Monitoring the twin transition of industrial ecosystems

PROXIMITY AND SOCIAL ECONOMY

Analytical report

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Executive summary

Measuring performance and monitoring change within an industrial ecosystem are vital components that enable policymakers and industry stakeholders to track progress over time and obtain valuable feedback on whether the system is moving in the desired direction. This report is a contribution to the 'European Monitor of Industrial Ecosystems' (EMI) project, initiated by the European Commission's Directorate General for Internal Market, Industry, Entrepreneurship, and SMEs, in partnership with the European Innovation Council and SMEs Executive Agency (EISMEA). Its primary objective is to present the current state and the advancements achieved over time in terms of the green and digital transition of the **Proximity, Social Economy and Civil Security Industrial Ecosystem**. From here on, referred to as the PSE ecosystem.

The **proximity economy** has been defined as a way of organising the economy around direct relationships with the objective of creating growth not solely in terms of financial capital, but also of social capital and contributing to the well-being and sustainability of our societies. The **social economy** has been defined as encompassing organisations placing people and social and/or environmental purpose over profit, reinvesting profits to carry out activities in the interest of their members and/or users, or society at large, in quality services, jobs, and in the sustainable development of the communities in which they operate, following democratic and/or participatory governance principles. Social economy organisations can take the form of cooperatives, mutual benefit societies, foundations, associations (including charities), and social enterprises.[1] [2]

Key findings about the green transition

The proximity and social economy by definition includes a broad range of activities that address critical environmental challenges and provide alternatives to mainstream production and consumption of goods. There is a strong link between the proximity and social economy, which comprises many entities that are strongly rooted in local communities and cautious about their environmental impact in these, and the concept of a circular economy which encompasses products and services that extend the lifespan of materials and products and the reuse and recycling of them.

The proximity and social economy as a whole have various negative impacts on the environment including greenhouse gas emissions, land use and water use, where trends are being shaped by the sub-sector of residential care activities and social work activities, followed by retail, accommodation, and food. Environmental impacts in this project were analysed based on Exiobase data. It was found that the ecosystem was responsible for 6.2% of greenhouse gas emissions and 5.75% of materials extraction in all industrial ecosystems focused on in this project in 2021. The impact over time shows a positive development (less environmental burden) between 2012 and 2015 but the negative impact has slightly been increasing in absolute volumes since then.

Social economy organisations have been pioneers in ecological innovation and are key contributors to the green transition of other industrial ecosystems as the above analysis also demonstrated. Both the proximity and social economy have been driving green innovations in the areas of low-carbon production (renewable energy cooperatives), circular economy, and sustainable production and consumption.

The social economy itself has to find ways to green its operations. The survey conducted in the framework of this project found that 29% of the respondents invested in environmental measures regarding their own operations over the past five years. More specifically:

- 17.8% of the respondents invested in renewables over the past five years,

[1] https://single-market-economy.ec.europa.eu/sectors/proximity-and-social-economy/social-economy-eu/social-enterprises_en.

[2] European Commission (2021). Social Economy Action Plan, December 2021.

- 10% of the respondents adopted energy saving technologies,
- recycling technologies and also more specifically recycled materials have been adopted by 9.4% of the organisations,
- 15.6% of the respondents adopted resell and reuse business models,
- 12% implemented actions in the field of remanufacturing,
- repair and maintenance services were adopted by 7.4% of the organisations,
- transparent supply chains represent a lower share but with the development of the digital product passport and related regulations, there is a potential for this field.

According to calculations based on Net Zero Insights and Crunchbase, venture capital and social impact investment in innovative economy organisations has steadily increased in recent years, peaking in 2021. **This trend means an estimated €3.7 bn of total cumulative capital invested into twin transition social-goal oriented organisations in the EU27 since 2015.**

Environmental skills are important enablers of the green transition of the ecosystem. Among professionals registered on LinkedIn and employed in the social economy (more specifically in civic, social and non-profit organisations), 5.31% indicate to possess at least one type of green skill, which is a relatively good result and due to the fact that many social economy organisations are environmentally focused by definition.

Key findings about the digital transition

The progress made towards a digital transformation of the proximity and social economy varies greatly among the organisations in the sector. While some organisations have been able to seize the opportunities offered by the digital transformation, **the ecosystem as a whole can be characterised as a laggard in digitalisation,** having only slightly adopted digital tools, often lacking the financial means to invest in digital technologies. The social economy is not a key driver of the digital transition, however, there are **some pioneers in digital solutions such as digitally enabled sharing economy, open source and 'tech for good' (the deliberate use of technology to positive social benefit) communities**. Overall, there is a higher use of digital platforms among social economy organisations as compared to advanced technologies. In contrast to the social economy, there is little evidence on the impact of the digital transition on the proximity economy. One trend that could be identified with the potential to drive the digital transition concerns smart city initiatives.

The number of **newly created innovative social economy organisations with a digital profile has significantly increased since 2010**. In 2020 and 2021, in the midst of the Covid-19 pandemic, social entrepreneurship gathered pace as social needs also increased, including in the context of digitally enabled innovations.

The survey conducted as part of the project found that **25% of the social economy organisations participating in the interviews had increased their investments dedicated to digital technologies** during the past five years. The detailed results reveal that even the adoption of basic digital technologies such as online platform and IT software is relatively low among the respondents.

- 13.6% adopted cloud technologies
- Internet of Things technologies embedded in products have been adopted by 7.4% of the respondents.
- The use of AI and big data is quite low close to 3%.
- The use of blockchain technologies was adopted only as part of payment and financial transactions according to the feedback of the interviewees.
- Augmented and virtual reality, robotics and digital twins are almost not present at all.

