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SDG Labs Research Report
Green skills in the field of Social Economy.
The theoretical model of Socially Driven Green Labs programme.

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Introduction

Climate change has brought the irresistible pressure toward a paradigm shift focused more on the complex consequences of environmental and social crises. Inclusive-ecological-transition-driven role of the Social Economy sector (social enterprises, cooperatives, mutual societies, non-profit associations) is concentrated in so-called green social economy entities (SEEs). By introducing and developing innovative solutions green social economy entities operate in such economy areas as circular economy, renewable energy, sustainable agriculture, social housing. Their presence is manifested also on the level of intersectoral cooperation (with enterprises, citizens). Against this background the role of education emerges which is of paramount importance to harness the full potential of the SEEs toward a green transition. Higher Education Institutions have a particular role to play in building students' green knowledge, skills, and competences so as to upscale the role of the SE in the green sector. **There are deficiencies of Higher Education Institutions in terms in aligning curricula and syllabuses to the requirements of environment sustainability, on the one hand, and the increasing demand for green skills (as transversal competences) in SEEs, on the other hand.**

The adjustment towards green transition taking place in SEEs is assumed to be the central issue of the paradigm shift, and the innovation in education (training programmes, workshop methodologies such as simulation-based learning) is a key driver.

PART I

Chapter 1. Genesis of green transformation in the European Union

November 2008 New Economic Foundation has published report with telling title: “Triple Crunch. Joined-up solutions to financial chaos, oil decline and climate change to transform the economy”¹. This was a reference to the collapse of the financial markets starting in 2007, the rise of oil prices on world stock exchanges in the middle of the same year and the ongoing climate change, to which, according to the Intergovernmental Panel on Climate Change, humans have been contributing as a result of warming the atmosphere, ocean and land². In the aforementioned study of the New Economics Foundation, it was stated: “(...) instead of making the usual predictable trade-offs, a new approach could be taken, one that joins up the need to cope with the impacts of peak oil and climate change, as well as kick-starting the economy. A unique opportunity has presented itself to tame and control the financial system so as to put it at the service of our society, to set us on a more sustainable, secure and fairer trajectory”³. Since 2008, it has been held discussions in various forums on the causes, particularly of the financial and real economy crisis, and the search for ways out of it, with a view to shaping the development framework in the long term, taking into account the issue, that the basis of management must be changed. For example, United Nations Environment Programme has encouraged countries to introducing “green stimulus packages”⁴. In the European Union, in the period 2008 – 2009, there were adopted two key documents, which significantly referred to the postulates of UNEP. The first one - “A European Economic Recovery Plan”, which one of two key pillars was smart investment defined as “investing in the right skills for tomorrow's needs; investing in energy efficiency to create jobs and save energy; investing in clean technologies to boost sectors like construction and automobiles in the low-carbon markets of the future; and investing in infrastructure and inter-connection to promote efficiency and innovation”⁵. Therefore, it can be pointed out that the European Union was dealing with “sustainable recovery”. According to the International Energy

¹ R. Potts, (2008). *Triple crunch. Joined-up solutions to financial chaos, oil decline and climate change to transform the economy*, New Economics Foundation, London, https://neweconomics.org/uploads/files/91cd89d66b0d556628_stm6bqsi.pdf (accessed at 09.05.2022).

² IPCC, (2021). *IPCC Sixth Assessment Report. Working Group 1: The Physical Science Basis. Summary for Policymakers*, 4, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf (accessed at 09.05.2022).

³ R. Potts, (2008). *Triple crunch. Joined-up solutions to financial chaos, oil decline and climate change to transform the economy*, New Economics Foundation, London, p. 13, https://neweconomics.org/uploads/files/91cd89d66b0d556628_stm6bqsi.pdf (accessed at 09.05.2022).

⁴ UNDESA, (2012). *A guidebook to the Green Economy. Issue 1: Green Economy, Green Growth, and Low-Carbon Development – history, definitions and a guide to recent publications Division for Sustainable Development*, UNDESA, p. 7, <https://sdgs.un.org/sites/default/files/publications/GE%20Guidebook.pdf> (accessed at 19.05.2022).

⁵ Communication from the Commission to the European Council. *A European Economic Recovery Plan*, Brussels, 26.11.2008 COM(2008) 800 final.

Agency⁶: “the [2008 European Economic Recovery Plan](#) included a substantial green stimulus directed to several areas, including:

- energy efficiency, with the aim of creating jobs and saving energy
- investment in clean technologies to boost sectors like construction and low-carbon automobiles
- infrastructure and interconnections to promote efficiency and innovation”.

The second document, it was strategy called “Europe 2020” , in the foreword to which the then head of the European Commission Jose Manuel Barroso stated: “The crisis is a wake-up call, the moment where we recognise that "business as usual" would consign us to a gradual decline, to the second rank of the new global order. This is Europe's moment of truth. It is the time to be bold and ambitious”. In the document have been emphasized not only the need to revive the economy in the short term, but also drawing attention to the necessity of shaping “sustainable future”⁷ . “Europe 2020 puts forward three mutually reinforcing priorities:

- Smart growth: developing an economy based on knowledge and innovation.
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.
- The EU needs to define where it wants to be by 2020. To this end, the Commission proposes the following EU headline targets:
 - 75 % of the population aged 20-64 should be employed.
 - 3% of the EU's GDP should be invested in R&D.
 - The "20/20/20" climate/energy targets should be met (including an increase to 30% of emissions reduction if the conditions are right).
 - The share of early school leavers should be under 10% and at least 40% of the younger generation should have a tertiary degree.
 - 20 million less people should be at risk of poverty”⁸.

The Strategy had reference to the three orders of sustainable development. It was an action plan for Europe, setting a new framework for social and economic development. It was also related to the transformation – green transformation. The green transformation is highlighted and justified by green limits (environmental limits) identified with air, water, land, biodiversity⁹. According to K. Cheba, I. Bąk, K. Szopik-Depczyńska, G. Ioppolo: “Green transformation has become one of the most important directions in the further development of the world. It involves the development of green technologies and the creation of legal regulations enforcing, for example, saving energy or reducing the emissions of greenhouse gases, as well as any other activities aimed at changing society’s attitude towards the acceptance of – frequently more expensive but more environment-friendly – technological

⁶ IEA, (2020). *Green stimulus after the 2008 crisis*. 29 June 2020, <https://www.iea.org/articles/green-stimulus-after-the-2008-crisis> (accessed at 11.05.2022).

⁷ Communication from the Commission. *EUROPE 2020 A strategy for smart, sustainable and inclusive growth*, Brussels, 3.3.2010, COM(2010) 2020.

⁸ Ibidem.

⁹ Leach, M. (2015). *What is green? Transformation imperatives and knowledge politics*, [in:] I. Scoones, M. Leach, P. Newell (ed.), *The politics of green transformations*, Earthscan form Routledge, London, p. 27, 37.

solutions and legal norms. Thus green transformation can be defined as combining economic growth with caring about the environment in order to guarantee a high quality of life for present and future generations at the level which is attainable due to civilisational development, as well as to an effective and rational use of the available resources”¹⁰. However much more appropriate word is ”transition”, because ”transition is a term used to describe conversion (evolution) from the existing model of economy and finance towards one based on increased social and environmental responsibility”¹¹. The issue of green transition is related with new approach to economic growth - ”green growth”. According to OECD it ”means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies”¹². Then, ”green growth consists of four fundamental dimensions:

- efficient and sustainable use of resources, including energy, water, land, and materials;
- protection of natural capital and recognition of the limits of Earth system processes;
- green economic opportunities for investment, trade, employment, and innovation; and
- inclusive growth which ensures access to basic services and resources, health and safety, social equality, and social protection”¹³.

There are 10 key priorities for green growth:

- 1) Shifting away from and replacing the conventional, resource-intensive model of economic growth with green growth;
- 2) Implementation of appropriate green growth strategies, policies, and plans;
- 3) The green transformation has to be just, fair, and inclusive;
- 4) Achieving zero-emissions targets;
- 5) Embracing sustainable energy and scaling back the use of fossil fuels—or replacing them altogether;
- 6) Reversing land degradation and the decline of ecosystem and biodiversity;
- 7) Smarter, cleaner, and more efficient and productive ways of managing water resources;
- 8) Green transformation in cities;
- 9) Greening infrastructure and construction in Cities;
- 10) Green technology disruptions and smart solutions¹⁴.

In literature we can find the term ”green economy”, which we can considered as the ultimate goal of green transformation in the socio-economic dimension. ”UNEP defines a green economy as one that results in improved human well-being and social equity, while

¹⁰ K. Cheba, I. Bąk, K. Szopik- Depczyńska, G. Ioppolo, (2022). Directions of green transformation of the European Union countries, *Ecological Indicators*, 136, p. 108601.

¹¹ B. Ryszawska, (2016). Sustainable transition needs sustainable finance, *Copernican Journal of Finance & Accounting*, 5(1), pp. 185-194.

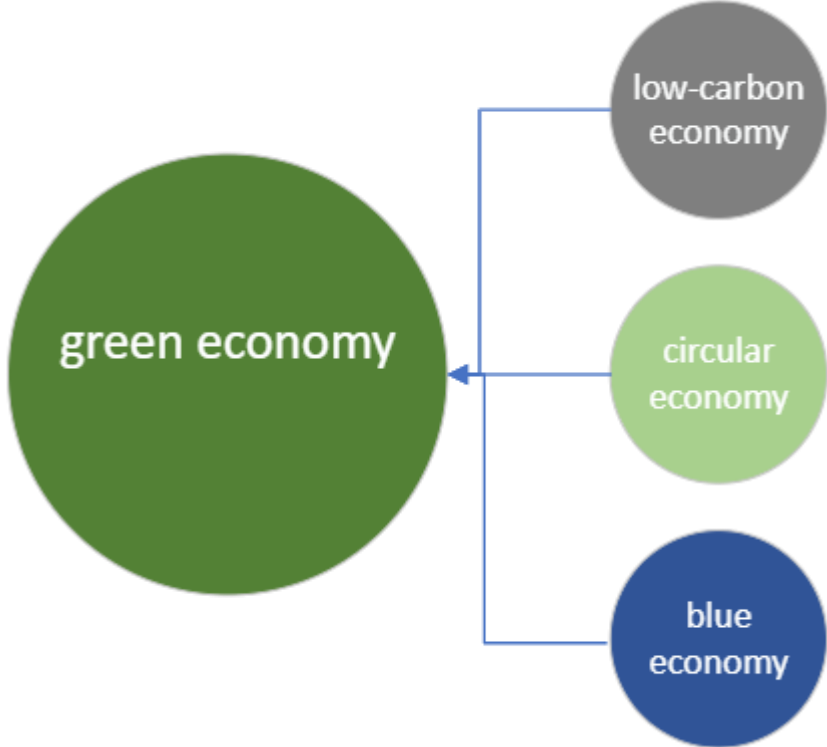
¹² OECD, (2022). *Green growth and sustainable development*. <https://www.oecd.org/greengrowth/> (accessed at. 17.05.2022).

¹³ GGGI, (2016). *Achieving Global Green Transformation: Report Summary*. October, p. 6.

¹⁴ Ibidem, p. 7-18.

significantly reducing environmental risks and ecological scarcities”¹⁵. Achieving this goal requires a transition based on shaping: low-carbon economy, circular economy and blue economy (Scheme 1).

Scheme 1. Linking the low carbon economy, the circular economy and the blue economy to the green economy



Source: Author’s own elaboration

A low-carbon economy concerns reduction of greenhouse gas emissions, development of renewable energy sources and increase of energy efficiency. In turn, “The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended”¹⁶. Then “the sustainable blue economy encompasses all sectoral and cross-sectoral economic activities related to the oceans, seas and coasts. It comprises emerging sectors and economic value based on natural capital and non-market goods and services through the conservation of marine habitats and ecosystem services”¹⁷.

¹⁵ UNEP, (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*, https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf (accessed at 19.05.2022).

¹⁶ European Parliament, (2015). *Circular economy: definition, importance and benefits*, <https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits> (accessed at 19.05.2022).

¹⁷ European Commission, (2021). *Sustainability criteria for the blue economy: main report*, Publications Office, European Climate, Infrastructure and Environment Executive Agency, p. 16, <https://data.europa.eu/doi/10.2826/399476>

The process of green transition requires a systemic approach requiring the involvement of the following actors: governments, local governments, enterprises and non-governmental organizations, local social communities. Each of them has instruments (in different forms), take activities that allow to undertake concrete actions related to the implementation of the transition processes (Scheme 2).

Scheme 2. Subjects involved in green transformation and their corresponding instruments

Subjects	governments	Local governments	enterprises	Non-governmental organizations	Local social communities
Instruments /activities	Law instruments	Law Instruments	Financial Capital	Education	Involvement of different social groups in different projects based on identified problems and opportunities for action on the level of group cooperation
	Financial instruments	Financial Instruments	Innovation potential	Involving different community groups in different projects	
	Strategies, plans and programs of economic sectors	development strategies for the region			
	Administrative structures				
	Education				

Source: Author’s own elaboration

In literature, in Internet you can find a huge number of examples of projects and good practices in the field of environmentally friendly actions taken by local authorities, NGOs, local communities as well as enterprises, ranging from those related to changing the urban space to a sustainable one, environmentally friendly production processes to eco-innovations. However, it is worth noting that the greatest range and diversity of instruments for green transformation is available to the state. In turn, the greatest potential for innovation should be identified with enterprises. Local communities and NGOs are characterized by a huge involvement in various types of environmentally friendly projects. Mentioned subjects have potential to introduce changes in process of green transition. However, we cannot forget about one more specific group of entities, i.e. social economy entities.

Chapter 2. The role of the public sector in relation to other market actors in the green transition

The green transformation is nowadays implemented by promoting the idea of responsibility in the activities of market entities, including abandoning the model of linear production and consumption (achieving economic growth at the expense of excessive exploitation of resources and generation of waste) in favour of a closed-circuit economy (LCA; circular economy). In the alternative concept of the CE (Circular Economy), the aim is to avoid the generation of waste and to keep raw materials in the economy for as long as possible. The CE reduces the human impact on the environment and allows significant values to be achieved for businesses, among others, mainly in the form of savings, thus benefiting the economy as a whole.

CE provides many solutions for value creation not based on the consumption of scarce resources by identifying possible courses of action for a circular economy, these are: regeneration; sharing; optimisation; closing cycles; virtualisation and exchange¹⁸. Due to existing market failures, the transition to a CE faces numerous barriers, which force aid (state intervention) in this area. Bottom-up initiatives alone are not sufficient. The implementation of a circular economy requires a systemic view of the LFG, in terms of complex relations and combinations of actors in a given sector (e.g. B2B), in cross-sectoral (e.g. Private Sector-Enterprises) and multi-sectoral (e.g. Private Sector-Enterprises-NGOs-Households) terms.

State intervention therefore responds to existing market failures and needs. This failure materialises in the form of generating externalities without incurring additional/sufficient financial outlays (e.g. environmental pollution, health costs for the local community)¹⁹. The traditional public instruments used for environmental and social issues are instruments of command (orders, prohibitions e.g. standards, specific product characteristics) and control (including enforcement). It should be noted, however, that such instruments do not introduce incentives to perform beyond the set target, and this means that they do not promote the development of innovation for environmental transformation²⁰. This is a fundamental issue, because CE innovations are a necessary element (recipe) of the discussed transformation. These innovations are not only products, but they are also new ways of doing business, new ecosystems of products and services, new types of interaction between companies and their stakeholders based on trust, diffusion of innovation and reduction of transaction costs.

CE requires efficient solutions, allowing to achieve savings, taking into account the principles of sustainable development, including environmental issues. From this perspective, innovations are also new configurations of products and services that increase the effectiveness of the relationship between the product and the user. Designing and implementing innovations understood in such a way makes it possible to obtain key values necessary to achieve market advantage of entities on the market, i.e. savings and minimisation of reputation risk. The importance of both values and the possibility to achieve

¹⁸ Rada Ministrów, (2019). GOZ roadmap, <https://www.gov.pl/web/rozwoj-technologie/rada-ministrow-przyjela-projekt-mapy-drogowej-goz>

¹⁹ Deloitte, (2018). *Closed loop - open opportunities*, Circular economy in Poland, <https://www2.deloitte.com/pl/pl/pages/zarzadzania-procesami-i-strategiczne/articles/innowacje/raport-zamkniety-obieg-otwarte-mozliwosci.html>, (accessed 19.05.2022)

²⁰ Ibidem.

them within the framework of CE innovations is a basic argument for the public sector in supporting green initiatives, and for companies - a chance to adapt to new conditions of competition and development in the long term. For households, in turn, it is an opportunity to improve their quality of life, not only in economic terms, but also in environmental and social terms. Directing the market towards new green business opportunities requires an additional public push in the form of improved market instruments (taxes, subsidies, allowances and licences for producers and consumers) and a process of education for CE and innovation for its implementation.

The dissemination of the above information, with examples, of the possibilities of embarking on the path of CE, is a key task of the public sector. Particular efforts should be directed towards the SME sector. They, due to their specific realities, need information and financial support. These entities are of particular economic (supplying public budgets, links to the local market, cooperation of this group of entities with large companies, usually transnational corporations (TNCs), but also environmental) importance. Their influence on the possibilities of green transformation is enormous, while the scale of their involvement in CE in Poland is still small.

SMEs on the Polish market are in the initial phase of implementing the CE concept in their activities. There is a widespread belief among local enterprises that responsible business orientation is the domain of MNCs (Multinational Corporations), equipped with adequate capital and employee facilities. Entrepreneurs who aspire to such relations should know that sustainable innovation in SMEs is practically feasible, profitable even in the short term and often required by large companies operating in the market. Using the example of the Polish company Mega, which produces furniture under the brands of large companies, it can be seen that the optimisation of the automatic sanding process, in order to reduce the energy intensity of the process, reduce the amount of waste and expand the offer with FSC Reclaimed Wood certified products, allowed to reduce operating costs and ensure a more durable cooperation with the client²¹.

The dissemination of this knowledge (based on examples) is, among others, "in the hands" of the public sector, with a large participation (in cooperation) with the so-called third sector. Thus, there is a strong need for public education and communication about the effects of current consumption, available solutions, and benefits of changes for ecological transformation (especially through the use of personalised information, or the so-called social proof of rightness)²². There is also a need to increase the quality and credibility of environmental impact information provided by the selling party and to ensure that it can be verified by the buying party (using appropriate instruments of proof).

The public sector, in cooperation with the financial sector, should also influence the financing of projects (their availability) that implement the assumptions of CE - support the creation of special financial instruments for companies (CE projects often escape standard assessment, which makes them more risky) or promote lowering the commission on loans (refunding the

²¹ Polska Agencja Rozwoju Przedsiębiorczości, (2015). *Responsibility pays off, or CSR in SMEs*, Warszawa, <https://www.parp.gov.pl/publications/publication/odpowiedzialnosc-sie-oplaca-czyli-csr-w-msp-%E2%80%93-publikacja-dobrych-praktyk-z-zakresu-spoecznej-odpowiedzialnosc-biznesu> (accessed at 19.05.2022).

²² Deloitte, (2018). *Closed loop - open opportunities*, Circular economy in Poland.

commission after verifying whether the environmental goal has been achieved by the company)²³.

Among the so-called urgent needs, which are the responsibility of the public sector, is also the need to invest in improving the vocational education system, so important for circular business models. Not without significance, for the development of sustainable innovation, is also the need to increase spending on research and the development of research partnerships, also internationally.

Socially responsible public procurement is also crucial for the development of CE. This is a very important (high impact potential) area for creating circular market needs and stimulating green innovation. Procedures in which public bodies, such as government departments, local and regional governments or public law bodies, purchase works, goods or services from companies can and should support the transition to a circular economy. Closed-loop public procurement can be defined as a procedure for public authorities to purchase works, goods, or services to ensure that energy and material cycles within supply chains are closed, with negative environmental impacts and waste generation throughout the life cycle minimised or, at best, eliminated²⁴. Procurement to help close the loop in the economy is also intended to achieve the sustainable development goals set out in the UN 2030 Agenda for Sustainable Development. In particular, Goal 12 - Sustainable Consumption and Production - includes a specific objective to promote sustainable procurement practices in line with national policies and priorities. As of 28 July 2016, when the Act of 22 June 2016 amending the Public Procurement Law (Journal of Laws 2016, item 1020) transposing the provisions of the Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement into the Polish legal system, it became a more effective tool for socially responsible public procurement²⁵. The EU directive as well as the act amending the Public Procurement Law address the issue of socially responsible public procurement in a much broader way. According to the developed definition, responsible public procurement refers to the stages of public procurement that consider one or more of the following aspects: promotion of decent work, respect for human rights and labour law, support for social inclusion, support for the social economy and small and medium enterprises, as well as promotion of equal opportunities and the principle of "accessible and designed for all". These objectives shall be achieved, inter alia, by taking into account the issues of fair and ethical trade and compliance with the principles of the Treaty and the Directives on public procurement. As already mentioned, public procurement can play a key role in the transition to a circular economy. By applying closed-loop principles to procurement, it is easier for public sector purchasers to adopt a holistic approach to sustainability - from the initial stages of the procurement process through to the end of life of the product - while also taking advantage of opportunities to make savings.

The idea of considering social aspects at the national level was shaped, i.a. by the Strategy "Efficient State 2020". This document indicates that in order to effectively manage material and financial resources, public administration offices should put emphasis on the dissemination of already existing legal solutions concerning the inclusion of social issues (the

²³ Deloitte, (2018). *Closed loop - open opportunities*, Circular economy in Poland.

²⁴ European Commission, (2018). *Public procurement for a circular economy. Good practise and guidance*, https://ec.europa.eu/environment/gpp/pdf/cp_european_commission_brochure_pl.pdf (accessed at 19.05.2022).

²⁵ Ibidem.

so-called social clauses), environmental aspects (the so-called green public procurement) in the tender procedures and increase the participation of small and medium-sized enterprises in the public procurement system.

A key issue relates to the contracting methods that a purchasing organisation can use to ensure a closed loop in the economy. These include take-back clauses by the supplier providing that the product, at the end of its life, is returned to the supplier for re-use, remanufacture or recycling, and product-service schemes where the contract covers both products and services. When deciding on public procurement to help close the loop in the economy, one must obviously take into account both the supplier systems and the technical specifications of the product, and the material used in its production.

Poland in terms of responsible procurement is at a rather early stage, but the declarations and ambitions of officials allow us to look at this issue optimistically. Especially that there are many positive and verified examples of the so-called old EU countries, where responsible procurement has brought the intended effect. These include the following cities: Bremen (replacement of the authority's vehicle fleet with a car-sharing service); Turin (closed loop concept in catering for schools); Berlin (use of concrete for construction), or Vaasa (use of biogas buses).

On the Polish ground, public policies aimed at implementing the transformation towards responsibility, CE in the activities of market entities can be classified as follows:

1. Tools affecting financial efficiency:

- **Empowering:** a number of legal acts regulating the relations between the enterprise and the environment and society (e.g. KP, KC, Environmental Protection Law).
- **Facilitating:** CIT relief for donations to public benefit organisations; competitions for socially responsible enterprises; amendment to the Public Procurement Law and allowing the criterion of environmental and social impact to be used by bidders (including local governments) in bid evaluation; participation of the National Fund for Environmental Protection and Water Management in financing investments that help reduce negative environmental impact.
- **Partnering:** creation of a stock exchange index e.g. WIG RESPECT - impact on access to capital; cooperation with NGOs in supporting responsible trade; possibility of using sustainable procurement principles in the selection of partners for projects implemented as public-private partnerships.

2. Tools not affecting financial efficiency:

- **Empowerment:** amendment of the Accounting Act implementing Directive 2014/95/EU on environmental and social impact reporting into Polish law.
- **Facilitation:** training courses (organised by agencies at governmental level, by local governments); provision of materials, expert duty hours, consultation points (organised at governmental level, by local governments).
- **Partnership:** programme "Social responsibility of science".
- **Support:** in the form of declarations and inclusion of CSR in long-term plans, e.g. Inclusion of CSR in the Strategy for Responsible Development until the end of 2020 (with an outlook to 2030); establishment of teams whose competences and

responsibilities include development of CSR and CE in Poland (ministries), adaptation of socially responsible practices in the activities of public agencies, including the Central Statistical Office, the Office of Competition and Consumer Protection; the document "Good practices in corporate social responsibility in companies with State Treasury shareholding" as guidelines of the Ministry of the State Treasury; promotion of CSR in services operated by the government (e.g. www.biznes.gov.pl; www.rodzinaipraca.gov.pl).

Although public policy on social responsibility and circularity presents itself as comprehensive, these tools are relatively few. Doubts also arise about their power to influence market actors. Too little information²⁶ reaches the SME sector about circularity and its benefits. There are too few financial incentives for this group of actors to seek innovations for the benefit of CE. An important role for the state in promoting social entrepreneurship is indicated by supporting the creation of local welfare networks including schools and other education establishments, health, employment and enterprise schemes within locality²⁷. Moreover, government can appoint groups of social entrepreneurs to test new ideas (i.e. vocational school supplements, job search programs, health contracts, education entitlements) to develop know-how within the national social policy framework²⁸.

²⁶ N. Ćwik, (ed.). (2013). *Shared responsibility. The role of innovation*, Responsible Business Forum, <https://odpowiedzialnybiznes.pl/publikacje/wspolna-odpowiedzialnosc-rola-innowacji-2/> (accessed at 19.05.2022)

²⁷ C. Leadbeater, (1997). *The rise of the Social Entrepreneurship*, Demos, London, p. 4.

²⁸ Ibidem, p. 87

Chapter 3. The role of social economy entities

Social enterprises by the provision of small-scale, low-cost solutions that are adapted to the local context can help the public sector to be innovative and more cost-effective²⁹. Self-sustainability, value-creation, quick assessment of the unfulfilled needs and aspirations of society followed by innovations and adaptations, establishment of self-supporting organization aimed toward earning profit through collective efforts of their teams to create social benefit was a response to the slowdown and limitation of the public sector to fulfil social needs³⁰, distortion in the distribution of income³¹, and the increasing employment of business strategies to address social problems while generating revenues. The rise of Social Enterprise (SE) as linked to the concept of “*social economy*” has been representing an adaptation move by civil society to respond to a complex and dynamic environment. Social Enterprises have been the fastest growing category of organizations³² as the consequence of the social problems being deployable by managerial practices. Social entrepreneurship gained practical relevance in 1970s and 1980s, and in 1990s attracted governments and academia³³. The success of social entrepreneurs such as Muhammad Yunus (the Grameen Bank for Microfinance founder, 2006 Nobel Peace Prize Winner), Jeffrey Skoll (the Skoll Foundation founder, one of 2006 Time Magazine’s 100 People of the Year) attracted immense media attention. The new type of entrepreneurship that emerged in various part of the world acknowledged the pressure toward the objective of more social wealth creation rather than economic wealth³⁴. The claims of some researchers to expect further reaching economic effects as the consequence of social enterprise activities and contributing to more growth, less poverty and improved large-scale social development, have been also present³⁵. Therefore, social enterprise idea/concept was also vital within corporate strategies widely

²⁹ B. Huybrechts, A. Nicholls, (2012). Social entrepreneurship: definitions, drivers and challenges, [in:] Volkmann, C.K., Tokarski, K. O., Ernst, K. (eds), *Social entrepreneurship and social business. An introduction and discussion with case studies*, Springer Gabler, Wiesbaden.

³⁰ Light, P.C. (2008). *The search for social entrepreneurship*, Brookings Institution Press, Washington; M. Sharir, M. Lerner, (2006). Gauging the success of social ventures initiated by individual social entrepreneurs, *Journal of World Business*, 41(1), pp. 6-20.

³¹ D. Bornstein, (2004). *How to change the world: social entrepreneurs and the power of new ideas*, Oxford University Press, New York.

³² T.K. Jain, (2019). Towards the Theory of Green Entrepreneurship, *NOLEGEIN-Journal of Entrepreneurship Planning, Development and Management*, 2(1).

³³ In 1991, first social enterprise model adopting a specific legal form for social co-operatives in Italy; the UK, in 2004, introduced a second juridical form for social enterprise within Europe – the Community Interest Company; M. Nyssens, (ed.). (2006). *Social Enterprise. At the Crossroads of Market, Public Policies and Civil Society*, Routledge, London-New York. The research on social entrepreneurship started to emerge: J. Boschee, (1995). Social Entrepreneurship, *Across the Board*, 32(3); J.G. Dees, (1998). *The Meaning of “Social Entrepreneurship”*, Kauffman Foundation and Standford University, Kansas City and Palo Alto; C. Leadbeater, (1997). *The rise of the Social Entrepreneurship*, Demos, London.

³⁴ J.G. Dees, (1998). The meaning of “social entrepreneurship”, Kauffman Foundation and Standford University, Kansas City and Palo Alto; W. Drayton, The citizen sector: Becoming as entrepreneurial and competitive as business, *California Management Review*, 44(3), pp. 120-132; C. Leadbeater, (1997). *The rise of the Social Entrepreneurship*, Demos, London.

³⁵ M. Yunus, (2008). *Creating a world without poverty: social business and the future of capitalism*, Public Affairs, New York; S.A. Zahra, E. Gedajlovic, D.O. Neubaum, J.M. Shulman, (2009). A typology of social entrepreneurs: motives, search processes and ethical challenges, *Journal of Business Venturing*, 24(5), pp. 519-532.

known as Corporate Social Responsibility, Corporate Social Innovation, or an accounting framework named the Triple Bottom Line³⁶. Exploration process by the means of trial-and-error with the expectation to advance economic, social and environmental progress of the society and increasing the value of common good through the discovery, development, selection, failure and destruction, and new ways of creating value is what constitutes social entrepreneurship³⁷. The first experiences of functioning of social enterprises in EU-15 have been researched in Europe since the 1990s, then, since 2000s, complemented by the development of research in the field of social innovation. The academic inquires began to shed more systemically some new light on the transformative power of social economy entities' (SEE) institutional settings. Ongoing research has contributed to raising awareness among citizens about the applicability and the importance of such approaches for social well-being. An important pillar on which social enterprise activity base is the organizational and institutional infrastructure. The transformation of the realization of social goals is a manifestation of development, in which the need to achieve a social goal is combined at the same time with the search for new forms of economic organization. The development of organizations of the social economy sector assumes diversification of sources of income, which is the motor of the search for new institutional forms and models of business activity. Social economy entities are non-governmental organizations, rural housewives' clubs, work cooperatives and solidarity economy entities understood as social enterprises, i.e. social economy entities that conduct economic or payable public benefit activity, professionally activate people who are difficult to employ, do not privatize profit or balance surplus and are managed in a participatory way, but also social cooperatives and cooperatives of the disabled and blind, sheltered workshops, reintegration units³⁸, and also in the domain of awareness rising and education. Social enterprise as non-profit or for-profit enterprise has "a specific socio-economic inclusion and social development capacity"³⁹; identified mostly within the non-profit sector⁴⁰; as "organizations pursuing a social mission through their economic activity"⁴¹. Social enterprises (SE) are perceived as hybrid organizations pursuing triple

³⁶ Financial positioning of the enterprises (this focused on profit generating, i.e. standard "bottom line") complemented by the measures of social and environmental impact.

