

THE PROBLEMS OF SUSTAINABLE AND PERMANENT DEVELOPMENT IN THE CONTEXT OF UNDERSTANDING THE ESSENCE OF SCIENCE

Ryszard BOROWIECKI¹, Barbara SIUTA-TOKARSKA^{2*}

¹ WSB University; borowier@uek.krakow.pl, ORCID: 0000-0002-2513-9450

² Cracow University of Economics; siutab@uek.krakow.pl, ORCID: 0000-0001-9078-6243

* Correspondence author

Purpose: The article refers to the problems of permanent and sustainable development in the context of understanding the essence of science. The aim of the research is to show the existing relationship between sustainable and permanent development as a specific idea and science in its essence.

Design/methodology/approach: The methodological frames of the publication were defined taking into consideration the assumed research goals as well as the research questions.

Findings: For the research aim the following research questions were formulated:

- what does the essence of science express in and what are its pillars?
- what does the essence of sustainable and permanent development consist in?
- is there a relationship between the problem of sustainable and permanent development and understanding the essence of science?
- what should be expected so that science – in its essence – could really contribute to the realisation of the idea of sustainable and permanent development?

Practical and social implications: The research is theoretical but takes into consideration available empirical data considering more important changes in natural, social and economic capital in the world, on the basis of which trends in the progress in the application implementation of the idea of sustainable and permanent development are presented. The publication also discusses the connections between the essence of science and its real contribution to putting the idea of the permanent and sustainable development into practice.

Originality/value: The model of sustainable and permanent development' idea in the aspect of the essence of science – pillars and foundations for the construction of the new world.

Keywords: development, science, economic, social and natural capitals.

Category of the paper: general review.

1. Introduction

The twentieth and the twenty-first centuries have become the time of dynamic and rapid changes in the surrounding of world economies, as well as the whole business sector. Facing the changes in their surrounding, business entities were forced either to adapt to the new reality or to anticipate these changes. In consequence, competitiveness in the 21st century is based on the skills, which make it possible to overcome new difficulties and challenges, which refer to some socio-economic changes, not yet properly examined and scientifically explained as to their causes, changes and effects. The same applies to environmental capital in the world. Taking into consideration all the above-mentioned issues – knowledge is the factor of competitiveness. This factor, together with proper skills and competences, contributes to building a new reality in the human world. It should be underlined that this new reality, defined by Z. Bauman – a philosopher – as postmodernism, not always serves human beings. Negative effects of excessive exploitation of the Earth by humans are clearly visible in a lot of statistic data and UN reports, hence the Authors of this publication, in their analysis and considerations concerning the concept of permanent and sustainable development, relying especially on their knowledge of management science, want to underline that the implementation of the idea of permanent and sustainable development requires proper planning, arranging and motivating, as well as controlling the achieved goals. All the above-mentioned activities have not been sufficiently implemented so far. The Authors of the publication claim that the discussed permanent and sustainable development – both on a global and local scale – will not be possible without the support of knowledge and science based on proper pillars, the search of which is one of the tasks of this publication.

2. The methodological outline of the research

Within the undertaken scientific research into the problems of sustainable and permanent development in the aspect of understanding the essence of science, available Polish and foreign literature on the subject discussing this problem was used. The research is theoretical, but takes into consideration available empirical data considering more important changes in natural, social and economic capital in the world, on the basis of which trends in the progress in implementing the idea of sustainable and permanent development are presented. Therefore, the aim of the research is to show the existing relationship between sustainable and permanent development as a specific idea and science in its essence. For the research aim formulated in this way, the following questions were created:

- what does the essence of science express and what are its pillars?
- what does the essence of sustainable and permanent development consist in?
- is there a relationship between the problem of sustainable and permanent development and understanding the essence of science?
- what should be expected so that science – in its essence – could really contribute to the realisation of the idea of sustainable and permanent development?

