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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.
Technical Summary

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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. *Technical Sumary*"
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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.

Chapter 1. The role of social economy entities in green transition

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-effective (Huybrechts & Nicholls, 2012). 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 needs (Light, 2008; Sharir & Lerner, 2006), distortion in the distribution of income (Bornstein, 2004), 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 organizations (Jain, 2019) 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 academia (Nyssens, 2006)[1]. 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 wealth (Dees, 1998; Drayton, 2002; Leadbeater, 1997). 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 present (Yunus, 2008; Zahra *et al.*, 2009). Therefore, social enterprise idea/concept was also vital within corporate strategies widely known as Corporate Social Responsibility, Corporate Social Innovation, or an accounting framework named the Triple Bottom Line[2]. 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 entrepreneurship (Valter *et al.*, 2017; Dart, 2004; Peredo & McLean, 2006). 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

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[1] 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; The research on social entrepreneurship started to emerge: (Boschee, 1995; Dees, 1998; Leadbeater, 1997).

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

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 units (Departament Ekonomii Społecznej i Solidarnej, 2019), 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" (Thomsen *et al.*, 2021); identified mostly within the non-profit sector (Davis, 1997; Fowler, 2000, Taylor *et al.*, 2000; Anderson & Dees, 2002; Pomerantz, 2005); as "organizations pursuing a social mission through their economic activity" (Huybrechts & Nicholls, 2013; Borzaga & Defourny, 2001; Defourny & Nyssens, 2006). Social enterprises (SE) are perceived as hybrid organizations pursuing triple 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 environment (Benevene *et al.,* 2017). 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 solutions (Kong, 2010). This kind of hybrid organizations supports engendering social capital to encourage more advanced social interactions and learning processes in societies of diverse structures (Hasan, 2005). 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" (Kong, 2019). The processes of investment and surplus reinvestment for the purpose of social, environmental and community good (Munoz *et al.*, 2015) is the core of social enterprise. This hybrid type of organization in its social, economic and environment aspects of impact in local communities (Nicholls, 2010; Weerawardena & Sullivan-Mort, 2006; Peredo & McLean, 2006; Ridley-Duff, 2008; Bull, 2008) 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" (Smallbone *et al.*, 2001). As SEs' primary focus is to use business to solve social or environmental problems (Rhoden, 2014), they apply market-based strategies to achieve social change (Arantes, 2020) (social entrepreneurship) including entrepreneurial endeavours 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, 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 makers (Jain, 2019).

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 conductive 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 endeavours to achieve social aims are through the most environmentally sustainable manners (Smith, 2005).

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" (Alvord *et al.*, 2004). Sustainable social transformation is considered to be catalysed 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 community (Smith, 2005). 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 aims, virtues, and properties that the social economy organization emerges from (Smith, 2005; Warren, 2001)[3]. 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 expectations (Alvord *et al.*,

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[3] This analysis of the role of the social economy draws on Mark Warren's typology of developmental effects of associations.

2004). 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 capital (Mair *et al.*, 2006).

Chapter 2. 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"(CEDEFOP, 2012) (Scheme 1).

Scheme 1. Reasons for the need for skills due to the transformation towards a green economy
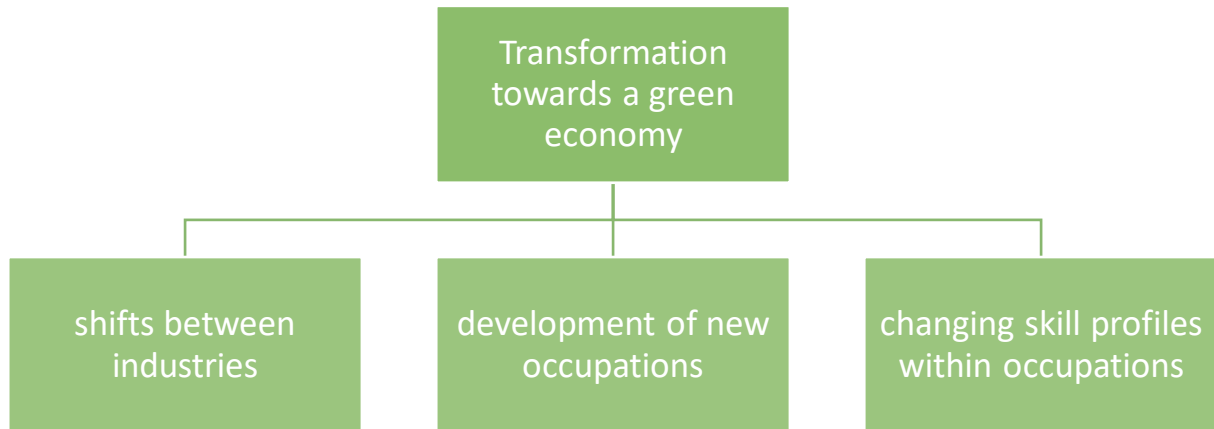
"Every job can potentially become greener. Integration of sustainable development and environmental awareness into education and training at all levels, starting from early childhood education, is an important task. It will contribute to changing consumer behaviour and triggering market forces to push 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" (Strietska-Ilina *et al.*, 2011).

