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# Entrepreneurship for sustainable development – ecopreneurship and eco-innovation

## Summary

**DEFINITION OF THE TERM:** Ecopreneurship is defined as entrepreneurial activity which is beneficial for the environment. It is a form of value creation through environmental products and innovations that contribute to the achievement of sustainable development goals.

**HISTORICAL ANALYSIS OF THE TERM:** Ecopreneurship is a new concept that first emerged in the 1990s. However, it was preceded by many years of work on conceptualising the notion of sustainability, culminating in the publication of the Brundtland Report in 1987.

**DISCUSSION OF THE TERM:** Ecopreneurship and social entrepreneurship form the basis of sustainable entrepreneurship in its broadest terms. The aim of entrepreneurial activities undertaken within ecopreneurship is to generate income by solving environmental problems, which requires both the environmental and economic aspects of sustainability to be addressed together.

**SYSTEMATIC REFLECTION WITH CONCLUSIONS AND RECOMMENDATIONS:** Value creation in ecopreneurship takes place primarily through eco-innovation. Through the proper use of eco-opportunities and the provision of new eco-innovations, entrepreneurs who integrate ecological values into their business development strategies can run profitable businesses while contributing to sustainable development goals.

**Keywords:** ecopreneurship, sustainable entrepreneurship, sustainable development, eco-opportunities, eco-innovation

## Definition of the term

Ensuring sustainable socio-economic development is now considered one of the key challenges of the modern era, and achieving its goals creates new determinants and opportunities for companies and entrepreneurship. In light of the 2030 Agenda for Sustainable Development, adopted at the United Nations Summit in 2015, entrepreneurship can make a vital contribution to sustainable development by creating decent jobs, stimulating economic growth and innovation, improving social conditions, and addressing social and environmental problems.

However, for entrepreneurship to fully contribute to sustainable development goals, it must be developed in line with their objectives, including those concerning social and environmental responsibility. This is reflected in the emergence and operationalisation of various concepts of sustainability-oriented entrepreneurship that are found in both entrepreneurship and sustainability studies. These concepts are based on key entrepreneurial principles which have been redefined to meet the requirements of sustainability.

One of these concepts is ecopreneurship, also known as ecological entrepreneurship, which can be defined in simple terms as entrepreneurial activity for the benefit of the environment (Chodyński, 2011). The term 'ecopreneurship' is a combination of the words 'ecological' ('eco') and 'entrepreneurship'. It can be understood as taking responsibility for the environment (its present and future shape) in entrepreneurship. This term can also be used to denote the undertaking of entrepreneurial actions that contribute to the preservation of the environment. In a broader sense, ecopreneurship is an innovative, market-oriented and personality-driven form of value creation through environmental innovations and products and which continues beyond the start-up phase of a company (Schaltegger, 2002, p. 48).

Ecopreneurship is considered a distinct area of entrepreneurship which, together with social entrepreneurship, forms the basis of sustainable entrepreneurship. The environmental dimension of sustainability is prioritised in ecopreneurship, whereas the social dimension is prioritised in social entrepreneurship.

Sustainable entrepreneurship is oriented simultaneously towards social aspects (it takes into account the expectations of stakeholders,

e.g., society, partners, employees, etc.), environmental aspects (including long-term environmental protection and the reduction of negative impacts), and economic aspects (including economic growth, while taking into account the previous two dimensions) (Urbaniec, 2018).

Sustainable entrepreneurship, in broad terms, can be defined as a business's continuing commitment to behave ethically and contribute to economic development, while improving the quality of life of the workforce, their families, local communities, the society and the world at large, as well as future generations (Crals & Vereeck, 2005). In the process approach, sustainable entrepreneurship can also be described as an innovative, market-oriented and personality-driven form of creating economic and societal value by means of break-through environmentally or socially beneficial market or institutional innovations (Schaltegger & Wagner, 2011).

In building a sustainable economy, eco-innovation is attributed a special role in making a significant contribution to mitigating the negative effects of economic growth on the environment. Eco-innovation can be treated as a category of innovation that resides in both innovation and environmental policy, and thus links innovation and sustainability. At the same time, eco-innovation is an integral element of ecopreneurship that allows companies to generate revenue by solving environmental problems.