3. The essence of science

Science is an ambiguous term, which is defined and understood differently. With regard to its ambiguity, a variety of the designators of the term, as well as the multitude of contexts, within which it can be discussed, it must be noted that there is not a single universal definition of this term, which would be able to encompass all its semantic aspects. However, both in the colloquial and the linguistic tradition of the meaning, the term science is related to the process and result of acquiring knowledge, gaining skills, as well as obtaining information. It means that those two terms, knowledge and science, are closely connected, but they do not constitute substitutes of each other (Fig. 1).

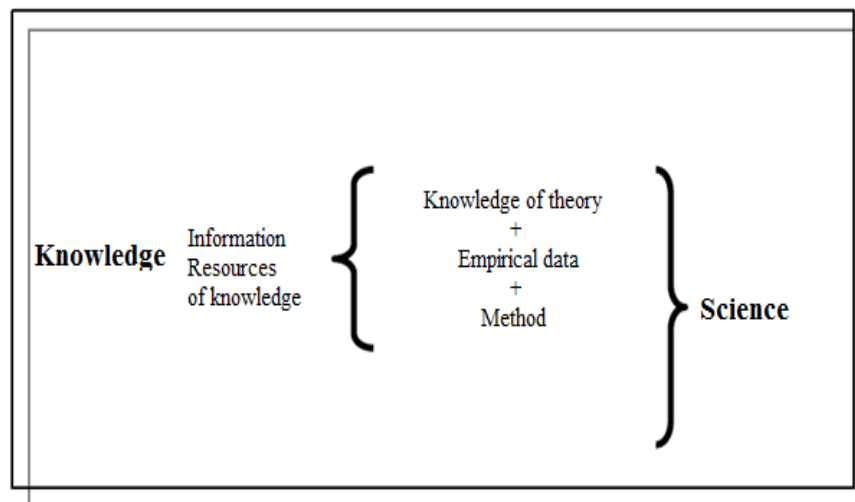


Figure 1. Knowledge versus science. Source: Author's own study based on (Meredyk, 2020).

We can indicate specific aspects of science, such as, for example (Apanowicz, 2000)¹:

- the functional aspect, namely the entirety of activities performed by scientists, and
- the subjective and content-related aspect, namely science is treated as a branch of knowledge meeting the criteria of scientificity, subordinate to methodological standards.

Primarily, however, science is related to exploratory cognition, which should be understood as an activity and, at the same time, as an objective result – a product of exploratory cognition.

In science development theory, it is emphasized that primary science is formal logic, on which all other areas of science are based, and from it formal science, that is mathematics, arises (Hoppe, http). However, the term science itself has been included in the repertoire of the methodological and epistemological reflection by means of the separation of philosophy and mythology by ancient Greeks (Woleński, 2009). Those were works by Plato and Aristotle on *episteme*, that is certain knowledge – a paradigm of science of that time – that enabled to separate it from *doxa*, namely opinion. Also today, one of the most important problems in the scientific discourse is the ability to differentiate between *science* and *pseudo-science* (Sadowski, Szydlik, 2016).

As K.R. Popper rightly notes: *cognition does not start with sensual perceptions, or with observations or data or fact collection, but it starts with problems*. It means that, at the beginning, tension between knowledge and ignorance appears, which is related to the acceptance of the occurrence of a specific relationship: there are no problems without knowledge, or knowledge without problems (Popper, 1992). Therefore, a problem is the primary character of the process of scientific cognition, which, in turn, arises from the natural cognitive need of an individual and the willingness to explore the existing knowledge (Ajdukiewicz, 2003). Scientific cognition itself may be perceived as a multi-stage procedure, which is characterised by (Apanowicz, 2003):

- intellectual inquisitiveness of a researcher,
- unambiguous formulations and clear constructs,
- creative character and a possibility of practical application,
- the use of renowned procedures (research methodology),
- constant criticism towards existing knowledge (Węgrzecki, 2011)².

¹ The following division into the aspects of science is also distinguished: content-related, subjective, functional, institutional. Moreover, science can be discussed in the following aspects: historical and geographical, historical and sociological, static, dynamic, structural, axiological, systemic, psychological, organisational, legal, linguistic, political, economic, or even an ideological one.