Own analysis based on Horizon 2020 data find a total investment in social economy pre-selected topics of €211m. In those projects with participation by social economy organisations, technological investments are made predominantly in Artificial Intelligence.

The total Horizon 2020 investment in proximity economy pre-selected topics is €907m and focuses on urban development.

The development of digital skills in the social economy faces a number of challenges that are important to foster the digital transition of the ecosystem. Among professionals registered on LinkedIn and employed in the social economy (more specifically in civic, social and non-profit organisations), **5.31% indicate to possess at least one type of green skill and 6.53% to have at least one advanced digital skill.**

The most mentioned advanced digital skill is related to cloud technologies, followed by artificial intelligence. The low prevalence of skills related to augmented and virtual reality (AVR), robotics, big data and IoT among social organisations aligns with findings on the uptake and use of these technologies.

The **share of online job advertisements that required any form of moderate digital skills (excluding basic IT office skills) was 16.04% over the period from 2019-2022, while this percentage was 8.29% for advanced digital skills.**

1. Introduction

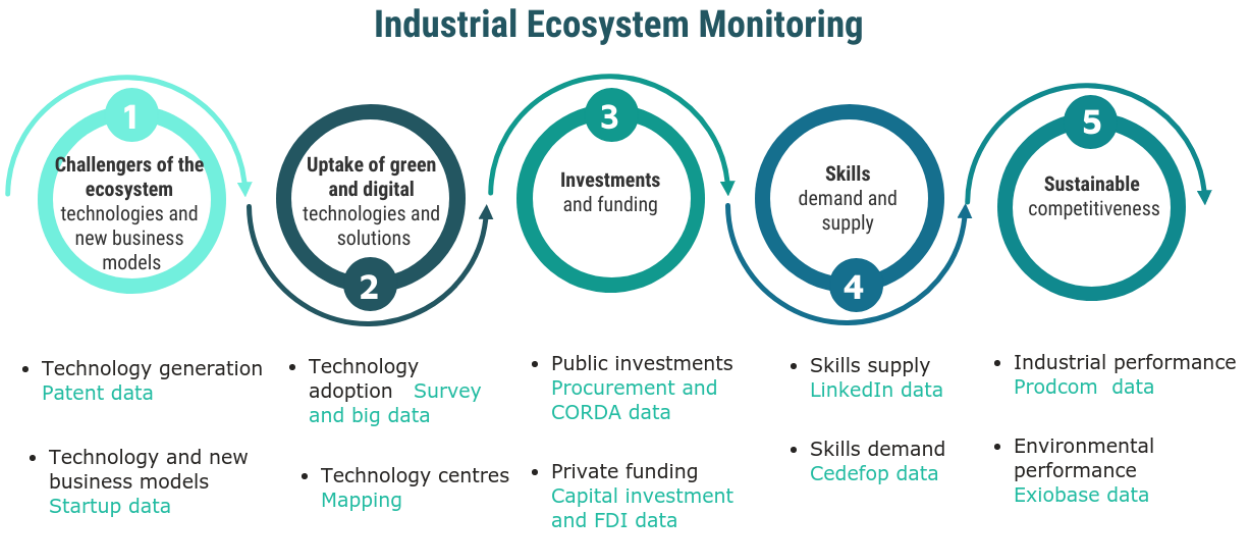
1.1 Objectives

This report has been prepared within the '**European Monitor of Industrial Ecosystems' (EMI)** project, initiated by the European Commission, Directorate General for Internal Market, Industry, Entrepreneurship and SMEs and the European Innovation Council and SMEs Executive Agency (EISMEA). The overall objective of the project is to **contribute to the analysis of the green and digital transformation of industrial ecosystems** and progress made over time.

The EU's updated industrial strategy[3] has identified 14 industrial ecosystems[4] – one of them being **'Proximity, Social Economy and Civil Security'** - that is in the focus of this report. The industrial strategy defined industrial ecosystems as encompassing all players operating in a value chain: from the smallest startups to the largest companies, from academia to research, service providers to suppliers. The notion of ecosystems captures the complex set of interlinkages and interdependencies among sectors and firms across the EU. Industrial transition is driven by technological, economic, and social changes, and in particular by green and digital technologies and the shift to the circular economy. To make transition sustainable, technological change needs to be coupled with new business models, the necessary investments, skills, regulatory framework conditions and behavioural change across the ecosystem.

Measuring performance and change is vital to allow policymakers and industry stakeholders to track progress over time and get feedback whether the system is moving in the desired direction. To measure performance, a dedicated **monitoring and indicator framework** has been set up for the purposes of this project with an aim to capture them in regular intervals (see the overview of the monitoring framework in Figure 1).

Figure 1: Overview of monitoring industrial ecosystems and relevant data sources



Source: Technopolis Group, IDEA Consult and Fraunhofer ISI

[3] European Commission (2020). A New Industrial Strategy for Europe, COM/2020/102 final and European Commission (2021). Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery, COM(2021) 350 final

[4] The 14 industrial ecosystems include: construction, digital industries, health, agri-food, renewables, energy intensive industries, transport and automotive, electronics, textile, aerospace and defense, cultural and creative culture industries, tourism, proximity and social economy, and retail

The indicator framework includes a **set of traditional and novel data sources that allow shedding new light on ongoing transformation patterns.** The novelty of the analysis lies in the exploratory and innovative data sources used across the different chapters. Due to its effort to analyse industrial ecosystems using a more or less standardised set of indicators, the study cannot address all aspects of the green and digital transition. Therefore, additional analysis and industry-specific data sources should be used to supplement a full assessment.