One of the first definitions of eco-innovation was proposed by C. Fussler and P. James (1996), for whom it is "new products and processes that provide customer and business value but significantly decrease environmental impacts". In their opinion, any such innovation contributes to sustainable development by commercially applying knowledge to engender direct or indirect environmental improvements.

Eco-innovation can also be understood more comprehensively as deliberate entrepreneurial behaviour which involves designing a product and managing it in an integrated manner throughout its life cycle. This contributes to the ecological modernisation of contemporary societies by taking environmental concerns into account in the development of products and related processes. Environmental innovation leads to integrated solutions whose aim is to reduce resource and energy inputs while improving the quality of a product or service.

Due to their importance in ensuring sustainable development, issues related to eco-innovation are of interest to both EU institutions and

international organisations. The EU's *Competitiveness and Innovation Framework Programme 2007–2013* (CIP), announced in 2007, defines eco-innovation as

any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of resources, including energy (Decision No. 1639/2006/EC of the European Parliament and of the Council, p. 17).

## Historical analysis of the term

Research on ecopreneurship is a relatively new research area dating back to the 1990s, when ecopreneurship became the subject of research, discussions, and publications involving a wide range of scholars, and the phrases 'green entrepreneur', 'environmental entrepreneur', and 'ecopreneur' appeared in the literature for the first time. Over time, the term 'ecopreneur' has become popular and has replaced other terms (Kainrath, 2011). Along with increasingly frequent attempts to conceptualise ecopreneurship, other concepts of sustainability-oriented entrepreneurship, such as social entrepreneurship, institutional entrepreneurship, and sustainable entrepreneurship, have also been developed. All these terms share, at their core, the key concept of sustainability.

The concept of sustainable development emerged as a response to the growing concern that the earth's ecosystem could be severely damaged by the effects of human activity. The main aim of sustainable development is the elimination or reduction of imbalances between economic growth, social development, and the natural environment. The concept of sustainable development evolved in stages. The first economic theories to emerge attempted to define the limits of developmental and environmental requirements with warnings about the negative effects of economic development; contemporary multidimensional concepts provide guidance and recommendations for the practical implementation of solutions which lead to economic, environmental, and social benefits (Bajdor, 2021).

The term 'sustainability' was originally used in forestry to describe forest management processes that would ensure forests' continuous

regeneration and prevent their degradation. The concept of sustainability created by Hans Carl von Carlowitz was developed at forestry universities in the early 19<sup>th</sup> century. Later, the term was taken up by scientists from other fields and entered political debate.

Classical economists laid the foundations for the concept of sustainable development by reflecting on the natural (ecological) barriers to growth and the limitations on available resources. They included T.R. Malthus (1766–1834), J.B. Say (1767–1832), D. Ricardo (1772–1823), J.S. Mill (1806–1873), and later also W.S. Jevons (1835–1882). The best-known contributions to the development in this area are Malthus' theory of population and Ricardo's theory of rent.

From the 1970s onwards, the concept of sustainability became the subject of a number of programmes, declarations, and reports dedicated to the ecology, societies, growth, and socio-economic development, which over time became the main dimensions of this concept. An important moment in this debate was the 1962 publication of R. Carson's book *The Silent Spring*, in which the author strongly emphasised the link between the agricultural overuse of seeds containing poisonous substances and their role in the extinction of local species. This book sparked a public debate on the environment and food security.

Another breakthrough came in 1987 with the publication of the Brundtland Report by the World Commission on Environment and Development, in which the term 'sustainable development' was used. In this report, sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. This understanding is based on two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the concept of 'limitations', understood not in absolute terms but as limitations imposed by the state of technology and social organization and by the capacity of the biosphere to absorb the effects of human activity. In the future, technology and social organisation will be able to be both better managed and improved, which will ensure a new era of economic growth. In light of the Brundtland Report, sustainable development is not a permanent state of harmony but rather a process of change in which resource exploitation, the direction of investment, the orientation of technological development, as well as institutional changes take into

account both present and future needs. It is a process that often requires difficult decisions and, ultimately, sustainable development must be based on the existence of political will.