² It should be emphasised that for ancient sceptics doubting was the final result of various solutions, but already for Descartes it was a tool by means of which he searched for the truth. It gave him the guarantee of a high cognitive value of judgments and was a manifestation of a critical research attitude.

Thus, when approaching scientific cognition in the context of the problem, its understanding in the category of searching the truth arises³. As K. Meredyk emphasizes (http), a common scientific problem is the truth, approached as an expected effect of the research process, which, in this approach, may be perceived as the “indicator of assessing the process efficiency and the final aim of the research”.

Thus, if we assume that the aim of scientific cognition is the search for the truth, a question arises: what is the aim of science?

In the author’s opinion, the ultimate aim of science should be wisdom, gained through finding out the truth, understood as the highest criterion of the assessment of science credibility for the common good (good should be understood here as ethical, including the moral aspect of the process of cognition and the application of science). It should be emphasised that the contact of those three pillars of science proves its beauty, which is presented in Figure 2.

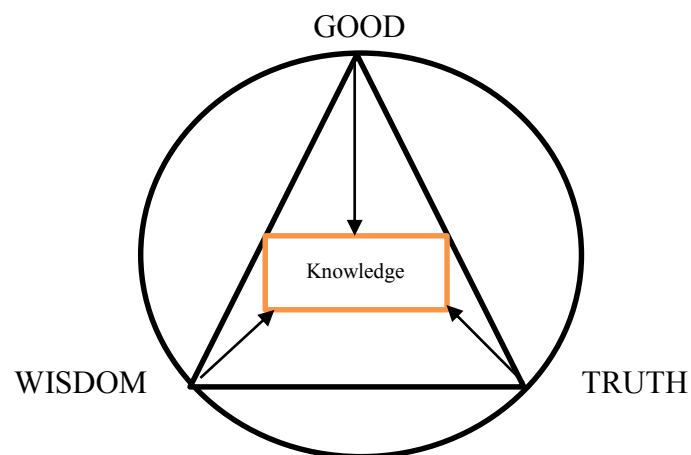


Figure 2. The beauty of science in the origin of scientific cognition as the union of three transcendental categories “truth-good-wisdom”. Source: author’s own study.

What arises from the essence of science is that it should face the truth.

Yet, resting science on that pillar only will cause that its product will be knowledge alone.

But when in science the truth touches the good, cognition will concern its “pure essence” – the search of which is required from us as people dealing with it – that is, wisdom⁴.

If the simultaneous crowning of those three components: the truth, good and wisdom in science takes place, then its whole beauty will be discovered in a perfectly braided palette of colours.

Thus, the truth, being related to acting in favour of the good, contributes to achieving wisdom. Wisdom thus defined allows to express a practical aspect of the cognition process in

³ In the classical approach, the truth is depicted as the adequacy of relationships between judgment and reality (empirical objectivity of thoughts).

⁴ The path to wisdom is understood here as faithfulness to the truth and good, that is such proceedings of a scientist/researcher which arise from the truth and good.

science, which, in the context of interdisciplinarity, enables progress in civilisation, the deepening of relationships, and – in particular – solving a scientific problem.

4. The idea of sustainable and permanent development

The concept of sustainable and permanent development is relatively young, but the idea itself, as a thought of development characterised by sustainability and permanence, is a little older. As early as in mid-18th century in Poland, Krzysztof Kluk, Rev., drew attention to the need for the maintenance of “forests and the permanence of their use” (Siemiński, 2008)⁵. It is assumed in the literature, that the term sustainable proceedings with natural resources occurred for the first time in the period concerning the mining industry crisis⁶. Another important event, regarding the idea of sustainable development, took place in 1975, when the United Nations Environment Programme Executive Board proposed a definition of sustainable development, understood as being compliant with “inevitably progressing economic development, which would not violate substantially and irreversibly the environment of human life, would not lead to the degradation of biosphere, which would reconcile the laws of nature, economics and culture”. However, only in 1987, the idea of sustainable development was adopted for good and its contemporary definition, included in the “Our Common Future” report, has been in force since then. It postulates to aim at the sustainability of three capitals: natural, social and economic. It means that none of the capitals should appropriate the “space” of another. The practice of life in the 21st century shows, however, that economic capital is the one, which dominates over the others, that is social and natural capitals, which is proven by the state of social inequality in the world (according to 2019 data, only 1% of the richest people in the world have a wealth two times bigger than that of 6.9 billion people worldwide, and also nearly a half of the world population live on less than USD 5.50 a day (Lawsom et al., 2020)), and the exploitation of the planet resources, degrading life on Earth (the so-called Living Planet Index, LPI⁷, depicting the biodiversity of the Earth’s resources, has diminished since the 1970s by almost 60% (*Living Planet Report*, 2018⁸)).