³⁷ C. Valter, D. Alain, C. Damiano, R. Francesca, L. Mariangela. (2017). Place-Based Network Organizations and Embedded Entrepreneurial Learning: Emerging Paths to Sustainability, *International Journal of Entrepreneurial Behaviour and Research* 23(3), pp. 504-523; R. Dart, (2004). The Legitimacy of Social Enterprise, *Nonprofit Management and Leadership*, 14(4), pp. 411-424; A.M. Peredo, M. McLean. (2006). Social Entrepreneurship: A Critical Review of the Concept, *Journal of World Business*, 41(1), pp. 56-65.

³⁸ Departament Ekonomii Społecznej i Solidarnej, (2019). *Krajowy Program Rozwoju Ekonomii Społecznej do 2023 roku. Ekonomia solidarności społecznej*, Ministerstwo Rodziny, Pracy i Polityki Społecznej, <https://www.ekonomiaspoleczna.gov.pl/Krajowy,Program,Rozwoju,Ekonomii,Społecznej,do,2023,roku,Ekonomia,solidarnosci,spolecznej,4119.html> (accessed at 19.05.2022), p. 11

³⁹ B. Thomsen, O. Muurlink, T. Best, (2021). Backpack Bootstrapping: Social Entrepreneurship Education Through Experiential Learning, *Journal of Social Entrepreneurship*, 12(2), pp. 238-264.

⁴⁰ T. Davis, (1997). *The NGO business hybrid: is the private sector the answer?*, Baltimore, MD, John Hopkins University; A. Fowler, (2000). NGOs as a moment in history: beyond aid to social entrepreneurship or civic innovation?, *Third World Quarterly*, 21(4), pp. 637-654; N. Taylor, R. Hobbs, F. Nilsson, K. O'Halloran, C. Preisser, (2000). The rise of the term social entrepreneurship in print publications. *Frontiers of Entrepreneurship Research*, 20(XXXVI); B.B. Anderson, J.G. Dees, (2002). Developing viable earned income strategies, [in:] J. G. Dees, J. Emerson, P. Economy, *Strategic tools for social entrepreneurs: enhancing the performance of your enterprising nonprofit*, John Wiley&Sons Inc., New York; M. Pomerantz, (2005). The business of social entrepreneurship in a "down economy", *In Business*, 25(3), pp. 25-28.

⁴¹ B. Huybrechts, A. Nicholls, (2013). The role of legitimacy in social enterprise – corporate collaboration, *Social Enterprise Journal*, 9(2), pp. 130-146; C. Borzaga, J. Defourny, (2001). *The emergence of social enterprise*,

bottom lines and creating the common good by making profits and adding to social value (example of creating more jobs especially for those with little opportunities) while protecting the natural environment⁴². The emergence of social enterprises was a strategic response to the frailty of government and philanthropic efforts to meet society expectations in delivering the right solutions⁴³. This kind of hybrid organizations supports engendering social capital to encourage more advanced social interactions and learning processes in societies of diverse structures⁴⁴. Social enterprises are therefore likely to be active in developing “effective knowledge and learning for (...) fostering a resilient future for them and their future generations”⁴⁵. The processes of investment and surplus reinvestment for the purpose of social, environmental and community good⁴⁶ is the core of social enterprise. This hybrid type of organization in its social, economic and environment aspects of impact in local communities⁴⁷ offers a range of contributions to advance local economic development processes by “providing goods and services which the market or public sector is unwilling or unable to provide, developing skills, creating employment, creating and managing workspace, and enhancing civil public involvement”⁴⁸. As SEs’ primary focus is to use business to solve social or environmental problems⁴⁹, they apply market-based strategies to achieve social change⁵⁰ (social entrepreneurship) including entrepreneurial endeavors to conserve and protect natural environment sustainability.

Very challenging and awaited sector of entrepreneurship is **green entrepreneurship** where entrepreneurs strive to neutralize environmentally damaging practices and stimulate environmentally friendly activities. These attitudes involve dissuading society from easy going style of life toward a tough one (promoting bicycling instead of driving a car, less profit, and more challenges with the goal of helping the environment at large by promoting more costly,

Routledge, London; J. Defourny, M. Nyssens, (2006), Defining social enterprise, [in:] Defourny, J. (eds.). *Social Enterprise: at the crossroads of markets, public policies and civil society*, Routledge, New York, pp. 3-27.

⁴² P. Benevene, E. Kong, B. Barbieri, M. Luchesi, M. Cortini, (2017). Representation of Intellectual Capital’s Components Amongst Italian Social Enterprises, *Journal of Intellectual Capital*, 18(3), pp. 564-587.

⁴³ E. Kong, (2010). Innovation Processes in Social Enterprises: An IC Perspective, *Journal of Intellectual Capital*, 11(2), pp. 158–178.

⁴⁴ S. Hasan, (2005). Social capital and social entrepreneurship in Asia: analyzing the link, *Asia Pacific Journal of Public Administration*, 27(1), pp. 1-17.

⁴⁵ E. Kong, (2019). Harnessing and advancing knowledge in social enterprises: Theoretical and operational challenges in the refugee settlement experience, *Journal of Social Entrepreneurship*, 10(2), p. 194.

⁴⁶ S.-A Munoz, A. Steiner, J. Farmer, (2015). Processes of Community-Led Social Enterprise Development: Learning from the Rural Context, *Community Development Journal*, 50(3), pp. 478-493.

⁴⁷ A. Nicholls, (2010). The Legitimacy of Social Entrepreneurship: Reflexive Isomorphism in a Pre- Paradigmatic Field, *Entrepreneurship Theory and Practice*, 34(4), pp. 611–633; J. Weerawardena, G. Sullivan-Mort, (2006). Investigating Social Entrepreneurship: A Multidimensional Model, *Journal of World Business*, 41(1), pp. 21-35; A. M. Peredo, M. McLean, (2006). Social Entrepreneurship: A Critical Review of the Concept, *Journal of World Business*, 41(1), pp. 56–65; R. Ridley-Duff, (2008). Social Enterprise as a Socially Rational Business, *International Journal of Entrepreneurial Behaviour and Research*, 14(5), pp. 291-312; M. Bull, (2008). Challenging Tensions: Critical, Theoretical and Empirical Perspectives on Social Enterprise, *International Journal of Entrepreneurial Behavior and Research*, 14(5), pp. 268–275.

⁴⁸ D. Smallbone, M. Evans, I. Ekanem, S. Butters, (2001). *Researching Social Enterprise*, Centre for Enterprise and Economic Development Research, Middlesex University Business School, London.

⁴⁹ Rhoden, L. (2014). The Capacity of NGOs to Become Sustainable by Creating Social Enterprises, *Journal of Small Business and Entrepreneurship Development*, 2(2), pp. 1-36.

⁵⁰ V. Arantes, (2020). Transforming or Complying? The Rise of Social Enterprises in Shanghai, *Journal of Social Entrepreneurship*, 13(2), pp. 143-163.

environment friendly products instead of making easy money burdening natural environment).

Modelling green entrepreneurship embraces identifying objectives and building a movement towards creating a better environment, raising a voice for a green products and practices (conflicting with the existing practices/lifestyle and goods), making people realize their responsibility, launching in the markets and creating new markets of environmentally friendly products and services (green value creation), targeting the environment friendly goods to customers able to pay for the value of the product contributing to cleaner environment (people more environmentally conscious), aiming toward a support from the government and other institutions with the potential to influence policy decision makers⁵¹.

Promoting green entrepreneurship remains vital within a couple of last decades when such example entities as Ashoka Foundation by Bill Drayton, the Skoll Foundation by Jeff Skoll, Schwab Foundation by Hilde and Klaus Schwab organize their efforts to educate, train, raise awareness, support policy making and initiatives of common people.

The fundamentals of social economy entities with their ethos and structures of organization are conducive through their context of day-to-day practice within which citizens are oriented towards social and environmental services and products. SEE are in their primary aim and structure explicitly environmental (because of their social sensitivity, because of the costs of their activities) in that they recycle, promote organic food and so on. And what is even more important here is that their endeavors to achieve social aims are through the most environmentally sustainable manners⁵².

Green entrepreneurship is a new and much sustainable wave in the market involving solutions to local problems embedded in a larger social system and its interdependencies, attuned to triggering the “cascade of mutually-reinforcing changes that create and sustain transformed social arrangements”⁵³. Sustainable social transformation is considered to be catalyzed by social entrepreneurship which is the creator of innovative solutions to social problems, mobilize ideas, increase/expand capacities, (re)allocate resources, make social arrangements for long-term solutions.

Social economy with its ethos and structures of organization hides a potential to orientate citizens towards environmental considerations. At the same time, it is attractive location to develop and articulate environmentally useful engagement – work, production, or ethical consumption. The social economy governance structure provides mechanisms open to variety of stakeholders to participate and stimulate the processes of social and economic governance (increase of environmental and social knowledge, cultivate virtues concentrated on the protection of environment, developing critical skills). The key result of the governance structure is to empower the members of particular social economy entities within its structure, and to empower the beneficiaries of the processes of service delivery in the broader community⁵⁴. The recognition of duties in relation to the environment together with the responsibilities being coherent with those duties seems to be particularly fertile within the

⁵¹ T. K. Jain, (2019). Towards the Theory of Green Entrepreneurship, *NOLEGEIN-Journal of Entrepreneurship Planning, Development and Management*, 2(1), pp. 1-5

⁵² G. Smith, (2005). Green Citizenship and the Social Economy, *Environmental Politics*, 14(2), pp. 273-289.

⁵³ S.H. Alvord, D.L. Brown, Ch.W. Letts, (2004). Social Entrepreneurship and Societal Transformation. An Explanatory Study, *The Journal of Applied Behavioral Science*, 40(3), pp. 260-282.

⁵⁴ G. Smith, (2005). Green Citizenship and the Social Economy, *Environmental Politics*, 14(2), pp. 273-289.

aims, virtues, and properties that the social economy organization emerges from⁵⁵. The special value is assigned to the engagement of social economy entities in the areas of raising awareness and understanding of environmental context since lack of awareness has been recognized as one of the major obstacles to acting pro-environmentally. There are a number of institutional designs very promising to practice varied forms of participation in this respect. Social entrepreneurship initiatives perceived as catalysts for pro-environmental activities have the potential for capacity-building within which local resource providers make emphasis on scaling up by organizing groups and lead to leverage change and transformational impacts on norms and expectations⁵⁶. There are some direct environmental outcomes that can be expected such as improved appearance of physical environment, reduction of unrecycled waste products, contribution to local environmental capital, more attractive place to work, renovation of old buildings, redeployment of unused assets, regeneration of physical infrastructure of community, regeneration of physical infrastructure of the region. The indirect environmental outcomes include increased attractiveness of the region, improved environmental context, contribution to sustainability agenda, contribution to regional environmental capital⁵⁷.

⁵⁵ Ibidem; This analysis of the role of the social economy draws on Mark Warren's typology of developmental effects of associations; M. E. Warren, (2001). *Democracy and Association*, Princeton University Press, Princeton-New-York.

⁵⁶ S.H. Alvord, D.L. Brown, Ch.W. Letts, (2004). Social Entrepreneurship and Societal Transformation. An Explanatory Study, *The Journal of Applied Behavioral Science*, 40(3), pp. 260-282.

⁵⁷ J. Mair, J. Robinson, K. Hockerts, (ed.). (2006). *Social Entrepreneurship*, Palgrave MacMillan, New York, p. 186, 197.

Chapter 4. Green skills as an element of green transformation

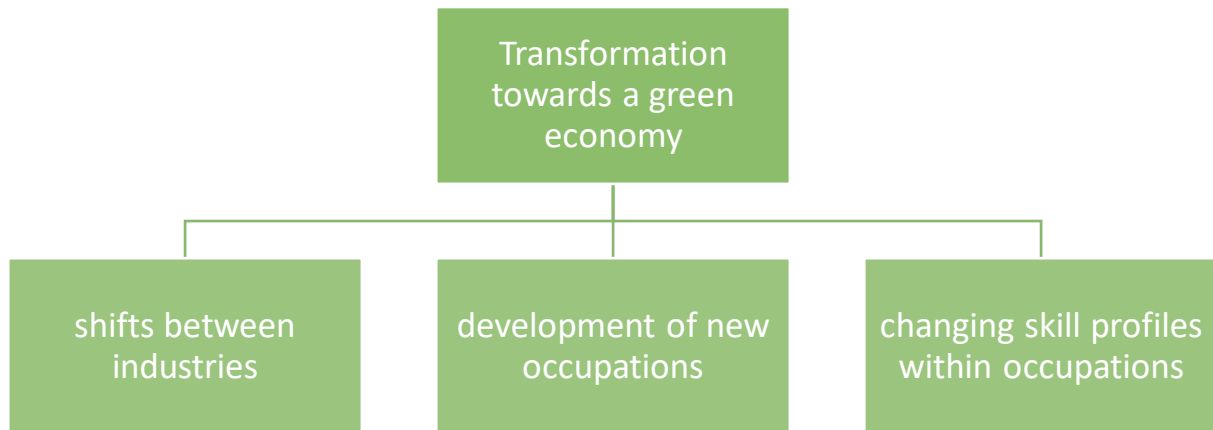
The need of development of green skills is related with the challenges the whole world is already facing: devastation of the environment, limitation of natural resources (including energy resources), progressive climate change, and which human have to adapt. As it is mentioned above, especially countries of European Union take action to overtake environmental problems and at the same time shape the framework of socio-economic development with respect for the environment by through systemic changes aimed at creating a low-carbon and circular economy. These activities are associated with structural changes in many sectors of traditional economies, changes in enterprises (production/service processes, offered products, services that are more environmentally friendly), household consumption, activities of local (e.g. waste management system) and central authorities (e.g. development of renewable energy sources). Changes require certain regulations, financial instruments, planning and management, educational activities, etc. In order for the aforementioned changes to take place, skills of a new kind are necessary.

The necessity of the circular economy to emerge increased the pressure to adjust skills of workers demanded by the industries concentrating on more ecologically sustainable technologies. Growing need for the skills to perform ecologically-oriented tasks call for the equipping graduates more with green skills together to technical and soft ones. These new skills can be differentiated depending on the sector, its specifics, they can be low, medium or high skills. Especially desirable are the high ones because of the link to research, innovation aimed at modern energy and resource efficient solutions. However, we must not forget the skills related with jobs necessary for reducing energy consumption and adopting measures to improve energy efficiency (for example demand for insulation workers, electricians and solar photovoltaic installers), recycling, development of clean transport etc. Then, there are needed skills related with design appropriate sectoral policies, implementation of environmental legislation, green tax reform, appropriate financial instruments (green bonds), more environmentally friendly production/service management systems.

The last economic crisis 2008-2010 and implemented programmes related to low-carbon and resource-efficient economy to overcome it have shown a lack of skills needed on the road to green transformation. "The transformation brought about by greening economies affects skill needs in three ways: first, **structural changes** lead to increased demand for some occupations and skill profiles, called **green increased demand occupations (GIDOs)**, and decreased demand for others. This creates a need for training to enable enterprises and workers to move from sectors and occupations in decline to those that are growing; second, **new economic activities** generate entirely new occupations that require the provision of appropriate training courses and the adaptation of qualification and training systems to **green new and emerging occupations (GNEOs)**; thirdly, and most pervasively, many **existing occupations and industries experience a greening of existing jobs (green expanded skills occupations - GESOs)**, which leads to significant changes in the tasks and skills required of workers. This source of change in skill requirements is the most common and calls for a major effort to revise existing curricula, qualification standards and training programmes at all levels of education and training. All three sources of change – **shifts between industries, development of new**

occupations and changing skill profiles within occupations – alter the skill profiles of occupations and thus affect training needs and delivery”⁵⁸ (Scheme 3).

Scheme 3. Reasons for the need for skills due to the transformation towards a green economy



Source: own elaboration based on: CEDEFOP, (2012). *Green skills and environmental awareness in vocational education and training. Synthesis report*, Luxembourg, p. 14.

“Every job can potentially become greener. Integration of sustainable development and environmental awareness into education and training at all levels, starting from early childhood education, is an important task. It will contribute to changing consumer behaviour and triggering market forces to push the greening agenda ahead(...). Employers investing in new technologies need to be able to find workers with the right skills. Workers and communities that lose jobs in ‘brown’ industries need opportunities for acquiring new skills and employment”⁵⁹.

The dimensions where new skills will be required are already apparent⁶⁰ (Scheme 4).

⁵⁸ CEDEFOP, (2012). *Green skills and environmental awareness in vocational education and training. Synthesis report*, Luxembourg, p. 14, https://www.cedefop.europa.eu/files/5524_en.pdf (accessed at. 30.05.2022).

⁵⁹ O. Strietska-Ilina, Ch. Hofmann, M. Durán Haro, S. Jeon, (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*, International Labour Office, Skills and Employability Department, Job Creation and Enterprise Development Department, Geneva, p. vi, https://www.ilo.org/wcmsp5/groups/public/-/dgreports/---dcomm/---publ/documents/publication/wcms_159585.pdf (accessed at 30.05.2022).

⁶⁰ Ibidem, p. 96.

Scheme 4. The dimensions of economy where new skills will be required



Source: own elaboration based on: O. Strietska-Illina, Ch. Hofmann, M. Durán Haro, S. Jeon, (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*, International Labour Office, Skills and Employability Department, Job Creation and Enterprise Development Department, Geneva, p. 96.

The new skills could be divided into three categories⁶¹:

- 1) **Basic skills** – which are more generic and routine skills found in occupations present in most industries and organisations.
- 2) **Advanced skills** – which have a higher component of knowledge intensity and can be found in technical occupations and management positions. These skills could also refer to social and communication skills (needed for team work), and specific language and cultural skills (needed in multicultural working environments).
- 3) **Converging skills** – which require several of the other skills plus skills specific to entrepreneurship, or for adjusting to the green transformation of jobs or indeed new green jobs.

Green skills are perceived to be composed of three dimensions categorized as cognitive, psychomotor, and affective dimensions⁶². Promotion of the sustainable development within those three dimension engage knowledge, abilities (skills), and values (attitudes).

The concept of green skills is variously defined. Many of them emphasise only elements related to the economy, although there are also definitions in which the authors note a

⁶¹ OECD, (2010). *Entrepreneurship, SMEs and innovation*, OECD, Paris, p. 164, [http://rosted.nu/attachments/File/2010/SMEs Entrepreneurship and Innovation 2010.pdf](http://rosted.nu/attachments/File/2010/SMEs_Entrepreneurship_and_Innovation_2010.pdf) (accessed at 30.05.2022).

⁶² L.Ch. Sern, (2018). Green Skills for Green Industry: A Review of Literature, *Journal of Physics: Conference Series*, 1019, pp. 012030.

combination of different spheres of human functioning, not only in their professional, but also in their social dimension. Scheme 5 presents the selected definitions of green skills.

Scheme 5. Selected definitions of green skills

Author	Definition	Differentiator
The Council of Australian Governments – COAG, (2009)	Green skills, also known as skills for sustainability, as the technical skills, knowledge, values and attitudes needed in the workforce to develop and support sustainable social, economic and environmental outcomes in business, industry and the community.	Skills needed to develop and support sustainable social, economic and environmental outcomes.
OECD/CEDEFOP, (2014)	Green skills can be defined as skills needed by the workforce in all sectors and at all levels, in order to help the adaptation of the products, services and processes to the changes due to climate change and to environmental requirements and regulation	Skills needed by the workforce in all sectors and at all levels.
Charles Arthur, (2021)	Green skills are the knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society	Skills needed to live in, develop and support a sustainable and resource-efficient society.
Global Green Skills Report, (2022)	Green skills: are those that enable the environmental sustainability of economic activities	For environmental sustainability of economic.

Source: G. McDonald, L. Condon, M. Riordan, (2012). *The Australian Green Skills Agreement. Policy and Industry Context, Institutional Response and Green Skills Delivery*, TAFE Directors Australia, Ultimo; C. Arthur, (2021). *What are green skills?*, UNIDO, <https://www.unido.org/stories/what-are-green-skills> (accessed at 30.05.2022); OECD/CEDEFOP, (2014). *Greener Skills and Jobs*, OECD Green Growth Studies, p. 16, https://read.oecd-ilibrary.org/industry-and-services/greener-skills-and-jobs_9789264208704-en#page4 (accessed at 30.05.2022). DOI: 10.1787/9789264208704-en; LinkedIn Economic Graph, (2022). *Global Green Skills Report 2022*, <https://economicgraph.linkedin.com/research/global-green-skills-report> (accessed at 30.05.2022).

The **core of green skills** is to build the labor potential to perform tasks that bring in profits without jeopardizing natural ecosystem and to ensure sustainable economic growth and development. That role of green skills taken on by skill training institutions ought to be aligned with the needs of the industrial sectors. Therefore, it is imperative for the skill training institutions to revise curriculum in order to equip graduates with green skills to cater for the demand of manpower market.

The following **green skills** are enumerated:

- 1) Design skill** (building design, machine design, and circuit design. The designer of today should be able to integrate green elements into their design in order to produce an idea that is friendly to the environment⁶³.

⁶³ A.A. Ragheb, H. El-Shimy, G.A. Ragheb, (2016). Green Architecture: A Concept of Sustainability, *Procedia - Social and Behavioral Sciences*, 216, pp. 778-787.

- 2) **Leadership skill** and 3) **Management skill** (to change the organizational structure, function, and operation in order to support green activities, such as lean production or life-cycle management⁶⁴).
- 4) **City planning skill** and 5) **Landscaping skill** (many parts of the world are going through urbanization and the existing metropolitans are evolving to become smart cities that aims to generate a more convenient and modern places to live in⁶⁵. These processes need proper planning and landscaping in order to make the cities livable and sustainable in long run).
- 6) **Energy skill** (to train workers with energy skills that help reduce the use of non-renewable resource in energy production and consumption, and at the same time replace those non-renewable resources with the ones that are more environmentally friendly and safe to use.)
- 7) **Financial skill** (to control the expenditure of an organisation in order to balance up the revenue and responsibility for environmental conservation⁶⁶).
- 8) **Procurement skill** (to deal many internal departments of an organization as well as external agencies to manage, coordinate and purchase materials. Within green industrial context, procurement skill is very much needed to ensure the materials purchased are environmental friendly in order to minimise the environment impact during their life cycle⁶⁷).
- 9) **Waste management skill** (the ability to reduce, reuse, and recycle waste through proper planning, implementation, and coordination of waste management system⁶⁸. Waste management skill is highly demanded nowadays by the waste management sector which contributes enormously to the sustainability of environment and prevention of pollution).
- 10) **Communication skill** (needed for verbal and non-verbal communication, but it also includes technological skills for communication which minimise energy consumption and more towards to environmental friendly type of communication⁶⁹).

The classification indicated above does not exclude a range of other skills needed to shape the green economy. The literature also mentions⁷⁰:

- adaptability and transferability skills to enable workers to learn and apply the new technologies and processes required to green their jobs;
- systems and risk analysis skills to assess, interpret and understand both the need for change and the measures required;

⁶⁴ UNEP, (2012), *Measuring progress towards a green economy*, United Nations Environment Programme Report.

⁶⁵ A. Adhya, P. Plowright, J. Stevens, (2010). Defining sustainable urbanism: Towards a responsive urban design, *Proceedings of the Conference on Sustainability and the Built Environment*, pp. 17-38.

⁶⁶ M. Krechovská, M. (2015). Financial Literacy as a Path to Sustainability, *Business Trend*, 2, pp. 3-12.

⁶⁷ A.A.M. Bohari, B. Xia, (2015). Developing green procurement framework for construction projects in Malaysia, [in:] *The Proceedings of the 6th International Conference on Engineering, Project, and Production Management 2015 (EPPM2015)*, Association of Engineering, Project, and Production Management (EPPM), pp. 282-290.

⁶⁸ Ö. Bozkurt, A. Stowell, (2016). Skill in the green economy: recycling promises in the UK e-waste management sector, *New Technology, Work, and Employment*, 31(2), pp. 146-160.

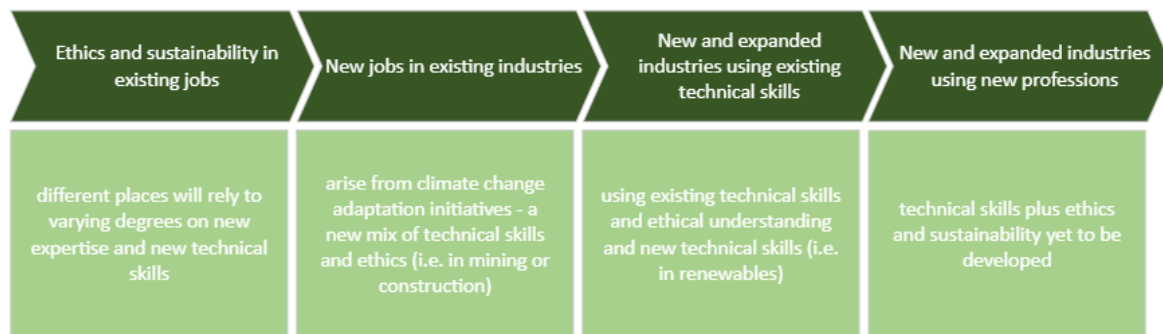
⁶⁹ Ibidem, p. 4-5.

⁷⁰ O. Strietska-Illina, Ch. Hofmann, M. Durán Haro, S. Jeon, (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*, International Labour Office, Skills and Employability Department, Job Creation and Enterprise Development Department, Geneva, p. 107.

- entrepreneurial skills to seize the opportunities of low-carbon technologies;
- innovation skills to identify opportunities and create new strategies to respond to green challenges;
- marketing skills to promote greener products and services;
- consulting skills to advise consumers about green solutions and to spread the use of green technologies;
- networking, IT and language skills to perform in global markets.

Any economy has to have at its disposal a broad range of knowledge and of technical, managerial and conceptual skills⁷¹. Some of these skills are not necessarily green per se, but only as green as the context in which they are applied. In this case, it should be emphasised that some of the non-obviousness associated with defining green skills in relation to business activities is also due to the fact that green jobs are not precisely defined⁷². In this respect, as various authors point out, it is therefore possible to think of green skills for jobs. They will therefore include these elements⁷³ (Scheme 6).

Scheme 6. Way of thinking in terms of green skills for jobs



Source: own elaboration based on: R. Maclean, S. Jagannathan, J. Sarvi (eds.). (2013). *Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific*, Springer, Dordrecht, p. 259

Based on this type of classification, groups of skills can be created with increasing levels of detail. One such example is the classification proposed by Davide Consoli, Giovanni Marin, David Popp and Francesco Vona⁷⁴ (Scheme 7).

⁷¹ O. Strietska-Illina, Ch. Hofmann, M. Durán Haro, S. Jeon, (2011). *Skills for green jobs: a global view: synthesis report based on 21 country studies*, International Labour Office, Skills and Employability Department, Job Creation and Enterprise Development Department, Geneva, p. 103

⁷² R. Maclean, S. Jagannathan, J. Sarvi (eds.). (2013). *Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific*, Springer, Dordrecht, p. 259.

⁷³ R. Maclean, S. Jagannathan, J. Sarvi (eds.). (2013). *Skills Development for Inclusive and Sustainable Growth in Developing Asia-Pacific*, Springer, Dordrecht, p. 259.

⁷⁴ D. Consoli, G. Marin, D. Popp, F. Vona, (2015). Green skills, VOX EU, CEPR, <https://voxeu.org/article/green-skills> (accessed at 30.05.2022).

Scheme 7. Categories of green skills



Source: own elaboration based on: D. Consoli, G. Marin, D. Popp, F. Vona, (2015). Green skills, VOX EU, CEPR, <https://voxeu.org/article/green-skills> (accessed at 30.05.2022).

Importantly, many of these classifications do not point directly to specific practical skill sets, but focus on their relational description in relation to the economy. For example, this is the case with the classification proposed by the LinkedIn group⁷⁵, where three types of such skills are distinguished:

- 1) **'Core' green skills** - are most directly related to these sustainability-promoting activities (i.e. recycling);
- 2) **'Ambivalent' green skills** - may or may not be used for sustainability (i.e. fleet management);
- 3) **'Adjacent' green skills** - can support acquisition of core and ambivalent green skills (i.e. biology).

The alternative classification could be the following, prepared by M. Pavlova⁷⁶:

⁷⁵ LinkedIn Economic Graph, (2022). *Global Green Skills Report 2022*, <https://economicgraph.linkedin.com/research/global-green-skills-report> (accessed at 30.05.2022).