The **methodological report** that sets the conceptual basis and explains the technical details of each indicator is found in a separate document uploaded on the EMI website. Moreover, some of the specific industry codes used throughout this analysis have been also included in Appendix B. The green and digital technologies considered in this study are presented in Figure 2.

Figure 2: Main technologies monitored in the project

Green transformation
Advanced Sustainable Materials
Biotechnology
Energy Saving technologies
Clean Production technologies
Renewable Energy technologies
Solar Power
Wind Power
Other (geothermal, hydropower, biomass)
Recycling technologies
Circular business models

Digital transformation
Advanced Manufacturing & Robotics
Advanced Manufacturing
Robotics
Artificial Intelligence
Augmented and Virtual Reality
Big Data
Cloud technologies
Blockchain
Digital Security & Networks/ Cybersecurity
Internet of Things
Micro- and Nanoelectronics & Photonics
Online platforms

Source: Technopolis Group, IDEA Consult and Fraunhofer ISI

This report contributes to the analysis of the **key pillars put forward in the 'Blueprint for the development of transition pathways'**[5] of the Industrial Forum developed in 2022.

1.2 Definitions and scope

For the purpose of this study, the **social economy** is defined as encompassing organisations placing people and social and/or environmental purpose over profit, reinvesting profits to carry out activities in the interest of their members and/or users, or society at large, in quality services, jobs, and in the sustainable development of the communities in which they operate, following democratic and/or participatory governance principles. Social economy organisations combine societal goals with an entrepreneurial spirit. At a European level, there is no single legal form for social economy organisations. Social economy organisations can take the form of cooperatives, mutual benefit societies, foundations, associations (including charities), and social enterprises.[6] [7]

SMEs constitute 99.9% of proximity and social economy organisations. Social economy is known to be present in almost every sector and industrial ecosystem, albeit with a different

[5] https://ec.europa.eu/docsroom/documents/49407/attachments/1/translations/en/renditions/native

[6] https://single-market-economy.ec.europa.eu/sectors/proximity-and-social-economy/social-economy-eu/social-enterprises_en.

[7] European Commission (2021). Social Economy Action Plan, December 2021.

organisational and business model compared to conventional enterprises. Besides some specific activities are known to be specifically developed by the social economy such as work integration of socially disadvantaged people (including people with disabilities), personal social services, local development of disadvantaged areas, and other activities such as recycling, environmental protection, and consumer protection[8], but also construction, agri-food, tourism, mobility and transport.

There are some limitations regarding defining the scope of the social economy. As the European Commission's (2020) report on 'Social enterprises and their ecosystems in Europe' points out "*there is no one sole definition of social entrepreneurship or social entrepreneur, nor is there one correct way to use the terms*". Social economy enterprises operate in many industries. However, statistical offices collect data by sector, not by type of enterprise. Moreover, not all organisations are registered as enterprises (but, e.g., as associations) and therefore do not have to report a balance sheet, resulting in even less official data. The identification of social economy organisations is further complicated by the lack of internationally comparable legal forms. Only a few EU Member States (such as France and Greece) have a specific legal structure or an explicit definition of social economy organisations in place. The place of the social economy and its recognition in the overall economy varies significantly across Member States.

The **proximity economy** is defined as a way of organising the economy around direct relationships with the objective of creating growth not solely in terms of financial capital, but also of social capital and contributing to the well-being and sustainability of our societies. The key features of the proximity economy are the geographical dimension, namely local and short value chains, and the organisational dimension, i.e. direct relationships in terms of coordination, social and relational perspective. Examples of such activities are including but not limited to personal and contact services, small shops, bars and restaurants, repair, cleaning, and maintenance services. Hence, it is often a driver for local growth.[9] The proximity economy also acts as the 'last-mile' delivery of goods and services of many of the ecosystems to the local businesses and citizens. Cities are hubs of the proximity economy, as they foster human centric city models (such as the 15-minutes city), local and short value chains, and enhance innovation, economic and social cohesion. Civil security services (fire fighters, police forces, emergency teams, etc.), are not included in this ecosystem, although subsumed under it in some sources.[10]

The proximity economy shares some characteristics with the social economy, notably both refer to largely locally rooted, short value chains for mainly local production and consumption.[11] Hence, the **intersection of the proximity and social economy has at its core the development and the needs of the local community**. An interesting intersection between the two ecosystems in terms of social and relational perspective is cooperatives, community-based organisations and partnerships in the entrepreneurial field which are characterised by local re-investment, organised collective action, common interests, and solidarity principles. Cooperatives can be found across various sectors, notably in agriculture, manufacturing, banking (e.g., Crédit Agricole in France, the co-operative bank of Ipeirou Co-op. LL in Greece[12] as well as Volksbanken in Germany[13] and Austria[14]), health care, insurance, and social services.

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[8] EC, 2021, SWD, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem; European Commission, 2021, Annual Single market report 2021, SWD(2021) 351 final; https://single-market-economy.ec.europa.eu/sectors/proximity-and-social-economy/social-economy-eu/social-enterprises_en.

[9] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.

[10] Ibid.

[11] Ibid.

[12] https://www.este.gr/en/members-of-the-association/full-members/25-co-operative-bank-of-ipeirou-co-op-ll.

[13] https://www.bvr.de/About_us/Cooperative_Financial_Network.

[14] https://www.raiffeisen.at/de/meine-bank/raiffeisen-bankengruppe.html.