⁵ On the basis of the document by K. Kluk, among others, in 1787 August Poniatowski issued “The Universal” Decree on the protection of forests and their development.

⁶ In 1713, Hans Carl von Carlowitz implemented sustainable forest economy in Germany, where, at the beginning of the 18th century, there were constant shortages of wood, due to activities related to the depletion of forest resources there. H.C. von Carlowitz ordered the reconstruction of the forests he managed and introduced the principles of regulated and future-oriented proceedings with natural resources, and the forest management model he introduced was soon adopted in forestry all over Germany.

⁷ LPI – Living Planet Index.

⁸ Measurement for the period 1970-2014.

Of course, the idea of sustainable and permanent development is not about the mathematical equality of those capitals, but about aiming at such harmonisation of development, so that it can be possible to eliminate the occurring and, in fact, constantly deepening of inequalities (Borowiecki, Siuta-Tokarska, 2019).

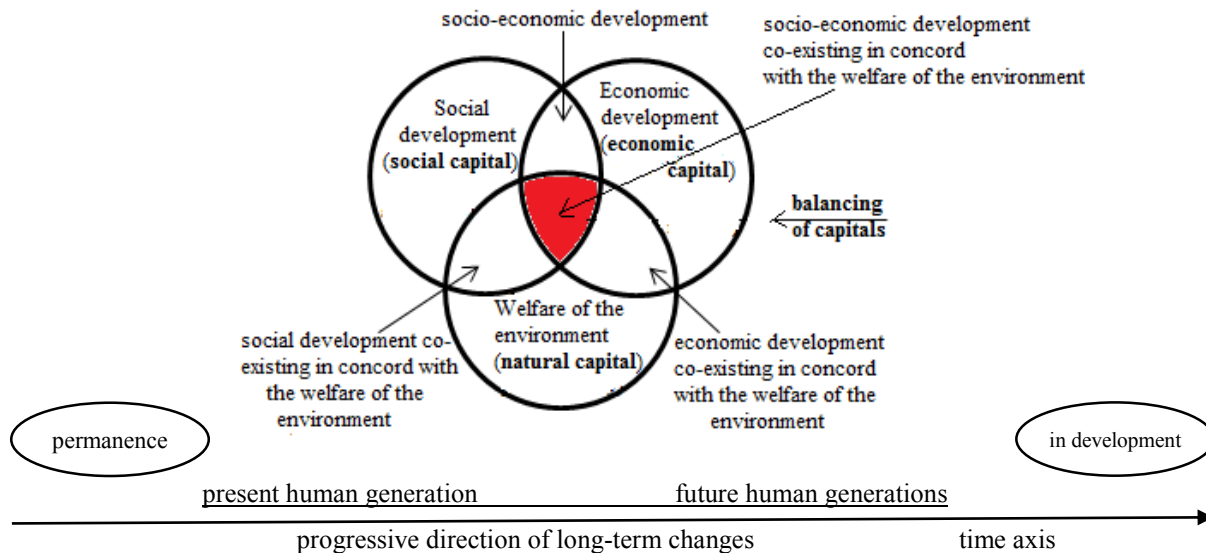


Figure 3. The essence of sustainable and permanent development. Source: (Siuta-Tokarska, Thier, Żmija, 2019).