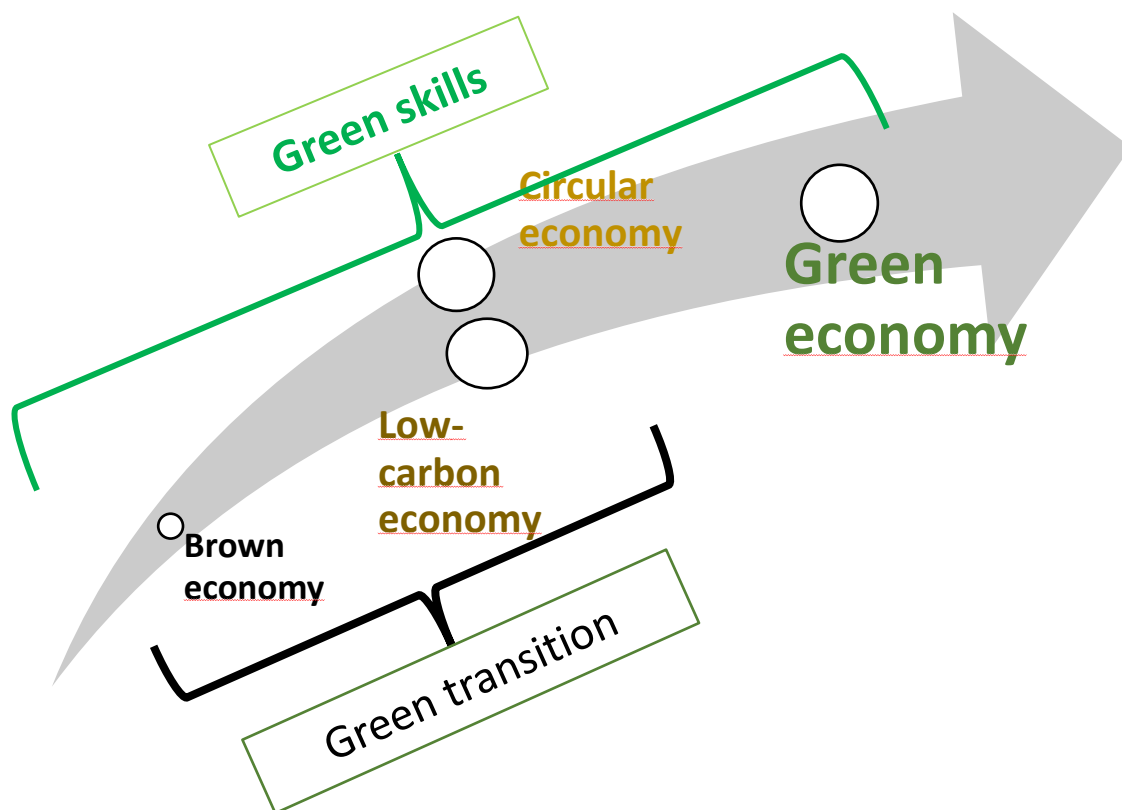
⁷⁶ M. Pavlova, (2017). *Green Skills as the Agenda for the Competence Movement in Vocational and Professional Education*, [in:] Mulder, M. (ed.), *Competence-based Vocational and Professional Education. Technical and Vocational Education and Training: Issues, Concerns and Prospects*, 23. Springer, Cham, p. 934.

- 1) **Key/Generic Green Skills** – defined as generic green skills which facilitate the preparation of the future workers to understand issues of green growth and to interpret environmental legislation, in purpose to increase energy and resource efficiency which in turn enables the processes necessary for transitioning to a greener economy,
- 2) **Topping-Up Skills** – „adding skills for tasks in existing occupations with environmentally friendly practices”⁷⁷,
- 3) **Specialised green skills** – which are related with new green occupations.

Additionally, the skills related with green economy could concern a support of resource efficiency, low carbon industry, climate resilience or managing natural assets⁷⁸.

It is possible to divide the green skills, taking into account the issue of green transition (Scheme 8), some are new related to support the transition, „others are not new: they involve doing established actions with a distinctive green economy awareness and understanding”⁷⁹. It should be also highlighted that the specifics of green skills will be different in the initial phase of the green transition (when measures, aimed at greening traditional sectors, introduction of green products and services, will be necessary), and different in the era of achieving the goal of a green economy.

Scheme 8. Green skills in transition processes to development of the green economy



Source: own elaboration

⁷⁷ M. Pavlova, (2017). *Green Skills as the Agenda for the Competence Movement in Vocational and Professional Education*, [in:] Mulder, M. (ed.), *Competence-based Vocational and Professional Education. Technical and Vocational Education and Training: Issues, Concerns and Prospects*, 23. Springer, Cham, p. 935.

⁷⁸ HM Government, (2011). *Skills for a green economy. A report on the evidence*, URN 11/1315, p. 8-10.

⁷⁹ Ibidem, p. 8.

Taking into account the above remarks related with definition and classification of the green skills, it should be highlighted that **definition of the green skills** the following definitional approach is proposed: the green skills are skills needed in all sectors, in all kind of organisation (governmental, non-governmental, business etc.), which from one side should help to understand the issue of green transition and enable it to be carried out (including necessity changes related with law, financial, administrative, management instruments) and on the other enable to develop environmental friendly solution in production, consumption and investment processes, creating and offering environmentally friendly products and services.

PART II

Chapter 5. Public institutions for green skills development

In Poland, the Minister of Development is the lead body for co-ordination of the entire package of the closed-circle economy and has a leading role in matters concerning the Communication "Closing the loop" and the Closed-circle Economy Team. Projects at national level, implemented within the framework of the chosen course for CE are:

- Road Map - towards a Closed Circuit Economy;
- Action Plan for Security of Energy Resources in Poland;
- Project R2;
- Environmental Footprint;
- European Innovation Partnership on Raw Materials.

There are public institutions of, inter alia, economic importance, operating under Polish law, which defines the scope of their tasks, supervisory bodies, principles of creating annual action plans and reporting on their implementation. The purpose of these institutions is to implement economic development programmes, supporting innovation and research activities, especially of small and medium-sized enterprises (SMEs), regional development, export growth, human resources development and the use of new technologies in business activities.

In the CE perspective, these institutions are focused on promoting proactive measures for innovation, solutions to protect the environment and improve the quality of life of societies. The key agency at the national level - the Polish Agency for Enterprise Development (PARP) - is involved in the implementation of national and international projects, financed from the structural funds, the state budget and the European Commission's multi-annual programmes. PARP actively participates in the creation and effective implementation of the state policy on entrepreneurship, innovation and adaptability of human resources, striving to become a key institution responsible for creating an environment supporting entrepreneurs. The Agency's activities are implemented with a special focus on the needs of the small and medium-sized enterprise sector.

The specific tasks of the Polish Agency for Enterprise Development in the field of entrepreneurship development include in particular:

- making important administrative and business information available to entrepreneurs,
- subsidizing entrepreneurs' access to services, e.g. training services,
- facilitating small and medium-sized entrepreneurs' access to specialist advisory and training services,
- facilitating small and medium-sized entrepreneurs to obtain certificates required on international markets by financing a part of costs of the certification process,
- providing advisory services to entrepreneurs applying for funds from specific programmes.

PARP and other public institutions, give special importance to network connections in promoting entrepreneurship, which is largely due to the changes that occur in technology design resulting in the need for frequent modification of production factors and products, and also due to the fact that network connections are an important channel for technology transfer.

Central to the development of small and medium-sized enterprises is the ability to absorb technology and to learn by using the technology⁸⁰. Only when these conditions are met can positive technological changes be expected among domestic enterprises cooperating with other entities. This is what network relations serve, which by facilitating the flow of knowledge, creating conditions for changing the way of thinking and acting, contribute to improving the functioning of entities in network systems⁸¹.

The institutions in question, their activity, are an important factor in the development of market actors, since the decisions made by entrepreneurs and their activities are carried out in an environment in which these institutions play an important role. Through the institutions in question, the resources (knowledge, information, financial resources), support the production of economic results and determine the incentives and constraints, are therefore translated into the decisions of the economic agents, thus directing and developing their activities⁸².

Furthermore, these institutions must ensure environmental protection by promoting economic activities that will not jeopardise future generations. These institutions seek to encourage a shift from reactive solutions (introducing green innovations to comply with environmental regulations) to proactive attitudes and solutions (exploiting business opportunities in a new context where there is greater concern for environmental protection and the financial benefits associated with it⁸³).

To this end, under Polish conditions, we can see the beginnings of a social enterprise culture that facilitates the integration of young people into the social economy and fosters the above objective.

However, it would be worthwhile for these institutions to make greater efforts to encourage the creation of platforms and structures through which social entrepreneurs can share their experiences, facilitating their access to private markets and the exposure of their activities.

For one of the main problems faced by social entrepreneurs (not only on the Polish market) is their isolation, which limits their development horizons. It seems that a network of social entrepreneurs would be a way to overcome this isolation. It could help collect and disseminate best practices, contributing to the development of skills, including green skills. It would provide a forum for debate and ideas. It could provide a kind of labour market where actors can exchange workers or provide joint training⁸⁴.

⁸⁰ UNCTAD, (2001). *Transfer of technology*, United Nations, New York-Geneva.

⁸¹ K. Przybylska, K. Przybylska, (2006). Benefits of Small Enterprises Operating in International Production Networks, [in:] Rymarczyk, J., Michalczyk, W. (eds.), *Regional and Global Problems in Modern World Economy*, AE in Wrocław, Wrocław.

⁸² M.-A. Galindo-Martín, M.-S. Castaño-Martínez, M.-T. Méndez-Picazo, (2020). The Relationship between Green Innovation, Social Entrepreneurship, and Sustainable Development, *Sustainability*, 12(11), pp. 4467.

⁸³ Ibidem.

⁸⁴ Ibidem.

The key issue is to assure the legal framework for operating social enterprises. Social entrepreneurs can help solve major social problems, but their development will only be possible in the right environment, which can be created largely by the government and the private sector by undertaking several practical solutions⁸⁵:

- promotion of local, national and international partnerships between actors in the social economy in order to share ideas, contacts and staff,
- developing a contract culture in the public sector,
- promoting partnership agreements between social entrepreneurs and business,
- sponsoring pilot programmes that would help strengthen relations between community organisations and local small business networks,
- social entrepreneurs should be included in the policy towards small and medium-sized enterprises in public policies,
- it is worth identifying a group of social entrepreneurs across the country (e.g. 100) who could
- be a testing ground for new policy ideas such as vocational training, vocational training allowances, job search programmes, health contracts, educational entitlements.

These activities, largely promoting networking and its benefits in the economy, will be an opportunity for market development not only for social enterprises, but also for other entities in the market which will enter into cooperation with them. Public institutions pursuing their strategic objectives should orient their support to a greater extent towards economic networking of entities, including the creation of networks of social enterprises. It is also advisable here to create franchising networks, where certain proven solutions and market skills will be replicated. At the same time, the proper legislation could enable to use such tools as socially responsible public procurement. Ministry of Family and Social Policy published the draft of Assumptions of Resilience and Development for social economy and social entrepreneurship for years 2022-2025 and the green transition is a very important part of the programme⁸⁶.

⁸⁵ C. Leadbeater, (1997). *The rise of the Social Entrepreneurship*, Demos, London.

⁸⁶ Departament Ekonomii Społecznej i Solidarnej, (2022). *Założenia resortowego programu pn. Odporność i rozwój ekonomii społecznej i przedsiębiorczości społecznej na lata 2022-2025*, [in:] *Krajowy Plan Odbudowy*, Ministerstwo Rodziny i Polityki Społecznej, Warszawa
<https://www.ekonomiaspoleczna.gov.pl/index.php?document=4286>

Chapter 6. The role of education in development of green skills

Social participation and civil reasonability are included in the eight Reference Framework key competence defined by the European Parliament and Council⁸⁷. There is an expectation that students can acquire “citizenship” competences alongside environmental and sustainability awareness and entrepreneurship education involving the focus on analytical, evaluative, and creative abilities⁸⁸ also hide the potential to boost the active citizenship for sustainability⁸⁹.

As social entrepreneurship education is about transferring/transmitting not just the abstract knowledge on competence identifying social market opportunities from teacher to students (such as definitions, frameworks, theories) but also the spirit/predisposition/mind-set/passion/skills/readiness to engage in the launching of social enterprises as a result of social learning process⁹⁰, there are a great role of students’ co-creating shared communities of practice identified as being a stimulator of “the propensity of students to launch social enterprise”⁹¹. Learning perceived both as a cognitive and a social process⁹² “requires collective and independent actions” which would deliver to learners the understanding and social spirit⁹³. Social learning theories disseminated via learning in the communities of practice workplaces⁹⁴ have the influence on the understanding of classroom-based management education⁹⁵, and especially on social entrepreneurship education⁹⁶. According to social learning theorists, individuals acquire the knowledge through observing, imitating, and modelling other behaviors⁹⁷. And the foundation of such learning are communities that provide the environment for the observation of behaviors, interactions with those involved⁹⁸. Those learning communities⁹⁹ are intended to trigger the social relationships potential

⁸⁷ European Parliament, the Council of the European Union, (2006). *Recommendation of the European Parliament and of the Council of 18 December 2006 on key competences for long-life learning*, Official Journal of the European Union L394/10:1-9.

⁸⁸ W. Anderson, D.R. Krathwohl, (eds.) (2001). *A taxonomy for learning, teaching, and assessing: a revision of Bloom’s taxonomy of educational objectives*, Longman, New York.

⁸⁹ T. Mets, J. Holbrook, S. Läänelaid, (2021). Entrepreneurship Education Challenges for Green Transformation, *Administrative Sciences*, 11(1), p. 15.

⁹⁰ H. Douglas, (2015). Designing social entrepreneurship education, *International Journal of Social Entrepreneurship and Innovation*, 3(5), pp. 362-373.

⁹¹ K. Hockerts, (2018). The Effects of Experimental Social Entrepreneurship Education on Intention Formation in Students, *Journal of Social Entrepreneurship*, 9(3), pp. 234-256.

⁹² S. Gherardi, D. Nicolini, F. Odella, (1998). Toward a social understanding of how people learn in organizations the notion of situated curriculum, *Management Learning*, 29(3), pp. 273-297.

⁹³ O. Branzei, C. Fredette, (2008). Effects of newcomers practicing on cross-level learning distortions, *Management Learning*, 39(4); pp. 393–412, Special Issue on Organizational Learning, Knowledge and Capabilities; J. Dewey, (1938). *Experience and education*, Touchstone, New York.

⁹⁴ E. Wenger, (1998). Community of practice: a brief introduction, *Learning in Doing*, 15(4), pp. 1-7.

⁹⁵ A. Y. Kolb, D. A. Kolb, (2005). Learning styles and learning spaces: enhancing experimental learning in higher education, *Academy of Management Learning and Education*, 4(2), pp. 193-212.

⁹⁶ C. Howorth, S. M. Smith, C. Parkinson, (2012). Social Learning and social entrepreneurship education, *Academy of Learning and Education*, 11(3), pp. 371-389; J. Kickul, C. Janssen-Selvadurai, M. D. Griffiths, (2012). A blended value framework for educating the next cadre of social entrepreneurs, *Academy of Management Learning and Education*, 11(3), pp. 479-493.

⁹⁷ A. Bandura, (1971). *Social learning theory*, Prentice-Hall, New Jersey.

⁹⁸ E. Wenger, (1998). Community of practice: a brief introduction, *Learning in Doing*, 15(4), pp. 1-7.

⁹⁹ L. N. Graves, (1992). Cooperative learning communities: context for a new vision of education and society, *Journal of Education*, 174(2), pp. 57-79.

between experts and learners to stimulate innovative formats of participatory and interactive learning activities (teachers more as facilitators participating on the level playing field, being knowledgeable and ignorant in some areas). For students to be part of the learning process it is indispensable to first acquire some knowledge, enact certain practices of the domain of study, then reflect on them and the learning process¹⁰⁰. Therefore, building a form of learning spaces by teachers to foster conversational learning, development of expertise, practicing and reflecting, feeling, and thinking¹⁰¹. The common method/tool is dividing students into small working groups within which they are given tasks to complete, once the task is presented, the teacher steps aside, leaving the students to organize "their own community of knowledge" as a space for exchanging ideas, asking questions, critiquing, discussing, and developing consensus. Groups can also share internally and explore selected dimensions of the topic/task to then share their expertise with the whole group (students are teachers to themselves; they excel at debating, at resolving disagreements). The student thus becomes an active participant in the educational process (thinking, not merely reproducing)¹⁰².

There is a role of a kind of studio teaching¹⁰³ that as a physical space create a room for students to work on projects while being in their phase of conceptualization, experimentation, concrete experience, and reflective observation¹⁰⁴. The concept of these physical place to incubate ideas is founded on design thinking¹⁰⁵. Getting engaged in participatory observation of a real-world, reflecting upon the observation by series of discussions, then getting into the interactions with managers of social enterprises and being instructed to getting involved in solving a social problem, identifying social entrepreneurship opportunities for start-ups call for educational set of tools – a form of a **laboratory space**. Launching social entrepreneurship education schemes/cycles does not remain without impact on the important students' characteristics as potential social entrepreneurs – empathy (building capacity to imagine the feelings of a marginalized people [transpose students into the feeling and thinking of others], enabling to support in reacting emotionally and compassionately to others feelings), moral obligation (increase the feeling of responsibility to address the problems of socially marginalized individuals and groups in result to sensed and beheld norms and values as moral imperatives), social entrepreneurial self-efficacy (enabling to contribute to societal change, create a social venture often through a small-scale social entrepreneurial behavior), perceived social support (to trigger the formation of behavioral intentions to set up a social venture) , intention to start a social enterprise (formation and fostering the plans to be personally involved in launching a social venture)¹⁰⁶.

From the cultural perspective, educational system can promote a culture of social entrepreneurship and makes integration of young people within social economy easier. From a market perspective, platforms and other organizational structures to share social

¹⁰⁰ C. Howorth, S. M. Smith, C. Parkinson, (2012). Social Learning and social entrepreneurship education, *Academy of Learning and Education*, 11(3), pp. 371-389.

¹⁰¹ K. Hockerts, (2018). The Effects of Experimental Social Entrepreneurship Education on Intention Formation in Students, *Journal of Social Entrepreneurship*, 9(3), p. 236.

¹⁰² J. Rifkin, (2012). *Trzecia rewolucja przemysłowa*, Sonia Draga, Katowice, p. 333, 337, 338, 339, 342.

¹⁰³ D. Barry, S. Meisiek, (2015). Discovering the business studio, *Journal of Management Education*, 39(1), pp. 153-175.

¹⁰⁴ D. A. Kolb, (1976). Management and the learning process, *California Management Review*, 18(3), pp. 21-31.

¹⁰⁵ T. Brown, (2008). *Design Thinking*, Harvard Business Review, (June).

¹⁰⁶ K. Hockerts, (2018). The Effects of Experimental Social Entrepreneurship Education on Intention Formation in Students, *Journal of Social Entrepreneurship*, 9(3), pp. 237-241.

entrepreneurs experience, knowledge, facilitate the transfer of know-how, increase the visibility of social entrepreneurship initiatives and encourage wider communities to cooperate. From the educational perspective, the education-focused activities can contribute to building business skills¹⁰⁷. To better equip communities with tools to tackle the dynamics and complexity of social problems including environmental issues, prioritizing improvement in education and innovation is of key importance¹⁰⁸. Shift from paradigm of “service” to a paradigm of participation (to join, to participate in, to bring additional capacity to movement for social justice; to position students more as critical scholars allying with community members as coinvestigators, not just passive volunteers) exposes that students responsibility is not simply “*to engage the task at hand, but to comprehend the potential influence of their contribution*”; service-learning does not always engage action research (participatory research).

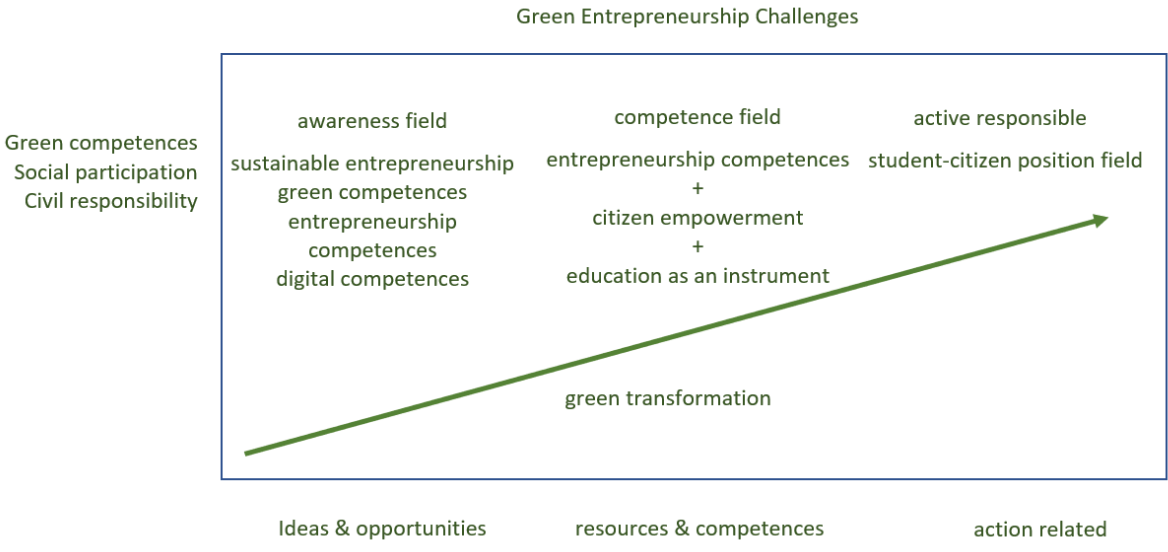
¹⁰⁷ OECD, (2016). *Policy brief on scaling the impact of social enterprises*, Luxembourg.

¹⁰⁸ H. Bossel, (1999). *Indicators for sustainable development: theory, method, applications*, International Institute for Sustainable Development, Winnipeg, Manitoba.

Chapter 7. Frameworks of the concept of SDG Labs – forming a laboratory space

The broader concept of the evolution of green entrepreneurship challenges alongside green transformation with the emphasis on green competences is presented on the Scheme 9.

Scheme 9. Conceptual model of evolving toward sustainable entrepreneurship with the emphasis on citizens’ green competences



Source: Authors’ own elaboration on the basis of T. Mets, J. Holbrook, S. Läänelaid, (2021). Entrepreneurship Education Challenges for Green Transformation, *Administrative Sciences*, 11(1), p. 15.

Awareness field is seen as transforming into a field of competence and then into active responsible student-citizen position field. The dynamism of the process involves green transformation in terms of evolving green competences together with social participation and civil responsibility. Those three fields focus on three areas of evolution namely ideas and opportunities, resources and competences, and action related areas.

Awareness. Lack of awareness on environmental protection is identified as one of the crucial factors to determine the fight with global climate change. There is scarce knowledge about climate change, about the risk of climate change¹⁰⁹. Majority of people do not recognize the causes of pollution (2012, 2015, 2001)¹¹⁰. The largest survey of public opinion on climate

¹⁰⁹ Oyero, O., Oyesomi, K., Abioye, T., Ajiboye, E., & Adedeji, T.K. (2015). Behavioural Practices and Climate Change Awareness in Ado Odo/Ota, Ogun State, Nigeria: Implications for Communication and Development Agenda, *International Conference on African Development Issues (CU-ICADI) 2015: Social and Economic Models for Development Track*, pp. 359-364.

¹¹⁰ National Environmental Education and Training Foundation, (2001). *The Ninth Annual National Report Card on Environmental Attitudes, Knowledge and Behaviour*, NEETF, Washington DC: NEETF; Asia Foundation (2012) Climate change perception survey. The Asia foundation, Dhaka. <http://asiafoundation.org/resources/pdfs/climatechangeperceptionsurvey.pdf> (accessed at 19.05.2022).

change covering 56% of the world's population - Peoples's Climate Vote¹¹¹ revealed in 2021 widespread recognition that: climate change is "a global emergency"; "the world should do everything necessary and urgently in response" to climate change; out of 18 policies four climate policies were indicated as the most popular to address the climate emergency: 1. Conservation of forests and land (54% public support); 2. Solar, wind and renewable power (53%); 3. Climate-friendly farming techniques (52%); and 4. Investing more in green businesses and jobs (50%). In almost all G20 countries more investment in green businesses and jobs is supported – 73% in the United Kingdom, 68% in Germany, Australia and Canada, 65% in South Africa, 64% in Italy, 59% in Japan, 57% in United States, 56% in France, 51% Argentina, Brazil and Indonesia. "A person's educational background" was identified as "the most profound socio-demographic driver in the climate emergency and climate action" (highly demanded action for climate change among people with post-secondary education and young people under 18¹¹²).

Competence. Shift from paradigm of "service" to a paradigm of participation (to join, to participate in, to bring additional capacity to movement for social justice; to position students more as critical scholars allying with community members as coinvestigators, not just passive volunteers) – students' responsibility is not simply "*to engage the task at hand, but to comprehend the potential influence of their contribution*". Green entrepreneurship trained through creating a context environment for green entrepreneurship and appreciation for the society (incorporate in regular courses, created as separate courses within the existing programs on environment and others, building structured programs aimed at explaining concepts/idea to build required skills of entrepreneurship, and then fundamentally aimed to design self-reliant organizations with the leadership orientation to create new eco-friendly goods, practices); can be studied through case studies, field visits, inquiries, interactions/cooperation with practitioners in the field; **students work with participant organizations** rather than for agencies; service-learning partnerships are formed to allow **students to work for participant organizations** as for example student consultants for a specific purpose or cause.

Active responsible position. An "empathetic model of collective education" is indicated which aims to introduce students to a dimension of educational experience characterized by the diffusion of learning across broad areas of civil society, combinations of formal and informal modes of instruction. The introduction of voluntary participation in local NGOs or community initiatives focused on helping to solve the problems of the local communities in which one lives is shown as examples of teaching within this model. Dispersed and collectivized learning

¹¹¹ C. Flynn, E. Yamasumi, S. Fisher, D. Snow, Z. Grant, M. Kirby, P. Browning, M. Rommerskirchen, I. Russell, (2021). *Peoples' Climate Vote*, UNDP, University of Oxford, <https://www.undp.org/publications/peoples-climate-vote> (accessed at: 24.03.2022).

¹¹² "There is majority support in nearly all G20 countries polled for more investment in green businesses and jobs, led by the United Kingdom (73%), followed by Germany, Australia and Canada (all 68%), South Africa (65%), Italy (64%), Japan (59%), United States (57%), France, (56%), and Argentina, Brazil, and Indonesia (all 51%); "The most profound socio-demographic driver of belief in the climate emergency and climate action is a person's educational background. There were consistently very high levels of demand for climate action among people with post-secondary education in all countries, ranging from LDCs, such as Bhutan and the Democratic Republic of the Congo (both 82%), to wealthy countries like France (87%) and Japan (82%); "Young people (under 18) are more likely to believe climate change is a global emergency than other age groups, but a substantial majority of older people still agreed with them. Nearly 70% of under-18s said that climate change is a global emergency, compared to 65% of those aged 18-35, 66% aged 36-59 and 58% of those aged over 60"; Ibidem.

is based on the belief that better outcomes can be generated by combining the experiences of people coming together to solve problems that affect them. Distributed and cooperative education allows the focus to shift from the individual to the interdependent group of students (the social experience within the group of students). Knowledge acquisition becomes a social experience, an experience shared with others rather than appropriated or owned. Students learn to share responsibility for the learning of others - inserting themselves into the thinking of others, opening themselves to other perspectives, developing skills to accept criticism, a willingness to help others, a sense of responsibility for the learning community - aimed at fostering "empathic sensitivity" (empathizing thoughts, putting oneself in the shoes of fellow students) - resonating with other students; supporting students to expand their self-awareness to others, to participate more deeply in interdependent communities, and to expand the boundaries of empathy.

In addition, communing with nature is essential to developing critical thinking - observing natural phenomena, understanding the concept of "existence," creating awareness - using the ways students connect phenomena, establishing relationships for themselves that allow them to place themselves in the world¹¹³.

Socially Driven Green Labs at the method layer are formed as a laboratory space and incorporate living laboratories methodology and simulation-based learning. At the tool layer, it contains of: 1. Depository of case studies and co-creation activities, resources, and digital package of lecture plans (digital gallery); 2. Teachers training opportunity (Massive Open Online Courses *Social Economy for a green transition*); 3. Business simulation models; 4. Academic programme incorporating theoretical and practical elements of green skills literacy and environmental sustainability (summer school).

The methodology of living laboratories is understood as an ecosystem that is open, or/and a community designed to integrate stakeholders in the process of innovation and emergence of new ideas. The methodology is based on multiple approaches (SDGLabs: user-center methodology, participatory research, co-design), user engagement (SDGLabs: building a community of users), participation of many stakeholders – HEI students, HEI teachers, SEE, real-life setting, co-creation (SDGLabs: engaging end users in the creation process).

The living labs methodology is based on the three-element framework: exploration, experimentation, evaluation¹¹⁴. What induced the application of the living laboratory method is its property of a collaborative nature (community of users: HEI students and teachers, as well as SEE with environmental objectives) and potential to endorse a common value of co-creation, rapid prototyping and validation aimed to scale up social innovation and businesses¹¹⁵.

The core objectives expected to be realized by application of living labs methodology is integration of HEI and SEE community with society, the reduction of mismatch of skills with the special emphasis on green skills, the design of multi-disciplinary and challenge-driven educational programme based on the co-creation of green capacities, working out a common "language" among the target groups.

¹¹³ J. Rifkin, (2012). *Trzecia rewolucja przemysłowa*, Sonia Draga, Katowice, p. 333, 337, 338, 339, 342.

¹¹⁴ K. Malberg, I. Vaittinen, P. Evans, D. Schuurman, A. Ståhlbröst, K. Vervoort, K. (2017). *Living Lab Methodology Handbook*, U4IoT Consortium, p. 13.

¹¹⁵ Ibidem, p. 13.

The methodology of living labs presented through the phases of defining (state-of-the-art of SEE development in respect to green skills engagement and its possible evolution toward some “future states”), ideating (co-design through knowledge and experience sharing), experimenting (real-life testing of the possible “future states”) and validating (feedback on the ideas and proposed approaches) applied to the issues of renewable energy, sustainable housing, sustainable food system or circular economy can be unfolded as follows:

At the defining stage, an introductory session on sustainability issues is opened to highlight the green business areas of SEE to be explored (renewable energy, sustainable housing, circular economy, sustainable food systems). At the ideating stage, students are moderated to come up with their own socially driven green business solution by using the SDG business canvas. At the experimenting stage, students together with their SEE partners test their green business ideas using SDG business simulation models to better understand the real business decision processes (living laboratory methodology combined with simulation-based application where students test one of the green businesses by taking up a role of a stakeholder – green business model simulation). At the validation stage, all participants identify the areas of further improvement.