In *Caring for the Earth: A Strategy for Sustainable Living*, developed in 1991 by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme (UNEP), and the World Wide Fund for Nature (WWF), sustainable development was defined as “improving the quality of human life while living within the carrying capacity of supporting ecosystems” (IUCN/UNEP/WWF, 1991). At the Earth Summit in Rio De Janeiro in 1992, another important declaration on the environment and development was adopted in which the term ‘sustainable development’ referred to the equal treatment of environmental, social, and economic issues and meant development that puts at the centre of its concerns human beings and their right to a healthy and productive life in harmony with nature. The document called on governments to reduce and eliminate those production and consumption patterns that distort this development. It also emphasised the importance of eradicating poverty and the role of scientific and technological exchange, and it advocated enhancing the development, adaptation, dissemination, and transfer of technology, including new technologies and innovations. Moreover, it discussed the ‘precautionary principle’, which is pertinent for legislation regarding environmental protection and which recommends caution in the implementation of new products, technologies, or services that may pose a risk to the environment and mandates the introduction of preventive measures to protect natural ecosystems.

In the evolution of the concept of sustainability, the ‘three-pillar’ model became the most widely accepted. It is based on three interrelated and equivalent pillars of sustainability: economic, social, and environmental (Klarin, 2018). Fully sustainable development is achieved by striking a balance between these areas, but this is not an easy state to achieve as the pursuit of economic goals may conflict with social or environmental objectives. In the literature, this concept is sometimes extended to include additional aspects relevant to sustainability that are institutional, political, cultural, or technological.

In this context, it is worth noting that the emphasis on the fundamental issues within sustainable development has changed over the years. In the 1970s, priority was given to environmental issues and the measures

taken, or to recommendations focused primarily on how to protect the environment. However, over time, the other two pillars of sustainable development – its social and economic aspects – also came to be considered (alongside the environmental aspect, of course), and the fight against poverty became one of the key challenges. This does not mean, however, that environmental protection has taken a back seat: it has been addressed in discussions dedicated to, e.g., economic growth or the improvement of living conditions (Bajdor, 2021).

The problems resulting from the industrial revolution, i.e., the still-unlimited exploitation of human and environmental resources, remain the greatest challenge to sustainable development. The initial phase of interest in this issue in the early 1990s was followed by the rapid development of ecopreneurship as a field of study. Renowned authors in this field include E. Crals and L. Vereeck; R. Isaak, A. Pastakia; M.M. Andersen; T.J. Dean and J.S. McMullen; S. Schaltegger and M. Wagner; and D. Kainrath. In Poland, sustainable entrepreneurship, including ecopreneurship, is studied by P. Bajdor and M. Urbaniec, among others.

## Discussion of the term

Solving global economic, social, and environmental problems requires the development of new modes of action directed towards sustainable development and the acquisition of new skills, which should be included in new concepts of entrepreneurship.

Many authors interested in sustainable development study social entrepreneurship, which is focused on solving social problems and finding sources of funding for this purpose (Schaltegger & Wagner, 2011). Social entrepreneurship operates within both business and social support and can be analysed from the perspective of identifying and exploiting opportunities for the purpose of alleviating social problems.

The main goals and motivations within ecopreneurship relate to generating income by contributing to solving environmental problems. Compared to social entrepreneurship, ecopreneurship is more strongly linked to the search for profitable entrepreneurial opportunities.

Achieving progress towards sustainability also requires changes in the business environment, market regulations, and social institutions.

Institutional entrepreneurship focuses on the processes that create social trends and the regulatory innovations that foster sustainable consumption and production (Table 1).

Table 1. Characterization of different types of sustainability-oriented entrepreneurship

	<b>Ecopreneurship</b>	<b>Social entrepreneurship</b>	<b>Institutional entrepreneurship</b>	<b>Sustainable entrepreneurship</b>
<b>Core motivation</b>	Contribute to solving environmental problem and create economic value	Contribute to solving societal problem and create value for society	Contribute to changing regulatory, societal and market institutions	Contribute to solving societal and environmental problems through the realization of a successful business
<b>Main goal</b>	Earn money by solving environmental problems	Achieve societal goal and secure funding to achieve this	Changing institutions as direct goal	Creating sustainable development through entrepreneurial corporate activities
<b>Role of economic goals</b>	Ends	Means	Means or ends	Means and ends
<b>Role of non-market goals</b>	Environmental issues as integrated core element	Societal goals as ends	Changing institutions as core element	Core element of integrated end to contribute to sustainable development
<b>Organizational development challenge</b>	From focus on environmental issues to integrating economic issues	From focus on societal issues to integrating economic issues	From changing institutions to integrating sustainability	From small contribution to large contribution to sustainable development

Source: own study based on (Schaltegger, Wagner, 2011).