In science, sustainable and permanent development can be discussed as a socio-philosophical idea, the direction of development, but also a scientific discipline (Turner, 1988; Dasgupta, 2007). However, no matter how it will be discussed, in its essence it is a concept (theoretical, with application of qualities), in which attention is focused on the qualitative aspect of human life in connection with the natural and economic environment, in the context of balancing its constituent capitals and ensuring permanence in the realisation of the adopted direction of the world's development (Jaki, Siuta-Tokarska, 2019).

When approaching sustainable and permanent development as a specific social idea, we can indicate, after S. Czarnowski (1982), a pioneer of research into the history of ideas, that it is: *a model of life for individuals, as members of a human federation and a model for a society, as a union of individuals. A model whose realisation is regarded a necessity, thus, a model being an action order.*

5. As an afterthought

Z. Piątek indicates that the superior goal of “sustainable” development is to achieve a harmonious co-existence of the human world, that is the anthroposphere, with the world of nature, in which the symbiosis is manifested in the most dynamic and sensitive manner with regard to the biosphere (Piątek, 2007). To be able to achieve this goal, it is necessary to take

actions which will be consecutively implemented with due diligence and fairness. D.H and D.L Meadows, as well as J. Randers (1995) distinguish three basic conditions of the implementation of such a set of goals. They are as follows:

- the speed of the use of renewable resources cannot exceed the speed of their recovery,
- the speed of the use of non-renewable resources cannot exceed the speed, with which their ecologically safe, renewable substitutes occur,
- the speed of pollutant emissions cannot exceed the assimilation ability of the environment.

The above-presented conditions of the implementation of sustainable development proposed by Meadows et al. (1995) are characteristic for those valid in the functioning of natural ecosystems, being in the state of the dynamic balance. This is why their adoption and implementation are rationally justified, as they are already applied in practice (healthy ecosystems, through natural homeostatic systems, regulating the circulation of matter and energy, fulfil those conditions, being in the state of permanent, sustainable development).

However, Z. Hull (2007) observes that the understanding of “sustainable” development, prevailing in the world of politics and business, actually fits in the framework of the unchanged paradigm of the development of the civilisation of consumerism and, in fact, expresses the strive for continuation (only in a modified version) of the world’s development model lasting for many years. A similar remark is made by M.R. Redclift (2009), emphasising that, in the place of new, radical interpretations, which would force a change in the understanding of the meaning of sustainable development, the term is often uncritically attached to the existing practices and policies. Therefore, what is visible in the life of a contemporary human, is the lack of unity and close relationship between juridical, ethical and moral standards in the hierarchy of doctrinal, cultural values and those which could be defined as ideal, in which man is perceived in the context of the trinomial of “family – society – state” (Szołtysek, 2003). As rightly observed by K. Najder-Stefaniak (2017), activity is always directed through values. However, in spite of quite a significant moral, ethical or political awareness of the 21st century man, individual values take over in practice, which oppose universal values (understood as equally important for various systems of being), which are necessary for the system to exist (Borowiecki, Siuta-Tokarska, Kusio, 2018). As a result, in the contemporary world, we can indicate three basic megatrends:

1. Global warming, accompanied by human hearts turning into ice.
2. The extinction of thousands of species of plants and animals, accompanied by the awakening of artificial intelligence.
3. Reaching the stars by humans (landing on the Moon and Mars), accompanied by losing the Earth (creating “the desert of life” related to the shortages of drinking water, wasteland, polluted air, contaminations etc.).

To sum up, we can assume that, in order to support the realisation of the idea of sustainable and permanent development of the world in real terms, science, in its essence, must express itself in its pillars: the truth, the good and the wisdom (also in the area of new scientific discoveries and their connections with the issue of ethics and morality). It is a boundary condition for the implementation of this idea. However, in addition to resting it on the essence of science thus understood, it also requires to be based on the unity and close connection between juridical, ethical and moral standards in the hierarchy of doctrinal, cultural values, and those which could be defined as ideal, in which man is perceived in the context of the trinomial of “family – society – state” with the simultaneous co-existence of the anthroposphere with the world of nature (Fig. 4). Such activities require fairness and consistency in their implementation, which in practice is non-existent.