The dimensions where new skills will be required are already apparent (Strietska-Ilina *et al.*, 2011) (Scheme 2).

Scheme 2. The dimensions of economy where new skills will be required

1) Knowledge - covering technical knowledge in a particular field and also knowledge about, for example, environmental regulations and resource efficient production processes, and general environmental awareness;	**2) Environmentally friendly tools** and machinery and green technological developments;
3) Understanding of sustainable (or banned) **materials** and how they are produced and handled;	**4) The production of green** and environmentally friendly **goods** and **services;**

Source: own elaboration based on: (Strietska-Ilina, *et al.*, 2011).

The new skills could be divided into three categories (OECD, 2010):

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 dimensions (Sern, 2018). 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 combination of different spheres of human functioning, not only in their professional, but also in their social dimension. Scheme 3 presents the selected definitions of green skills.

Scheme 3. 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: (McDonald, *et al.*, 2012; Arthur, 2021; OECD/CEDEFOP, 2014; LinkedIn Economic Graph, 2022).

The **core of green skills** is to build the labour 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 environment (Ragheb *et al.*, 2016).

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 management (UNEP, 2012).

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 in (Adhya, *et al.*2010). These processes need proper planning and landscaping in order to make the cities liveable 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.)
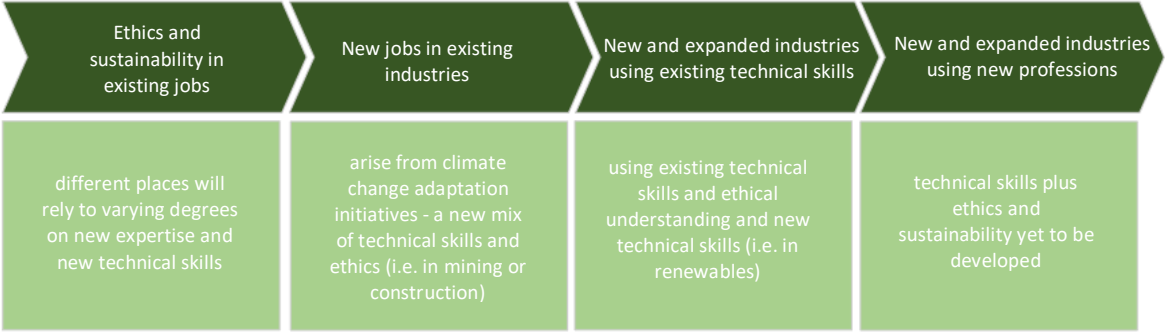
7) **Financial skill** (to control the expenditure of an organisation in order to balance up the revenue and responsibility for environmental conservation (Krechovská, 2015).

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 cycle (Bohari & Xia, 2015).

9) **Waste management skill** (the ability to reduce, reuse, and recycle waste through proper planning, implementation, and coordination of waste management system (Bozkurt & Stowell, 2016). 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 communication (Bozkurt & Stowell, 2016).