Sustainable entrepreneurship is the broadest and most complex concept that comprehensively captures the contribution of entrepreneurial activities to sustainable development. In this understanding, entrepreneurship involves a commitment to solving social and environmental problems through profitable business activity. Sustainable entrepreneurship brings together the three pillars of sustainability (i.e., its economic, social, and environmental aspects) and draws on other types of sustainability-oriented entrepreneurship (i.e., ecopreneurship, social entrepreneurship,

and institutional entrepreneurship. It is characterised by three attributes: (1) balancing environmental and social concerns with economic benefits (action orientation); (2) creating new value and innovation (process orientation); and (3) transforming businesses, sectors, or economies towards sustainability (outcome orientation) (Urbaniec, 2018).

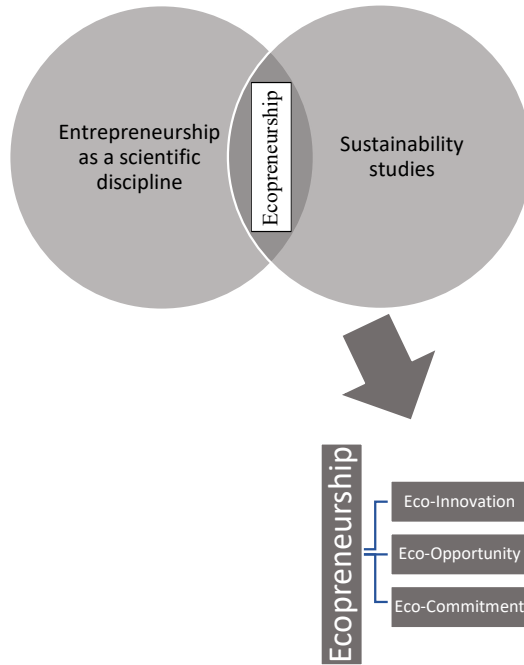
Entrepreneurial activities related to the realisation of sustainable development goals require a creative approach and taking into consideration changes occurring in the external and internal environment of a company. Eco-innovation, which is the domain of ecopreneurship, is an example of such activities.

Ecopreneurship as an entrepreneurial activity is determined by changes in the market environment, including consumers' growing environmental awareness, the introduction of new environmental legislation, and the emergence of new models of business services conducive to environmental initiatives (Seroka-Stolka, 2012). In this approach, it is emphasised that activities undertaken by commercial organisations through which they implement environmental entrepreneurship should take into account the regulatory influence of the state (compliance-based environmentalism) and the pro-ecological influence of the market (market-driven environmentalism), and it should be based on the ecological values endorsed by consumers (value-driven environmentalism) (Chodyński, 2011). Thus, ecopreneurship should be based on analysis of a company's market environment in order to identify and exploit numerous market gaps and thus offer new environmentally friendly products, services, and marketing methods. Ecopreneurship can also be understood as the process of identifying, evaluating, and exploiting entrepreneurial opportunities that minimise the environmental impact of the activities undertaken, while generating economic benefits. Ecopreneurial activities can contribute to an organisation's development by exploiting ecological market opportunities, while at the same time being a manifestation of responsible corporate behaviours that take into account the ecological factor.

The development of ecopreneurial activities is strongly linked to the creation of innovative enterprises capable of offering environmentally friendly products and services. Thus, eco-innovation can be seen as a key aspect of ecopreneurship that enables the creation of new solutions that take environmental requirements into account.

Innovativeness is an important element of D. Kainrath’s concept of ecopreneurship (Figure 1).

Figure 1. The relationship between ecopreneurship and other scientific disciplines



Source: own study based on (Kainrath, 2011).

Referring to the relationship between the different types of sustainability-oriented entrepreneurship, Kainrath places ecopreneurship at the intersection between the entrepreneurial sphere and the environmental and economic parts of the sustainability concept. Thus, he chooses to exclude the social dimension of sustainability from the concept of ecopreneurship, even though he shares the widespread opinion that the three pillars of sustainability are interrelated. According to him, however, addressing the social aspect is the responsibility of governments or society as a whole, and an individual company, when implementing a more environmentally friendly business model, does not necessarily have to take into account the principles of social justice; however, it can certainly include them among its voluntarily declared values.

