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THE IMPACT OF INNOVATION ON THE SUSTAINABLE DEVELOPMENT OF ENTERPRISES

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Abstract

Research background: Innovations are of great interest to scientists, practitioners, and decision-makers as a key instrument for achieving sustainable development, the existing literature indicates theoretical and methodological gaps in this area.
Purpose: The main objective of this article is to examine whether innovation positively impacts sustainable development in enterprises in the SME sector.
Research methodology: the study was conducted among enterprises from the SME sector in Poland. In the field of research, the electronic questionnaire technique (Google Forms) was used. Partial square inclusion equation (PLS) structural modeling was used to analyze the data.
Results: The ability of enterprises to achieve the desired result, create and improve products and services, high-quality products, and quick processes of transforming an idea into a product/service affect the development of enterprises towards sustainable development.
Novelty: Compared to previous studies, this article contains significant novelties. First, the measure of innovation and sustainable development was analyzed. Secondly, the contribution of innovation to sustainable development is shown. The article is a contribution to further research, as it formulates selective conclusions from empirical research.

Keywords: sustainable development, innovation, efficiency, quality

JEL numbers: Q01, M13, O31, O32

Introduction

Innovation related to the shaping of sustainable development policy is gaining importance. Innovation affects the development of ideas and solutions to economic, social, and environmental problems. In accordance with the concept of sustainable development, radically innovative models, processes, goods, and services are often created. These solutions are socially responsible, related to scientific research, add value to society and the environment, and also have a positive impact on the financial result of an organisation. New strategic models are the involvement of enterprises in the implementation of the 17 Sustainable Development Goals (SDGs) and strategic cooperation of various stakeholder groups. Economic growth is not a sufficient indicator of sustainable development, though social and environmental dimensions have become important for progress. According to Pyszka (2012) innovation becomes a clear impulse to look for completely different qualitative solutions, which can improve the competitiveness of businesses in the field of sustainable development. There are a few things to note:

a) the need to choose the right idea and involve the R&D department/people in its development (also from other departments, e.g. marketing, production, etc.);
b) continue to innovate and use it to drive change in the organization;
c) innovation, bottom-up or top-down;
d) using the positive effects of innovation to create new ones;
e) creating an infrastructure to support further responsible innovation and the creation of larger innovation packages;
f) finding opportunities to commercialize social innovations (products and patents or even business ventures);
g) searching for so-called innovations "blue oceans", i.e. opportunities to develop initiatives and products that allow you to operate outside the competition.

The most important factor influencing the economy are small and medium-sized enterprises. They make up 90% of the world's business and jobs. These enterprises are the backbone of all modern European economies. Unlike large corporations focused on mass production, they adapt faster and easier to changing consumer attitudes. They can react much faster to changes in demand. Greater flexibility is a factor that makes them play an important role in introducing climate-friendly changes and technological development.

Approaches to innovation coming from developing economies can become an excellent tool supporting the implementation of the concept of sustainable development not only in

developing countries. Increasingly, innovations generated and implemented in enterprises are of a socially responsible nature, and the role of the company's stakeholders in their production is noticeable. This proves the pursuit of sustainable development of the surveyed enterprise. Companies that have started or plan to start implementing the principles of sustainable development are required to fundamentally change the way they think about business and innovation. A sustainable future must be innovative (Bukowski, Majewski, Sobolewska, Stawicka, Suchoń, 2022). Innovation is an important element of sustainable development of the economy and building a competitive advantage of enterprises (Wronka-Pośpiech, 2015; Gwarda-Gruszczyńska, 2017; Dwikat, Arshad, Shariff, 2023). Innovations created as part of innovation models from developing countries have a large market potential, especially in the conditions of globalization. It is necessary to create an active policy in this regard as it helps in shaping the overall policy of sustainable development. Models of innovation from developing countries will not naturally spread on a large scale in developed countries, especially among small and medium-sized enterprises. According to Teneta-Skwiercz (2016) pro-social and pro-ecological innovations can take place as part of a 3-stage continuum of sustainable development. The first level is the pursuit of operationalization at the operational level (innovations at the level of the entire organization), the second is organizational transformation (introduction of new products and services, change in consumption habits) and the third is the creation of a network of industrial symbiosis (innovations within the circular economy, the waste from one enterprise becomes a source of resources for another enterprise).