Part III

Chapter 8. Research results analysis

8.1. Research Methodology

Research problem:

Due to the dominant linear model of production and consumption in the world economy, there is a clear need to develop green skills among market actors, including those in the social economy. This process should take place with the participation of an appropriately constructed and implemented educational system oriented to the circular needs of the economy.

Defining possible green skills deficiencies on the part of students, teachers and social economy actors, is an important step in improving green skills among social economy entities. It is also not without importance to evaluate the educational system in terms of the effectiveness of supporting and developing such skills.

Thus, research questions arise:

1. To what extent do social economy entities **possess and develop** green skills adequately to market needs?
2. Are there any **cooperation gaps** between social economy entities and education entities in the field?
3. Does the higher education system, provide **real support** for the acquisition and development of green skills?

Primary research objective:

To conduct a comprehensive and transnational research to verify what green skills social economy actors possess and develop in order to realize an inclusive green transformation.

Specific objectives:

In social enterprises:

- To identify green skills needs and challenges in social enterprises of the project partner countries.
- To conduct a comparative analysis of the current state of art in each partner country.
- To obtain insights and data on factors influencing circular business decisions (these was obtained through in-depth interviews from representatives of green PES).

In the higher education sector - teachers:

- Identify key elements (learning objectives, knowledge, skills and social competencies) of educational programs that support the acquisition of environmentally focused skills by university students in social economy-related fields of study;
- Create proposals to modify educational programs to make universities a force for green transformation;
- To conduct a comparative study in the partner countries.

In the higher education sector - students:

- To check whether the implemented educational programs in higher education (in partner countries) allow students to acquire green skills.

The project adopted the following **research hypotheses:**

H₁: Social economy entities, despite their significant involvement in green activities, do not demonstrate significant skills and competencies in having and developing green skills relevant to market needs (geared towards revenue generation).

H₂: Deficiencies in green SEE skills are a barrier to entering into cross-sectoral cooperation, acquiring circular business projects that benefit the environment, the economy and the development of the SEE themselves.

H₃: There is a need to modify educational programs, in order to increase support so that higher education centers provide support for skills formation as a driver of green transformation.

Subject scope of the study (research sample):

- SEE, defined as entities (social cooperatives, social enterprises, foundations, associations, etc.) that carry out business activities to achieve social and environmental goals. **SAMPLE SIZE:** 80 PES/20 per country.
- University teachers and students (undergraduate, graduate and postgraduate) in majors/courses related to social economy. **SAMPLE SIZE:** 25 teachers and 50 students/6 teachers and 13 students per country.

Research method:

1. **Analysis of the secondary data** - collection of existing data on green SEE and green skills among students;
2. **Diagnostic survey** using two tools:
 - 2.1. **Survey questionnaire** - will allow Partners to verify data in the same way as using statistical methods.
 - 2.2. **In-depth interviews** - will provide a more in-depth look at the issues. Additionally, to/from the in-depth interviews, Partners will collect a set of case studies of SEE that operate in economic sectors with environmental objectives (e.g. rural development, renewable energy, reuse and recycling, sustainable housing and agriculture) and/or incorporate green practices and environmentally friendly approaches into their operations.

End result:

Develop a theoretical model of the SDG Labs educational program describing the key educational approach (Living Labs methodology, simulation-based learning), its key features (co-creation canvas model, SDG simulation business models, summer school) and operational aspects of SDG Labs to be incubated in higher education institutions offering SE education.

8.2. Green skills in Social Economy Enterprises

Within the research 81 Social Economy Enterprises (hereinafter referred to as: SEE or Entities) took part. Table 1. presents the basic statistics described the group.

Table 1. The average number of years of SEE operation

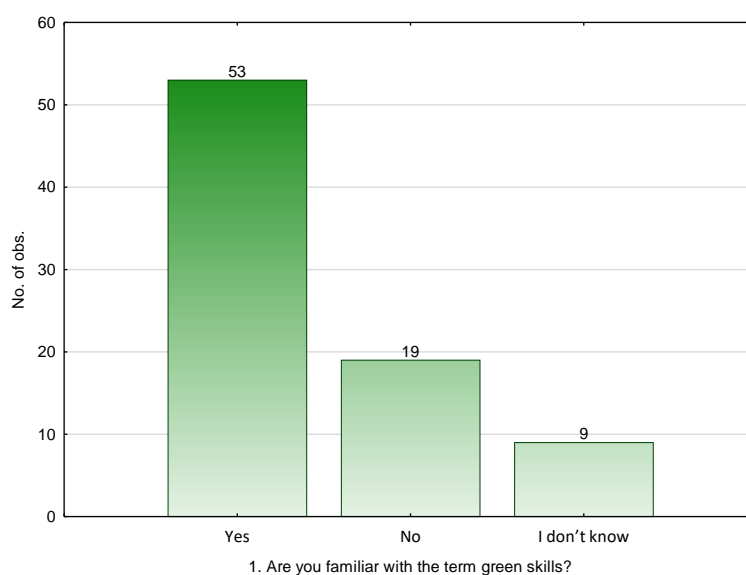
	Average no. years of operation	Std. Dev.
Belgium	3,08	(2,47)
Czechia	12,82	(9,36)
Greece	8,52	(7,24)
Poland	7,4	(4,97)
Total	8,07	(7,31)

Note: In () - standard deviation

Sources: own elaboration

The average number of years of SEE operation amounted more than 8 years, with the shortest activity being 0.5 year and the longest being 32 years. The longest operating SEE were located in the Czech Republic.

Chart 1. Knowledge of the term 'green skills'



Sources: own elaboration

Almost 2/3 of respondents (65.4%) met the term 'green skills'. One in four respondents (23.5%) had never heard of the term and 11.1% were not sure if they knew it (Chart 1).

Most of respondents understand the term 'green skills' as 'knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities' (65.4%) (Table 2). 1/3 of them understands this term as: 'tackling climate change'. 26 respondents (32.1%) indicated it as: 'transition to low-carbon economy'. The least (29.6%), indicate that the term is related to: 'transition to low-carbon economy', 'new environmentally friendly economic sectors' and 'green products/services'.

Table 2. Identification of term ‘green skills’

	transition to low-carbon economy	transition to circular economy (closed loop economy)	tackling climate change	new environmentally friendly economic sectors	green products /services	knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities
Belgium	8	4	4	3	2	6
Czechia	5	8	8	9	10	13
Greece	4	6	7	5	2	16
Poland	7	8	9	7	10	18
Total	24	26	28	24	24	53

Sources: own elaboration

Most of the SEE representatives came across the term of ‘green skills’ in social media (32.1%) and in scientific papers (28.3%) (Table 3). Press as a source of information about term ‘green skills’ indicated 22.2% respondents. Using the opportunity to indicate another place, respondents stressed that they had not encountered this term. This may mean that the term is not popular among the surveyed ‘green SEE’ respondents, which may be surprising. Only 13 respondents familiarize with this term via academic conferences and 12 of them via study program. This represents just over 16%.

Table 3. Sources of come across of term ‘green skills’

	study programme	scientific papers	academic conferences	press	social media	television	other
Belgium	3	6	4	4	4	.	1
Czechia	1	2	.	3	7	1	4
Greece	6	9	5	6	8	1	3
Poland	2	6	4	5	7	2	9
Total	12	23	13	18	26	4	17

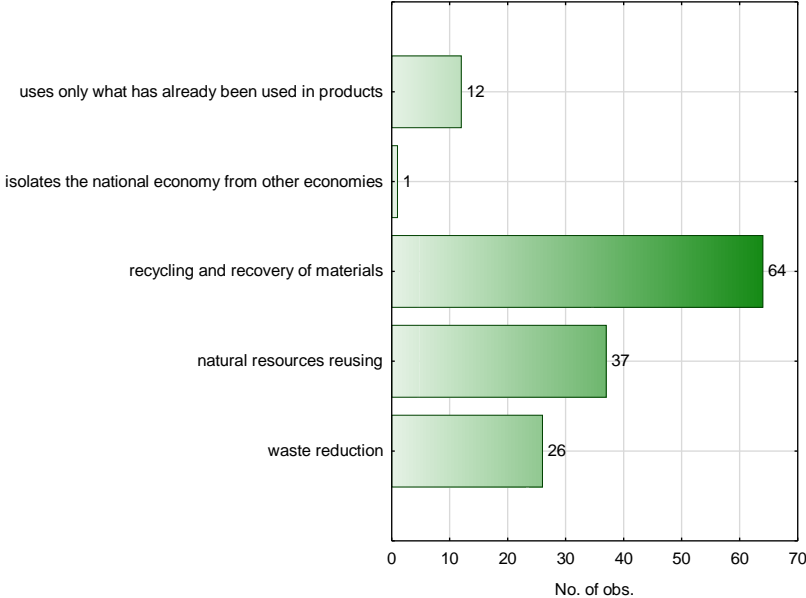
Note: (.) - phenomenon did not occur

Sources: own elaboration

During the survey, respondents were also asked about their knowledge of the term ‘circular economy’. Most of them stated that it is ‘recycling and recovery of materials in production, distribution or consumption processes’ (79%) or ‘natural resources reusing’ (45.7%) (Chart 2). These values are similar to the results of previous studies¹¹⁶.

¹¹⁶ Szczygieł E., (2020). *Circular behaviours in households and the quality of life of their inhabitants*, Research grant of Pedagogical University in Krakow, No. BN.610 – 64/PBU/2020.

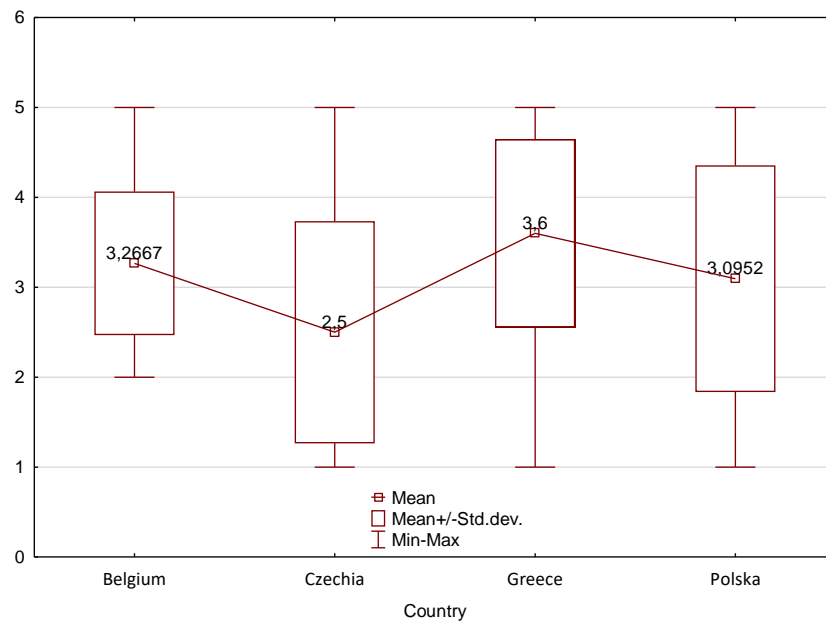
Chart 2. Identification of term ‘circular economy’



Sources: own elaboration

When SEE representatives were asked, to what extent people working/internships in their organisation have the opportunity to acquire green skills, most of them indicated ‘3’ as an assessment. Considering the scale, where 1 meant ‘in none’, and 5 meant ‘fully’, there was a possibility to count basic statistics: mean value and standard deviation. For these questions mean amounted 3.1, which could be interpreted as closer to the statement ‘in fully’. Standard deviation amounted 1.17 which can mean a wide variation of up to one mark in plus or minus. By country, the highest average was recorded in Greece (3.6) and the lowest – in Czechia (2.5) (Chart 3).

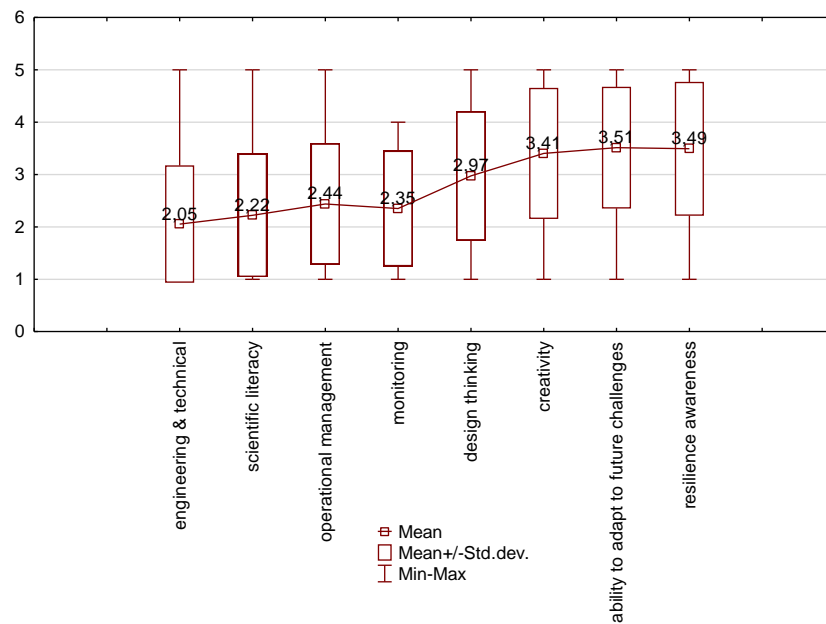
Chart 3. Working/internships aimed at developing ‘green skills’ in SEE



Sources: own elaboration

Analysing the degree of acquisition of green skills at the placement site, SEE representatives indicated that the acquisition of ‘ability to adapt to future challenges’ was the highest (average: 3.51) (Chart 4). In this question 8 skills were assessed: 1) engineering and technical skills, 2) scientific literacy understand as broad-based and necessary for innovation, 3) operational management skills, 4) monitoring skills defined as skills required to assess compliance with technical criteria and legal standards relating to environmental protection, 5) design thinking understand as realising projects based on the ability to see the source of problems and real customer/client needs, 6) creativity, 7) ability to adapt to future challenges and 8) resilience awareness of progressing climate changes and the impact of production/service processes on them. When broken down by country, the results are not so clear-cut (Table 6). In Belgium, the highest mean score was achieved by the indication ‘creativity’ (3.89). In Czechia it was: ‘ability to adapt to future challenges’ (3.05) and ‘resilience awareness’ (3.0). In Greece, the highest average was 3.8 for ‘creativity’. In Poland, it was ‘resilience awareness’ (3.86) and ‘ability to adapt to future challenges’ (3.8).

Chart 4. Assessment of acquisition of ‘green skills’ at the placement site



Sources: own elaboration

Table 4. Functional areas of enterprises related with needed extending of ‘green skills’

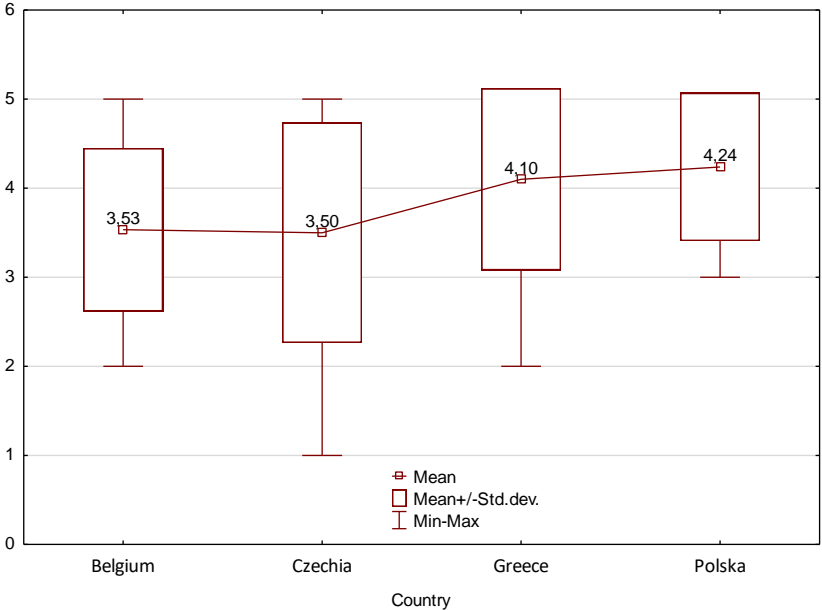
	engineering & technical skills	scientific literacy	operational management	monitoring	design thinking	creativity	ability to adapt to future challenges	resilience awareness
Belgium	2.53	2.71	2.79	2.67	3.13	3.89	3.73	3.63
Czechia	1.2	1.4	1.65	1.65	2.2	2.53	3.05	3.0
Greece	2.65	3.0	2.85	2.75	3.45	3.8	3.55	3.55
Poland	1.95	1.89	2.58	2.42	3.15	3.62	3.81	3.86
Mean	2.05	2.22	2.44	2.35	2.97	3.41	3.51	3.49
<i>Std. dev.</i>	<i>(1.12)</i>	<i>(1.18)</i>	<i>(1.15)</i>	<i>(1.10)</i>	<i>(1.23)</i>	<i>(1.25)</i>	<i>(1.16)</i>	<i>(1.28)</i>

Note: In () - standard deviation

Sources: own elaboration

When SEE representatives were asked about how beneficial would it be for their organisation to take on employees with established green skills, most of them indicated ‘5’ (mode) as an assessment. Considering the scale, where 1 meant ‘in none’, and 5 meant ‘fully’, there was a possibility to count basic statistics: mean value and standard deviation. For this question mean amounted 3.86, which could be interpreted as closer to the statement ‘in fully’. Standard deviation amounted 1.05 which can mean a wide variation of up to one mark in plus or minus. By country, the highest average was recorded in Poland (4.23) and the lowest – in Czechia (3.5) (Chart 5).

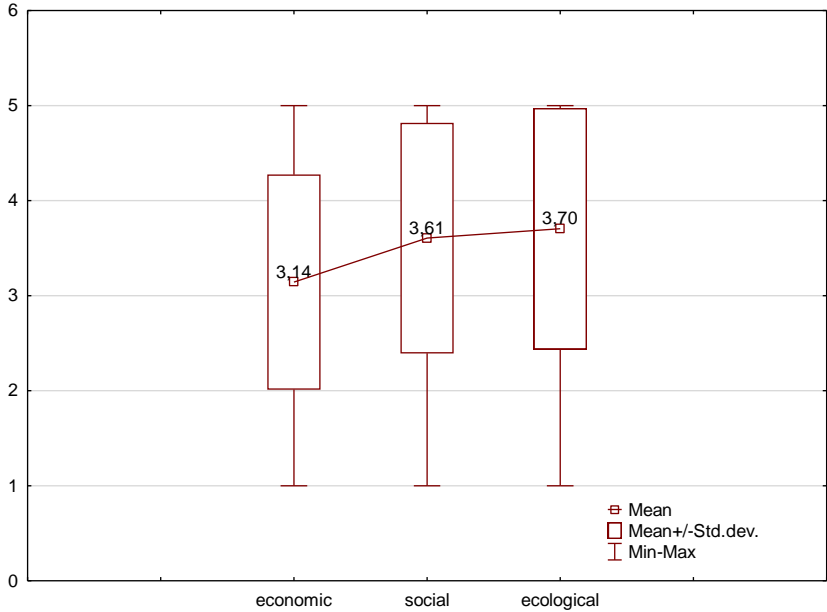
Chart 5. Level of benefits for SEE taking on employees with established green skills



Sources: own elaboration

When SEE representatives were asked, to what extent they are able to justify the cost-effectiveness of environmental solutions in economic, social and ecological aspects, most of them indicated as an assessment: '3' for economic, '4' for social and '5' for ecological. Considering the scale, where 1 meant 'in none', and 5 meant 'fully', there was a possibility to count basic statistics: mean value and standard deviation. For this question means amounted: 3.14 for economic, 3.61 for social and 3.7 for ecological. All this means could be interpreted as closer to the statement 'in fully'. By country, the highest average for 'economic' aspect was recorded in Poland (3.81) and the lowest – in Czechia (2.45). The highest average for 'social' aspect was recorded in Poland (4.24) and the lowest – in Belgium (3.1). The highest average for 'ecological' aspect was recorded in Poland (4.19) and the lowest – in Czechia (3.1) (Chart 6 and Table 5).

Chart 6. Ability to justify the cost-effectiveness of environmental solutions in three dimensions



Sources: own elaboration

Table 5. Functional areas of enterprises related with needed extending of ‘green skills’

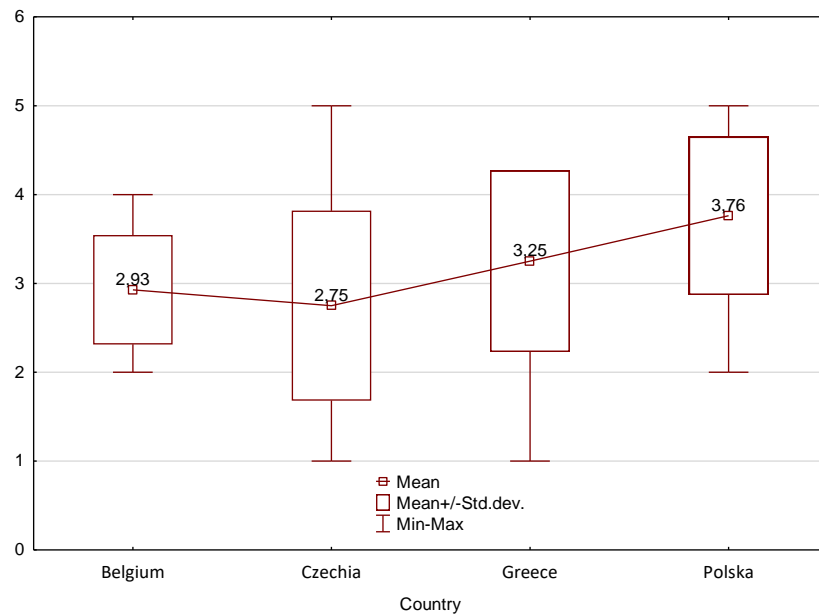
	economic	social	ecological
Belgium	2.88	3.10	3.40
Czechia	2.45	3.15	3.10
Greece	3.35	3.65	3.95
Poland	3.81	4.24	4.19
Mean	3.14	3.61	3.71
<i>Std. dev.</i>	<i>(1.13)</i>	<i>(1.21)</i>	<i>(1.26)</i>

Note: In () - standard deviation

Sources: own elaboration

SEE representatives were asked about their ability to find partners (e.g. business or public institutions) for carrying on the environmental projects. Most of respondents assess it at ‘3’ (mode). The average mean amounted 3.2 for all respondents, but when the results would be analysed by the countries, differences become apparent (Chart 7).

Chart 7. Ability to find partners for environmental projects



Sources: own elaboration

The highest assessment of the declared ability to find the partners was reported in Poland (3.76), the lowest – in Czechia (2.75). In that country, the results were also the most diverse. The most consistent were in Belgium.

The representatives of SEE were asked about the situation, that a good (environmentally and economically justified) project ever not been implemented by their organisation because of a set of causes (Table 6). In this questions respondents can declare 'Yes' or 'No' for the following reasons:

- lack of economic knowledge of the members of the organisation,
- lack of environmental knowledge among members of the organisation,
- lack of organisational skills,
- lack of persuasive skills of members of the organisation,
- lack of relationship (cooperation) skills of members of the organisation,
- institutional constraints,
- red tape (bureaucracy),
- lack of appropriate legal frameworks.

Table 6 presents the number and percentage of declarations.

Table 6. Decision concerning implementation of a good project due to the reasons

	Number of observations		Percentage	
	Yes	No	Yes	No
lack of economic knowledge of the members of the organisation	24	50	29.6	61.4
lack of environmental knowledge among members of the organisation	23	51	28.4	63.0
lack of organisational skills	13	59	16	72
lack of persuasive skills of members of the organisation	16	56	19.7	69.1
lack of relationship (cooperation) skills of members of the organisation	16	56	19.7	69.1
institutional constraints	34	36	41.9	44.4
red tape (bureaucracy)	44	26	54.3	32.0
lack of appropriate legal frameworks	32	36	39.5	44.4

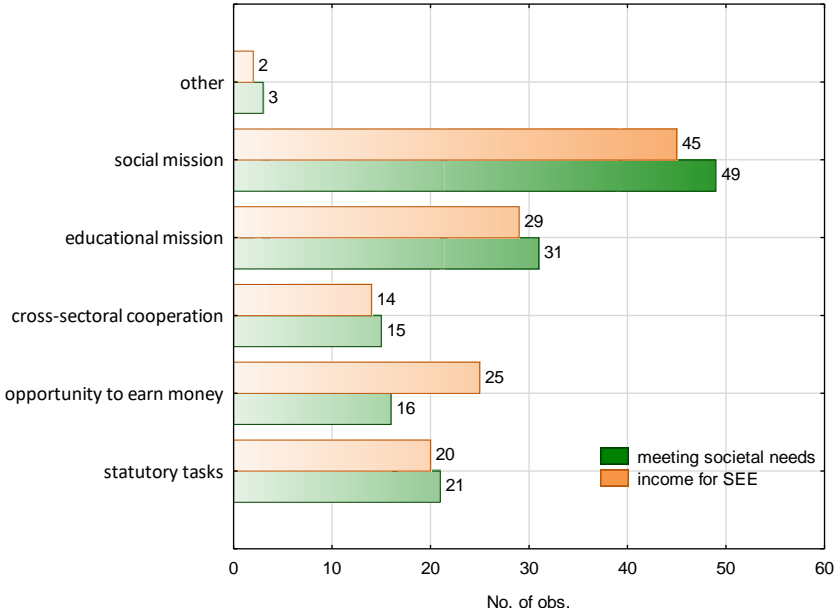
Sources: own elaboration

SEE representatives mostly declare that lack of any knowledge (economic, environmental) or skills (organisational, persuasive or cooperation) were not a main reason to reject the decision about carrying on the project. What is worth to underline, lack of these soft skills in the lowest level caused the project rejection, compared to lack of knowledge, which was more likely to be a decision to abandon a project. The most important reason causes the decision of non-implementation of a project was 'bureaucracy' (so called 'red tape'). In 54.3% of answers were reported that this was a reason of abandon a project. The second reason of this situation was 'institutional constraints' (41.9% of answers 'yes'). The third one was 'lack of appropriate legal frameworks' (39.5%). In summary, external factors were more likely to determine project rejection than internal factors in the SEE.

60 from 81 SEE representatives declared that they were not able to generate revenue through their green economy activities. The rest (21 SEE) declared the various amounts of it. The average of these data is not suitable for calculation, except for Poland, where it amounted for the surveyed SEE 147 thous. PLN (approx. 31 thous. EUR).

Analysing of main driver to work towards a green economy as a way of meeting societal needs and as a source of income for your organisation, SEE representatives reported that the most important factor in both cases is 'social mission' (Chart 8). The second one is 'educational mission). SEE representatives noticed that opportunity to earn money is important in their work towards a green economy. This may be an indication of their business attitude.

Chart 8. The main drivers to work towards a green economy as a way of meeting societal needs and as a source of income for your organisation



Sources: own elaboration

46 of respondents declared that they did not perceive the gaps in the green skills of trainees or university graduates. The rest of them noticed, that the trainees had mainly a theoretical background or lack of needed knowledge (especially in broader context), lack of skills or awareness.

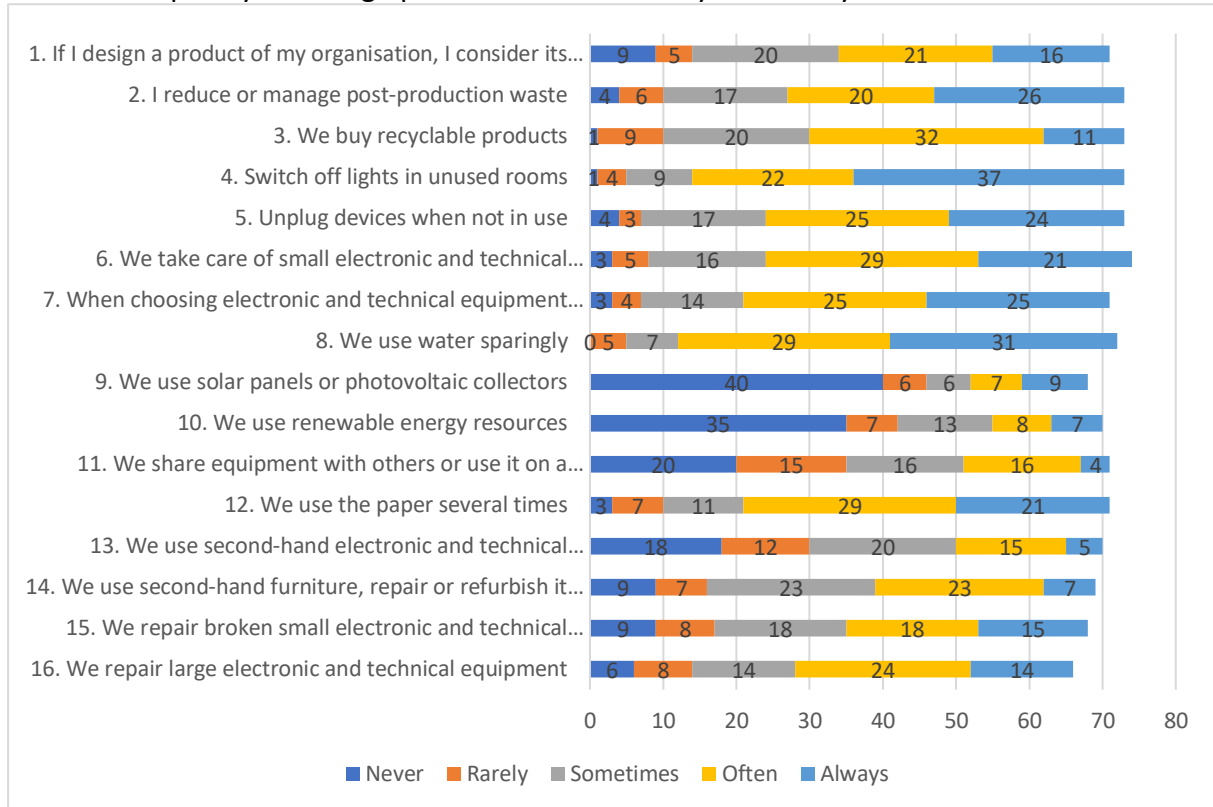
Communication deficiencies that result from students/students being afraid to ask questions, to be inquisitive, to co-create something together with joy and a sense of mission. Poor engagement and sense of purpose in what is a duty and what is a pleasure at university.