Kainrath's concept of ecopreneurship consists of three main sub-concepts: eco-innovation, eco-opportunity, and eco-commitment. What, in his view, distinguishes eco-innovation from other forms of innovation is a concern with the direction and nature of progress – in particular, concern for whether an innovation leads to mitigating or solving a particular environmental problem.

An eco-opportunity can be understood as a market imperfection that affects the environment and which, if an ecopreneur finds a solution for it, will allow him to earn entrepreneurial rent and at the same time mitigate the environmental burden. Ecopreneurial rent thus results from the exploitation of an ecologically relevant business opportunity and can be earned by an entrepreneur who is the first to exploit this new opportunity in his business, since, due to the lack of competition, his activity will generate above-average returns.

Kainrath defines eco-commitment as the impact exerted on the entrepreneurial vision by one of three types of commitment (or their combination): affective commitment, continuance commitment, and normative commitment. Affective commitment, understood as an entrepreneur's emotional attachment to the environment, makes environmental protection an end in itself and is therefore the strongest form of commitment to solving environmental problems. An ecopreneur with an affective commitment to the environment will always take environmental issues into account in his activities and will strive to adopt the most environmentally friendly solution possible. This will not only lead to far-reaching radical eco-innovations but will also result in the exploitation of eco-opportunities that other market participants do not see or treat as marginal or uninteresting.

Continuance commitment stems from an awareness of the economic and social costs of ignoring environmental issues. An ecopreneur who is guided by continuance commitment in his activities respects social and economic norms and will thus direct his efforts towards the realisation of eco-opportunities that are both socially and economically 'acceptable'. This approach aims to minimise the tangible and intangible costs that could arise from a company's tarnished image if it disregards environmental concerns.

Normative commitment means that an ecopreneur is guided by a sense of duty or obligation in ecological matters. This sense may be driven by external influences, such as environmental legislation or

rules. Typically, this type of commitment only leads to compliance with the minimum environmental requirements and as such is the weakest form of environmental commitment. However, it can be accompanied by other forms, in which case it can lead to a fuller exploitation of eco-opportunities and the emergence of eco-innovation (Kainrath, 2011).

An organisation characterised by eco-innovation can realise innovation in connection with the market, taking into account external environmental trends and internal organisational determinants (Seroka-Stolka, 2012). The implementation and success of strategies based on eco-innovation require that a company possesses relevant ecological knowledge and competencies. The ecological values endorsed and the ecological awareness of entrepreneurs, company managers, and consumers are important factors that contribute to the success of innovation strategies. Conscious consumers are guided in their purchases not only by the characteristics of the product they buy, but also, for example, whether it is produced in the least environmentally damaging way, which allows innovative companies to increase their market competitiveness based on the ecological factor.

Several types of eco-innovation are distinguished in the literature. Their basic classification follows the convention adopted in the Oslo Manual. According to this typology, four types of innovation can be listed:

- product innovation: its main objective is to reduce negative environmental impacts. This goal can be achieved, for example, by minimising material intensity throughout the product life cycle, increasing the possibility of repairing or remanufacturing products, increasing the share of recyclable materials, etc.;
- process innovation: the implementation of a new or significantly improved production method or delivery method, a new range of technologies, new equipment and new software. It leads to the reduction of negative impacts on the environment through, e.g., the reduction of electricity consumption, emissions of harmful substances, noise, or the use of materials and raw materials;
- organisational innovation: implementation of new organisational methods and systems to manage the environmental aspects of processes and products. Examples include the implementation of environmental management systems and the introduction of environmental standards in production (e.g., ISO 14000 series);

- marketing innovation: new marketing activities involving significant changes in product positioning, promotion, distribution or pricing policy in accordance with the principles of green marketing. The overarching goal in this case is to look for ways to encourage customers to purchase, use, or implement eco-innovations (Olejniczak, 2015; Cichy, Szafraniec, 2015).