The aim of the article is to present, based on a critical literature review and empirical research, the impact of innovation on the sustainable development of enterprises from the SME sector. The theoretical model formulates the relationship between innovation and sustainable development. The empirical research was focused on checking the developed theoretical model. It was hypothesized that innovation positively affects the sustainable development of a company. Using Google Forms, the author prepared an electronic version of the survey. The resulting link was sent to a group managing enterprises from the SME sector in Poland. The chapter is divided into five parts. The main problems and conclusions are presented in the introduction. The second and third parts are synthetic contemporary views on innovation and sustainable development, based on a critical review of the literature. The next section presents the results of the author's research on the impact of innovation on sustainable development among SMEs in Poland. The article ends with a summary, an indication of the limitations of the study and a proposal for further research.

1. Background and hypotheses development

1.1. Approach to innovation

Innovations understood as a new approach to technical, organizational, economic, scientific, and social problems, are a key driver of changes in the economy and society. Often this issue is analyzed only from a purely technical or economic point of view. In this context, attention is paid primarily to the greater efficiency or lower costs of new, innovative technology. Innovations are also considered in terms of the potential added value of new products or services that may affect the extension of their functionality. In practice, innovations are equated with inventions, but innovations are considered in relation to the result, a new product or process, an improved technique, technology, organization, or society. On the other hand, innovation is an organization's ability to constantly search for, implement and disseminate innovations. Innovation refers to a company's openness to new ideas in the organizational culture and the company's readiness to create new ideas that are developed and used in new products and services. The innovativeness of a company is equated by many researchers with the concept of innovation (Hee-Jae Cho, Pucik, 2005; Kraśnicka, 2018; Bahta, Yun, Islam, Ashfaq, 2020). Innovation is clearly treated as a certain attribute of the company, its ability to introduce innovations, which can be measured and assessed. It is the ability to create something new or make significant changes, acting in a way that uses this ability (Hilami, Ramayah, Mustapha, Pawanchik, 2010). According to Karbowski (2015), the innovativeness of enterprises can be defined as the ability of enterprises to create inventions and their effective implementation on the market. Such an ability consists of a series of interrelated competencies of the company, thanks to which innovations are created. Dobni (2010) emphasizes that the innovativeness of an organization can be defined even more broadly and include the willingness (tendency) to be innovative and the ability to introduce new products, services or ideas, to their implementation, which leads to the improvement of business results. For the purposes of empirical research, it is usually assumed that the innovativeness of an enterprise expresses the willingness and ability to implement new solutions, both technological (product and process innovations) and non-technological (organizational and marketing innovations). Also, the measurement of enterprise innovation encounters many difficulties related to the selection of measures, and at the same time it is considered crucial by both researchers and practitioners, which ultimately translates into many existing approaches to this issue (Oslo Manual, 2005; Nawrocki, 2015; Rouf, Siddique, 2022). Innovation is most often analyzed as:

a) a feature of a company that defines its competence in creating and using tools facilitating competition for customers and responding to changes in the environment (Janasz, Kozieł, 2007, Elalfy, Darwish, Weber, 2020);
b) the ability to implement novelties not only within the product offer, but also in the sphere of production, organizational structure, logistics, supply chain, relations with the environment and enterprise management (Kanter, 1984; Sopińska, Mierzejewska, 2017; Yang, Basile, 2021).

Innovation not only meets the needs of the current generation, but also combines economic, social and environmental aspects, and will ensure that the needs of future generations are met (Ober, 2022). Dynamic changes in the environment require companies to be able to look for a way to stand out, often through innovation, learning to quickly adapt to changes, the ability to allocate resources (Paliszkiewicz, 2019) Innovation is an organization's tendency to implement innovations, including changes of a technical and behavioral nature (Sołtysik, 2021; Samad, 2020). The innovativeness of an enterprise is the ability to effectively allocate resources to shape the optimal configuration of competitive advantages, it includes an element of efficiency, as well as the factor of time under the influence of which the shape of the optimal configuration of competitive advantages changes. The innovativeness of a company depends on many factors, such as: form of ownership, industry sector, size of the company, organizational culture, organizational structure (de Paulo, 2017). The innovativeness of a company consists of the environment related to the availability of specialized services, institutions (including research and development) and resources (mainly human capital), competition or public policy, which is becoming more and more developed thanks to the use of EU structural funds (Dyduch, 2018, Samad, 2020; Ober, 2022).