Some of the asked SEE representatives noticed, that trainees even if they think about the green aspects, they cannot behave sustainable. They underline the inability to change the idea into practice, sometimes due to the lack of small local initiatives in the community.

The field of the green economy is relatively modern, with different theoretical approaches, and many different social interventions that can be targeted. Also, the socio-economic system and its connection to the different sectors of production and consumption has a high degree of complexity. These factors can lead to knowledge gaps on some topics, but also to good in-depth knowledge on others.

The last part of survey was related with taking up the circular behaviours by the SEE as organizations. Circular behaviours were described by 16 statements (Chart 9 & Table 7).

Chart 9. Frequency of taking up circular behaviours by the surveyed SEE



Sources: own elaboration

Table 7. Number of responses related with circular behaviours taken up by SEE

	Never	Rarely	Someti mes	Often	Always	Mean of CB
1. If I design a product of my organisation, I consider its life cycle	9	5	20	21	16	3.42
2. I reduce or manage post-production waste	4	6	17	20	26	3.79
3. We buy recyclable products	1	9	20	32	11	3.59
4. Switch off lights in unused rooms	1	4	9	22	37	4.23
5. Unplug devices when not in use	4	3	17	25	24	3.85
6. We take care of small electronic and technical equipment, thus prolonging its life	3	5	16	29	21	3.81
7. When choosing electronic and technical equipment we are guided by its energy class	3	4	14	25	25	3.92
8. We use water sparingly	.	5	7	29	31	4.19
9. We use solar panels or photovoltaic collectors	40	6	6	7	9	2.10
10. We use renewable energy resources	35	7	13	8	7	2.21
11. We share equipment with others or use it on a rental basis	20	15	16	16	4	2.56
12. We use the paper several times	3	7	11	29	21	3.82
13. We use second-hand electronic and technical equipment	18	12	20	15	5	2.67
14. We use second-hand furniture, repair or refurbish it to make use of	9	7	23	23	7	3.17
15. We repair broken small electronic and technical equipment	9	8	18	18	15	3.32
16. We repair large electronic and technical equipment	6	8	14	24	14	3.48

Note: (.) - phenomenon did not occur

Sources: own elaboration

In only two cases did the average reach a value above 4.0:

- 4. Switch off lights in unused rooms (4.23),
- 8. We use water sparingly (4.19).

These behaviours are relatively simple and indeed frequently undertaken. Nor do they present many difficulties.

In 5 cases the mean value from the survey achieved more than 3.5 point:

- 7. When choosing electronic and technical equipment we are guided by its energy class (3.92),
- 5. Unplug devices when not in use (3.85),
- 12. We use the paper several times (3.82),
- 6. We take care of small electronic and technical equipment, thus prolonging its life (3.81),
- 2. I reduce or manage post-production waste (3.79),
- 3. We buy recyclable products (3.59).

In 4 cases, the average did not exceed 3.0. These behaviours required a little more attention, sometimes effort or time.:

- 16. We repair large electronic and technical equipment (3.48),
- 1. If I design a product of my organisation, I consider its life cycle (3.42),
- 15. We repair broken small electronic and technical equipment (3.32),
- 14. We use second-hand furniture, repair or refurbish it to make use of (3.17).

Due to the fact that distribution of variable ‘Mean of Circular behaviours’ (Shapiro-Wilk’s W test $p=0.0063$ for $\alpha=0.05$) is not normal, authors decided to apply ANOVA Kruskal-Wallis test, which is non-parametric alternative for one-way ANOVA test.

Due to this procedure it was possible to analyse the potential differences between the countries in assessment of circular behaviours. The Kruskal-Wallis ANOVA results allowed to reject of the null hypothesis of no difference¹¹⁷ between countries ($p=0.0228$). In other words, there are statistically significant differences between countries and gender.

8.3. Green skills among Higher Education teachers

Within the research 33 of respondents from the group of higher education teachers (hereinafter referred to as: teachers) took part. Table 8. presents the basic statistics described the group.

Table 8. The metrics information about higher education teachers group

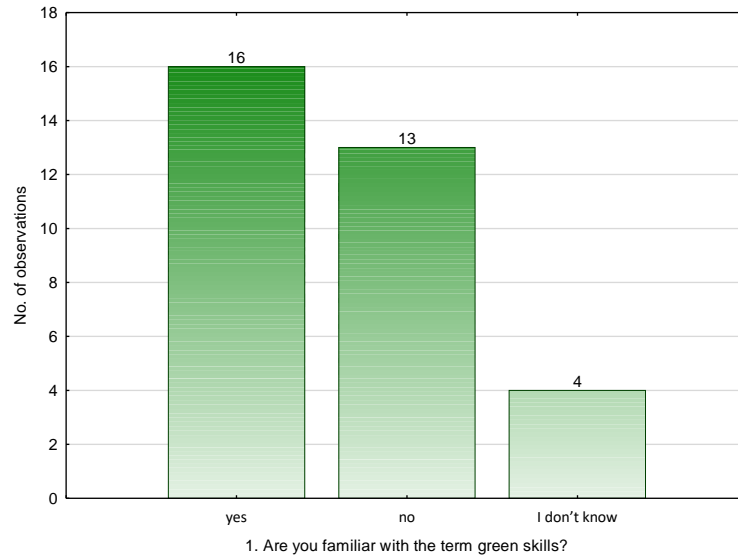
	Average age	Gender		Average no. years of occupation	Having volunteer experience
		Female	Male		
Belgium	44,3	7	2	14,6	1/9
Czechia	43,6	3	3	13,2	5/6
Greece	43,8	2	8	17,5	1/10
Poland	47,7	4	4	21,2	4/8
Total	44,8	16	17	16,7	11/33

Sources: own elaboration

¹¹⁷ Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

Men predominated among teachers (17 in refer to 16 women). The average age of all respondents was 44.8 years and the average number of years of occupation was 16.7. Exactly 1/3 of teachers have volunteer experience (by country, most from the Czech Republic).

Chart 10. Knowledge of the term 'green skills'



Sources: own elaboration

Almost half of respondents (48.5%) met the term 'green skills'. Slightly fewer (39.4%) had never heard of the term and 12.1% were not sure if they knew it (Chart 10).

Most of respondents understood the term 'green skills' as 'knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities' (81.1%) (Table 9). 1/3 of them understands this term also as: 'transition to circular economy (closed loop economy)' and 'tackling climate change'. 9 of respondents (27.2%) identifies it as 'transition to low-carbon economy'. The least (18.1%), indicate that the term is related to 'new environmentally friendly economic sectors' and 'green products/services'.

Table 9. Identification of term 'green skills'

	transition to low-carbon economy	transition to circular economy (closed loop economy)	tackling climate change	new environmentally friendly economic sectors	green products /services	knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities
Belgium	1	4	4	2	2	6
Czechia	2	3	1	1	1	6
Greece	3	1	2	1	2	9
Poland	3	3	4	2	1	6
Total	9	11	11	6	6	27

Sources: own elaboration

Most of the teachers came across the term of 'green skills' in scientific papers (30.3%) and in social media (27.3%) (Table 10). Academic conferences and press as a source of information about term 'green skills' indicated 21.1% of them. Using the opportunity to indicate another

place, respondents stressed that they had not encountered this term. This may mean that the term is not popular among the surveyed teachers of social economy-related studies, which may be surprising. Only 4 respondents were familiarized with this term via study program. This represents just over 12%. From the point of view of the group of respondents, this is quite important information indicating that the topic of green skills is not addressed in a formal way in the curricula of courses related to social economy.

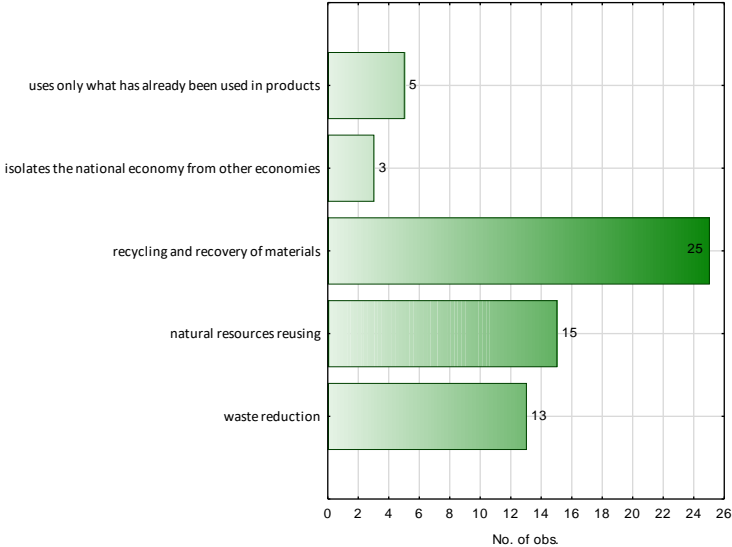
Table 10. Sources of come across of term ‘green skills’

	study programme	scientific papers	academic conferences	press	social media	television	other
Belgium	2	3	1	2	2	.	2
Czechia	.	4	3	1	1	.	.
Greece	1	5	2	2	4	1	1
Poland	1	3	1	2	2	2	1
Total	4	15	7	7	9	3	4

Note: (.) - phenomenon did not occur
Sources: own elaboration

During the survey, respondents were also asked about their knowledge of the term ‘circular economy’. Most of them stated that it is ‘recycling and recovery of materials in production, distribution or consumption processes’ (75.8%) or ‘natural resources reusing’ (45.5%) (Chart 11).

Chart 11. Identification of term ‘circular economy’



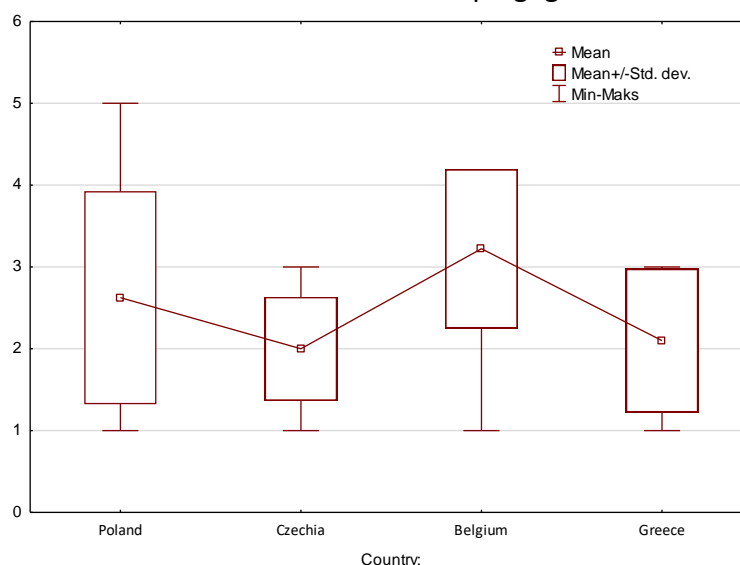
Sources: own elaboration

Perhaps surprisingly, some respondents indicated economic autarky as an understanding of the term ‘circular economy’. This result is surprising especially from the point of view of the target group (teachers) and from the popularity of the term in both science and journalism.

When respondents were asked to what extent are courses aimed at developing green skills implemented in the fields of study at your university, most of them indicated ‘3’ as an assessment. Considering the scale, where 1 meant ‘in none’, and 5 meant ‘fully’, there was a possibility to count basic statistics: mean value and standard deviation. For this question mean amounted 2.52, which could be interpreted as closer to the statement ‘in none’. Standard

deviation amounted 1.06 which can mean a wide variation of up to one mark in plus or minus. By country, the highest average was recorded in Belgium (3.22) and the lowest – in Czechia (2.0) (Chart 12).

Chart 12. Implementation of courses aimed at developing ‘green skills’



Sources: own elaboration

In an open question, teachers indicated mostly sustainable management topics courses (*'Sustainability management'*, *'Sustainable consumption and production'*, *'Sustainable product development'*, *'Sustainable design'*) or social entrepreneurship, during which green skills were developed (all indications were 19, some subjects overlapped).

Answering the question to what extent are green skills needed in the given functional areas of enterprises, respondents indicated that they concern mainly in *'production'* (mean: 4.48) and *'transport and storage'* (mean: 4.12) (Table 11). These values are quite close to the answer that 'green skills' should be developed and used to their full potential in these particular areas of business operations. Respondents rated the importance of green skills slightly above average in terms of *'sales'*, *'finance'* and *'advertising'*, although in all these aspects they play a significant role. The results obtained may imply traditional, technical thinking about the application of green skills only to the manufacturing sphere and supply logistics.

Table 11. Functional areas of enterprises related with needed extending of 'green skills'

	production	transport and storage	sales	finance	advertising
Belgium	4	3.78	3.67	3.78	3.56
Czechia	4.67	4.34	3.5	3.5	3.17
Greece	4.9	4.5	3.5	3.7	3.4
Poland	4.38	3.88	3.88	3.13	3.63
Mean	4.48	4.12	3.63	3.54	3.45
<i>Std. dev.</i>	<i>(0.71)</i>	<i>(1.02)</i>	<i>(1.02)</i>	<i>(1.17)</i>	<i>(1.2)</i>

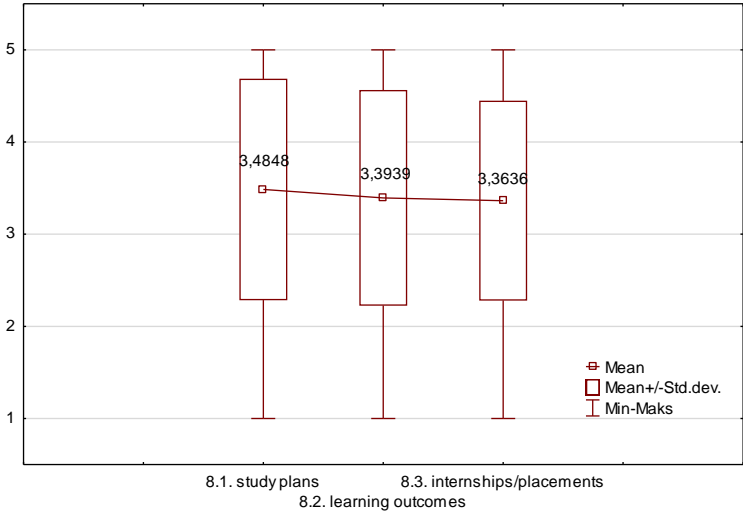
Note: In () - standard deviation

Sources: own elaboration

Respondents rated appropriate study plans as the highest opportunity to acquire 'green skills' (Chart 13). This result may indicate the emergence of reflection in respondents, especially when juxtaposed with the responses in the table 3. By country, the indication of a study plan

predominates in the majority of countries, although in Poland the indication of work placements was higher (Table 12).

Chart 13. Opportunity to acquire ‘green skills’ based on the chosen educational elements



Sources: own elaboration

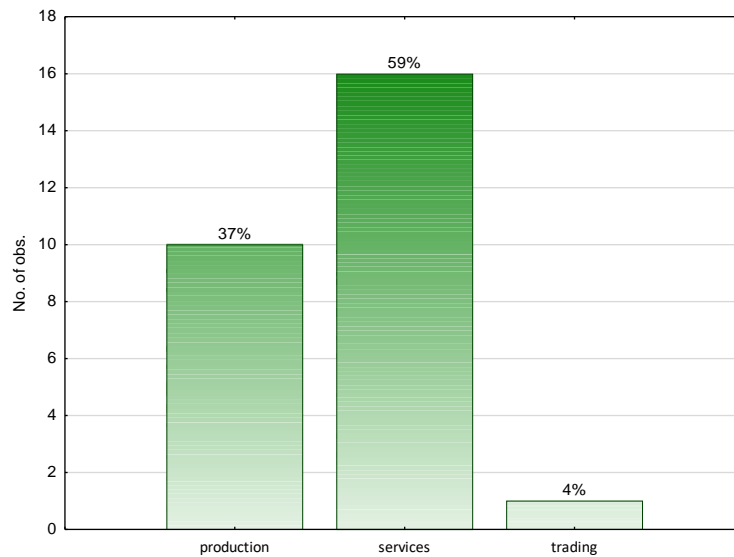
Table 12. Opportunity to acquire ‘green skills’ based on the chosen educational elements by countries

	study plans	learning outcomes	internships/placements
Belgium	3,78	3,78	3,56
Czechia	2,50	2,50	2,50
Greece	3,90	3,70	3,50
Poland	3,38	3,25	3,63
Mean	3.48	3.39	3.36
<i>Std. dev.</i>	<i>(1.2)</i>	<i>(1.17)</i>	<i>(1.08)</i>

Note: In () - standard deviation
Sources: own elaboration

Respondents indicated that students studying for a degree in social economy most often undertake internships in entities providing services (59%) (Chart 14).

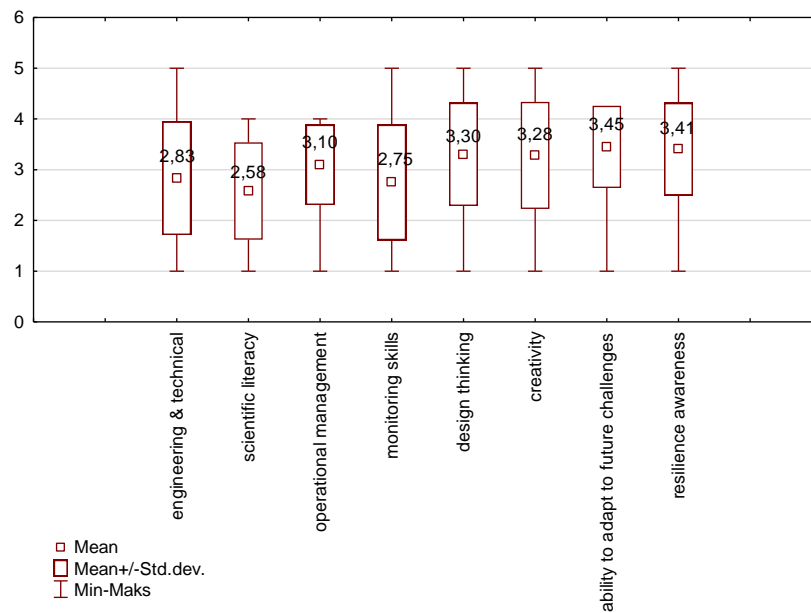
Chart 14. Main area of activity of the entities where students do internships/placements and acquire 'green skills'



Sources: own elaboration

Analysing the degree of acquisition of green skills at the placement site, teachers indicated that the acquisition of 'ability to adapt to future challenges' was the highest (average: 3.45) (Chart 15). In this question 8 skills were assessed: 1) engineering and technical skills, 2) scientific literacy understand as broad-based and necessary for innovation, 3) operational management skills, 4) monitoring skills defined as skills required to assess compliance with technical criteria and legal standards relating to environmental protection, 5) design thinking understand as realising projects based on the ability to see the source of problems and real customer/client needs, 6) creativity, 7) ability to adapt to future challenges and 8) resilience awareness of progressing climate changes and the impact of production/service processes on them. When broken down by country, the results are not so clear-cut (Table 13). In Belgium, the highest mean score was achieved by the indication 'design thinking' (3.67). In Czechia it was: 'creativity' and 'ability to adapt to future challenges' (both at 2.83). It is worth noting that the average scores for all groups were the lowest in the country. This may indicate a low level of recognition that students can develop green skills through work placements. In Greece, the highest average was 3.7 for 'resilience awareness'. In Poland, it was 'creativity' and 'ability to adapt to future challenges' (both at 3.75).

Chart 15. Assessment of acquisition of ‘green skills’ at the placement site



Sources: own elaboration

Table 13. Functional areas of enterprises related with needed extending of ‘green skills’

	engineering & technical skills	scientific literacy	operational management	monitoring	design thinking	creativity	ability to adapt to future challenges	resilience awareness
Belgium	3.5	2.63	3.25	3	3.67	3.13	3.5	3.78
Czechia	1.6	1.83	2.5	1.5	2.67	2.83	2.83	2.2
Greece	3.3	3	3.5	3.2	3.5	3.3	3.56	3.7
Poland	2.29	2.57	2.86	2.86	3.13	3.75	3.75	3.38
Mean	2.83	2.58	3.1	2.75	3.3	3.28	3.45	3.41
<i>Std. dev.</i>	(1.12)	(0.96)	(0.79)	(1.14)	(1.02)	(1.05)	(0.81)	(0.91)

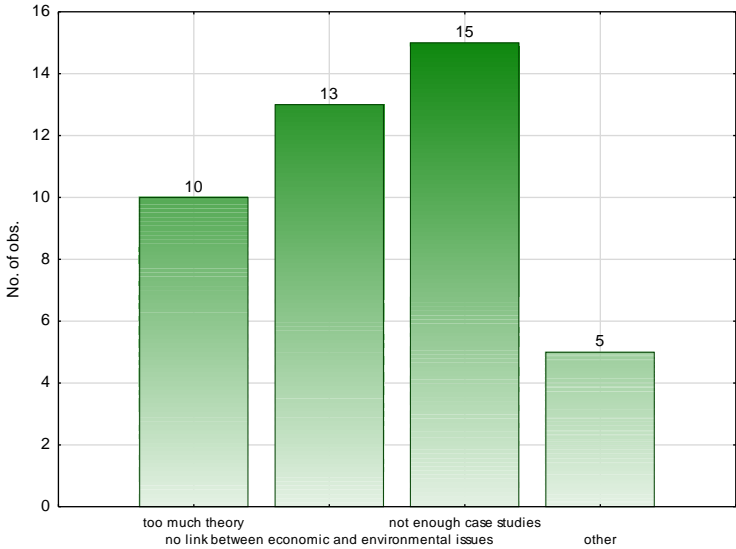
Note: In () - standard deviation

Sources: own elaboration

Teachers mostly do not check the effects of their courses in terms of green skills acquired. Only 5 of respondents (15.1%) do that (2 from Belgium and 3 from Poland). They use the credits, exams or other possibility related with the carried out projects. The rest of surveyed teachers do not check the effects.

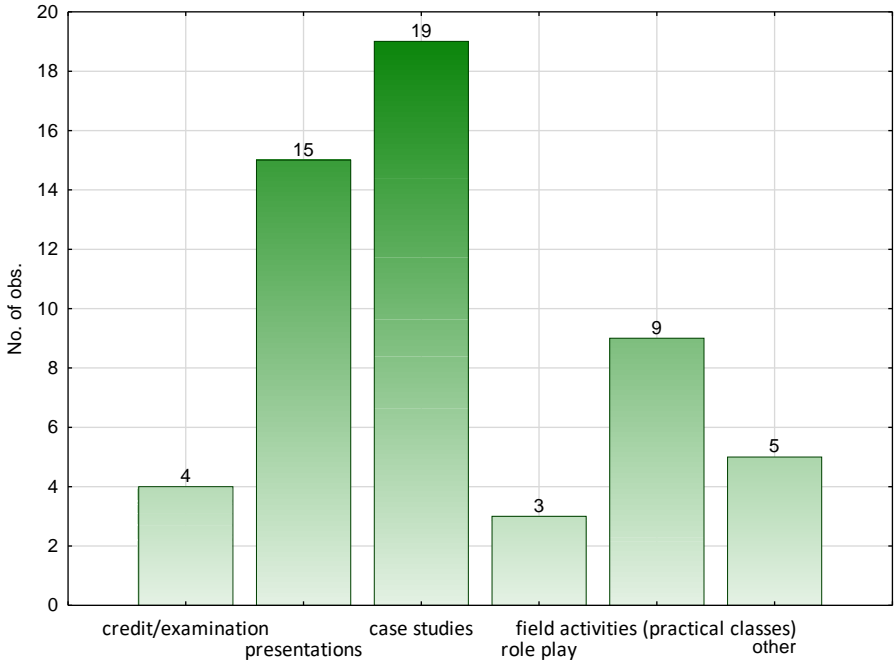
Answering the question on the weaknesses that were seen in terms of improving green skills in educational programmes, surveyed teachers noted that the most important obstacle is related with not enough case studies (Chart 16). More than 45% of teachers saw this weakness and it might be relevant to consider the tools used by teachers to shape students' ability to associate economic and environmental issues (Chart 17). Teachers shape the students' ability mostly due to use ‘case studies’ (57.6%) or ‘presentations’ (45.5%).

Chart 16. Assessment of weaknesses seen in educational programmes in terms of improving 'green skills'



Sources: own elaboration

Chart 17. Tools for shaping students' ability to associate economic and environmental issues

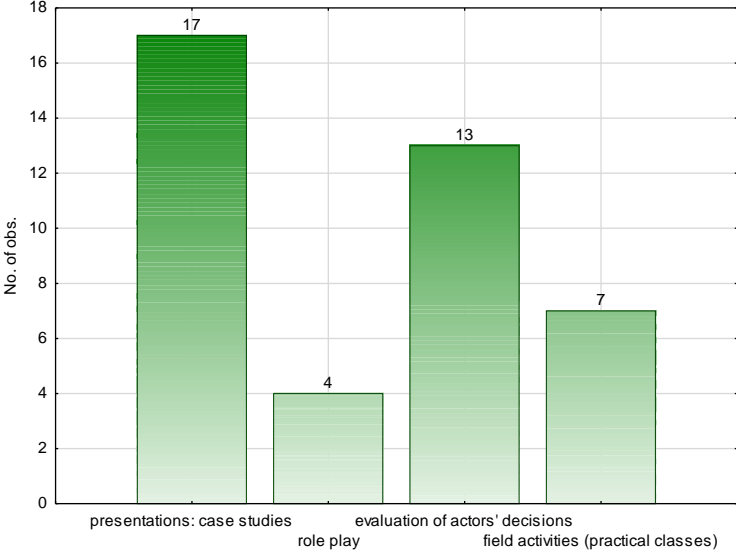


Sources: own elaboration

Analysing the data on Chart 16 and 17, it is worth noting that quite a high percentage of teachers do not see the connection between environmental and economic issues (almost 40%), while over than 30% claims that in educational programmes there are too much theory. This may indicate a need for enrichment or replacement of content in study programmes with more practical, case-based studies. It is worth noting that teachers also suggest more practice to shape the link between environmental and economic issues (27.2%). In an additional option, teachers identified group work as an element in developing these skills.

When teaching students to argue environmental issues with economic benefits, teachers indicated that they primarily use also 'case studies' in form of presentations (51.5%) (Chart 18). As a second tool, teachers indicated 'evaluation of actors' decisions' (39.4%).

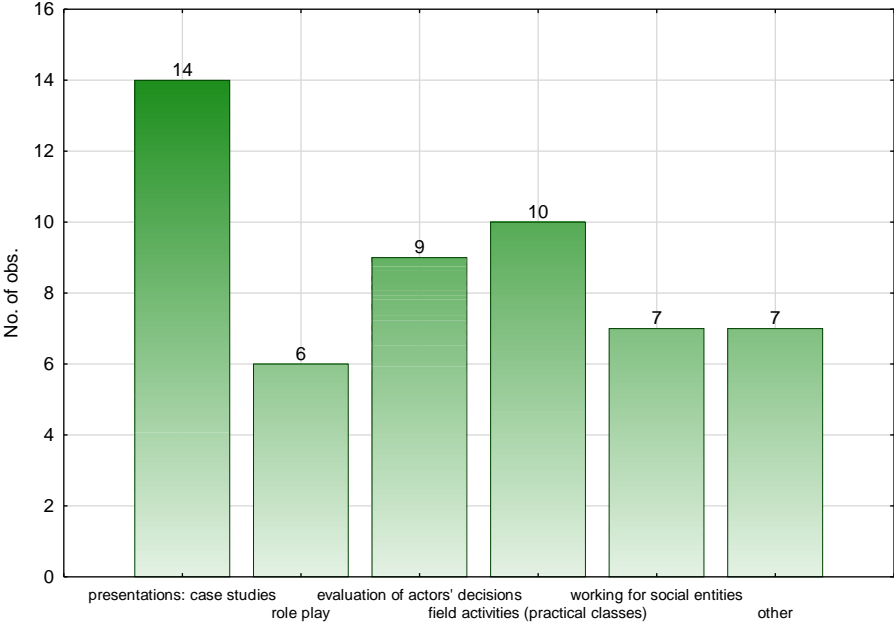
Chart 18. Tools for shaping students' ability to argue environmental issues with economic benefits



Sources: own elaboration

Shaping students' cooperative skills, teachers mostly use also 'case studies' in form of presentations (42.4%) and 'practical classes' (30.3%) (Chart 19). Among the most popular tools there is also 'evaluation of actors' decisions' (27.3%) which underlines the practical dimension of used tools.