Given the lack of a clear definition and proper data collection for the proximity and social **economies by national authorities, the opportunities for data analyses are limited.** For the social economy, secondary data exist that shed light on their interlinkage with the twin transition. Such data largely stems from surveys of organisations in the ecosystem carried by interest groups and researchers. As part of this study, a dedicated survey of SMEs (organisations in the case of PSE) was also carried out. The findings of the study survey, and secondary data from surveys presented in other studies are clearly indicated in this report. For the proximity economy, no existing survey data could be identified. Given the intersection between the two ecosystems in terms of their entities' governance structure, goals, and local rootedness however, some evidence for the social economy also relates to the intersection with the proximity economy. Where applicable, this will be discussed. For trends and developments in the most innovative, entrepreneurial, and technology-prone segment of the social economy, Crunchbase and Net Zero Insights (including green organisations) is a highly relevant source, that is exploited in the following chapters. However, this analysis only covers a fraction of the entire social economy sector, given that these databases do not cover social economy organisations as a distinct category that one could filter for. Hence, social economy organisations such as cooperatives that often rely on their own revenues instead of seeking external financing will be severely underrepresented in this part of the analysis. For the proximity economy, it was not possible to produce comparable statistics given the difficulty to define its scope based on the filters and keywords available in the statistical databases used.

1.3 Industry state of play

According to data from 2017, the **social economy** comprises 2.8 million enterprises in the EU27, 10% of all businesses, and provides over 13.6 million paid jobs in Europe (6.3% of the EU's workforce).[15] Taken together, the proximity and social economy **ecosystem** is estimated to account for 6.54% of EU GDP.[16] This figure can vary from 1.8% in Poland to 10% in France and Spain.[17] The importance of the social economy in terms of paid employment is strongest in North-Western Europe, and lowest in Central and Eastern Europe.[18]

The **Covid-19 pandemic** has heavily disrupted the proximity and social economy ecosystem. As a result of the measures imposed under the first lockdown (March-May 2020), the majority of European countries closed non-essential shops, leaving only food sales points (e.g., supermarkets, corner shops), pharmacies and other essential sale points open. A lot of the proximity economy and social economy relies on personal interaction. Hence, parts of the sector were threatened by non-local e-commerce businesses, while other proximity and social economy organisations identified e-commerce as an opportunity for themselves. While many businesses were not able to adapt, others did adapt, e.g., by serving their target groups online.[19] The European Social Enterprise Monitor (ESEM) shows that during the Covid-19 pandemic, 58.3% of ESEM social economy organisations helped target groups affected by the crisis. While 37.4% developed new products/services, 32.1% digitised their existing offers.[20] Those social economy activities most relevant for sanitary and social needs exhibited a spike in demand.[21]

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[15] EESC, 2017, Recent Evolutions of Social Economy – Study.
[16] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.
[17] Ibid.
[18] UN, 2018, Satellite Account on Non-profit and Related Institutions and Volunteer Work Handbook, https://unstats.un.org/unsd/nationalaccount/docs/UN_TSE_HB_FNL_web.pdf.
[19] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final, p. 5.
[20] Dupain, W., Scharpe, K., Gazeley, T., Bennett, T., Mair, J., Raith, M., Bosma, N., 2022, "The State of Social Enterprise in Europe – European Social Enterprise Monitor 2021-2022". Euclid Network.
[21] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final, p. 5.

In past crises, the social economy has proven more **resilient** than conventional for-profit models, possibly due to its democratic governance model and more risk-averse nature.[22] However, certain **vulnerabilities** remain in the ecosystem as demonstrated by the Covid-19 crisis, including limited security liquidity and recapitalisation options[2324] and a lack of digital agility in many social economy organisations.[25] Moreover, Covid-19 strongly affected both, target groups and providers, in the social services and social housing sectors. Organisations in the proximity economy were affected similarly, particularly in terms of liquidity and recapitalisation, digital agility, and discontinued service contracts.[2627]

It is estimated that the proximity and social economy lost equity worth between €52 bn and €87 bn during the pandemic.[28] Other than textiles, the ecosystem showed the lowest business confidence in October 2021.[29] As a positive consequence of the pandemic, trends regarding social impact initiatives and related investments have been accelerated. Similarly, in the proximity economy, positive trends and the popularity of concepts such as "buy local" have also increased.[30]

Aside from the Covid-19 crisis, soaring energy prices, as well as general inflation and rising costs of living strongly affect the social economy ecosystem.

The organisation Social Enterprise UK confirms that, like most businesses, social economy organisations are concerned about rising costs and inflation. Particularly in procurement, an increase in costs is not met by changes in contract fees.[31] Rising energy prices affect owners of buildings and public services (often local authorities) such as social housing facilities and often energy companies/organisations in their capacity to provide adequate services to their target groups.[32] Hence, many social economy organisations face pressures in continuing their services, sometimes in parallel with a need to expand on them to meet increased demand, e.g. in their provision of services, such as energy advice.[33]

In an open letter of the organisation "Social Economy Europe" to European Commission President Ursula von der Leyen, the organisation stresses the important role of social economy organisations in facing the current energy crisis and the war in Ukraine: Social entities not only produce and distribute renewable energy, but they also support households in improving their energy efficiency. Moreover, entities in this ecosystem can provide social services and job opportunities to those fleeing from Ukraine or those internally displaced within their country.[34] Moreover, the social economy can provide support to those worst affected by the cost-of-living crisis.[35] The organisation "Social Services Europe (SSE)" also wrote an Open Letter to express concerns regarding the pressure arising from the rising of the energy costs and the cost-of-living crisis, demanding