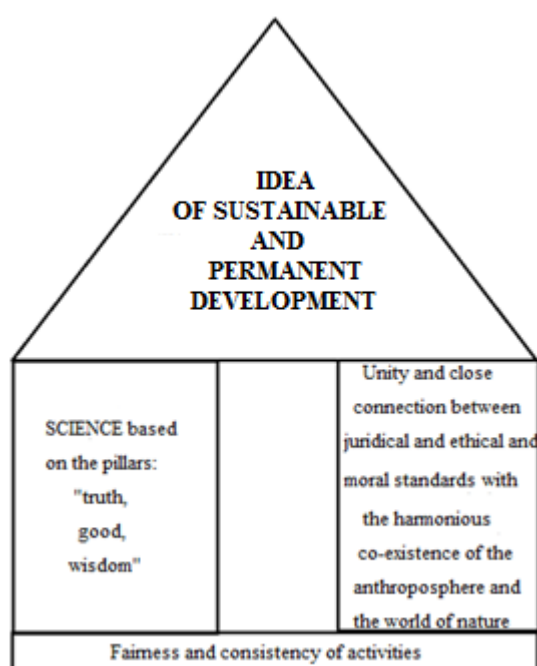


Figure 4. The idea of sustainable and permanent development in the context of the essence of science – pillars and foundations for the construction of the new world. Source: Author’s own study.

6. Conclusions

The aim of the research was to present the existing relationship between sustainable and permanent development as a specific idea and science in its essence – this goal has been accomplished. The scientific research also makes it possible to answer the following research questions, posed at the beginning of the publication:

- what does the essence of science express and what are its pillars?
- what does the essence of sustainable and permanent development consist in?

- is there a relationship between the problem of sustainable and permanent development and understanding the essence of science?
- what should be expected so that science – in its essence – could really contribute to the realisation of the idea of sustainable and permanent development?

It should be underlined, that the source literature analysis and the research carried by the authors of the publication shed new light on the problem of connections existing between the science and the idea of permanent and sustainable development, in which the authors refer to the classic pillars of knowledge, i.e. truth, good and wisdom, as the boundary conditions of implementation of the discussed idea, at the same time taking into consideration the fact that there exists a kind of unity and a close link between juridical, moral and ethical standards in the hierarchy of doctrinal, cultural, and those which could be defined as ideal values, in which, in turn, a human being is perceived in the perspective of the trinomial consisting the following elements: “family”, “society” and “state”, assuming the simultaneous cohesive co-existence of anthroposphere with the world of nature. It, nevertheless, requires honesty and consistency to implement the discussed idea in real life, taking into consideration the basic management functions, i.e. proper planning, arranging, motivating, as well as controlling the results to achieve the assumed goals.

Acknowledgements

The publication is a component of scientific research carried out at the University of Economics in Cracow as a part of research of the Potential Program.

References

1. Ajdukiewicz, K. (2003). *Zagadnienia i kierunki filozofii*. Warszawa: Wydawnictwo Antyk.
2. Apanowicz, J. (2000). *Metodologiczne elementy procesu poznania naukowego w teorii organizacji i zarządzania*. Gdynia: WSAiB.
3. Apanowicz, J. (2003). *Metodologia nauk*. Toruń: TNOiK, Dom Organizatora.
4. Borowiecki, R., Siuta-Tokarska, B. (2019). Management Science(s) – Contemporary Challenges Against the Backdrop of Fundamental Issues of Philosophy. *Scientific Papers of Silesian University of Technology. Organization and Management Series, No. 135*, pp. 33-47.

