp-content/uploads/2017/01/Outputs-outcomes-and-impact.pdf>.

## 6. Regional impact metrics of university spin-offs

University spin-offs affect region in social, economic and environmental dimensions with direct and indirect way. For the purpose of innovation strategies of HEIs, metrics in these three dimensions and two scopes are proposed (Table 1). To be with accordance of the nature of externalities, spill-over effects and multiplier effects, the proposal includes impact value chain in two scope levels: direct and indirect. The direct metrics are related strictly with a certain activity (here: academic spin-off). The indirect metrics refer to wider economy/society/environment beyond spheres directly affected.

**Table 1.**  
*Regional impact metrics of academic spin-offs*

	Direct metrics (related to a given spin-off creation)		Indirect metrics (referring to possible externalities creation, spill over effects and multiplier effects in a broader – indirect- sense)	
	Metrics	Justification	Metrics	Justification
Economic metrics (indicators referring to certain economic quantities, useful to analyse the economic situation and predict future changes)	<ul style="list-style-type: none"> <li>Number of employees</li> <li>Sector of activity</li> </ul>	Number of employees and promoters, combined with information on sectors of activity, measure the capability of spin-offs to create high-tech employment and high-tech entrepreneurs. (Iacobucci, Micozzi 2015). Refers to the potential of positive externalities, spill overs.	<ul style="list-style-type: none"> <li>GDP and GDP per capita</li> </ul>	GDP is the principal aggregate for measuring economic output. It can be presented in absolute values and per inhabitant ratios (per capita) [Eurostat, 2021] Using GDP per capita is more informative, as it represents how much economic production value can be attributed to each individual citizen.
	<ul style="list-style-type: none"> <li>Average wages level</li> </ul>	The wage level refers to the consumption potential of the employees and their ability to create multiplier effects.	<ul style="list-style-type: none"> <li>Private and public Final Consumption Expenses</li> </ul>	A better indicator than GDP to estimate the regional development and the wealth of regional region's citizens can be the private and public Final Consumption Expenses (FCE), which exclude from the GNI investments and the balance of saving. [European Parliament, 2017]
	<ul style="list-style-type: none"> <li>Share of new and modernized products in sold production</li> <li>The number of inventions submitted for patenting</li> <li>The number of patents obtained</li> <li>High technology import and export share</li> </ul>	These metrics refer to the potential of knowledge spill overs.	<ul style="list-style-type: none"> <li>Unemployment rate</li> </ul>	A very general indicator of economic development of the area.
	<ul style="list-style-type: none"> <li>Corporate Income Tax</li> <li>Turnover</li> </ul>	Theses metrics refer to the potential for creation of multiplier effects	<ul style="list-style-type: none"> <li>Revenues to the territorial units budget due to participation in PIT, CIT and real estate tax</li> <li>Territorial units' own income of territorial units per capita</li> </ul>	These metrics refer to the economic condition of a territorial unit and have an impact on multiplier effects and depend on economic activity of citizens.
	<ul style="list-style-type: none"> <li>Awards in public competition</li> </ul>	This metric refers to the ability of a region's image fostering	<ul style="list-style-type: none"> <li>Increase in real estate prices</li> <li>Number of SMEs</li> <li>Investments in the enterprise sector</li> <li>Foreign Direct Investment</li> </ul>	These metrics refer to the investment attractiveness of the territory and the potential of positive externalities, spill overs and multiplier effects.

Cont. table 1.

	<ul style="list-style-type: none"> <li>• Projects with regional cooperants including HEIs</li> <li>• Public private co-publications</li> </ul>	<p>This metric refers to the possibility of spill over effects and innovation diffusion (positive externalities)</p>	<ul style="list-style-type: none"> <li>• Indices of the share of exports and imports of high-tech products in total exports and imports</li> <li>• Shared R&amp;D facilities with local/regional industry</li> <li>• SMEs introducing product/ process/ marketing innovations as percentage of SMEs</li> <li>• Mobility of university staff to or from local business enterprises</li> <li>• Value (or number) of VC funds investments</li> <li>• Outlays on innovative activities in enterprises in relation to GDP [%]</li> <li>• Share of innovative enterprises - in the total number of industrial enterprises [%]</li> <li>• Share of innovative enterprises - in the total number of enterprises from the service sector [%]</li> <li>• The region's share in national expenditure on innovative activities in enterprises [%]</li> <li>• Innovative SMEs collaborating with others as percentage of SMEs</li> <li>• Employment in medium-high and high tech manufacturing and knowledge-intensive services</li> <li>• Sales of new-to-market and new-to-firm innovations as percentage of total turnover (for SMEs only)</li> </ul>	<p>These metrics refer to the potential of knowledge spill overs and innovation diffusion</p>
<p><b>Social metrics (measures of well-being of society)</b></p>	<ul style="list-style-type: none"> <li>• Number of employees with PhD or higher</li> </ul>	<p>This metric reflects the potential of knowledge spill overs</p>	<ul style="list-style-type: none"> <li>• Life expectancy at birth</li> <li>• Mortality rate</li> <li>• Homicide rate</li> </ul>	<p>Life expectancy at birth - average number of years a generation should live under the current mortality conditions at each age). This is the most global indicator of population health. It reflects the sanitary, environmental, nutritional, etc., living conditions of a population. It is available for males, females, and the average of both. Additional metric (mortality rate or homicide rate) can also be included here.</p>