Currently, social innovations are understood as the phenomenon of the emergence of new solutions (procedures, products, ideas) to issues and social needs, accompanied by social exchange and cooperation, taking institutionalized forms. Social innovations are based on introducing such products, services and solutions to the market that will solve the problems of the community, i.e. lack of work, low income, maladjustment of the education system to the needs of the labor market, activation of specific social groups or improvement of the quality of life. Thanks to such solutions, companies create not only sustainable social value, but also business value, gaining access to a market that no one has been interested in until now. Social innovations are characterized by openness, willingness to share their knowledge and the experience of many entities (Makieła, Stuss, 2018). Several driving forces of business social innovation are indicated: increasing corporate awareness, increasing consumer awareness,

limited natural resources – which create an incentive to produce alternative energy, current technology that can be used to create something new, new markets in developing countries (Bukowski *et al*., 2022). In general, the authors indicate that the implementation of innovations can be considered in terms of efficiency and effectiveness (Waśniewski, 2018; Dyduch, 2019; Williams, Murphy, 2023).

The elements of innovation most often indicated by researchers are: effectiveness (the ability to achieve the desired results should be an important part of every organization); productivity (the ability to generate, create, improve and/or produce products and services is of key importance; quality and efficiency – the process of transforming an idea/invention into a product or service that creates value is important for the development of an organization). The innovativeness of a company is manifested in the company's ability to create and implement innovations, which are treated as one of the most important elements of development, modernity and efficiency on the market.

1.2. Sustainable Development

Classical theories of development consider development within the so-called economic growth and development. According to these theories, development is a concept of sustainable development: from the beginning to the present, synonymous with economic growth that each country must undergo at a given stage, driven by the transformation of traditional agriculture into modern industrialized production of various products and services, i.e. the departure from traditional society to the stage of maturity and high consumption (Williams, Murphy, 2023). These theories consider development among countries constrained by the poor allocation of resources appearing as a result of strong government and corruption, ineffective and insufficient economic initiatives, but also political, institutional and economic austerity, thanks to which is the capture and dominance of developed rich countries (Todaro, Smith, 2003). According to several neoliberal and modern development theories established over the last 60 years (Willis, 2005) and modern understanding, development is a process that results in an improvement in the quality of life and increase in self-sufficiency of economies that are technically more complex and dependent on global integration (Matos, Silvestre, 2013; ISO 26000). The primary goal of this process is to create a stimulating environment where people can enjoy themselves and live long, healthy and creative lives. Growth theory suggests that economic growth is the result of the internal state or corporate system, and that knowledge and ideas play a key role in economic growth (Todaro, Smith, 2003; Greiner, Kim, 2021). The endogenous growth theory model consists of four basic factors: 1) capital measured

in units of consumer goods, 2) work commitment, individual skills, 3) human capital, including education, learning, development and individual training, and 4) technological development. According to this model, if countries want to stimulate economic growth, they must encourage investment in research and development and the accumulation of human capital, given that an adequate level of state capital stock is the key to economic growth. Various taxonomies of the meaning of the term development can be found in the literature and the following meanings are most often emphasized: 1) development as structural changes, 2) human development, 3) development of democracy and governance, and 4) development as environmental sustainability (Vázquez, Sumner, 2013). According to Thomas (2004), development is associated with positive changes that society has experienced throughout history and continues to experience, while Sharpley's (2009) development outlines the plans, policies, programs and actions undertaken by specific institutions, governments and other governmental and non-governmental. Accordingly, the most recognized development indicator is the Human Development Index (HDI), which integrates various categories of socio-cultural, economic, ecological and political development of individual areas (WMO, 2015). The term sustainability literally means "the ability to maintain some entity, outcome or process over time" (Jenkins, 2009) and to perform activities that do not deplete the resources on which that ability depends. Accordingly, ecological sustainability has become the basic framework for socio-cultural and economic sustainability considerations, but also the subject of contention in the concept of sustainable development. The concept of sustainable development boils down to functioning based on the achievement of three basic goals:

a) economic, expressed in meeting the basic material needs of humanity using techniques and technologies that do not damage the environment;
b) social, which ensures the minimum subsistence (end of hunger, misery and poverty), health protection, development of the human spiritual sphere (culture), security and education;
c) ecological, consisting in stopping environmental degradation and eliminating threats (Komisja Europejska, 2015). The circular economy means reducing the negative impact on the environment and rational use of resources. Waste is becoming more and more costly and is no longer socially acceptable. A circular economy can be defined as a broad dimension of product responsibility and product life cycle (Kulczycka, 2020; Zumente, Bistrova, 2021). The circular economy has attracted much attention from policy makers, researchers and practitioners around the world as a means of promoting Sustainable Development Goals (Niero, Hauschild, 2017).

2. Model and hypotheses

For the innovation variable, a description was adopted using four measures: efficiency, productivity, quality and innovation. These measures were selected from the business model presented by Sink and Tuttle, Paliszkiewicz (1989, 2019). Efficiency is the ability to achieve the results assumed by a company. Productivity, defined as the ability to create, improve and/or produce products and services. Productivity is broadly understood as progressive growth in the conditions of the economy: climate-neutral, circular, data-driven (A New Productivity Strategy for Europe, 2020; Haywood, Boihang, 2021). Also the dimension of quality is highlighted as important in innovation. The quality of the product, services, implementation process, information technology – an element that ensures the competitive advantage of every organization. Another indicated dimension is efficiency, defined as the process of transforming an idea into a product or service that creates value and is important for the competitiveness of the organization. Efficiency is the development of strategic mechanisms that support creativity and transform them in the implementation of new products (Table 1).

Table 1. Measures of Innovation – I

Code	Dimension	Item
I 1	Efficiency	The ability to achieve the desired result is a decisive action of the enterprise
I 2	Productivity	The ability to generate, create and improve products and services is crucial
I 3	Quality	The high quality of the product provides a decisive competitive advantage for any organization
I 4	Operational efficiency	The process of transforming an idea into a product/service definitely creates a competitive advantage for a company

Source: study based on Sinka and Tutla, Paliszkiewicz (1989, 2019).

According to the results of the theoretical analysis presented above, the economic, social and ecological goals were described using four measures. The process of economic change towards a circular business, the process of economic change in terms of economic goals, the process of social change and the process of ecological change were taken into account. The dimensions of the economic, social and ecological goals are presented in Table 2.

In the opinion of the European Commission (2015, 2020) innovation applies to both processes methods of production, services, and management aimed at preventing or significantly reducing pollution and other negative effects of the use of natural resources, including energy. An important benefit of conceptualizing various innovations for Sustainability innovation research is complex and rich, reflecting the different perspectives and interests that emerge

from different communities (Fernández, López, Blanco, 2018). Combining innovation in discourse with the concept of sustainable development gives a triple approach (Silvestre, Țîrcă, 2018).), and the nature of innovation may be different. Innovation and sustainable development are innovations: ecological, social, or sustainable. The results of the literature review led to the following hypothesis:

Table 2. Measures of Sustainable Development – SDGs

Code	Dimension	Item
SDGs 1	Circular business	Socially responsible practices in a company definitely affect the reduction of losses, contribute to the circular business.
SDGs 2	Economic goals	Socially responsible practices definitely bring economic benefits, influence innovations, increase sales and market share.
SDGs 3	Social goals	The company is definitely focused on long-term and stable growth, loyalty of customers, stakeholders, local community, image improvement.
SDGs 4	Ecological goals	The company is definitely changing in the direction of sustainable development.

Source: study based on Komisja Europejska (2015, 2020).

Hypothesis H1. Innovation positively affects the sustainable development of enterprises.