An extended typology of eco-innovation has been proposed by Andersen (2008) which reflects the diverse roles of eco-innovation in 'greening' the market. On this basis, Andersen distinguishes five types of eco-innovation:

- add-on eco-innovations: a response to ex-post environmental problems, primarily covering technologies and services related to pollution reduction and resource conservation;
- integrated eco-innovations: cover 'cleaner', i.e., more environmentally efficient, technologies and products;
- alternative product eco-innovations: innovations that represent a radical technological discontinuity. They are not 'cleaner' than similar products but offer substantially different solutions (based on a new technological trajectory) that are more environmentally friendly than existing products;
- macro-organisational eco-innovations: these innovations entail new solutions for organising society in an eco-efficient way that moves towards more sustainable production and consumption; they entail various changes in regional and spatial planning and technological infrastructure;
- general-purpose eco-innovations: these concern certain new general-purpose technologies which have a significant impact on the economy and, more specifically, on the innovation process, as they contribute to the development of a range of other technological innovations.

## Systematic reflection with conclusions and recommendations

Sustainability orientation requires integrating economic, environmental, and social goals, both in the short and long term; this entails designing

entrepreneurial activities that are socially responsible, environmentally friendly, and economically valuable, while contributing to macro-sustainability (Jastrzębska, 2016). This does not mean planning and implementing two separate business and sustainability strategies in a company but developing one integrated business strategy that is sustainable.

In this way, ecopreneurial companies seek to meet the needs of different stakeholder groups: investors, customers, suppliers, local authorities, society, and even unique stakeholders such as 'future generations'. Given the growing ecological awareness of society, entrepreneurs have realised that sustainable development is possible only by balancing the interests of different parties. Hence, their goal is to provide these groups with values.

Ecopreneurship as a part of sustainable entrepreneurship contributes to ensuring sustainable development, but the question of the directions of its further development should be posed. Should the environmental dimension of sustainable development be relatively more important than the economic dimension, or should the economic dimension be given priority? Some believe that an ecopreneur should first consider the environmental impact and only then the profitability of the projects undertaken; others believe that although the focus has so far been primarily on ecology, it is the economic dimension that needs more attention and better integration into the concept. However, if it is assumed that both dimensions are equivalent and interrelated, then the problem arises as to how to properly ensure this equivalence in practice.

Certainly, one of the ways through which eco-innovation fosters sustainability is to introduce eco-innovation into various sectors of the economy in order to develop new solutions that take environmental requirements into account. This includes eco-innovation in sectors considered to be particularly important from social and environmental perspectives, examples of which are shown in Table 2.

Table 2. Directions of eco-innovation and examples of eco-innovations by sector

Sector	Directions of eco-innovation	Examples of eco-innovation
<b>Food sector</b>	eco-innovative agricultural production methods and organic food-processing methods	organic farming methods, enhanced by scientific progress in this area
	ecological solutions to increase agricultural water resources and biodiversity	modern watercourse restoration technologies; conservation breeding of traditional and regional varieties
	regional and traditional food-production methods	development of products with geographical indications and traditional product designations, such as Protected Designation of Origin, Protected Geographical Indication, Traditional Speciality Guaranteed
<b>Energy sector</b>	eco-technologies to reduce energy demand	the introduction of smart grids which, by skilfully managing energy consumption, storage and production, enable a significant reduction in the amount of energy resources consumed; the introduction of modern control systems to improve energy efficiency
	eco-innovations using energy from the sun and other renewable sources	development of solar, photovoltaic, thermal and hybrid systems for energy generation; development of biomass-based electricity-generation systems; modification of wind power systems to increase capacity
<b>Building sector</b>	energy-efficient and heli-heating building technologies	materials and technologies that protect buildings from overheating and/or reduce heat loss; solar thermal materials and technologies integrated into buildings
	technologies using natural building materials	production of raw clay and straw elements – StrawBale technology
	integrated design technologies in the life cycle of buildings	methods and tools for sustainable design/life-cycle integrated design, enabling multi-criteria optimisation of design decisions
	autonomous building technologies	Autonomous Accessible House technology and construction