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[22] Birchall, J., & Ketilson, L. H., 2009, Resilience of the cooperative business model in times of crisis. International Labour Organisation.
[23] European Association of Service Providers for Persons with Disabilities, 2020, The impact of COVID-19 on disability services in Europe'.
[24] Organisation for Economic Co-operation and Development, 2020, Social economy and the COVID-19 crisis: current and future roles. OECD Publishing.
[25] Dupain, W., Pilia, O., Wunsch, M., Hoffmann, P., Scharpe, K., Mair, J., Raith, M., Bosma, N., 2021, The State of Social Enterprise in Europe – European Social Enterprise Monitor 2020-2021, Euclid Network.
[26] Housing Europe, 2021, The state of housing in Europe 2021, URL: https://www.stateofhousing.eu/#p=18.
[27] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.
[28] Ibid.
[29] Business and Consumer Survey, European Commission (2021). European Commission analysis based on data by the Joint Harmonised EU Programme of Business and Consumer Surveys.
[30] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final, p. 5.
[31] https://www.socialenterprise.org.uk/thought-leadership/cost-of-living-crisis-social-enterprise-advisory-panel-members-want-structural-economic-reform-not-just-one-off-handouts/.
[32] https://cor.europa.eu/en/news/Pages/COTER-22112022.aspx.
[33] https://www.powertochange.org.uk/news/new-support-for-community-businesses-facing-cost-of-living-crisis/.
[34] https://www.socialeconomy.eu.org/2022/09/12/see-open-letter-to-ec-president-social-economy-solutions-to-multiple-crisis/.
[35] https://www.socialenterprise.org.uk/news/social-enterprise-uk-statement-on-inflation-and-the-energy-crisis/.

financial support from the public authorities to protect the capacity and resilience of social service providers.[36]

This report is structured as follows:

1. The present section 1 makes an attempt to define the scope of the proximity and social economy ecosystem and describes some of its key characteristics and its status within the European economy. It is based on desk research and interviews carried out with ecosystem experts.
2. Section 2 describes the way the digital and green transitions (the twin transition) are affecting the ecosystem and how, vice versa, the ecosystem complies/reacts to these transitions. It also considers the progress made in the ecosystem towards the twin transition in terms of technology and solution adoption. The section includes examples of organisations in the ecosystem at the forefront of the digital and the green transition. It is based on desk research, interviews carried out with ecosystem experts and on analysis of data collected from Crunchbase and Net Zero Insights on the profile of the ecosystem.
3. Section 3 presents findings from a survey conducted for this study on the uptake of technologies relevant for the twin transition.
4. Section 4 looks at investment levels and availability of funding and skills as key ingredients for a successful transition of the ecosystem. This section draws on desk research, data from Net Zero Insights and LinkedIn.
5. Section 5 considers the performance of the ecosystem in terms of environmental standards and zooms in on the contribution of the ecosystem to building a circular and low-carbon economy. The section draws on desk research, expert interviews and data from the International Standards Organisation (ISO), Eurostat and Exiobase.
6. Section 6 looks at the ecosystem's resilience to external shocks and will be added to the report at a later stage.

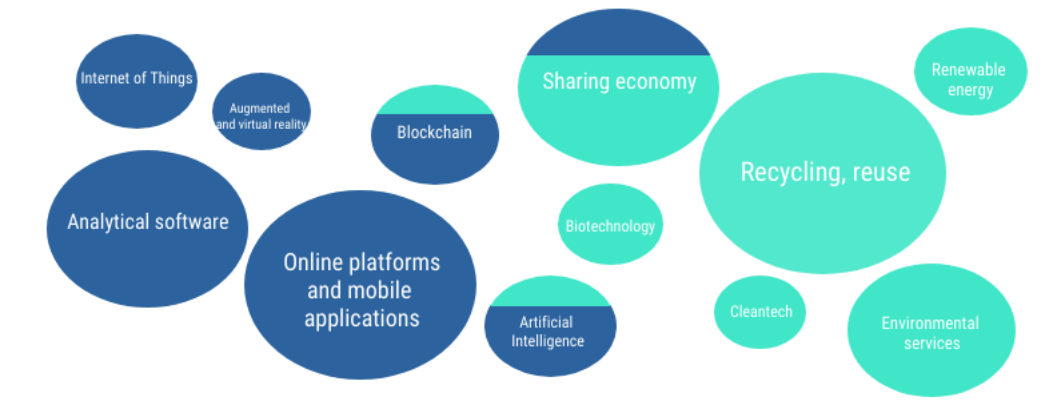
[36] https://www.socialserviceseurope.eu/letteronenergycosts

2. Technological trends in the proximity and social economy

Key findings

There is a major degree of diversity in terms of how digital and green technologies impact social or proximity economy entities and vice versa, depending on the sub-industry in which they operate. In general, **social economy organisations are characterised by a low digitalisation level, but there are frontrunners taking advantage of digital solutions** such as platform technologies, mobile apps, and also more advanced technologies such as artificial intelligence or blockchain. Overall, there is a higher use of digital platforms among social economy organisations as compared to advanced technologies.

Figure 3: Digital and green technologies used/developed by innovative social economy organisations



Source: Technopolis Group based on Crunchbase and Net Zero Insights data, 2023

The social economy is not a key driver of the digital transition, however, **there are some pioneers in digital solutions** such as digitally enabled sharing economy, open source and 'tech for good' (the deliberate use of technology to positive social benefit) communities. In general, given the large heterogeneity of the ecosystem, social economy organisations have very different needs ranging from basic digital literacy to making use of open-source technology or AI solutions. In contrast to the social economy, there is little evidence on the impact of the digital transition on the **proximity economy**. One trend that could be identified with the potential to drive the digital transition concerns smart city initiatives.