3. Methods and sample

An instrument with two constructs/latents was used in this study. The first construct represents innovation and was empirically confirmed by Sink and Tuttle (1989) and Paliszkiewicz (2019) based on earlier research on innovation. Another construct representing Sustainable Development was taken from (Komisja Europejska, 2015). The elements for each structure are shown in the Results. Study variables were rated on a 7-point scale. On a Likert scale, 7 completely agree, 6 somewhat agree, 5 somewhat agree, 4 neither agree nor disagree, 3 somewhat disagree, 2 somewhat disagree, 1 completely disagree. The study was conducted among enterprises from the SME sector in Poland. In terms of the research technique, the technique of an electronic questionnaire intended for self-filling (Google Forms) was used. Data collection was carried out electronically, mainly using the snowball method, and started with entrepreneurs who then willingly recommended the research to their friends. The final sample size was 119 cases. Finally, the presented article was examined by enterprises operating in the agribusiness sector. The distribution of the sample is presented in Table 3. Smart PLS 7.0, structural modeling of partial least squares equations (PLS), was used to analyze the data. The analyzes include the determination of the reliability of the research model – determination

Table 3. Characteristics of the enterprises surveyed (N = 119)

Enterprise size	Volume	Participation (%)
Small (10–49 employees)	52	44
Medium (50–249 employees)	67	56

Source: author's study based on the results.

of the reliability of indicators and internal consistency, and the determination of the validity of the research model – determination of convergent and discriminatory validity. For the validation of the instrument, the Delphi methodology was followed, likewise, the reliability was determined through the Cronbach's Alpha coefficient. Survey methods as a tool for measuring innovation and sustainable development are particularly useful when reputation indicators are not obligatory for enterprises.

4. Results and discussion

Evaluation of the measurement model in Table 1 presents the measurement analysis of the model based on the reliability and validity of the measurement scales. In terms of reliability, the scales' internal consistency is demonstrated by Cronbach's alpha (between 0.721 and 0.832) and composite reliability (between 0.852 and 0.882). For convergent validity, all factor loadings are above 0.659. Similarly, all scales have extracted mean variance (AVE) percentages greater than 50%. The discriminant validity of the construct was tested using the Fornell Larcker criteria, which verify the independence of each scale, taking into account that the square root of the AVE is greater than the correlations with the other scales. In all cases, the assumption was met. The test results are presented in Table 4.

Table 4. Results of the model measurement analysis

Variables	Cronbach alpha	Composite reliability	Factor loads (range)	Average variance extracted (AVE)	Discriminant Validity
I	0.719	0.826	0.703–0.764	0.542	0.736
SDGs	0.735	0.834	0.690–0.767	0.558	0.747

Source: author's study based on the results.

As indicated in Table 4 in all cases the assumption was met. As shown in Figure 1, on average an R2 greater than 0.500 was obtained, which is very significant showing that the model significantly explains the variance of the conceptual constructs of the dependent variable.

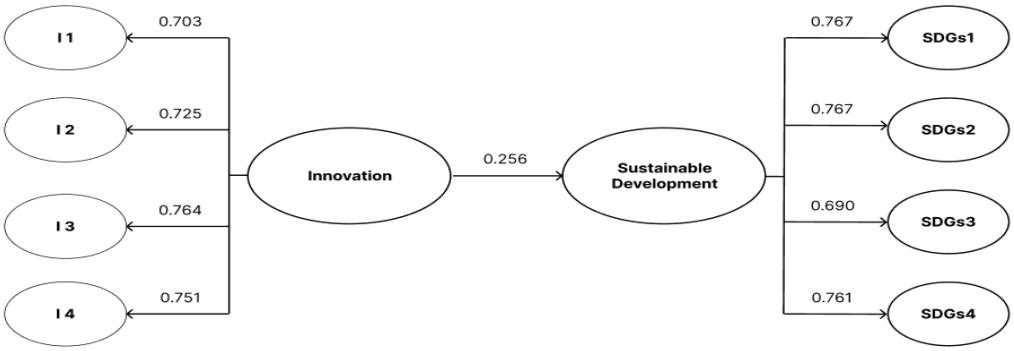


Figure 1. Results for the hypothesized model with structural equations

Source: author's study based on the results.