Cont. table 1.

	<ul style="list-style-type: none"> <li>Number of employees with disabilities</li> </ul>	This metric refers to social responsibility of a company and its impact on social inclusion activities	<ul style="list-style-type: none"> <li>Dynamics of costs of welfare and social assistance</li> </ul>	Social assistance available to individuals and families whose income and assets do not cover their essential daily expenses. Rise or drop in expenses indicates the living conditions of a given society.	
	<ul style="list-style-type: none"> <li>Number of employees previously in long-term unemployment</li> </ul>	This metric reflects the impact of a company on regional long-term unemployment problems (social exclusion problem)	<ul style="list-style-type: none"> <li>Dynamics of costs related to counteracting pathologies</li> </ul>	Local governments tasks include counteracting pathologies. The rise in social welfare implies the reduction of such costs.	
			<ul style="list-style-type: none"> <li>Migration rate</li> </ul>	Migration rate indicates the attractiveness of a territory in terms of subjective life quality on the basis of which people make decision about	
			<ul style="list-style-type: none"> <li>Households Broadband access</li> <li>Numbers of rooms per person</li> </ul>	These metrics refer to the living conditions of a population.	
				<ul style="list-style-type: none"> <li>Voter turnout</li> </ul>	This metric refers to the trust in public bodies and also to the quality of social capital in the area. Can create additional economic spill overs and positive externalities.
				<ul style="list-style-type: none"> <li>Share of labour force with at least secondary education</li> </ul>	This metric refers to the potential of high-tech sector development (spill overs)
<b>Environmental metrics (metrics assessing the environmental impact; related to using natural resources and generating waste and emissions)</b>	<ul style="list-style-type: none"> <li>Electricity cost/ usage</li> <li>Sewage cost</li> </ul>	These refer to carbon footprint of a company	<ul style="list-style-type: none"> <li>LCA indicator set</li> </ul>	A Life Cycle Assessment (LCA) quantifies and assesses the emissions, the consumption of resources, and the pressures on health and the environment attributed to different products over their entire life cycle. It quantifies all physical exchanges with the environment, whether these are inputs (resources, such as materials, land use, water and energy), or outputs (emissions to air, water and soil). These inputs and outputs (life cycle inventory (LCI)) are then classified according to the environmental impact category(-ies) they belong to (e.g. climate change or ecotoxicity); as a result, the potential environmental impacts of the product can be assessed. These environmental impacts can be reported either for each impact category individually, or can be aggregated- weighting their relative importance into a single indicator of environmental impacts.	

Cont. table 1.

	<ul style="list-style-type: none"> <li>• Pro-ecological investment</li> <li>• Products related to ecology</li> </ul>	These refer to the potential of positive environmental externalities creation.	<ul style="list-style-type: none"> <li>• CO2 emissions</li> <li>• Green areas share</li> <li>• Average level of PM2.5 in the region experienced by the population</li> </ul>	These metrics refer to the state of natural environment of the area with special regard of air condition.
--	--	--	--	---

Source: Own development with use of: European Union, 2010; European Commission, 2014; OECD, 2021; Jonkers, 2018; Urząd Marszałkowski Województwa Mazowieckiego, 2019; UN OHCHR, 2020; Iacobucci and Micozzi, 2015; European Commission 2021; European Parliament, 2017; Deloitte Business Consulting S.A. and Łódzka Agencja Rozwoju Regionalnego S.A., 2013; Cheng Hui and Wang Bei, 2019; Eurostat, 2021.

## 7. Discussion

The concept of impact measurement presented in this article is neither complete nor limitless. Certainly, it is necessary to define more detailed rules for the implementation of the planning and monitoring system for research and commercialization by universities. The article presents only the proposed set of indicators. Additionally, the presented set can be expanded with other indicators related to publicly recognized values. It should also be noted that it is difficult to link indirect indicators with specific spin-off companies, which, according to the author, does not diminish the need to monitor the state of the region and make the university's activity a tool to improve its condition and respond to the most priority public challenges.