The proximity and social economy are important drivers of the green transition of the EU economy and society. Actors of the social economy often help increase environmental awareness and acceptance for the green transition, e.g., in the case of energy communities, organisations operating in the circular economy or cooperatives in different sectors. Social economy actors are aware of their environmental responsibility and contribute to societal development goals that are related to the green transition. Often, digital solutions provide opportunities for measurement and optimisation, driving the green transition. Overall, the green and digital transitions are intertwined.

Both the proximity and social economy are **pioneering green innovations in the areas of low-carbon production (renewable energy cooperatives), circular economy, and sustainable production and consumption.**

The number of **newly created innovative social economy organisations with a digital or green profile has significantly increased** since 2010. In 2020 and 2021, in the midst of the Covid-19 pandemic, social entrepreneurship gathered pace as social needs also increased, including in the context of green and digitally enabled innovations.

2.1 Links between the twin transition and the proximity and social economy

In this chapter technological trends are investigated from the perspective of innovative proximity and social economy organisations that challenge either their own ecosystem showing new ways to green or digitalise or other ecosystems (providing them green or digital tech-based services). Next, in Chapter 3, technology uptake is analysed from the perspective of the traditional social economy organisations.

The social economy is said to be spearheading the green and digital transition by boosting new modes of entrepreneurship and regenerative growth models and by empowering communities to reap the benefits.[37] However, the contribution of the ecosystem to the digital transition is dominated by the development of new markets and business models for mainstream technologies rather than the development or adoption of high-tech technologies. The organisation Social Economy Europe (SEE) stresses the contribution the social economy makes to accelerating a fair and inclusive green and digital transition of the European economy, with organisations often being locally rooted, boosting local development, strategic autonomy, and resilience.[38]

There is a major degree of diversity in terms of how the twin transition impacts social or proximity economy entities and vice versa, with the impact **depending on the industry in which specific proximity and social economy** organisations **operate**.

In the following, we set out how the green and digital transformations of the European economy are impacting the proximity and social economy ecosystem, and, in reverse, how it is contributing to those transformations.

2.1.2 Green transition

We once again focus on the social economy here, providing insights regarding `both the proximity and social economy's role in the green transition at the end of the section.

The process of **the green transition is impacting actors of the social economy**. Social entrepreneurs seem not only to be aware of social sustainability, but also of environmental sustainability: The European Social Enterprise Monitor 2021-2022 shows that social economy organisations operate in various SDG areas related to the green transition, indicating an environmental impact on "Clean Water and Sanitation" (9.8% of respondents), "Affordable and Clean Energy" (11.3%), "Sustainable Cities and Communities" (33.6%), "Climate Action" (28.3%), "Life Below Water" (6.3%), "Life on Land" (10.7%).[39] Social economy organisations surveyed in the study also assume environmental responsibility in their own procurement and supply chains, rating the importance of environmental responsibility in this context with a value of 75.6% out of 100%.[40]

[37] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.
[38] Social Economy Europe (SEE), 2022, Towards a Council Recommendation on developing social economy framework conditions, Social Economy Europe contribution to the EC call for evidence Brussels, 29 September 2022.
[39] Dupain, W., Scharpe, K., Gazeley, T., Bennett, T., Mair, J., Raith, M., Bosma, N., 2022, "The State of Social Enterprise in Europe – European Social Enterprise Monitor 2021-2022". Euclid Network.
[40] Ibid.

The social economy has been delivering green innovations for decades. Given their primary focus on using business methods to solve social or environmental problems, social economy enterprises (as one sub-group of the social economy) apply market-based strategies to achieve social objectives such as conserving and protecting the environment.[41] With a growing number of entrepreneurs linking profit with social and sustainability objectives, the market for sustainable products and services can be expected to grow while business models, missions and ambitions are evolving. This trend may result in a growing collaboration between the social economy and mainstream business models, with the social economy emerging as a potential business partner[42]. Other important stakeholders in this regard include financing intermediaries, municipalities and regions, incubators, or the chamber of commerce.[43]

Social economy actors have the potential to pioneer new forms of organising economic activities in a sustainable manner and illustrating their economic potential.[44] Green social economy organisations not only have the potential to change the structure of the economy through sustainability but also to create and change the norms in a society which underpin sustainable development.[45] Social economy entities can play a key role in meeting the social objectives of the EU underpinned in the Green Deal.

Particularly in the **agriculture sector** the market shares of **cooperatives** are high in many European countries: 83% in the Netherlands, 79% in Finland, 55% in Italy and 50% in France.[46] Evidence from France suggests that agricultural cooperatives play an important role in the economic sustainability of rural areas.[47] Farmers' cooperatives in Europe contribute to the development of human capital and environmental sustainability in rural regions.[48] One form of agriculture cooperatives are Community Supported Agriculture (CSA), which has a positive environmental impact: Even if not certified organic, CSA often acts according to environmentally sustainable standards due to its members' support for sustainable practices. This often manifests in the recycling of water, less use of agrochemicals and pollution, and less reliance on fossil fuels.[49]

In several European countries, **energy communities** (sometimes organised as cooperatives) contribute to the roll-out of renewable energies. Energy communities are often organised as cooperatives and often provide stable energy costs and financial benefits for its members. Hence, they help increase acceptance of renewable energies in the local communities and thereby help to overcome one of the major barriers for a green transition in the energy sector. Energy cooperatives are discussed more in detail in chapter 6.