The classification indicated above does not exclude a range of other skills needed to shape the green economy. The literature also mentions (Strietska-Ilina *et al.*, 2011):

- 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;
- 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 skills (Strietska-Ilina *et al.*, 2011). 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 defined (Maclean, *et al.*, 2013). In this respect, as various authors point out, it is therefore possible to think of green skills for jobs. They will therefore include these elements (Maclean, *et al.*, 2013) (Scheme 4).
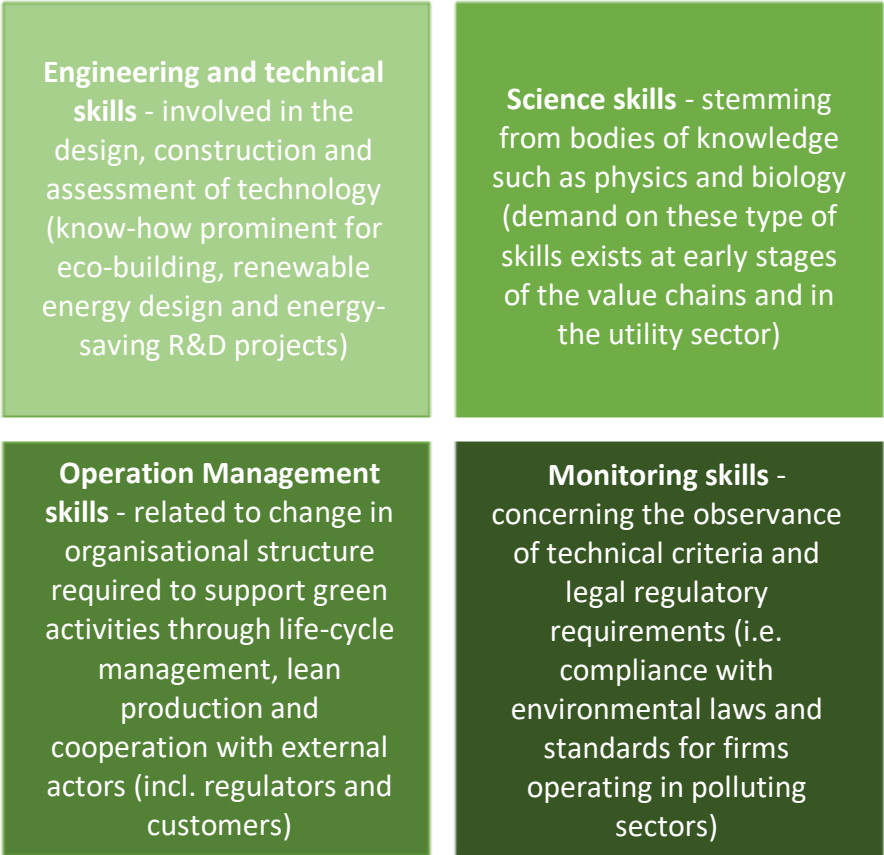
Scheme 4. Way of thinking in terms of green skills for jobs

Ethics and sustainability in existing jobs	New jobs in existing industries	New and expanded industries using existing technical skills	New and expanded industries using new professions
different places will rely to varying degrees on new expertise and new technical skills	arise from climate change adaptation initiatives - a new mix of technical skills and ethics (i.e. in mining or construction)	using existing technical skills and ethical understanding and new technical skills (i.e. in renewables)	technical skills plus ethics and sustainability yet to be developed

Source: own elaboration based on: (Maclean, *et al.* 2013).

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 Vona (Consoli *et al.*, 2015) (Scheme 5).

Scheme 5. Categories of green skills

Engineering and technical skills - involved in the design, construction and assessment of technology (know-how prominent for eco-building, renewable energy design and energy-saving R&D projects)	**Science skills** - stemming from bodies of knowledge such as physics and biology (demand on these type of skills exists at early stages of the value chains and in the utility sector)
Operation Management skills - related to change in organisational structure required to support green activities through life-cycle management, lean production and cooperation with external actors (incl. regulators and customers)	**Monitoring skills** - concerning the observance of technical criteria and legal regulatory requirements (i.e. compliance with environmental laws and standards for firms operating in polluting sectors)

Source: own elaboration based on: (Consoli *et al.,* 2015).

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 group (LinkedIn Economic Graph, 2022), 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. Pavlova (2017):

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" (Pavlova, 2017),
3) **Specialised green skills** – which are related with new green occupations.

Additionally, the sills related with green economy could concern a support of resource efficiency, low carbon industry, climate resilience or managing natural assets (HM Government, 2011).