## 8. Summary

The concept of public value allows for a broader look at the activities of enterprises as well as research and development activities of universities. It is an approach that, enriched with the concept of Responsible Research and Innovation (RRI), allows for a new perspective on the impact of academic spin-offs on the regional environment. Understanding possible impact with its scope and dimensions can and should be incorporated in HEI's innovation strategies to properly plan and control undertaken activities. On the planning stage, metrics should be helpful in shaping the research process to achieve publicly valuable results as broadly as possible. In monitoring and control, HEIs can assess their impact on society, economy and environment while fulfilling third mission of contemporary university.

## Acknowledgements

I would like to thank the team from the Faculty of Management of the University of Lodz implementing the project RiEcoLab – RESPONSIBLE INNOVATION-LED ENTREPRENEURIAL UNIVERSITY TRANSFORMATION CENTRES (ECOSYSTEM INTEGRATION LABS), financed by HORIZONT 2020, for our joint work, thanks to which this article was created.

For more information about a project, please refer to the following website: <https://riecolab.eu>.

## References

1. Blaug, R., Horner, L., Kenyon, A., Lekhi, R. (2006). *Public Value and Local Communities. A Literature Review*. London: The Work Foundation.
2. Botterman, M., Miiard, J., Horlings, E., van Oranje, C., van Deelen, M., Pedersen, K. (2008). *Wartość dla obywateli. Wizja zarządzania publicznego w 2020 roku. Raport Samorządowej Komisji Europejskiej (2020)*. Rotterdam.
3. Bozeman, B. (2007). *Public Values and Public Interest. Counterbalancing Economic Individualism*. Washington, DC: Georgetown University Press.
4. Cheng Hui, Wang Bei (2019). Multiplier Effect of Science and Technology Innovation in Regional Economic Development Based on Panel Data of Coastal Cities, *Journ.al of Coastal Research*, pp. 883-890. Available at: <https://search-1ebscohost-1com-10ao1bjws02ca.han3.lib.uni.lodz.pl/login.aspx?direct=true&db=edsjsr&AN=edsjsr.26854067&lang=pl&site=eds-live>. 15.06.2022.
5. Coats, D., Passmore, E. (2008). *Public Value – The Next Steps in Public Service Reform*. London: The Work Foundation.
6. Deloitte Business Consulting S.A. and Łódzka Agencja Rozwoju Regionalnego S.A. (2013). *Regionalna Strategia Innowacji dla Województwa Łódzkiego LORIS 2030*, <https://rpo.lodzkie.pl/images/prawo-i-dokumenty/RSILORIS2030final1.pdf>. 12.07.2022.
7. European Commission (2021) *Performance, monitoring and evaluation of the European Regional Development Fund, the Cohesion Fund and the Just Transition Fund in 2021-2027*, [https://ec.europa.eu/regional\\_policy/sources/docgener/evaluation/pdf/performance2127/performance2127\\_swd.pdf](https://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/performance2127/performance2127_swd.pdf). 12.07.2022.
8. European Parliament(2017), *.Research for REGI Committee - Indicators in Cohesion Policy*, [https://www.europarl.europa.eu/RegData/etudes/STUD/2017/601976/IPOL\\_STU\(2017\)601976\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2017/601976/IPOL_STU(2017)601976_EN.pdf), 10.07.2022.