Chart 19. Tools for shaping students' cooperative skills

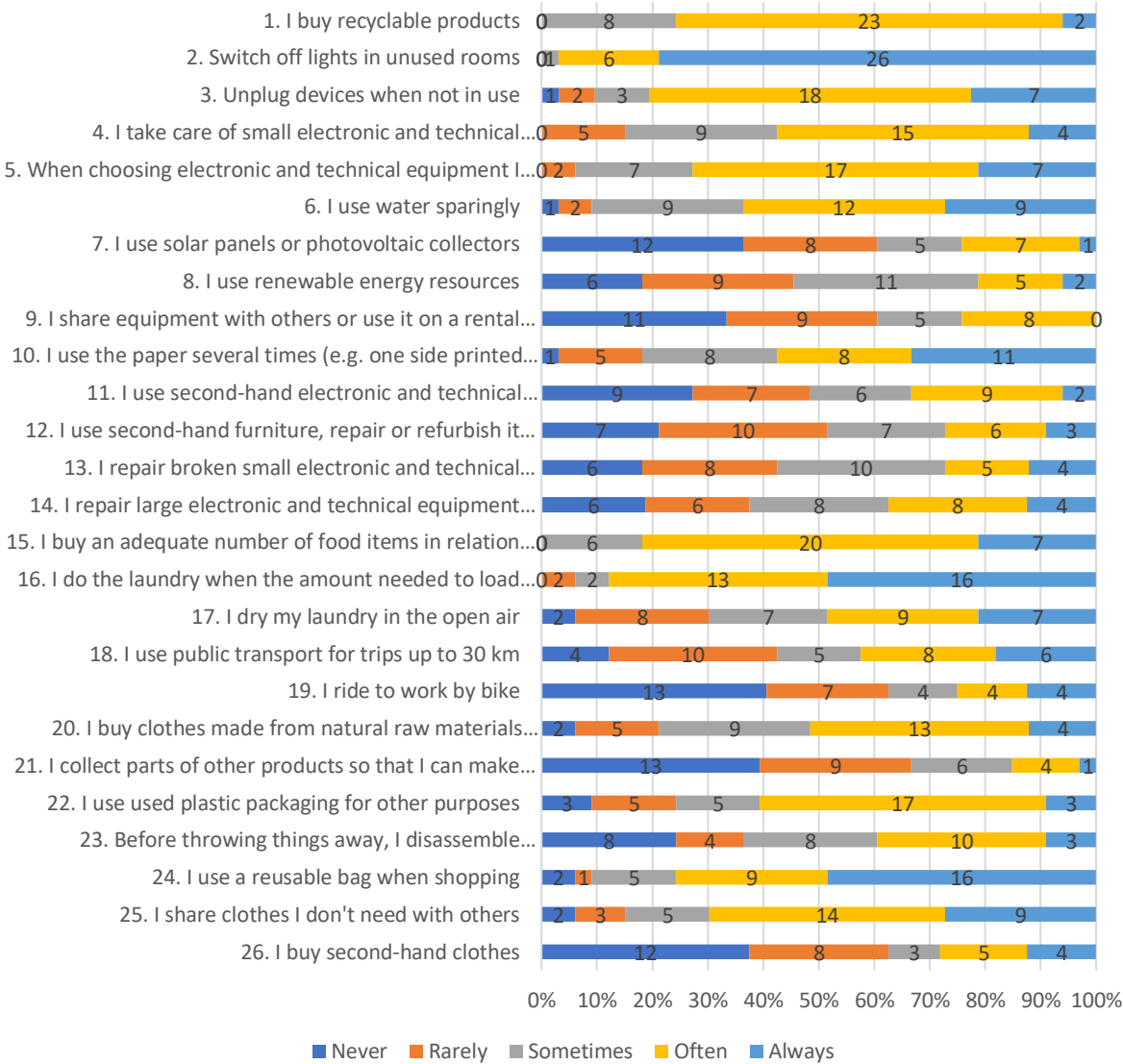


Sources: own elaboration

The analysed results of this part of the research indicate a quite significant role of case studies and practical classes or evaluation of actors' decisions as tools not only for presenting issues linking environmental and economic issues, but also for shaping skills of critical evaluation of these links.

The last part of survey was related with taking up the circular behaviours by the teachers. Circular behaviours were described by 26 statements (Chart 20 & Table 14).

Chart 20. Frequency of taking up circular behaviours by the surveyed teachers



Sources: own elaboration

Table 14. Number of responses related with circular behaviours taken up by the teachers

	Never	Rarely	Someti mes	Often	Always	Mean of CB
1. I buy recyclable products	.	.	8	23	2	3,82
2. Switch off lights in unused rooms	.	.	1	6	26	4,76
3. Unplug devices when not in use	1	2	3	18	7	3,90
4. I take care of small electronic and technical equipment, thus prolonging its life	.	5	9	15	4	3,55
5. When choosing electronic and technical equipment I am guided by its energy class	.	2	7	17	7	3,88
6. I use water sparingly	1	2	9	12	9	3,79
7. I use solar panels or photovoltaic collectors	12	8	5	7	1	2,30
8. I use renewable energy resources	6	9	11	5	2	2,64
9. I share equipment with others or use it on a rental basis (I do not buy)	11	9	5	8	.	2,30
10. I use the paper several times (e.g. one side printed on, I use it for the dirty copy)	1	5	8	8	11	3,70
11. I use second-hand electronic and technical equipment (e.g. leased laptop)	9	7	6	9	2	2,64
12. I use second-hand furniture, repair or refurbish it to make use of	7	10	7	6	3	2,64
13. I repair broken small electronic and technical equipment (e.g. telephone, electric kettle)	6	8	10	5	4	2,79
14. I repair large electronic and technical equipment (e.g. computers)	6	6	8	8	4	2,94
15. I buy an adequate number of food items in relation to what I can eat	.	.	6	20	7	4,03
16. I do the laundry when the amount needed to load the entire washing machine has been collected	.	2	2	13	16	4,30
17. I dry my laundry in the open air	2	8	7	9	7	3,33
18. I use public transport for trips up to 30 km	4	10	5	8	6	3,06
19. I ride to work by bike	13	7	4	4	4	2,34
20. I buy clothes made from natural raw materials (cotton, silk, linen)	2	5	9	13	4	3,36
21. I collect parts of other products so that I can make the product I need from them	13	9	6	4	1	2,12
22. I use used plastic packaging for other purposes	3	5	5	17	3	3,36
23. Before throwing things away, I disassemble components that I estimate may be useful	8	4	8	10	3	2,88
24. I use a reusable bag when shopping	2	1	5	9	16	4,09
25. I share clothes I don't need with others	2	3	5	14	9	3,76
26. I buy second-hand clothes	12	8	3	5	4	2,41

Note: (.) - phenomenon did not occur

Sources: own elaboration

In only four cases did the average reach a value above 4.0:

- 2. Switch off lights in unused rooms (4.76),
- 16. I do the laundry when the amount needed to load the entire washing machine has been collected (4.30),
- 24. I use a reusable bag when shopping (4.09),
- 15. I buy an adequate number of food items in relation to what I can eat (4.03).

These behaviours are relatively simple and indeed frequently undertaken. Nor do they present many difficulties.

In 7 cases the mean value from the survey achieved more than 3.5 point:

- 3. Unplug devices when not in use (3.90),

- 5. When choosing electronic and technical equipment I am guided by its energy class (3.88)
- 1. I buy recyclable products (3.82),
- 6. I use water sparingly (3.79),
- 25. I share clothes I don't need with others (3.76),
- 10. I use the paper several times (e.g. one side printed on, I use it for the dirty copy) (3.7)
- 4. I take care of small electronic and technical equipment, thus prolonging its life (3.55).

In 11 cases, the average did not exceed 3.0. These behaviours required a little more attention, sometimes effort or time.:

- 14. I repair large electronic and technical equipment (e.g. computers) (2.94),
- 23. Before throwing things away, I disassemble components that I estimate may be useful (2.88),
- 13. I repair broken small electronic and technical equipment (e.g. telephone, electric kettle) (2.79),
- 8. I use renewable energy resources (2.64),
- 11. I use second-hand electronic and technical equipment (e.g. leased laptop) (2.64),
- 12. I use second-hand furniture, repair or refurbish it to make use of (2.64),
- 26. I buy second-hand clothes (2.41),
- 19. I ride to work by bike (2.34),
- 7. I use solar panels or photovoltaic collectors (2.30),
- 9. I share equipment with others or use it on a rental basis (I do not buy) (2.3),
- 21. I collect parts of other products so that I can make the product I need from them (2.12).

Due to the fact of normality of distribution of variable 'Mean of Circular behaviours' (Shapiro-Wilk's W test $p=0.933$ for $\alpha=0.05$) and homogeneity of variance (Levene's test $p=0.063$) it was possible to analyse the potential differences between the countries in assessment of circular behaviours. The ANOVA test results did not mandate the rejection of the null hypothesis of no difference¹¹⁸ ($p=0.257$). In other words, the results obtained do not differ between countries. Interestingly, the results do not differ according to the gender of the respondents either ($p=0.465$).

8.4. Green skills among Higher Education students

Within the research of 141 respondents from the group of higher education students (hereinafter referred to as: students) were take part. Table 15 presents the basic statistics described the group.

¹¹⁸ Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

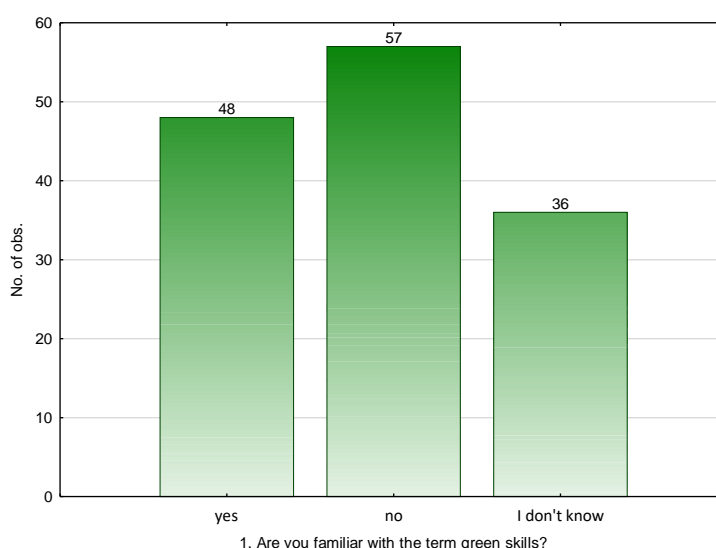
Table 15. The metrics information about higher education students group

	Average age	Gender		Refusal to reply	Degree of the study			Having work experience	Having volunteer experience
		Female	Male		BSc	MSc	Post-grad		
Belgium	26.42	5	4	3	.	5	1	1/13	1/13
Czechia	21.72	18	7	.	18	5	.	9/25	3/25
Greece	26.69	13	18	1	.	26	4	19/32	11/32
Poland	22.08	54	16	1	52	18	.	28/71	23/71
Total	23.44	90	45	6	70	54	5	57/141	38/141

Sources: own elaboration

Women predominated among students (90 in refer to 45 men; 6 persons refused answers). The average age of all respondents was 23.4 years. Students attended mostly 1st graduate level of the study (Bachelor's). Less than a half of them had work experience (40.4%) and one in four students (26.9%) had volunteer experience (by country, most from the Greece).

Chart 21. Knowledge of the term 'green skills'



Sources: own elaboration

Less than a half of respondents (40%) didn't meet the term 'green skills'. Slightly fewer (34%) had heard of the term and 26% were not sure if they knew it (Chart 21).

Most of respondents understood the term 'green skills' as 'knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities' (69.5.1%) (Table 16). Over than 36% understood this term as 'tackling climate change' and almost 1/3 of them (31.2%) also as: 'new environmentally friendly economic sectors' and 'green products/services'. 38 of respondents (26.9%) identified it as 'transition to low-carbon economy'. The least (17%), indicated that the term is related to 'transition to circular economy (closed loop economy)'. These results are different than in HE teacher group.

Table 16. Identification of term ‘green skills’

	transition to low-carbon economy	transition to circular economy (closed loop economy)	tackling climate change	new environmentally friendly economic sectors	green products /services	knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities
Belgium	3	4	4	1	3	1
Czechia	4	7	10	6	9	22
Greece	8	2	9	9	8	20
Poland	23	11	28	28	24	55
Total	38	24	51	44	44	98

Sources: own elaboration

Most of the students came across the term of ‘green skills’ in study programme (41.1%) and in social media (32.6%) (Table 17). Scientific papers as a source of information about term ‘green skills’ indicated 16.3% of them. Press and television indicated less than one in ten students (7.8% and 7.1%). Using the opportunity to indicate another place, respondents stressed that they had not encountered this term (12 responses) or met it right in the research in work or in volunteer place. This may mean that the term is not so popular among the surveyed students of social economy-related studies, which may be surprising (similarly as in HE teacher group). Better information is that, the students were mostly familiarized with the term via study programme. From the point of view of the group of respondents, this is quite important information indicating that the topic of green skills should be presented via study programme in extended version, and the curricula of courses related to social economy could be the best place to present this idea.

Table 17. Sources of come across of term ‘green skills’

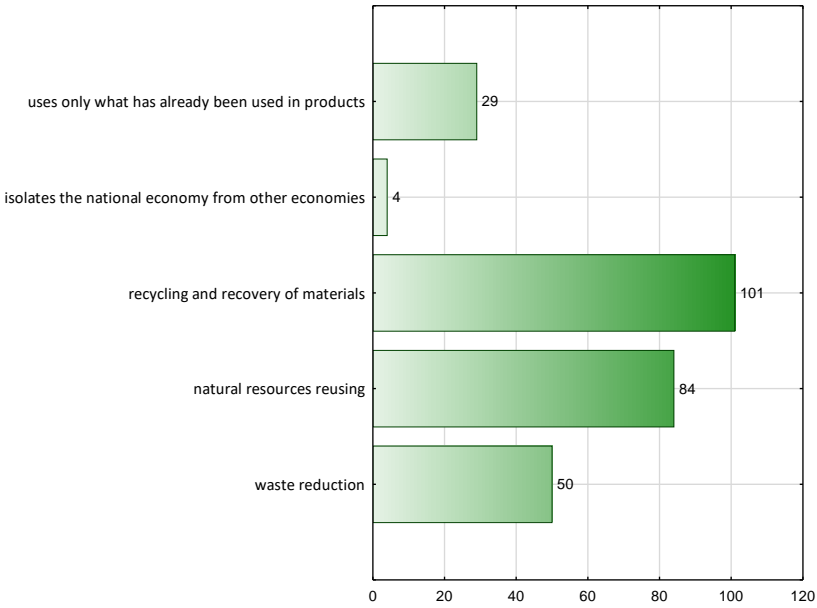
	study programme	scientific papers	academic conferences	press	social media	television	other
Belgium	2	2	2	1	1	1	.
Czechia	14	3	.	.	6	1	1
Greece	2	7	.	4	13	3	1
Poland	40	11	5	6	26	5	1
Total	58	23	7	11	46	10	3

Note: (.) - phenomenon did not occur

Sources: own elaboration

During the survey, respondents were also asked about their knowledge of the term ‘circular economy’ (Chart 22). Most of them stated that it is ‘recycling and recovery of materials in production, distribution or consumption processes’ (71.6%) (similarly, in the HE teachers group it amounted 75.8%) or ‘natural resources reusing’ (59,6%). What could be surprising in the group of HE teachers it amounted only 45.5%.

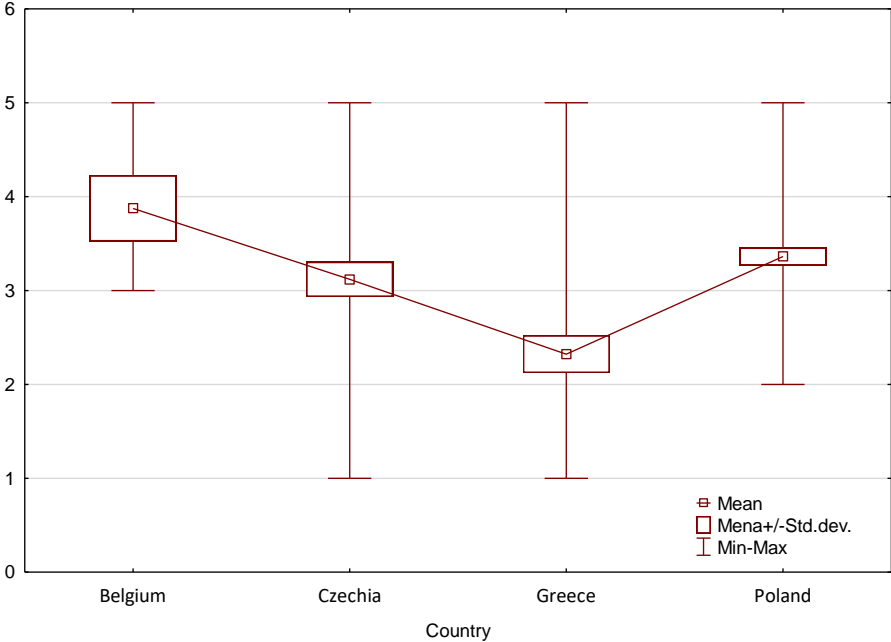
Chart 22. Identification of term ‘circular economy’



Sources: own elaboration

When respondents were asked to what extent are courses aimed at developing green skills implemented in the fields of study at your university, most of them indicated ‘3’ as an assessment. Considering the scale, where 1 meant ‘in none’, and 5 meant ‘fully’, there was a possibility to count basic statistics: mean value and standard deviation. For this question mean amounted 3.10, which could be interpreted as closer to the statement ‘fully’. Standard deviation amounted 1.01 which can mean a wide variation of up to one mark in plus or minus. By country, the highest average was recorded in Belgium (3.87) and the lowest – in Greece (2.32) (Chart 23).

Chart 23. Implementation of courses aimed at developing ‘green skills’



Sources: own elaboration

In an open question, students indicated mostly sustainable management topics courses (*'Sustainability management'*, *'Sustainable consumption and production'*, *'CSR'*) or social entrepreneurship, during which green skills were developed (all indications were 35, some subjects overlapped).

Answering the question to what extent are green skills needed in the given functional areas of enterprises, respondents indicated that they concern mainly in *'production'* (mean: 4.34) and *'transport and storage'* (mean: 4.08) (Table 18). Respondents rated the importance of green skills slightly above average in terms of *'advertising'*, *'sales'* and *'finance'*, although in all these aspects they play a significant role. The results obtained may imply traditional, technical thinking about the application of green skills only to the manufacturing sphere and supply logistics (similarly as in HE teachers group).

Table 18. Functional areas of enterprises related with needed extending of 'green skills'

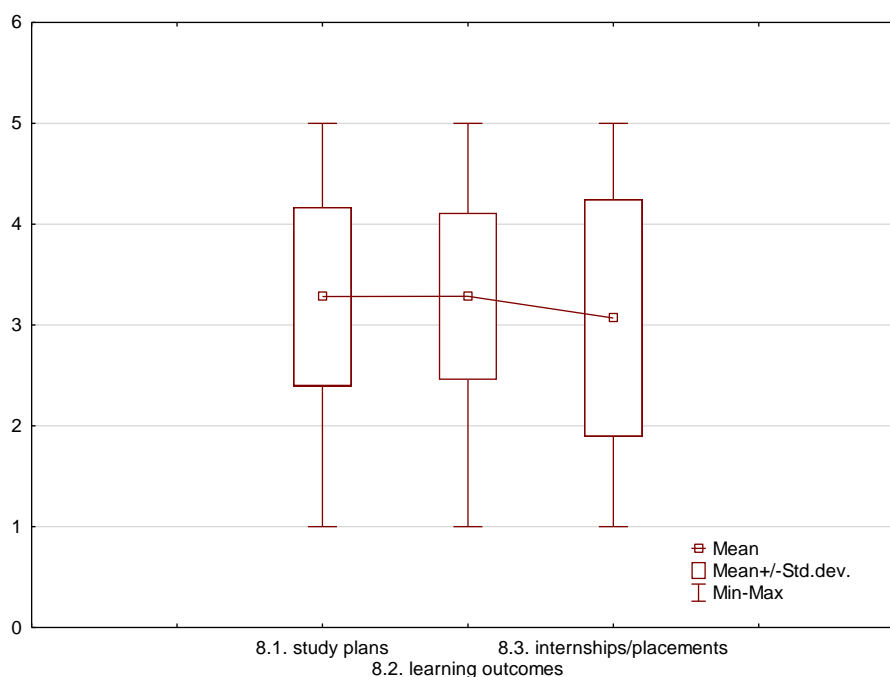
	production	transport and storage	sales	finance	advertising
Belgium	3.55	2.91	3.10	3.38	3.10
Czechia	4.32	4.20	3.16	2.56	3.24
Greece	4.65	4.35	3.48	3.39	3.68
Poland	4.34	4.11	3.61	3.30	3.64
Mean	4.34	4.09	3.46	3.19	3.53
<i>Std. dev.</i>	<i>(0.89)</i>	<i>(0.96)</i>	<i>(1.05)</i>	<i>(1.07)</i>	<i>(1.11)</i>

Note: In () - standard deviation

Sources: own elaboration

Respondents rated appropriate learning outcomes and study plans as the highest opportunity to acquire 'green skills' (Chart 24). This result may indicate the emergence of reflection in respondents, especially when juxtaposed with the responses in the table 10. By country, the indication of a study plan predominates in the majority of countries, although in Czech Republic the indication of learning outcomes was higher (Table 19).

Chart 24. Opportunity to acquire ‘green skills’ based on the chosen educational elements



Sources: own elaboration

Table 19. Opportunity to acquire ‘green skills’ based on the chosen educational elements by countries

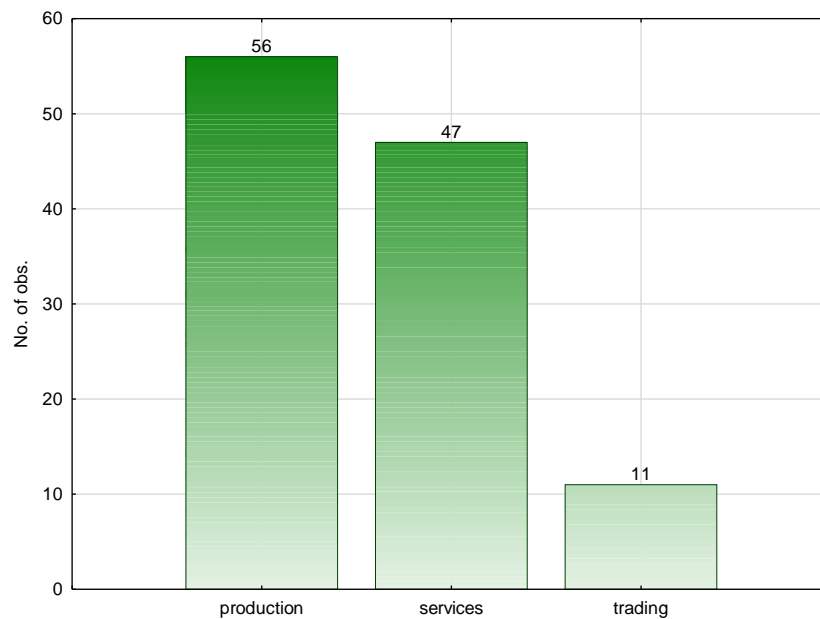
	study plans	learning outcomes	internships/placements
Belgium	2,73	2,88	2,67
Czechia	3,36	3,40	3,29
Greece	3,20	3,10	3,20
Poland	3,38	3,37	2,99
Mean	3.28	3.28	3.06
<i>Std. dev.</i>	(0.88)	(0.82)	(1.17)

Note: In () - standard deviation

Sources: own elaboration

Students studying for a degree in social economy indicated that they most often undertake internships in entities providing production (39.7%) (Chart 25). This is a different answer to that given by the HE teachers (in that group the entities providing services were noticed as the place of internships).

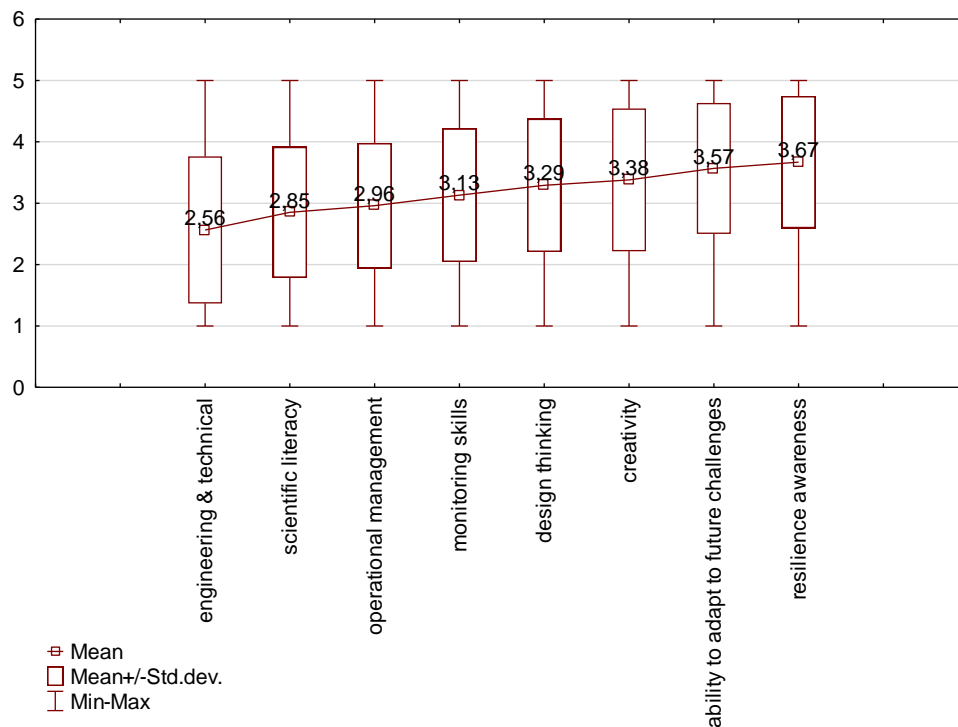
Chart 25. Main area of activity of the entities where students do internships/placements and acquire 'green skills'



Sources: own elaboration

Analysing the degree of acquisition of green skills at the placement site, students indicated that the acquisition of 'resilience awareness of progressing climate changes and the impact of production/service processes on them' was the highest (average: 3.67) (Chart 26). In this question 8 skills were assessed: 1) engineering and technical skills, 2) scientific literacy understand as broad-based and necessary for innovation, 3) operational management skills, 4) monitoring skills defined as skills required to assess compliance with technical criteria and legal standards relating to environmental protection, 5) design thinking understand as realising projects based on the ability to see the source of problems and real customer/client needs, 6) creativity, 7) ability to adapt to future challenges and 8) resilience awareness of progressing climate changes and the impact of production/service processes on them. When broken down by country, the results are similar (Table 20). In Belgium, the highest mean score was achieved by the indication 'creativity' and 'ability to adapt to future challenges' (both at 3.89). In Czechia, Greece and in Poland it was 'resilience awareness' (3.5, 3.81 and 3.7).

Chart 26. Assessment of acquisition of ‘green skills’ at the placement site



Sources: own elaboration

Table 20. Functional areas of enterprises related with needed extending of ‘green skills’

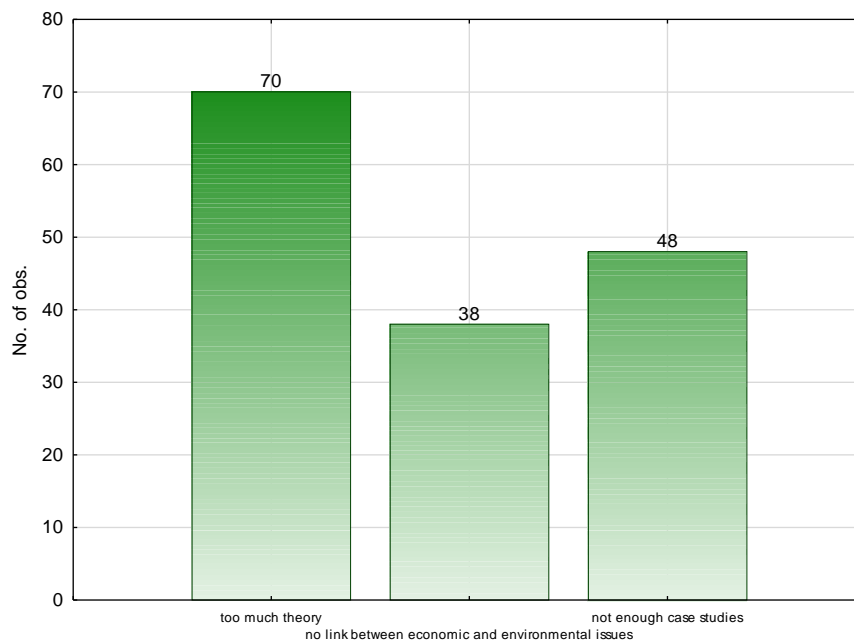
	engineering & technical skills	scientific literacy	operational management	monitoring	design thinking	creativity	ability to adapt to future challenges	resilience awareness
Belgium	2.89	3.56	3.18	3.25	3.78	3.89	3.89	3.44
Czechia	2.38	2.65	2.75	2.90	3.20	2.63	3.25	3.50
Greece	3.26	2.96	3.19	3.74	3.46	3.35	3.65	3.81
Poland	2.30	2.78	2.90	2.94	3.19	3.54	3.58	3.70
Mean	2.56	2.85	3.96	3.13	3.29	3.38	3.57	3.67
<i>Std. dev.</i>	<i>(1.20)</i>	<i>(1.07)</i>	<i>(1.02)</i>	<i>(1.09)</i>	<i>(1.08)</i>	<i>(1.16)</i>	<i>(1.07)</i>	<i>(1.08)</i>

Note: In () - standard deviation

Sources: own elaboration

Answering the question on weaknesses perceived in terms of improving green skills in educational programmes, surveyed students noted that the most important obstacle was related with too much theory (Chart 27). Almost a half students saw this weakness (49.6%). Students complained also of not enough number of case studies (34.04%).