It is possible to divide the green skills, taking into account the issue of green transition (Scheme 6), 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" (HM Government, 2011). 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 6. Green skills in transition processes to development of the green economy
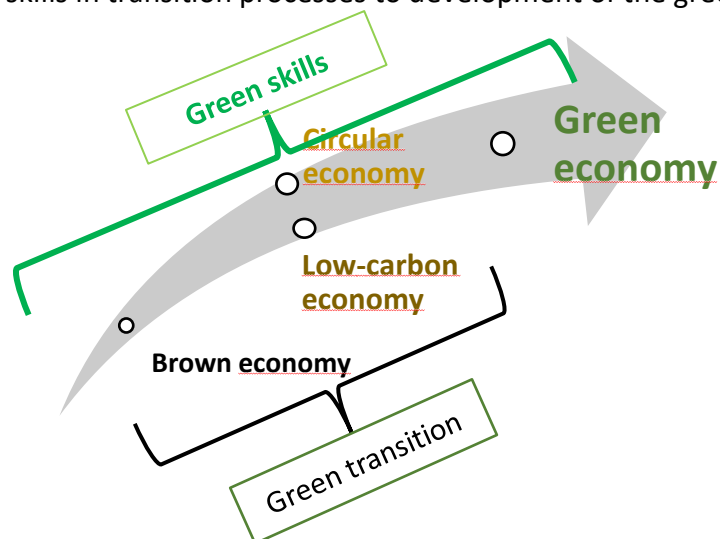
Source: own elaboration

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.

Chapter 3. 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 Council (2006). 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 abilities (Anderson & Krathwohl, 2001) also hide the potential to boost the active citizenship for sustainability (Mets *et al.,* 2021).

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 process (Douglas, 2015), 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" (Hockerts, 2018). Learning perceived both as a cognitive and a social process (Gherardi *et al.*, 1998) "requires collective and independent actions" which would deliver to learners the understanding and social spirit (Branzei & Fredette, 2008; Dewey, 1938). Social learning theories disseminated via learning in the communities of practice workplaces (Wenger, 1998) have the influence on the understanding of classroom-based management education (Kolb & Kolb, 2005), and especially on social entrepreneurship education (Howorth *et al.*, 2012). According to social learning theorists, individuals acquire the knowledge through observing, imitating, and modelling other behaviours (Bandura, 1971). And the foundation of such learning are communities that provide the environment for the observation of behaviours, interactions with those involved (Wenger, 1998). Those learning communities (Graves, 1992) are intended to trigger the social relationships potential 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 process (Howorth *et al.*, 2012). Therefore, building a form of learning spaces by teachers to foster conversational learning, development of expertise, practicing and reflecting, feeling, and thinking (Hockerts, 2018). 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) (Rifkin, 2012).

There is a role of a kind of studio teaching (Barry & Meisiek, 2015) 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 observation (Kolb, 1976). The concept of these physical place to incubate ideas is founded on design thinking (Brown, 2008). 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
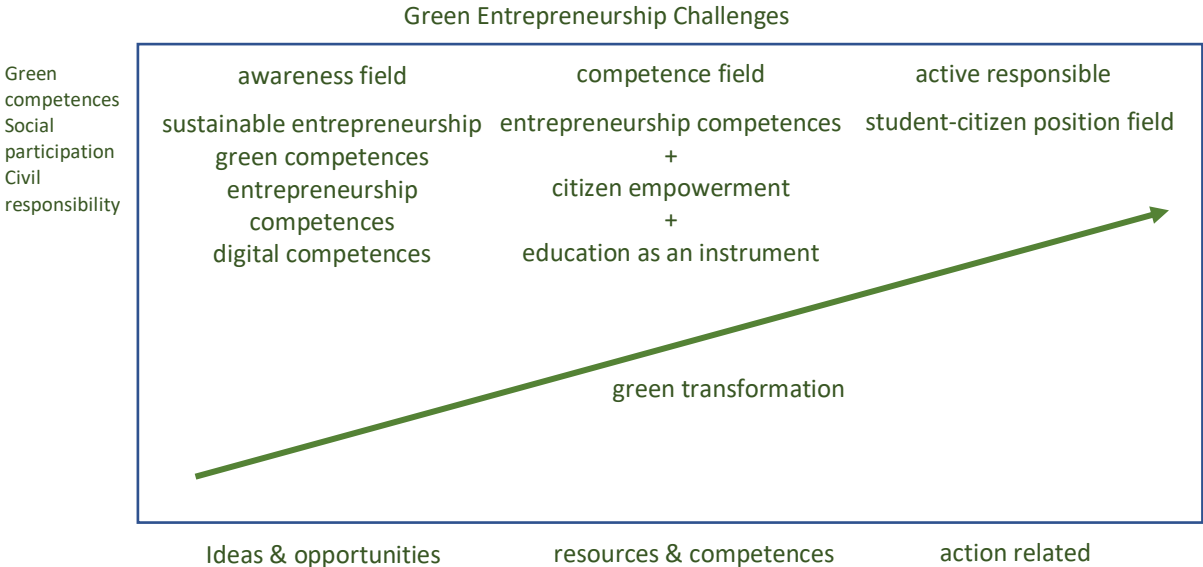
instructed to getting involved in solving a social problem, identifying social entrepreneurship opportunities for start-ups call for educational set of tools – a form of a **laboratory space**. Launching social entrepreneurship education schemes/cycles does not remain without impact on the important 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 behaviour), perceived social support (to trigger the formation of behavioural 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) (Hockerts, 2018).