<b>Transport sector</b>	eco-innovative solutions for the elimination and biodegradation of pollutants	innovative systems for reducing harmful emissions
	use of solar energy in vehicles	charging cars from photovoltaic panels, using car chargers; solar panels integrated into electric cars; photovoltaic panels on the outer shell of vehicles as an alternative energy source
	public transport ecotechnologies	zero-emission green buses running on electricity or hydrogen
	use of hydrogen and other renewable energy sources	propulsion using renewable energy sources and energy sources from waste and biofuels, as well as climate-neutral fuels (including hydrogen from renewable sources)
<b>Environmental protection sector</b>	eco-innovative solutions for the elimination and biodegradation of pollutants	innovative waste recycling technologies; innovative, environmentally friendly and safe waste disposal methods; technologies for recovering materials from wastewater and for closing the water and wastewater cycle
<b>Pharmaceutical and health care sector</b>	eco-solutions to sustain human health	promotion of healthy lifestyles through increased awareness of the role of diet and physical activity
	new generations of medicines based on natural compounds	antimicrobial medicines based on natural ingredients, e.g., peptides with antibiotic activity
<b>Chemical sector</b>	new generations of eco-innovative, fully biodegradable plastics	biodegradable BIO-PAK industrial bags; green modified bitumen; fully recyclable monoPET films
	technologies using living organisms to decompose toxic substances	BACTrem biopreparation for the elimination of contamination by petroleum substances in soil, waste, sludge and wastewater, based on the synergistic interaction of microorganisms
<b>Various</b>	industrial technologies of cleaner or clean production	any activity aimed to reduce pollution in business activity and create a circular economy

Source: own study based on (Woźniak, 2010).

Obviously, eco-innovation includes not only the latest technological developments that can make a significant contribution to sustainable development, but also all environmentally friendly ideas and innovations of a non-technological nature. Leading technological eco-innovations

are introduced in the energy sector, among others, and include energy-saving eco-technologies and eco-innovations based on solar energy.

It is worth noting the impressive development of photovoltaic technology in recent years. Manufacturers of photovoltaic modules are constantly developing new solutions that can have a positive impact on the environment. For example, ML System SA, a Polish manufacturer of photovoltaic modules, recently launched the world's first production line of innovative quantum-coated photovoltaic glass, a breakthrough solution for generating electricity from the sun while maintaining good parameters in terms of transparency and insulation.

Many examples of non-technological eco-innovations that have a positive environmental impact can be found in the organic farming sector. These include innovative methods of crop protection in organic farming, such as the use of basic substances in the protection of organic vegetables and herbs that protect against the most dangerous agrophages and pathogens, or new methods of optimising the selection of varieties of agricultural crops in organic cultivation that are recommended for commercial production. New developments in marketing, promotion, and market analysis also play a big role in this sector. They serve to support the development of environmentally friendly agriculture and are particularly targeted at groups and organisations of organic food producers, producers of food with geographical indications, and producers of traditional foods whose activities contribute to the protection of natural resources, biodiversity, and the sustainable development of agribusiness.

The above examples of significant eco-innovations clearly show that ecopreneurship is implemented by entrepreneurs who consider the principles of sustainable development when starting their business and, while aiming to make a profit in their activities, are also guided by grounded ecological values, all of which is manifested in their green products or services. An entrepreneur can become an eco-innovator and pursue sustainable development goals in two ways. The first is to undertake activities aimed at making a profit from pro-environmental activities, such as recycling and waste disposal, contaminated land reclamation, pollution control, water management, environmental consulting services, or organic farming. This modus operandi is characteristic of green entrepreneurs who have high environmental awareness and are active in the sector of environmental protection. However, an

eco-innovator can also be a person from outside the environmental sector who conducts business in any sector. He may exploit ecological business opportunities by introducing eco-innovations. Thus, whilst striving for better eco-efficiency of goods produced or services offered, he is simultaneously focused on reducing the use of environmental resources or reducing their negative impact on the environment. The activities of this group can also contribute significantly (and profitably) to sustainable development goals.

Contemporary trends in the field of ecology which create new eco-opportunities influence the activities of enterprises by creating new determinants and setting directions for eco-innovativeness. Entrepreneurs who strive to meet the expectations of their stakeholders and contribute to sustainable development goals should incorporate ecological values into their business development strategies. At the same time, developing research and spreading knowledge of the role of ecopreneurship and eco-innovation in ensuring sustainable development is important for shaping adequate state policies in this regard, initiating international cooperation at the level of government and local administration, and conducting dialogue between governments, NGOs, and intergovernmental organisations dedicated to environmental protection and sustainable development.

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