After verifying the validity and reliability of the measurement model, the relationship of the constructs was tested. The hypotheses were tested by examining the road coefficients and their significance levels. Table 5 shows the contracting of results, where the hypotheses H1 is accepted ($p < 0.05$).

Table 5. Results of the model structure analysis

Hypothesis	Mean sample	Standard deviation	Beta	P value	Decision
I → SDGs	0.255	0.087	2.943	0.003	Accept H1

Source: author's study based on the results.

As a result, the impact of innovation on development goals in the case of small and medium-sized enterprises is in the high impact between innovation and development comparison (0.735) according to Cronbach's alpha and the impact on innovation criteria ($p < 0.05$), i.e. why H1 is accepted and in turn there is a correlation high correlation between variables. The results are in line with those of Silvestre and Tirca (2018) who reviewed the innovation and further development literature and 28 papers. Eight focused on new policy criteria for further development, and four of them addressed both environmental and societal

challenges in different contexts. Other research results focused on innovations related to increased energy demand and environmental protection. The articles mainly deal with the social challenges of innovation for sustainable development (Picatoste, Ruesga, Gonzalez, 2018; Motta, Issberner, dos Rios Prado, 2018; Ordonez-Ponce, Clarke, MacDonald, 2021). Increased sustainability performance requires profound change in organizations, supply chains and communities, and this can only happen through learning and innovation. Innovations in the SD discourse and the concept of sustainable development are also considered by Silvestre (2015), suggesting that the nature of innovation is different (i.e. traditional, ecological, social or sustainable), organizations, supply chains and communities may evolve differently on their sustainable development trajectories. This is because different types of innovation can improve different types of learning and can be more conducive to different innovation opportunities for SD. Also, the results of studies by Vargas-Vargas, Meseguer-Santamaría, Mondéjar-Jiménez and Mondéjar-Jiménez (2010) indicate that social and political awareness of the importance of sustainable innovation development is growing significantly. Concern for the environment for innovation is becoming more and more common as companies are more aware of the consequences of their actions and try to be socially responsible. Companies are now more environmentally oriented and are investing more in environmental issues.

Conclusions

The development of innovation is conditioned by the willingness and ability to create new and improve existing products and technological processes as well as new organization and management systems, as well as other creative changes leading to the creation of new values in various subsystems of a company. Smooth and effective implementation of innovative processes is conditioned by access to valuable knowledge resources, which should be constantly developed and skillfully used. In addition, an innovative company is distinguished by intensive interactions between the market and the products offered or technologies used, the integration of various functions within the so-called value chain and systematically implemented learning strategies. The results show that innovation in alternative resources and energy is at the heart of how companies promote sustainability and support the Sustainable Development Goals. Most cases focus on ecological inputs (mainly climate and energy), with sustainability and cost-effectiveness being common features. Balancing economic, social and ecological goals becomes a priority in business. Innovation is characterized by the fact that it is the result of a positive change, is at the top of the agenda of business leaders, and the need to invest

in innovation is considered a priority. Innovation as something new, something desirable, consciously designed and implemented with a certain value in mind, which is based on a strategy towards sustainable development. The impact of innovation on competitive advantages, created in a responsible, economically, socially and ecologically manner, is pointed out. Innovation affects sustainable development, it means that the ability of enterprises to achieve the desired results, the ability to generate, create and improve products and services, high product quality or quick processes of transforming an idea into a product/service can affect the reduction of losses, contribute to business circular economy, affect long-term and stable growth, loyalty of customers, stakeholders, the local community, and improve the image. Innovation affects the transformation of enterprises towards sustainable development. The limitations of this study include the method of collecting data, the survey questionnaire, which is related to the reliability of the data provided. In this case, anonymity was ensured to reduce errors in the responses. The second limitation is the sample size. The study was conducted in one country; a larger sample could yield better results. Another limitation is the selection of measures – there are many described constructs, there is no unified approach, the author proposed her own approach. This tool is worth expanding by adding new metrics and constructs, and more hypotheses can be made in the future. In response to the pace of changes on the market and in the environment of enterprises, it would be interesting to further develop research on the adaptation of the small and medium-sized enterprise sector to the market.

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