Chart 27. Assessment of weaknesses seen in educational programmes in terms of improving 'green skills'



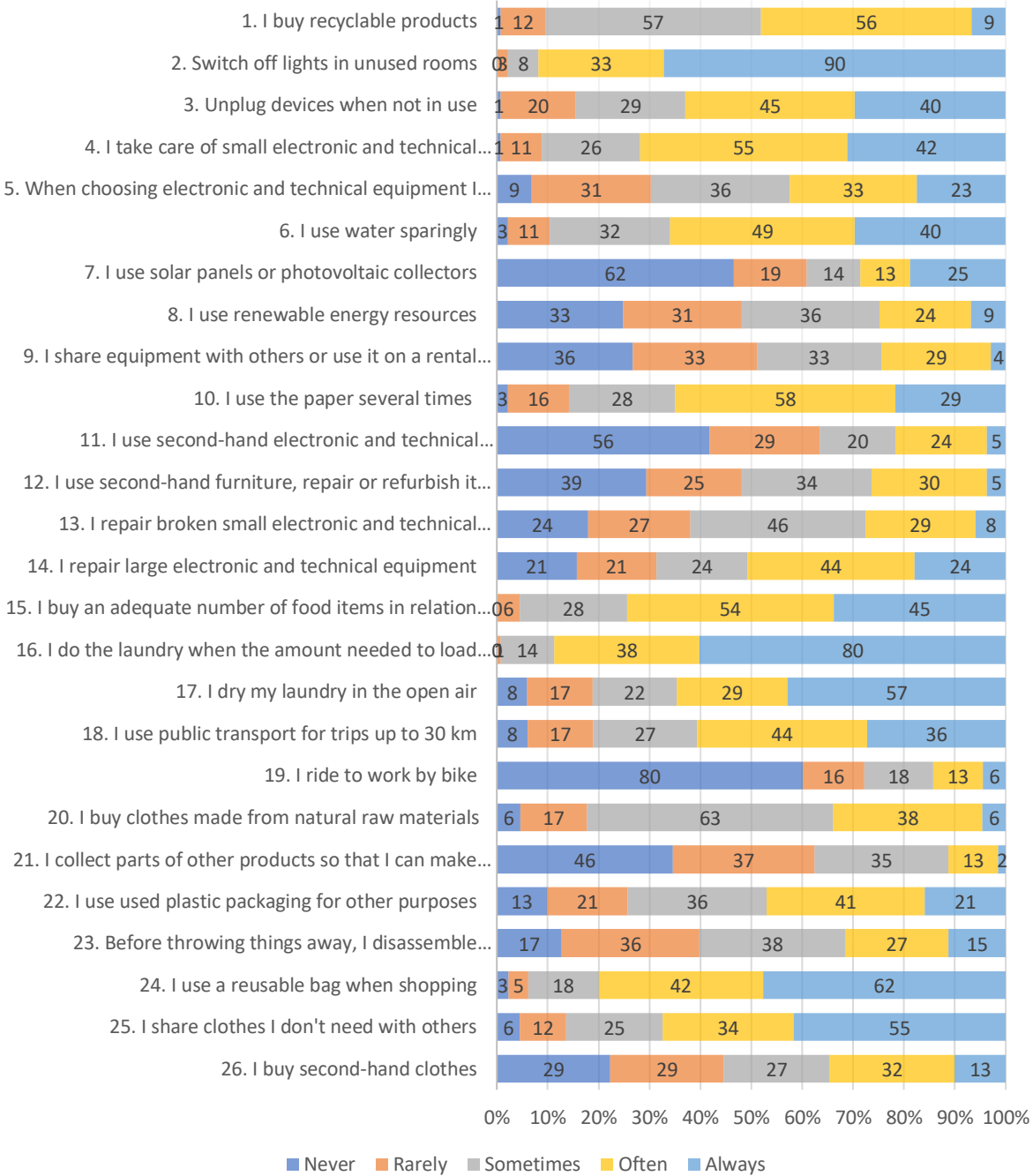
Sources: own elaboration

Students indicated the subjects of study that most enhanced their environmental skills. These were mostly linked to similar subjects mentioned earlier (when indicating the opportunities to acquire and develop environmental skills). These subjects raised, among other things: environmental awareness and impact and behaviour change, awareness of innovation and good practice in applying theory to practical examples. The courses influenced the change of personal improvements in sustainable living, showed how to turn ecology into something fashionable and elegant, definitely influenced the implementation of environmental actions in students' daily lives. They also raised students' level of knowledge on the subject, made them aware of the scale of the problem and increased their readiness to take appropriate action.

For the question 'What subjects still need to be introduced into the study plan to improve green skills?', students claimed that there should be more practical courses based on real cases. They stated only in a few examples the exact names of the course (ex. 'Applying ecology in everyday life', 'Environmental protection', or 'How to recycle properly'). The most important indication in this case was that the proposed subjects should be based on the analysis of real cases (e.g. from Scandinavian or Anglo-Saxon countries).

The last part of survey was related with taking up the circular behaviours by the teachers. Circular behaviours were described by 26 statements (Chart 28 & Table 21).

Chart 28. Frequency of taking up circular behaviours by the surveyed teachers



Sources: own elaboration

Table 21. Number of responses related with circular behaviours taken up by the students

	Never	Rarely	Someti mes	Often	Always	Mean of CB
1. I buy recyclable products	1	12	57	56	9	3,44
2. Switch off lights in unused rooms	.	3	8	33	90	4,57
3. Unplug devices when not in use	1	20	29	45	40	3,76
4. I take care of small electronic and technical equipment, thus prolonging its life	1	11	26	55	42	3,93
5. When choosing electronic and technical equipment I am guided by its energy class	9	31	36	33	23	3,23
6. I use water sparingly	3	11	32	49	40	3,83
7. I use solar panels or photovoltaic collectors	62	19	14	13	25	2,40
8. I use renewable energy resources	33	31	36	24	9	2,59
9. I share equipment with others or use it on a rental basis (I do not buy)	36	33	33	29	4	2,50
10. I use the paper several times (e.g. one side printed on, I use it for the dirty copy)	3	16	28	58	29	3,70
11. I use second-hand electronic and technical equipment (e.g. leased laptop)	56	29	20	24	5	2,20
12. I use second-hand furniture, repair or refurbish it to make use of	39	25	34	30	5	2,53
13. I repair broken small electronic and technical equipment (e.g. telephone, electric kettle)	24	27	46	29	8	2,78
14. I repair large electronic and technical equipment (e.g. computers)	21	21	24	44	24	3,22
15. I buy an adequate number of food items in relation to what I can eat	.	6	28	54	45	4,04
16. I do the laundry when the amount needed to load the entire washing machine has been collected	.	1	14	38	80	4,48
17. I dry my laundry in the open air	8	17	22	29	57	3,83
18. I use public transport for trips up to 30 km	8	17	27	44	36	3,63
19. I ride to work by bike	80	16	18	13	6	1,86
20. I buy clothes made from natural raw materials (cotton, silk, linen)	6	17	63	38	6	3,16
21. I collect parts of other products so that I can make the product I need from them	46	37	35	13	2	2,16
22. I use used plastic packaging for other purposes	13	21	36	41	21	3,27
23. Before throwing things away, I disassemble components that I estimate may be useful	17	36	38	27	15	2,90
24. I use a reusable bag when shopping	3	5	18	42	62	4,19
25. I share clothes I don't need with others	6	12	25	34	55	3,91
26. I buy second-hand clothes	29	29	27	32	13	2,78

Note: (.) - phenomenon did not occur

Sources: own elaboration

In only four cases did the average reach a value above 4.0:

- 2. Switch off lights in unused rooms (4.57),
- 16. I do the laundry when the amount needed to load the entire washing machine has been collected (4.48),
- 24. I use a reusable bag when shopping (4.19),
- 15. I buy an adequate number of food items in relation to what I can eat (4.04).

These behaviours are relatively simple and indeed frequently undertaken. What is needed to be underline, these are the same as in case of the HE Teachers.

In 7 cases the mean value from the survey achieved more than 3.5 point:

- 4. I take care of small electronic and technical equipment, thus prolonging its life (3.93)
- 25. I share clothes I don't need with others (3.91)
- 6. I use water sparingly (3.83)
- 17. I dry my laundry in the open air (3.83)
- 3. Unplug devices when not in use (3.76)
- 10. I use the paper several times (3.7)
- 18. I use public transport for trips up to 30 km (3.63).

In 10 cases, the average did not exceed 3.0. These behaviours required a little more attention, sometimes effort or time.:

- 23. Before throwing things away, I disassemble components that I estimate may be useful (2.9)
- 26. I buy second-hand clothes (2.78)
- 13. I repair broken small electronic and technical equipment (2.78)
- 8. I use renewable energy resources (2.59)
- 12. I use second-hand furniture, repair or refurbish it to make use of (2.53)
- 9. I share equipment with others or use it on a rental basis (2.5)
- 7. I use solar panels or photovoltaic collectors (2.4)
- 11. I use second-hand electronic and technical equipment (2.2)
- 21. I collect parts of other products so that I can make the product I need from them (2.16)
- 19. I ride to work by bike (1.86).

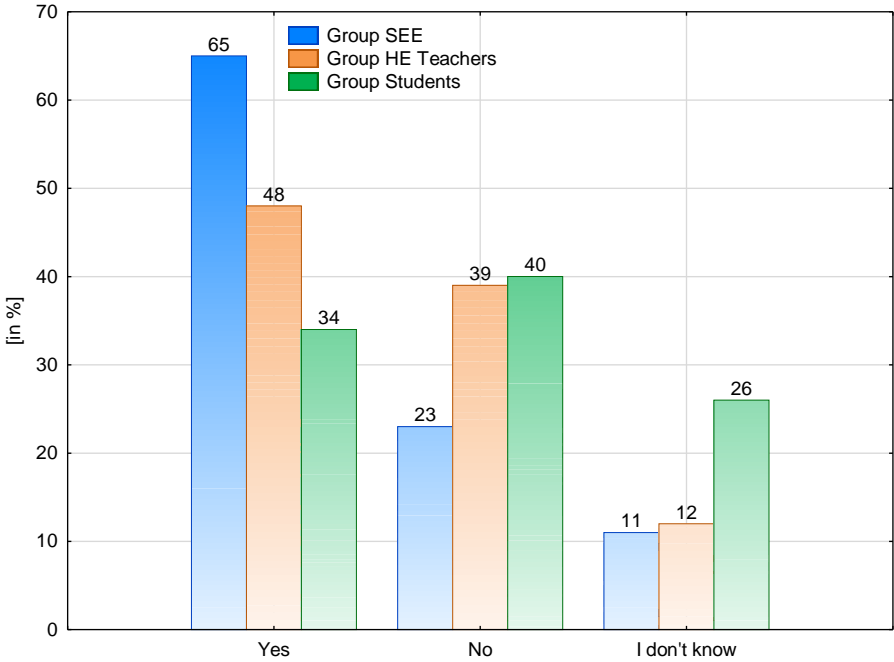
Due to the fact that distribution of variable 'Mean of Circular behaviours' (Shapiro-Wilk's W test $p=0.000$ for $\alpha=0.05$) is not normal, authors decided to apply ANOVA Kruskal-Wallis test, which is non-parametric alternative for one-way ANOVA test. Due to this procedure it was possible to analyse the potential differences between the countries, genders and level of study degree in assessment of circular behaviours. The Kruskal-Wallis ANOVA results allowed to reject of the null hypothesis of no difference¹¹⁹ between countries ($p=0.000$) and gender ($p=0.0265$). In other words, there are statistically significant differences between countries and gender. Interestingly, the results do not differ according to the degree of the study ($p=0.1718$).

8.5. Cross-group analysis

Analysing the potential similarities or differences between target groups, authors decide to compare the results from questions common for all three groups. There were 6 such questions in the survey. First of them concerned familiarity with the term 'green skills'. Chart 29 presents the results as a frequency of given responses: 'yes', 'no', and 'I don't know'.

¹¹⁹ Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

Chart 29. Knowledge of the term 'green skills' among the target groups

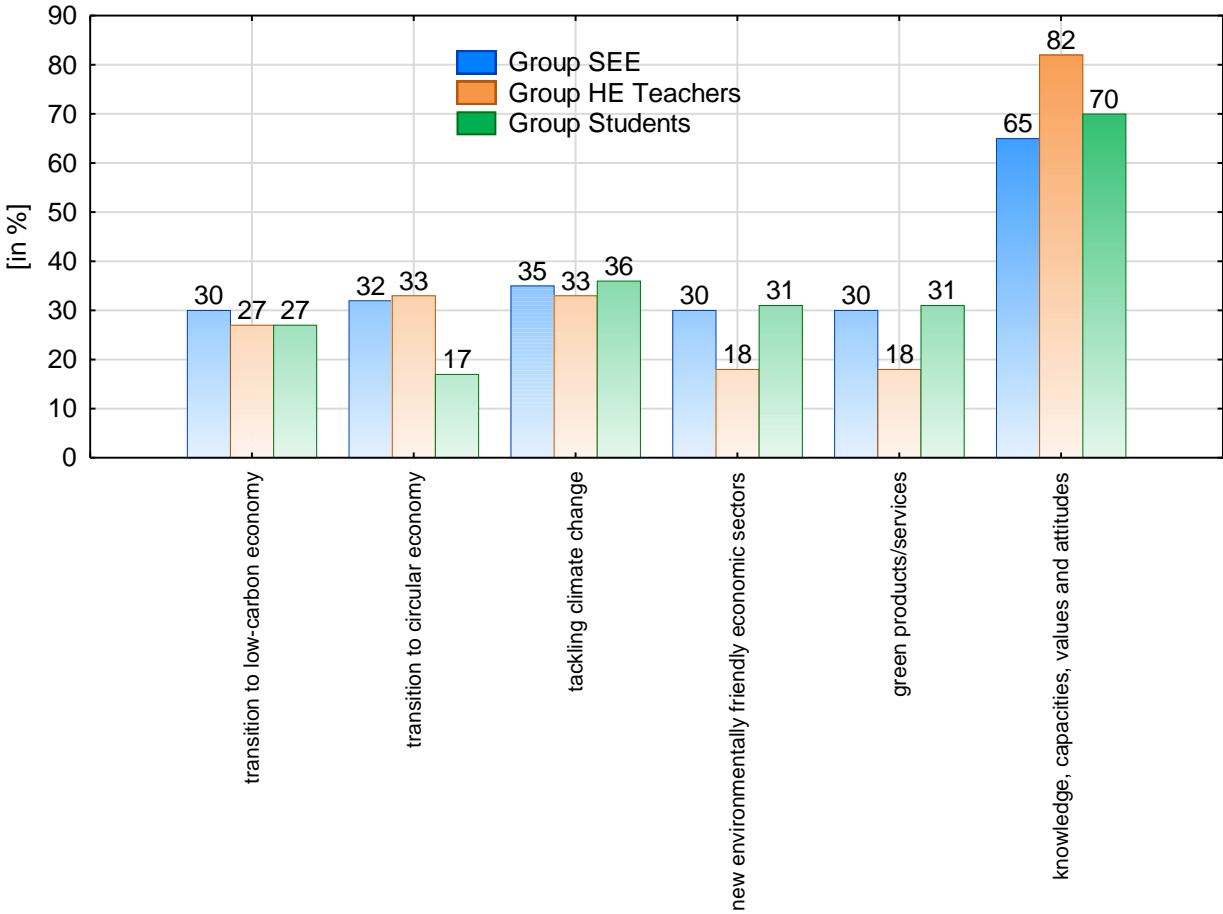


Sources: own elaboration

The highest level of knowledge about ‘green skills’ was noticed among SEE representatives (65%). The lowest – among the Students (34%). The Students were also the most undecided in this issue (26% of them don’t know if they are familiarized with the term ‘green skills’). There is a statistically significant difference between the target groups. The Independence Chi² Pearsons test confirm alternative hypothesis¹²⁰ ($p=0.00019$).

¹²⁰ Tested hypothesis: H₀ – no difference between features, H₁ – existent difference between features.

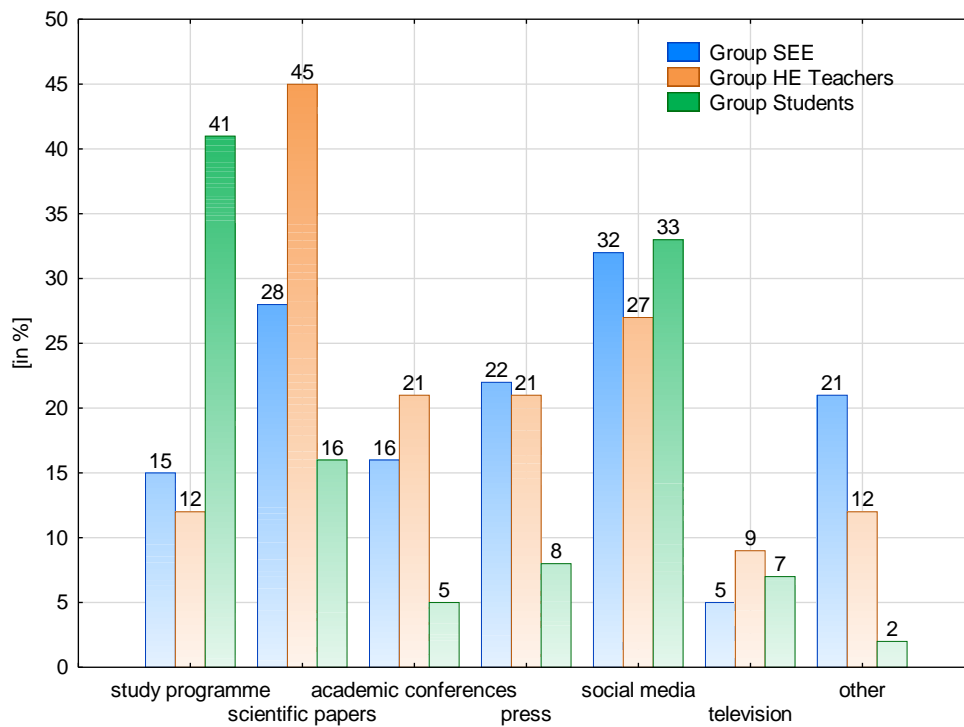
Chart 30. Identification of term ‘green skills’ among the target groups



Sources: own elaboration

Chart 30 presents the identification of the term ‘green skills’. Respondents tended to agree on the understanding of this term. In all three groups the most important understanding was related with the last description: ‘knowledge, capacities values and attitudes needed to develop and support a society that reduces the environmental impact of human activities’. This response was preferred mostly by the teachers (82%). Using the Independence Chi² Pearsons test, authors were allowed to notice that there is a statistically significant difference between the target groups concerning one dimensions: ‘transition to circular economy (closed loop economy)’ ($p=0.04073$).

Chart 31. Sources of come across of term 'green skills'

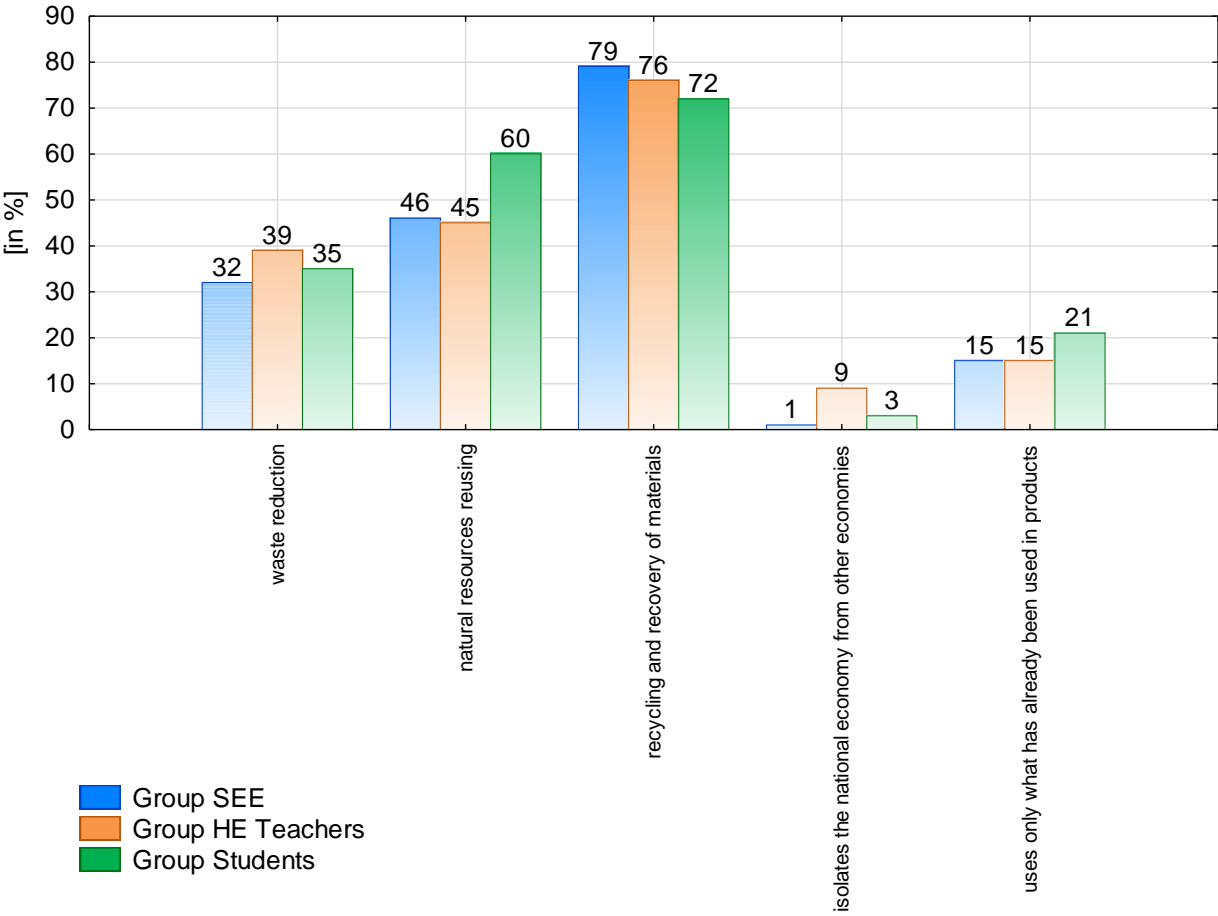


Sources: own elaboration

The sources of the term 'green skills' were different between the groups. They agreed on the degree of relevance of two of the given media: 'social media' (as important) and 'television' (as not important). The Independence Chi² Pearsons test showed no difference between the groups ($p=0.94849$ for 'social media' and $p=0.86338$ for 'television'). In the rest cases, there were statistically significant differences between the groups:

- $p=0.00005$ for 'study program',
- $p=0.00321$ for 'scientific papers',
- $p=0.01071$ for 'academic conferences',
- $p=0.01547$ for 'press'.

Chart 32. Knowledge of the term 'circular economy' among the target groups

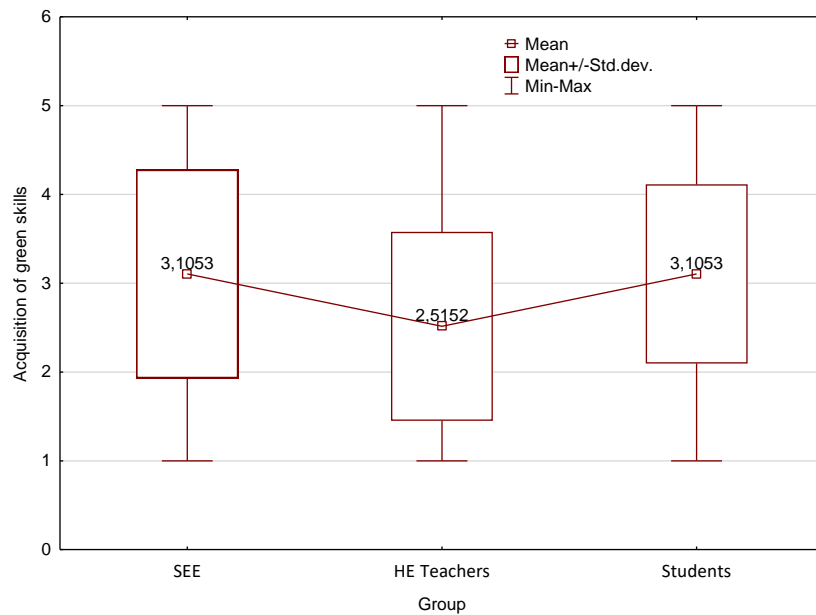


Sources: own elaboration

For respondents from target groups the most well-known definition of 'circular economy' was description of it as 'recycling and recovery of materials in production, distribution or consumption processes' (Chart 32). Over than 70% of respondents in each group chose that answer. Additionally, there were no statistically significant differences between groups in understanding of the term 'circular economy'.

Assessment of possibility to acquire of green skills was the highest both in SEE representatives (as a place to acquire of the skills by the trainees) and in group of Students (as the field of study) (Chart 33).

Chart 33. Possibility to acquire of green skills among the target groups

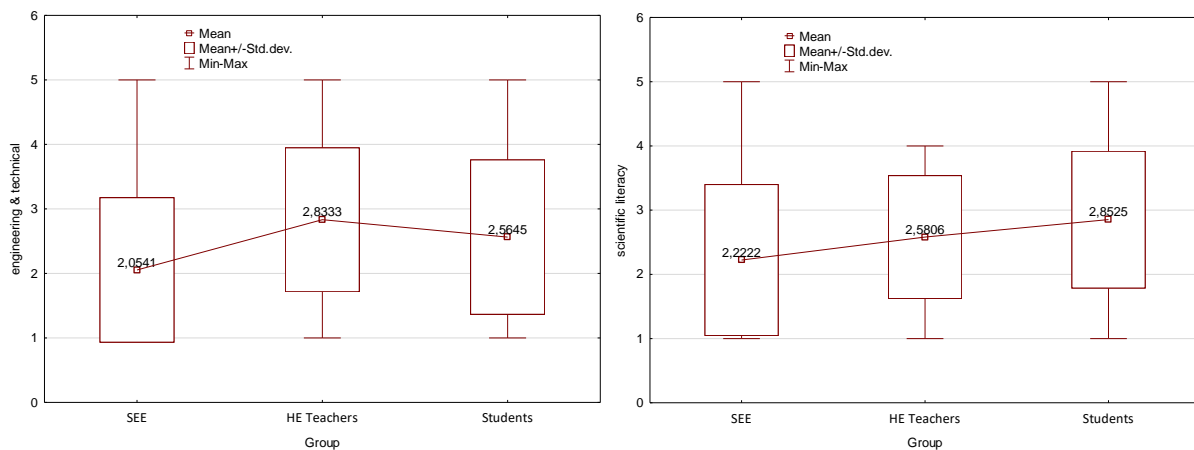


Sources: own elaboration

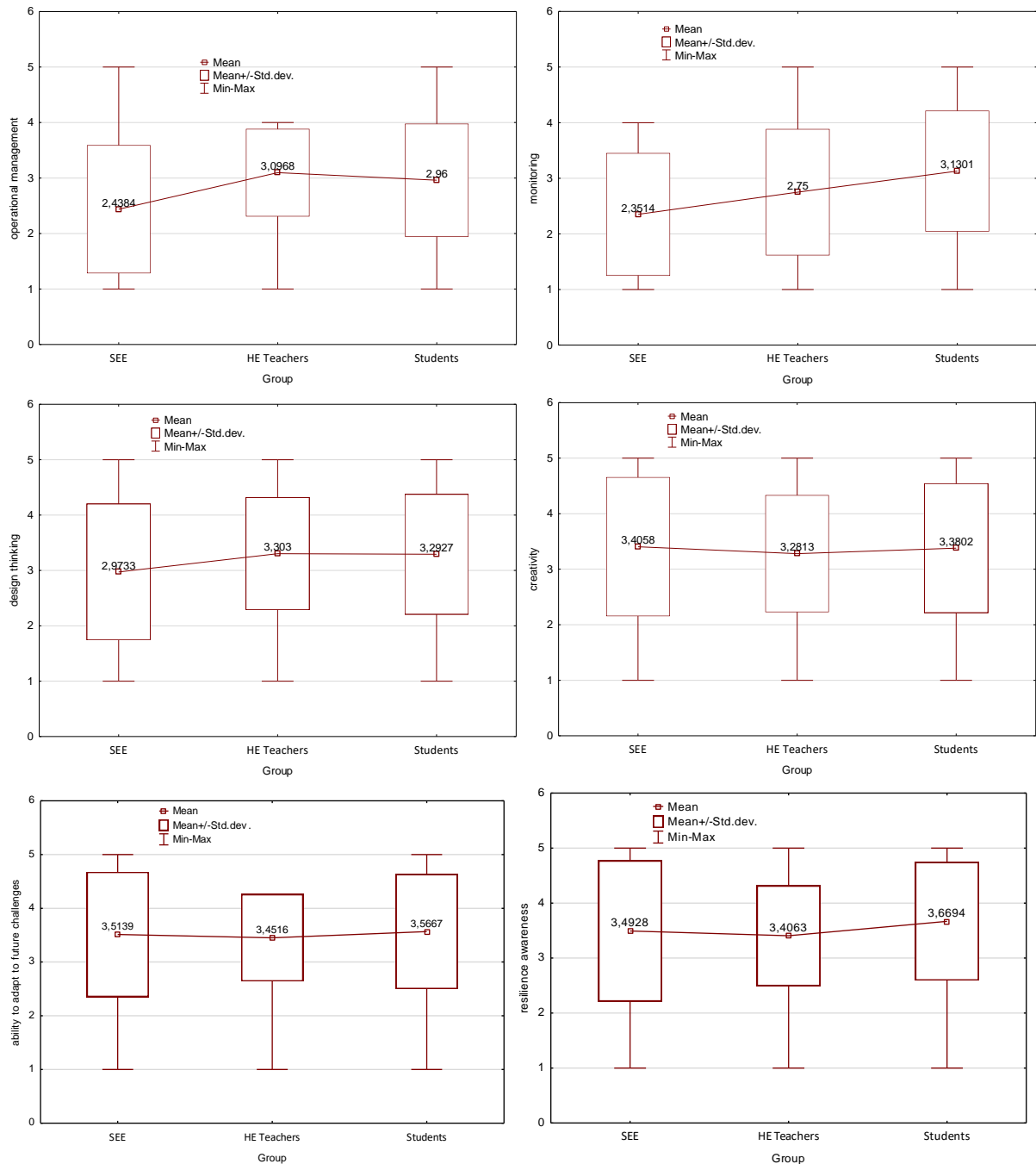
The Kruskal-Wallis ANOVA results allowed to reject of the null hypothesis of no difference¹²¹ between groups ($p=0.0155$). In other words, there are statistically significant differences between groups in assessment of possibility to acquire of green skills.

The last common question for all groups was related with the assessment of functional area of enterprises related with needed extending of 'green skills'. The groups assessed eight dimensions (Chart 34).

Chart 34. Functional areas of enterprises related with needed extending of 'green skills' in the opinion of the target groups



¹²¹ Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.



Sources: own elaboration

The first dimension ‘engineering & technical skills’ was assessed the highest in the group of HE Teachers (2.83). The second one – ‘scientific literacy’ – in group of Students (2.85). The third one – ‘operational management skills’ – in the group of HE Teachers (3.09). The fourth one – ‘monitoring skills’ - in the group of Students (3.13). The fifth one – ‘design thinking’ - in the group of HE Teachers (3.3). The sixth one – ‘creativity’ - in the group of SEE (3.4). The seventh one – ‘ability to adapt to future challenges’ - in the group of Students (3.56). The eighth one – ‘resilience awareness’ - in the group of Students (3.66).