9. European Union (2010). *Making sustainable production a reality. A guide for business and policy makers to Life Cycle Thinking and Assessment*. Luxembourg: European Union, <https://eplca.jrc.ec.europa.eu/uploads/LCT-Making-sustainable-consumption-and-production-a-reality-A-guide-for-business-and-policy-makers-to-Life-Cycle-Thinking-and-Assessment.pdf>.
10. Eurostat (2021). *EGDP at regional level*, [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=GDP\\_at\\_regional\\_level#Gross\\_domestic\\_product\\_.28GDP.29](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=GDP_at_regional_level#Gross_domestic_product_.28GDP.29), 20.06.2022.
11. Hołuj, A. (2021). Externalities in the Light of Selected Spatial Economy Issues - Contribution to the Discussion. *European Research Studies Journal*, Vol. XXIV, Iss. 1, pp. 3-21.
12. Howard, J. (2005). *The Emerging Business of Knowledge Transfer. Creating values from intellectual products and services*, Australian Government. Department of Education. Science and Training, [http://www.howardpartners.com.au/publications/Howard\\_Partners\\_Business\\_of\\_Knowledge\\_Transfer\\_Report.pdf](http://www.howardpartners.com.au/publications/Howard_Partners_Business_of_Knowledge_Transfer_Report.pdf), 14.06.2022.
13. [https://ec.europa.eu/commission/presscorner/detail/en/MEMO\\_13\\_1085](https://ec.europa.eu/commission/presscorner/detail/en/MEMO_13_1085).
14. Iacobucci, D., Micozzi, A. (2015). How to evaluate the impact of academic spin-offs on local development: an empirical analysis of the Italian case. *The Journal of Technology Transfer*, vol. 40(3), pp. 434-452. Springer.
15. International NGO Training and Research Centre (INTRAC) (2017). *Outputs, Outcomes, and Impact*, <https://www.intrac.org/wpcms/wp-content/uploads/2017/01/Outputs-outcomes-and-impact.pdf>, 10.06.2022.
16. Jonkers, K. et al. (2018). *A Regional Innovation Impact Assessment Framework for universities*, EUR 28927 EN. Luxemburg: Publications Office of the European Union.
17. Kelly, G., Mulgan, G., Muers, S. (2002). *Creating Public Value. An Analytical Framework for Public Service Reform*. Discussion paper prepared by the Cabinet Office Strategy Unit, United Kingdom.
18. Mahdon, M. (2006). *Public Value and Health*. London: The Work Foundation.
19. Matusiak, K.B. (2020). *Budowa powiązań nauki z biznesem w gospodarce opartej na wiedzy. Rola i miejsce uniwersytetu w procesach innowacyjnych*. Warsaw: SGH.
20. Meynhardt, T. (2012). *Public Value – Turning a Conceptual Framework into a Scorecard. Paper submitted for the Conference. Creating Public Value in a Multi-Sector*. Shared-Power World, Minneapolis on September 20-22.
21. Meynhardt, T., Gomez, P., Schweizer, M. (2014). The Public Value Scorecard: what makes an organization valuable to society? *Performance*, 6(1), 2-9.
22. Moore, M. (1995). *Creating public value*. Cambridge: Harvard University Press.
23. Moore, M. (2003). *The Public Value Scorecard. A Rejoinder and an Alternative to 'Strategic Performance Measurement and Management in Non-Profit Organizations' by*

- Robert Kaplan. Working Paper #18. Boston: Hauser Center for Nonprofit Organizations, Kennedy School of Government, Harvard University.
24. Moretti, E. (2010). Local Multipliers. *American Economic Review: Papers and Proceedings*, 100(2), 1-7.
  25. O'Flynn, J., Alford, J. (2009). Making sense of public value: concepts, critiques and emergent meanings. *International Journal of Public Administration*, vol. 32, no. 3-4, 171-191.
  26. OECD (2021). *Households with broadband access (indicator)*, <https://doi.org/10.1787/f9b84af5-en>, 02 November 2021.
  27. Owen, R., Stilgoe, J., Macnaghten, P., Gorman, M., Fisher, E., Guston, D. (2013). *A framework for responsible innovation. Responsible innovation: managing the responsible emergence of science and innovation in society*, 31, 27-50.
  28. Science Foundation Ireland and Economic and Social Research Council, <https://www.sfi.ie/funding/award-management/research-impact/>.
  29. Stevens, B., Lahr, M. (1988) Regional Economic Multipliers: Definition, Measurement, and Application. *Economic Development Quarterly – ECON. DEV. Q.*, 2, 88-96.
  30. Stoker, G. (2006). Public Value Management. A New Narrative for Networked Governance? *The American Review of Public Administration*, 36(1), 41-57.
  31. Talbot, C. (2011). Paradoxes and Prospects of 'Public Value'. *Public Money and Management*, 31(1), 27-34.
  32. UN OHCHR (2020). *Article 27—Illustrative indicators on work and employment—Human rights indicators on the CRPD*, <https://bridgingthegap-project.eu/crpd-indicators/>.
  33. Urząd Marszałkowski Województwa Mazowieckiego (2019). *Monitoring wskaźników dla celu głównego, celów strategicznych i celów operacyjnych Regionalnej Strategii Innowacji dla Mazowsza do 2020 roku w kontekście inteligentnych specjalizacji*, <https://innowacyjni.mazovia.pl/upload/pages/1744/1744-0.pdf>, 10.07.2022.
  34. Von Schomberg, R. (2013). *A vision of responsible research and innovation. Responsible innovation: Managing the responsible emergence of science and innovation in society*, 51-74.
  35. Wiśniewska, M. (2018) Wartość publiczna i zarządzanie wartością publiczną. *Samorząd Terytorialny*, nr 3.