Non-profit housing providers or housing cooperatives are important players with regards to the rental housing market in several European countries. In Germany, 2.2 million dwellings are owned by housing cooperatives and in Sweden, housing cooperatives are the most common owners of multi-dwelling buildings.[50] Cooperative housing has a positive impact on people's quality of life and health and can contribute to environmental

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[41] Kowalska, K., Szczygieł, E., Szyja, P., & Śliwa, R., 2022, Green skills in the field of Social Economy

[42] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.

[43] https://op.europa.eu/en/publication-detail/-/publication/1ceb9a1d-6146-11ec-9c6c-01aa75ed71a1/language-en/format-RDF

[44] https://www.oecd-ilibrary.org/docserver/e9eea313-en.pdf?expires=1660833787&id=id&accname=guest&checksum=33DE17BE65E80D6C81FAD540EFE82E64.

[45] Anastasia Costantini – Diesis, 2019, The Potential of Social Economy in Advancing a Green Transition, in: Social economy and green transformation in the European Union: S.11.

[46] https://single-market-economy.ec.europa.eu/sectors/proximity-and-social-economy/social-economy-eu/cooperatives_en.

[47] Filippi, Maryline, 2012, *Support for farmers' cooperatives: country report France*. Wageningen: Wageningen UR, 2012.

[48] Bijman, Jos, et al., 2012, Support for farmers' cooperatives. Wageningen UR, 2012.

[49] Medici, Marco, Maurizio Canavari, and Alessandra Castellini, 2021, "Exploring the economic, social, and environmental dimensions of community-supported agriculture in Italy." Journal of Cleaner Production 316 (2021): 128233.

[50] https://www.gdw.de/der-gdw/unternehmenssparten/genossenschaften/, https://www.scb.se/en/finding-statistics/statistics-by-subject-area/housing-construction-and-building/housing-construction-and-conversion/dwelling-stock/pong/statistical-news/dwelling-stock-december-31-2021/.

sustainability and energy efficiency as criteria considered when deciding on construction and rehabilitation measures.[51] Co-housing furthermore tends to have a lower carbon and ecological footprint in comparison to conventional housing as the sharing of spaces and activities reduces the individual energy demand.[52]

Moreover, the cooperative use of technology, as well as cooperative production and financing are trends that facilitate a shift to a post-carbon society.[53] The sharing (or collaborative) economy often organises exchanges among individuals through virtual platforms.

Actors of the social economy contribute to the reuse and recycling of goods and are pioneers regarding renewable energies and sustainable agriculture.[54] The **circular and low-carbon economy** are particularly relevant as a societal goal shaping the contribution of the proximity and social economy to the green transition. For further discussion, see chapter 6.

In the context of the *just transition*, the social economy can also play an important role in training and **reskilling workers**, thus cushioning the impact of decarbonising industries.[55]

The social economy faces a couple of **challenges** in the context of the ongoing green transition that should be addressed in order for it to boost its contribution to this transformation. Substantial investment is needed for developing circular economy activities and to support local green deals, green manufacturing and remanufacturing, regeneration and renovation, and eco-innovation. Substantial investment is also needed in order to decarbonise social infrastructure.[56] Furthermore, a lack of technical skills and operational and financial capacity to scale up solutions in many proximity and social economy organisations needs to be addressed. Some social economy organisations also struggle to compete in specific markets (e.g., in waste management). In the area of social housing, cooperative housing and urban development strategies, there is an annual investment gap of EUR 57 billion, which has negative consequences on the greening of the EU housing stock.[57]

Further challenges for the social economy in the context of the green transition include (i) lack of visibility and potential of the Social Economy in the green transition, (ii) lack of convergence between green and social objectives, (iii) lack of equal footing of environmental, social and employment sectors in the context of EU-level targets for the circular economy, (iv) the Social Economy sector not being mainstreamed within circular policies, (vi) lack of investment in capacity-building in the social green economy[58] and the lack (or lack of recognition) of green skills.[59] Moreover, legislative frameworks in highly regulated sectors such as energy and waste management are not always adapted to the social economy's governance models.[60] Given that the costs of technological investments

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[51] Reyes, Alexia, et al., 2022, "Living Together for a Better Life: The Impact of Cooperative Housing on Health and Quality of Life." *Buildings* 12.12 (2022): 2099.
[52] Hagbert, P., 2019, "Co-housing as a socio-ecologically sustainable alternative?." *Contemporary Co-housing in Europe*. Routledge, 2019. 183-201.
[53] Stephanie Cesbron, Louise Evans, Neil Walmsley and James Tweed, Koen Rademaekers, Roel van der Veen, Nick Rothengatter and Jessica Yearwood, 2014, Cooperative production, financing and use of low carbon technologies, Case studies.
[54] https://www.socialeconomy.eu.org/the-social-economy/.
[55] European Commission, 2021, Building an economy that works for people: an action plan for the social economy.
[56] EC, 2021, SWD, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem; European Commission, 2021, Annual Single market report 2021, SWD(2021) 351 final, p. 155; https://single-market-economy.ec.europa.eu/sectors/proximity-and-social-economy/social-economy-eu/social-enterprises_en.
[57] Trinomics, Ricardo-AEA, 2015, Cooperative production, financing and use of low carbon technologies. Case studies, http://trinomics.eu/wp-content/uploads/2015/06/LowCarbonConcepts.pdf.
[58] European Commission, 2021, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Building an economy that works for people: an action plan for the social economy, SWD(2021) 373 final.
[59] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.
[60] Ibid.

in sectors such as mechanical recycling of plastics are high, it is difficult for social entrepreneurs to enter and be active in this field.[61]