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 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 skills (OECD, 2016). 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 importance (Bossel, 1999). 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).

Chapter 4. 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 7.

Scheme 7. Conceptual model of evolving toward sustainable entrepreneurship with the emphasis on citizens' green competences

Green Entrepreneurship Challenges

Green competences Social participation Civil responsibility	awareness field sustainable entrepreneurship green competences entrepreneurship competences digital competences	competence field entrepreneurship competences + citizen empowerment + education as an instrument	active responsible student-citizen position field
		green transformation	
	Ideas & opportunities	resources & competences	action related

Source: Authors' own elaboration on (Mets *et al.*, 2021).

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 change (Oyero *et al.*, 2015). Majority of people do not recognize the causes of pollution (2012, 2015, 2001) (National Environmental Education and Training Foundation, 2001; Asia Foundation, 2012). The largest survey of public opinion on climate change covering 56% of the world's population - Peoples's Climate Vote (Flynn *et al.*, 2021) 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 18 (Flynn *et al.*, 2021)[4].

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 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-

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[4] "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".

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 world (Rifkin, 2012).

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, evaluation (Malberg *et al.*, 2017). 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 businesses (Malberg *et al.*, 2017). 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.

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.

Chapter 5. Research results analysis

5.1. 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.

– 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.

5.2. Green skills in Social Economy Enterprises

Within the research 81 of Social Economy Enterprises (hereinafter referred to as: SEE or Entities) took part. 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.

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. 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 1). 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 1. 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 2). 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 2. 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%). These values are similar to the results of previous studies (Szczygieł, 2020).

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 this question 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).

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). In this question 8 skills were assessed[5]. When broken down by country, the results are not so clear-cut (Table 3). 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).

Table 3. 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**
Std. dev.	(*1.12*)	(*1.18*)	(1.15)	(1.10)	(1.23)	(1.25)	(1.16)	(1.28)

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).

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

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[5] 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.

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) (Table 4).

Table 4. 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**
Std. dev.	(*1.13*)	(*1.21*)	(*1.26*)

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

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 5).

Table 5. 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).

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.

5.3. Green skills among Higher Education teachers

Within the research of 33 respondents from the group of higher education teachers (hereinafter referred to as: teachers) who took part in the questionnaire, men predominated (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).

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.

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 6). 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 6. 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 7). 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 7. 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%). 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).

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).

Respondents rated appropriate study plans as the highest opportunity to acquire 'green skills'. 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 8).

Table 8. 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**
Std. dev.	(*1.2*)	(*1.17*)	(*1.08*)

Note: In () - standard deviation
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). In this question 8 mentioned that skills were assessed. When broken down by country, the results are not so clear-cut (Table 9). 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).