Table 22. Results of Kruskal-Wallis ANOVA test in the scope of functional areas of enterprises related with needed extending of ‘green skills’

	<i>p-value</i>
engineering & technical	0.0017**
scientific literacy	0.0010***
operational management	0.0007***
monitoring	0.0000***
design thinking	0.1722
creativity	0.8311
ability to adapt to future challenges	0.8098
resilience awareness	0.3530

Note: statistical significance: $p < 0.05$ – existing (*), $p < 0.01$ – high (**), $p < 0.001$ – very high (***)
Sources: own elaboration

The Kruskal-Wallis ANOVA results allowed to reject of the null hypothesis of no difference¹²² between groups in four cases (*p-value* marked on bold). In other words, in these four dimensions there are statistically significant differences between groups.

8.6. Verification of the Research Hypothesis

In the **first research hypothesis**, the Authors assumed that Social Economy Entities, despite their significant involvement in green activities, do not demonstrate significant skills and competencies in having and developing green skills relevant to market needs (geared towards revenue generation). Research results indicate that SEE representatives know the term ‘green skills’ (65.4%), as well as they identify it as ‘knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities’ (also 65.4%). They treat ‘circular economy’ mostly as ‘recovery of materials’ (79%). This may indicate a moderate level of knowledge in these aspects and an identification with technical elements. Assessment of having the opportunity to acquire green skills by people working/internships in their organization was at average level (mean=3.1). This may indicate a moderate level of that possibility arising from the nature of operation of surveyed SEE.

Assessing the possibility of acquisition of ‘green skills’ at the placement site, SEE representatives noticed, that it is related mostly with ‘ability to adapt to future challenges’ (mean=3.51) and ‘resilience awareness’ (mean=3.49). Unfortunately, this does not indicate a business mindset, but rather an emphasis on soft skills.

Ability to justify of the cost-effectiveness of environmental solutions in economic, social and ecological aspects, was assessed by the SEE representatives on moderate level. The average did not exceed 4.0 and was respectively: ‘3.14’ for economic, ‘3.61’ for social and ‘3.71’ for ecological aspect. Additionally, 74% of SEE representatives declared that they were not able to generate revenue through their green economy activities.

These results may indicate that green skills are not fully developed in these SEE. The first research hypothesis H_1 can thus **be accepted** (Table 23).

¹²² Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

Table 23. Summary of research hypothesis

hypothesis	decision
<i>H₁</i> : Social economy entities, despite their significant involvement in green activities, do not demonstrate significant skills and competencies in having and developing green skills relevant to market needs (geared towards revenue generation).	<i>accepted</i>
<i>H₂</i> : Deficiencies in green SEE skills are a barrier to entering into cross-sectoral cooperation, acquiring circular business projects that benefit the environment, the economy and the development of the SEE themselves.	<i>partially rejected</i>
<i>H₃</i> : There is a need to modify educational programs, in order to increase support so that higher education centers provide support for skills formation as a driver of green transformation.	<i>accepted</i>

Sources: own elaboration

In the **second research hypothesis**, the Authors assumed that deficiencies in green SEE skills are a barrier to entering into cross-sectoral cooperation, acquiring circular business projects that benefit the environment, the economy and the development of the SEE themselves. The research results indicate that the assessment of ability to find the partners (e.g. business or public institutions) for carrying on the environmental projects is moderate (mean=3.2). The respondents from SEE group noticed, that the most important barriers have external and 'technical' characters (ex. red tape-bureaucracy - 54.3%; institutional constraints - 41.9% and lack of appropriate legal frameworks - 39.5%). To a lesser extent, the lack of partnership was due to a lack of skills (ex. lack of economic knowledge of the members of the organisation - 29.6%, lack of environmental knowledge among members of the organisation - 28.4%). However, this problem was reported by almost 30% of the respondents, so the hypothesis examined ***H₂* cannot be explicitly rejected.**

In the **third research hypothesis**, the Authors assumed that there is a need to modify educational programs, in order to increase support so that higher education centers provide support for skills formation as a driver of green transformation. The research results indicate that the HE Teachers and Students are agree that study plans are the most important opportunity to acquire 'green skills' (HE Teachers: 3.48, Students: 3.28).

Quite a high percentage of teachers (over than 30%) claims that in educational programmes there are too much theory. This may indicate a need for enrichment or replacement of content in study programmes with more practical, case-based studies. It is worth noting that teachers also suggest more practice to shape the link between environmental and economic issues (27.2%). In an additional option, teachers identified group work as an element in developing these skills. When teaching students to argue environmental issues with economic benefits, teachers indicated that they primarily use also 'case studies' in form of presentations (51.5%). As a second tool, teachers indicated 'evaluation of actors' decisions' (39.4%). The assessment of this situation is similarly in Students group. They noted that the most important obstacle is related with too much theory (49.6%). Students claim also for not enough number of case studies (34.04%). These results may indicate that there is a need to correct the study programmes and enrich them in the practical prats. The third research hypothesis ***H₃* can thus be accepted.**

PART IV

Chapter 9. The theoretical model of the SDG labs programme

Socially Driven Green Labs programme is founded on designing an innovative and holistic educational programme that will offer HE teachers in SE related fields all the necessary skills, methodologies, and knowledge to foster the next generation of green social entrepreneurs.

The programme offers new, blended learning and flexible training and learning pathways that incorporate people-centred and multistakeholder methodologies (Living Labs methodology) and hands-on approaches (simulation-based learning) for cultivating SE teachers' and students' green literacy and skills and establishing meaningful green cooperation's schemes within various green SE stakeholders. The educational project will offer multiple blended learning elements (MOOC, teachers' online handbook, summer school, online pocket courses, face-to-face training workshops) and ready to use resources (SDG labs Digital Gallery) that will offer a teachers' and students' training programme, both virtual and physical activities.

The SDG Labs educational programme are to be designed to trigger the attempts towards:

- 1) defining the current and future green skills shortages in SEEs;
- 2) providing an online depository with a wide range of case studies and ready to use co-creation activities, tools and resources and a digital package of lecture plans supporting social and green entrepreneurial competence development;
- 3) equipping HE teachers with an innovative and flexible training opportunity on how to integrate environmental-related issues into SE curricula; the MOOC "Social Economy for a green transition" will explore how certain key SE business areas are currently leading the way towards green growth;
- 4) supplying students with knowledge and skills that are aligned with the requirements of green labour market.

Innovativeness of SDG Labs educational programme consists of the following results that are expected:

- 1) SDG Labs Digital Gallery that will provide an online depository with a wide range of ready to use, and interactive co-creation activities, tools and resources and a digital package of lecture plans supporting social and green entrepreneurial competence development, and an online screening tool with case studies of SEEs that operate in economic sectors with environmental objectives;
- 2) SDG Labs capacity building programme that will provide to HE teachers flexible training opportunity on how to integrate environmental-related issues into SE curricula, equip students with knowledge and skills that are aligned with the requirements of green labour market and establish local green cooperation's schemes within various SE stakeholders; the massive open online course "Social Economy for a green transition" are to be delivered to teachers;
- 3) SDG Labs business simulation models that will offer a package of more than 20 interactive learning environments acting as mindtools for SE students to design and experiment

freely on their own environmental simulation SE business models and understand the consequences of real business decisions;

- 4) SDG Labs students' upskilling programme that will offer a blended learning package incorporating both theoretical and practical elements of green skills literacy and environmental sustainability; set of online pocket courses that will provide an exciting learning to students as they experiment throughout the different phases of the SDG Labs (define, ideate, experiment, validate) and the on-campus learning programme that will be realised through the summer school serving as a test-bed for the overall educational programme.

SDG Lab Digital Gallery

SDG Lab Digital Gallery is a set of interactive teaching materials on environmental studies and development of green skills, designed to provide mentors and teachers with theoretical and practical knowledge on developing students' green skills. It will serve as one stop shop for teaching material, ranging from open educational resources and case studies to articles and videos. In terms of pedagogical criteria, the resource is easy to understand and has clear learning objectives, free and interactive, catchy, and engaging the learner's interest, and relevant to recent climate change and environmental debates.

This kind of resource should provide the learner with a holistic idea about environmental change and green skills, it develops the knowledge in key areas related to environmental issues, help the learner critically evaluate key issues of climate change. There to a range deliverables to be produced within developing this source of project activities. Those are: 50 online resources that will enable HE teachers to develop their students' green skills, a set of interactive teaching materials on environmental studies and development of green skills. All sorts of those resources are to be carefully mapped and selected testes and finetuned, translated into five languages, and publicized on the online digital gallery on a dedicated space of the project's website.

SDG Labs capacity building programme for HE teachers (MOOC, handbook)

The objective of this module of the SDG Labs educational project is to train HEI teacher to apply the SDG Labs programme and integrate environmental-related issues into SE curricula.

Basing on the needs of the HEI teachers derived from research study, the content development teacher's handbook will be delivered on how to launch and run SDG Lab and how to participate and contribute throughout the defining, ideating, experimenting, and validating phases. Moreover, quick guide for the MOOC will be provided. As well as teacher's guide on using simulation-based learning.

MOOC "Social Economy for a green transition" will be developed with the structure and themes formulated after based on research study, within such areas as: renewable energy, sustainable housing, sustainable food systems, circular economy. Then, the MOOC testing and finetuning will be undertaken with the use of internal testing among partners and finetuning by one of the partner universities. Handbook testing within the teaching staff is to be provided by partner universities, throughout online workshops organized by partner universities. Moreover, a series of training workshops to familiarize educators and make them apply and

implement the SDG Labs educational programme, with a blended formulation (face-to-face training seminar and coaching sessions, webinars, mentoring and guidance sessions).

SDG Labs business simulation for students

The business simulation models will offer a package of more than 20 interactive learning environments that will act as mindtools for SE students to design and experiment freely on their own environmental simulation SE business models.

SDG Labs for students (on-line and on-campus learning programme for summer school)

The core of the SDG Lab upskilling programme is that students interact and collaborate with teachers and green SEEs and are getting prepared for applying forward-looking skills of the green business sector and better explore the potential of the SE for achieving green growth.

The upskilling programme offers a blended learning package incorporating both theoretical and practical elements of green skills literacy and environmental sustainability for students, such as for example a set of pocket courses that will provide an online learning journey to students and the on-campus learning programme, that will be realised through the “SDG Labs Summer School”, and will act as a test-bed for the overall educational programme - co-creating their own SDG business models (e.g. sustainable farming, renewable energy solutions) with on-the ground green business actors (green SEEs).

Conclusions

The process of green transition encompasses the involvement of governments, local governments, enterprises and non-governmental organizations, local social communities, each of whom has its own role to play. The green transformation implemented by promoting the idea of responsibility is vibrant in the activities of market entities, and visible by leaving the model of linear production and consumption in favour of a closed-circuit economy. Their aim is to avoid the generation of waste and to keep raw materials in the economy for as long as possible to reduce the human impact on the environment. NGOs, local communities, state as well as enterprises, those related to changing the urban space to a sustainable one, and those implementing environmentally friendly production processes, apply a diversity of instruments for green transformation. A particular involvement in various types of environmentally friendly projects and a special potential introduced within the changes of green transition is by social economy entities. Self-sustainability, value-creation, quick assessment of the unfulfilled needs and aspirations of society followed by innovations and adaptations, establishment of self-supporting organization aimed toward earning profit through collective efforts of their teams to create social benefit is what the hybrid organizations, pursuing triple bottom lines and creating the common good by making profits and adding to social value, offer. This kind of hybrid organizations (social economy entities, including social enterprises) supports engendering social capital to encourage more advanced social interactions and learning processes in societies of diverse structures: Green entrepreneurship executed by SEE fosters identifying objectives and building a movement towards creating a better environment, raising a voice for a green products and practices, making people realize their responsibility, launching in the markets and creating new markets of environmentally friendly products and services, targeting the environment friendly goods to customers able to pay for the value of the product contributing to cleaner environment, aiming toward a support from the government and other institutions with the potential to influence policy decision makers. Promoting green entrepreneurship remains vital within the ethos and structures of the hybrid organization that are conducive through their context of day-to-day practice within which citizens are oriented towards social and environmental services and products. SEE are in their primary aim and structure explicitly environmental (because of their social sensitivity, because of the costs of their activities) in that they recycle, promote organic food and so on. And what is even more important here is that their endeavors to achieve social aims are through the most environmentally sustainable manners. That is why those types of organizations hide a potential to orientate citizens towards environmental considerations.

The necessity of the circular economy to emerge increased the pressure to adjust skills of workers demanded by the industries concentrating on more ecologically sustainable technologies. Growing need for the skills to perform ecologically-oriented tasks call for equipping graduates more with green skills, both technical and soft ones. As social entrepreneurship education is about transmitting not just the abstract knowledge on competence identifying social market opportunities from teacher to students but also the readiness to engage in the launching of social enterprises as a result of social learning process, there is a great role of students' co-creating shared communities of practice identified as being a stimulator of new business ideas and business models. The learning communities are intended to trigger the social relationships potential between experts and learners to stimulate innovative formats of participatory and interactive learning activities. Shift from

paradigm of “service” to a paradigm of participation intensifies students’ responsibility to not simply complete the task, but to comprehend its potential impact on society.

Getting engaged in participatory observation of a real-world, reflecting upon the observation by series of discussions, then getting into the interactions with managers of social enterprises and being instructed to getting involved in solving a social problem, identifying social entrepreneurship opportunities for start-ups call for educational set of tools. In effect, it is a kind of call for apparatus that can enable to incubate ideas, and can be conceptualized as a form of a laboratory space.

The research results undertaken at the very beginning of the project aiming to define the current and future green skills shortages in SEEs and recognize the solutions and educational approaches for restructuring social economy university curricula revealed that:

- green skills may not be fully developed in SEE;
- deficiencies in green SEE skills cannot be considered explicitly as a barrier to entering into cross-sectoral cooperation, acquiring circular business projects that benefit the environment, the economy and the development of the SEE themselves;
- there is a need to modify educational programs, in order to increase support so that higher education centers provide support for skills formation as a driver of green transformation;
- and, study plans are the most important opportunity to acquire ‘green skills’.

This is a framework to be followed by a blended methodological approach, supplying both theoretical and empirical insights, and setting the basis for further creating needs-oriented training programmes for both SE educational providers and students. The laboratory space being designed within this educational project offers flexible training and learning pathways that incorporate people-centred and multistakeholder methodologies (Living Labs methodology) and hands-on approaches (simulation-based learning) for cultivating SE teachers’ and students’ green literacy and skills and establishing meaningful green cooperation’s schemes within various green SE stakeholders. It will include MOOC, teachers’ online handbook, online pocket courses, face-to-face training workshops and ready to use resources that will offer a teachers’ and students’ training programme, both virtual and physical activities, including summer school.

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Appendixes

Questionnaires for target groups

	QUESTIONS for SEE	QUESTIONS for HE Teachers	QUESTIONS for Students
1)	Are you familiar with the term <i>green skills</i>? <i>[1-yes, 2-no, 3-I don't know]</i>	Are you familiar with the term <i>green skills</i>? <i>[1-yes, 2-no, 3-I don't know]</i>	Are you familiar with the term <i>green skills</i>? <i>[1-yes, 2-no, 3-I don't know]</i>
2)	What do you identify the term <i>green skills</i> with? <i>1 - transition to low-carbon economy</i> <i>2 - Transition to circular economy (closed loop economy)</i> <i>3 - tackling climate change</i> <i>4 - new environmentally friendly economic sectors</i> <i>5 - green products/services</i> <i>6 - knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities</i>	What do you identify the term <i>green skills</i> with? <i>1 - transition to low-carbon economy</i> <i>2 - Transition to circular economy (closed loop economy)</i> <i>3 - tackling climate change</i> <i>4 - new environmentally friendly economic sectors</i> <i>5 - green products/services</i> <i>6 - knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities</i>	What do you identify the term <i>green skills</i> with? <i>1 - transition to low-carbon economy</i> <i>2 - Transition to circular economy (closed loop economy)</i> <i>3 - tackling climate change</i> <i>4 - new environmentally friendly economic sectors</i> <i>5 - green products/services</i> <i>6 - knowledge, capacities, values and attitudes needed to develop and support a society that reduces the environmental impact of human activities</i>
3)	Where have you come across the term <i>green skills</i>? <i>1 - study programme</i> <i>2 - scientific papers</i> <i>3 - academic conferences</i> <i>4 - press</i> <i>5 - social media</i> <i>6 - television</i> <i>7 - other, which?...</i>	Where have you come across the term <i>green skills</i>? <i>1 - study programme</i> <i>2 - scientific papers</i> <i>3 - academic conferences</i> <i>4 - press</i> <i>5 - social media</i> <i>6 - television</i> <i>7 - other, which?...</i>	Where have you come across the term <i>green skills</i>? <i>1 - study programme</i> <i>2 - scientific papers</i> <i>3 - academic conferences</i> <i>4 - press</i> <i>5 - social media</i> <i>6 - television</i> <i>7 - other, which?...</i>
4)	What do you identify the term <i>circular economy</i> with? <i>1 - waste reduction</i> <i>2 - natural resources reusing</i> <i>3 - recycling and recovery of materials in production, distribution or consumption processes</i>	What do you identify the term <i>circular economy</i> with? <i>1 - waste reduction</i> <i>2 - natural resources reusing</i> <i>3 - recycling and recovery of materials in production, distribution or consumption processes</i>	What do you identify the term <i>circular economy</i> with? <i>1 - waste reduction</i> <i>2 - natural resources reusing</i> <i>3 - recycling and recovery of materials in production, distribution or consumption processes</i>

	4 - isolates the national economy from other economies 5 - uses only what has already been used in products	4 - isolates the national economy from other economies 5 - uses only what has already been used in products	4 - isolates the national economy from other economies 5 - uses only what has already been used in products
5)	To what extent people working/internships in your organisation have the opportunity to acquire green skills? [1 - in none, 2, 3, 4, 5 - fully]	To what extent are courses aimed at developing green skills implemented in the fields of study at your university? [1 - in none, 2, 3, 4, 5 - fully]	To what extent is there an opportunity to acquire and develop green skills in your field of study? [1 - in none, 2, 3, 4, 5 - fully]
6)		If any green skills are developed in education, please name the course(s):	If any green skills are developed in education, please name the course(s):
7)		To what extent are green skills needed in the given functional areas of enterprises? [1 - in none, 2, 3, 4, 5 - fully] – production – transport and storage – sales – finance – advertising other which?...	To what extent are green skills needed in the given functional areas of enterprises? [1 - in none, 2, 3, 4, 5 - fully] – production – transport and storage – sales – finance – advertising other which?...
8)		How would you rate the opportunity to acquire green skills based on the following educational elements at your university? [1 - in none, 2, 3, 4, 5 - fully] – study plans – learning outcomes – internships/placements	How would you rate the opportunity to acquire green skills based on the following educational elements at your university? [1 - in none, 2, 3, 4, 5 - fully] – study plans – learning outcomes – internships/placements
9)	To what extent do employees/trainees/interns have an environmental sensitivity* (environmentally friendly behaviour) before starting their apprenticeship/internship? [1 - in none, 2, 3, 4, 5 - fully]		

10)	<p>How beneficial would it be for your organisation to take on employees with established green skills?</p> <p><i>[1 - in none, 2, 3, 4, 5 - fully]</i></p>		
11)	<p>To what extent are you able to justify the cost-effectiveness of environmental solutions in terms of:</p> <ul style="list-style-type: none"> - economic - social - ecological <p><i>[1 none, 2, 3, 4, 5 - fully]</i></p>		
12)	<p>How would you rate your ability to find partners, e.g. business or public partners for environmental projects?</p> <p><i>[1 - in none, 2, 3, 4, 5 - fully]</i></p>		
13)		<p>What is the main area of activity of the entities where students do internships/placements and acquire green skills?</p> <p><i>1 - production</i> <i>2 - services</i> <i>3 - trading</i> <i>4 - other, which?...</i></p>	<p>What is the main area of activity of the entities where you are doing internships and acquiring green skills?</p> <p><i>1 - production</i> <i>2 - services</i> <i>3 - trading</i> <i>4 - other, which?...</i></p>
14)	<p>Has a good (environmentally and economically justified) project ever not been implemented by your organisation because of:</p> <ul style="list-style-type: none"> - lack of economic knowledge of the members of the organisation - lack of environmental knowledge among members of the organisation - lack of organisational skills - lack of persuasive skills of members of the organisation 		

	<ul style="list-style-type: none"> - lack of relationship (cooperation) skills of members of the organisation - institutional constraints - red tape (bureaucracy) - lack of appropriate legal frameworks <p>[1 - yes, 2 - no]</p>		
15)	<p>-To what extent do employees and students acquire green skills in your organisation? [1 - in none, 2, 3, 4, 5 - fully]</p> <ul style="list-style-type: none"> - engineering and technical skills - scientific literacy - broad-based and necessary for innovation - operational management skills - monitoring skills - skills required to assess compliance with technical criteria and legal standards relating to environmental protection - design thinking (realising projects based on the ability to see the source of problems and real customer/client needs) - creativity - ability to adapt to future challenges - resilience awareness of progressing climate changes and the impact of production/service processes on them <p>other, which? ...</p>	<p>To what extent do students acquire green skills on placement? [1 - in none, 2, 3, 4, 5 - fully]</p> <ul style="list-style-type: none"> - engineering and technical skills - scientific literacy - broad-based and necessary for innovation - operational management skills - monitoring skills - skills required to assess compliance with technical criteria and legal standards relating to environmental protection - design thinking (realising projects based on the ability to see the source of problems and real customer/client needs) - creativity - ability to adapt to future challenges - resilience awareness of progressing climate changes and the impact of production/service processes on them <p>other, which? ...</p>	<p>To what extent do you acquire green skills on the placement? [1 - in none, 2, 3, 4, 5 - fully]</p> <ul style="list-style-type: none"> - engineering and technical skills - scientific literacy - broad-based and necessary for innovation - operational management skills - monitoring skills - skills required to assess compliance with technical criteria and legal standards relating to environmental protection - design thinking (realising projects based on the ability to see the source of problems and real customer/client needs) - creativity - ability to adapt to future challenges - resilience awareness of progressing climate changes and the impact of production/service processes on them <p>other, which? ...</p>
16)	<p>Have you been able to generate revenue through your green economy activities. How much did they amount to annually?</p> <p>- Failed to generate</p> <p>- (amount)</p>		

17)	<p>What are the main drivers for you to work towards a green economy as a way of meeting societal needs?</p> <ul style="list-style-type: none"> - Statutory tasks - Opportunity to earn money - Cross-sectoral cooperation - Educational mission - Social mission - Other, which? ... 		
18)		<p>Do you check the effects of your courses in terms of green skills acquired? [1 - yes, 2 - no]</p>	
19)	<p>What is the biggest driver of your green transformation efforts as a source of income for your organisation?</p> <ul style="list-style-type: none"> - Statutory tasks - Opportunity to earn money - Cross-sectoral cooperation - Educational mission - Social mission - Other, which? ... 	<p>How do you measure the effects of your courses in terms of green skills acquired?</p>	
20)		<p>What weaknesses do you see in terms of improving green skills in educational programmes?</p> <ul style="list-style-type: none"> - too much theory - no link between economic and environmental issues - not enough case studies - other, which? ... 	<p>What weaknesses do you see in terms of improving green skills in educational programmes?</p> <ul style="list-style-type: none"> - too much theory - no link between economic and environmental issues - not enough case studies - other, which? ...
21)			<p>Do you recognise the learning subjects that have most enhanced your green skills?</p>

			How have they improved these skills?
22)			What subjects still need to be introduced into the study plan to improve green skills?
23)	To what extent do you perceive gaps in the green skills of trainees or university graduates? <i>- I see no shortcomings</i>		
24)		How do you shape students' ability to associate economic and environmental issues? – <i>credit/examination</i> – <i>presentations</i> – <i>case studies</i> – <i>role play</i> – <i>field activities (practical classes)</i> – <i>other what?...</i>	
25)		How do you shape students' ability to argue environmental issues with economic benefits? – <i>presentations: case studies</i> – <i>role play</i> – <i>evaluation of actors' decisions</i> – <i>field activities (practical classes)</i> – <i>other, which</i>	
26)		How do you shape students' cooperative skills? – <i>presentations: case studies</i> – <i>role play</i> – <i>evaluation of actors' decisions</i> – <i>field activities (practical classes)</i> – <i>working for social entities</i>	

27)	<p>Please indicate the frequency of your organisation's environmental activities: <i>[1 - Never, 2 - Rarely, 3 - Sometimes, 4 - Often, 5 - Always]</i></p> <ul style="list-style-type: none"> - If I design a product of my organisation, I consider its life cycle - I reduce or manage post-production waste - We buy recyclable products - Switch off lights in unused rooms - Unplug devices when not in use - We take care of small electronic and technical equipment, thus prolonging its life - When choosing electronic and technical equipment we are guided by its energy class - We use water sparingly - We use solar panels or photovoltaic collectors - We use renewable energy resources - We share equipment with others or use it on a rental basis (we do not buy) - We use the paper several times (e.g. one side printed on, we use it for the dirty copy) - We use second-hand electronic and technical equipment (e.g. leased laptop) - We use second-hand furniture, repair or refurbish it to make use of - We repair broken small electronic and technical equipment (e.g. telephone, electric kettle) - We repair large electronic and technical equipment (e.g. computers) 	<p><i>- other, which?</i></p> <p>Please indicate the frequency of your environmental activities: <i>[1 - Never, 2 - Rarely, 3 - Sometimes, 4 - Often, 5 - Always]</i></p> <ul style="list-style-type: none"> - I buy recyclable products - Switch off lights in unused rooms - Unplug devices when not in use - I take care of small electronic and technical equipment, thus prolonging its life - When choosing electronic and technical equipment I am guided by its energy class - I use water sparingly - I use solar panels or photovoltaic collectors - I use renewable energy resources - I share equipment with others or use it on a rental basis (I do not buy) - I use the paper several times (e.g. one side printed on, I use it for the dirty copy) - I use second-hand electronic and technical equipment (e.g. leased laptop) - I use second-hand furniture, repair or refurbish it to make use of - I repair broken small electronic and technical equipment (e.g. telephone, electric kettle) - I repair large electronic and technical equipment (e.g. computers) - I buy an adequate number of food items in relation to what I can eat - I do the laundry when the amount needed to load the entire washing machine has been collected 	<p>Please indicate the frequency of your environmental activities: <i>[1 - Never, 2 - Rarely, 3 - Sometimes, 4 - Often, 5 - Always]</i></p> <ul style="list-style-type: none"> - I buy recyclable products - Switch off lights in unused rooms - Unplug devices when not in use - I take care of small electronic and technical equipment, thus prolonging its life - When choosing electronic and technical equipment I am guided by its energy class - I use water sparingly - I use solar panels or photovoltaic collectors - I use renewable energy resources - I share equipment with others or use it on a rental basis (I do not buy) - I use the paper several times (e.g. one side printed on, I use it for the dirty copy) - I use second-hand electronic and technical equipment (e.g. leased laptop) - I use second-hand furniture, repair or refurbish it to make use of - I repair broken small electronic and technical equipment (e.g. telephone, electric kettle) - I repair large electronic and technical equipment (e.g. computers) - I buy an adequate number of food items in relation to what I can eat - I do the laundry when the amount needed to load the entire washing machine has been collected
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		<ul style="list-style-type: none"> - I dry my laundry in the open air - I use public transport for trips up to 30 km - I ride to work by bike - I buy clothes made from natural raw materials (cotton, silk, linen) - I collect parts of other products so that I can make the product I need from them - I use used plastic packaging for other purposes - Before throwing things away, I disassemble components that I estimate may be useful - I use a reusable bag when shopping - I share clothes I don't need with others - I buy second-hand clothes 	<ul style="list-style-type: none"> - I dry my laundry in the open air - I use public transport for trips up to 30 km - I ride to university / work by bike - I buy clothes made from natural raw materials (cotton, silk, linen) - I collect parts of other products so that I can make the product I need from them - I use used plastic packaging for other purposes - Before throwing things away, I disassemble components that I estimate may be useful - I use a reusable bag when shopping - I share clothes I don't need with others - I buy second-hand clothes
28)	Metrics Country: Number of years of operation: Legal form of social economy entity: Industry (area of activity, e.g.: ...)	Metrics Country: Age: Gender: Number of years in occupation: Position: Volunteer experience:	Metrics Country: Region: Age: Gender: Year of study: Degree: Form of study (full-time/part-time): Work experience: Volunteer experience:

In-depth interview with representatives of social economy entities

The purpose of the interview is to gather information on the factors influencing circular business decisions and to identify the importance of green skills of employees and members of social economy entities in the process of green transformation and entry of these entities into the so-called green sectors of the economy.

The interview is a part of international research conducted among social economy entities and in the higher education sector responsible for social economy education. Implementation of the research is one of the elements of the project „Harnessing the potential of the Social Economy towards a green transformation through the establishment of Socially Driven Green Labs within Universities”, whose leader is Pedagogical University of Cracow.

Questions:

1. How are green skills developed in your organization among its participants?
2. Do people in your organization have opportunities to learn green skills through special courses/workshops outside your organization?
3. What difficulties do you see in getting people in your organization to learn green skills?
4. Do you think that green skills are necessary, or are the so-called *future skills* sufficient (competences that allow solving complex problems with the use of modern digital solutions, adapting to new ways of organizing work processes; competences, which allow to adapt to new professions; competences that allow for the ability to act in a self-organizing way)?
5. Is there any area of your functional activity where green skills are particularly needed?
6. Do similar organizations as yours put emphasis on green skills development?
7. Are there any significant tangible benefits from developing green skills in your organization?
8. Does developing green skills among participants of the organization require additional financial resources?
9. What are your expectations in terms of education system (higher education, postgraduate studies) in the context of real improvement of green skills and competencies? What conditions must be met by the education system in this regard?
10. Are green skills being used to implement projects that are part of your organization's efforts to create a circular economy?
11. Is your organization pursuing partnerships with others for the circular economy and what role do green skills play in this endeavour?

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