5. Borowiecki, R., Siuta-Tokarska, B., Kusio, T. (2018). Zarządzanie na rzecz zrównoważonego i trwałego rozwoju – metaparadygmat nauk o zarządzaniu XXI wieku. *Ekonomika i Organizacja Przedsiębiorstwa*, No. 2, pp. 28-43.
6. Czarnowski, S. (1982). *Wybór pism socjologicznych*. Warszawa: Książka i Wiedza.
7. Dasgupta, P. (2007). Measuring Sustainable Development: Theory and Application. *Asian Development Review*, Vol. 24, 1, pp. 1-10.
8. Hoppe, G. *Teoria istoty nauki*. Retrieved from: <http://grzegorzhoppe.com/wp-content/uploads/2018/01/teoria-istoty-nauki-2.pdf>, 17.02.2020.
9. Hull, Z. (2007). Czy idea sustainable development ukazuje nową wizję rozwoju cywilizacyjnego? *Problemy Ekorozwoju*, Vol. 2, No. 1, pp. 49-57.
10. Jaki, A., Siuta-Tokarska, B. (2019). New Imperative of Corporate Value Creation in Face of the Challenges of Sustainable Development. *EBER*, Vol. 7, No. 2, pp. 63-81.
11. Lawson, M., Parvez Butt, A., Harvey, R., Sarosi, D., Coffey, C., Piaget, K., Thekkudan, J. (2020). *Time to care. Unpaid and underpaid care work and the global inequality crisis*. Oxford: Oxfam.
12. Grooten, N., Almond, R.E.A. (eds.) (2018). *Living Planet Report 2018: Aiming higher*. Gland: World Wide Fund for Nature.
13. Meadows, D.H., Meadows, D.L., Randers, J. (1995). *Przekraczanie granic. Globalne załamanie czy bezpieczna przyszłość?* Warszawa: CUUW, PTWKR.
14. Meredyk, K. *Struktura projektu naukowego* Retrieved from: http://mikroekonomia.net/system/publication_files/330/original/25.pdf?1314952665, 17.02.2020.
15. Najder-Stefaniak, K. (2017). Rozwój zrównoważony i wartości uniwersalne. In: R.F. Sadowski, Z. Łepko (Eds.), *Theoria i Praxis zrównoważonego rozwoju. 30 lat od ogłoszonego Raportu Brundtland* (pp. 191-202). Warszawa: Wyd. Towarzystwo Naukowe Franciszka Salezego.
16. Piątek, Z. (2007). Przyrodnicze i społeczno-historyczne warunki równoważenia ładu ludzkiego świata. *Problemy Ekorozwoju*, Vol. 2, No. 2, pp. 5-18.
17. Popper, K.R. (1992). Logika nauk społecznych. *Acta Universitatis Wratislaviensis*, No. 1317, *Prace filozoficzne*, LXXI.
18. Redclift, M.R. (2009). Rozwój zrównoważony (1987-2005) – oksymoron czasu dorastania. *Problemy Ekorozwoju*, Vol. 4, No. 1, pp. 33-50.
19. Sadowski, A., Szydlík, A. (2016). Poznanie naukowe i kanony nauki. *Optimum. Studia ekonomiczne*, No. 2(80), pp. 55-68.
20. Siemiński, J.L. (2008). Idea „rozwoju zrównoważonego i trwałego” obszarów wiejskich w Polsce na tle innych koncepcji. Ujęcie planistyczne (Część I). *Infrastruktura i ekologia terenów wiejskich*, No. 2. Polish Academy of Sciences, Krakow Branch, pp. 7-25.
21. Siuta-Tokarska, B., Their, A., Żmija, K. (2019). *Procesy i problemy realizacji zrównoważonego i trwałego rozwoju w Polsce. Kontekst mikroekonomiczny*. Warszawa: PWN.

22. Szoltysek, A. (2003). *Filozofia pedagogiki. Podstawy edukacji: teoria-metodyka-praktyka*. Katowice: Wyd. ESSE.
23. Turner, R.K. (1988). Pluralism in an environmental economics: a survey of the sustainable economic development debate. *Journal of Agricultural Economics Vol. 39, 3*, pp. 352-359.
24. Węgrzecki, A. (2011). *Zarys filozofii*. Kraków: Wydawnictwo Uniwersytetu Ekonomicznego.
25. Woleński, J. (2009). Dwa pojęcia nauki: metodologiczne i epistemologiczne. *Prace Komisji Historii Nauki Polskiej Akademii Umiejętności, Vol. IX*.