Table 9. 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**
Std. dev.	(*1.12*)	(*0.96*)	(0.79)	**(1.14)**	(1.02)	(1.05)	(0.81)	(0.91)

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

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. 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. Teachers shape the students' ability mostly due to use 'case studies' (57.6%) or 'presentations' (45.5%).

Analysing the data, 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%). As a second tool, teachers indicated 'evaluation of actors' decisions' (39.4%). Shaping students' cooperative skills, teachers mostly use also 'case studies' in form of presentations (42.4%) and 'practical classes' (30.3%). Among the most popular tools there is also 'evaluation of actors' decisions' (27.3%) which underlines the practical dimension of used tools. 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.

5.4. Green skills among Higher Education students

Within the research of 141 respondents from the group of higher education students (hereinafter referred to as: students), 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 Ist 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).

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. 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%) (Table 10). 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 10. 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 11). 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 11. 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'. 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%.

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).

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).

Respondents rated appropriate learning outcomes and study plans as the highest opportunity to acquire 'green skills'. 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 12).

Table 12. 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**
Std. dev.	(*0.88*)	(*0.82*)	(*1.17*)

Note: In () - standard deviation
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). In this question 8 mentioned skills were assessed. When broken down by country, the results are similar (Table 13). 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).

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	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**
Std. dev.	(*1.20*)	(*1.07*)	(*1.02*)	(*1.09*)	(*1.08*)	(*1.16*)	(*1.07*)	(*1.08*)

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. Almost a half students saw this weakness (49.6%). Students complained also of not enough number of case studies (34.04%).

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).

5.5.   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'. Table 14 presents the results as a frequency of given responses: 'yes', 'no', and 'I don't know'.

Table 14. Knowledge of the term 'green skills' among the target groups [in %]

	Yes	No	I don't know
SEE	65	23	11
HE Teachers	48	39	12
Students.	34	40	26

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 Chi^2 Pearsons test confirm alternative hypothesis[6] (p=0.00019).

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[6] Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

Table 15. Identification of term 'green skills' among the target groups [in %]

	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
SEE	30	32	35	30	30	65
HE Teachers	27	33	33	18	18	82
Students	27	17	36	31	31	70

Sources: own elaboration

Table 15 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 Chi^2 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).

Table 16. Sources of come across of term 'green skills'

	study programme	scientific papers	academic conferences	press	social media	television	other
SEE	15	28	16	22	32	5	21
HE Teachers	12	45	.21	21	27	9	12
Students	41	16	5	8	33	7	2

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 Chi^2 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'.

Table 17. Knowledge of the term 'circular economy' among the target groups [in %]

	Waste reduction	Natural resources reusing	Recycling and recovery of materials	Isolates the national economy from other economies	Use only what has been already used in products
SEE	32	46	79	1	15
HE Teachers	39	45	76	9	15
Students	35	60	72	3	21

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' (Table 19). 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) (in both 3.11; in HE Teachers it amounted 2.51. The Kruskal-Wallis ANOVA results allowed to reject of the null hypothesis of no difference[7] between groups (p=0.0155). In other words, the 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 (Table 18).

Table 18. 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
SEE	2.05	2.22	2.43	2.35	2.97	3.40	3.51	3.49
HE Teachers	2.83	2.58	3.09	2.75	3.30	3.28	3.45	3.40
Students	2.56	2.85	2.96	3.13	3.29	3.38	3.56	3.67

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 19. Results of Kruskal-Wallis ANOVA test in the scope of functional areas of enterprises related with needed extending of 'green skills'

	p-value
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

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[7] Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

The Kruskal-Wallis ANOVA results allowed to reject of the null hypothesis of no difference[8] between groups in four cases (*p-value* marked on bold). In other words, in these four dimensions there are statistically significant differences between groups.

5.6. 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 20).

Table 20. Summary of research hypothesis

hypothesis	decision
H_1: 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).	*accepted*
H_2: 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.	*partially rejected*
H_3: 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.	*accepted*

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

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[8] Tested hypothesis: H_0 – no difference between features, H_1 – existent difference between features.

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 *H_2* **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 centres provide support for skills formation as a driver of green transformation. The research results indicate that the HE Teachers and Students 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 parts. The third research hypothesis *H_3* can thus **be accepted.**

Chapter 6. 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.

S***DG 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 vivant 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 conductive 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 endeavours 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 centres 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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