The **proximity economy, like the social economy, has the potential to contribute to Europe's green transition**, for example, by deploying Local Green Deals that include explicit mutual agreements between the local government, its stakeholders, and its urban society–- specifically local economic actors, such as SMEs and civil society organisations–- to accelerate and scale-up a city's green transition. LGDs have a broader focus on the green transition and embrace, in addition to decarbonisation, issues such as circular economy actions, raw materials shortages, sustainable food systems, redesigning products, services and business processes in order to minimise the use of fossil energy and natural resources, reduce waste and pollution. Other relevant activities in the ecosystem include **clean and shared mobility services**, **low carbon industrial applications, sustainable (social) housing** and **local energy cooperatives**.[62] [63] The combination of social and local activities may also benefit the food system, by emphasising local production, urban farming, and fighting food waste, combining agriculture with tourism and leisure, thus also contributing to rural development.[64] In several cases activities cannot be assigned unambiguously to the social or the proximity economy, particularly if the common core of proximity and social economy, the development of the local community, is at the centre of the activity.

There is also a link between the redesign of urban spaces, in part accelerated by the trend of remote working started by the pandemic, the concept of a'15-minute city' where citizens have access to essential urban services within a 15-minute walk or bikeride,[65] and the proximity economy. These trends can be mutually reinforcing in a virtuous circle.

2.1.3 Digital transition

We firstly consider the impact of and contribution to the digital transformation of social economy organisations, before considering the relationship to the proximity economy. The following passages will first elaborate on the use of digital platforms among social economy organisations, followed by a closer look at trends related to advanced digital technologies.

Digital platform technologies can enhance social economy organisations' performance in different ways:

- Firstly, they **reduce transaction costs** and increase organisations' customer reach.[66]
- Furthermore, digital platform technologies offer social economy organisations unprecedented opportunities for networking and collaborating beyond physical reach. Digital social economy platforms can more easily foster community engagement and stakeholder collaboration. They function as intermediaries between two or more parties, facilitating exchanges and transactions. Across the

[61] Felicita Medved, 2019, The New Plastics Economy: Policy and Social Innovation, in: Social economy and green transformation in the European Union: p. 73.
[62] Trinomics, Ricardo-AEA, 2015, Cooperative production, financing and use of low carbon technologies. Case studies, http://trinomics.eu/wp-content/uploads/2015/06/LowCarbonConcepts.pdf.
[63] Stephanie Cesbron, Louise Evans, Neil Walmsley and James Tweed, Koen Rademaekers, Roel van der Veen, Nick Rothengatter and Jessica Yearwood, 2014, Cooperative production, financing and use of low carbon technologies, Case studies.
[64] Konstantinidis, C., 2016, Assessing the socio-economic dimensions of the rise of organic farming in the European Union, https://www.researchgate.net/publication/301336017_Assessing_the_socio-economic_dimensions_of_the_rise_of_organic_farming_in_the_European_Union.
[65] https://www.cnu.org/publicsquare/2021/02/08/defining-15-minute-city.
[66] Gagliardi D., Psarra F., Wintjes R., Trendafili K., Pineda Mendoza J., Haaland K., Turkeli S., Giotitsas C., Pazaitis A., Niglia F., (2020), New Technologies and Digitisation: Opportunities and Challenges for the Social Economy and Social Enterprises. European Commission, Executive Agency for SMEs, DOI: 10.2826/767888.

value chain, open digital economy platforms are used for **co-creation of content, services or products**.

- Moreover, platforms may allow for **new forms of crowdfunding and crowdsourcing**.[6768] Digital platforms have the potential to improve the adaptation (combining online shared technology with local deployment) of social and local economy actors and can enable digital skills training of workers and disadvantage people also in remote areas. They may enable local stakeholders (of the proximity economy) to connect around communal projects. In sum, digital technology has the potential to offer better engagement models for social economy actors.[69] According to a study by the Social Good Accelerator, 43% of social organisations report using platform technologies for e-learning, 35% for crowdfunding, crowdsourcing, crowdmapping.[70]
- Platforms may also be deployed to **foster new models of decision-making, control mechanisms and distributed ownership structures**. Thus, the digital transformation allows for new governance approaches, e.g., through decentralised ownership models. With new principles such as data sovereignty being integrated into platforms, beneficiaries, users, producers and consumers are granted more central roles In digital platforms. Platform cooperatives, digital platforms owned, governed and controlled by workers, are also on the rise globally. [71] According to a report by the Social Good Accelerator, 53% of social organisations report using platform technologies for **democratic participation**. [72]

In the context of a recent study for the European Commission, 93% of participating experts stated that **digital platform technology will be a key enabler in the social economy** in the next 15 years (p. 104).[73] As compared to their commercial counterparts, platform applications in the social economy are driven by social impact orientation, including participatory governance models and the empowerment of (local) stakeholders and communities.

In conclusion, digital social economy platforms may empower users, workers, associates, or customers, while fostering social capital development and promoting the creation of social value in (local) communities.[74]

While the use of **advanced digital technologies** is not as prevalent among social economy organisations as digital platforms, they do have the potential to impact the social economy in Europe. The social economy sphere can merge with the digital to create open social digital innovation.[75] The **following trends** should be highlighted in this context:

- Under the term '**Tech4good**', social economy organisations and proximity economy players, such as cities and communities, deploy advanced digital technologies, such as artificial intelligence, to achieve green or social impact

[67] Ibid.
[68] https://www.oecd.org/coronavirus/policy-responses/social-economy-and-the-covid-19-crisis-current-and-future-roles-f904b89f/#boxsection-d1e743.
[69] EC, 2021, SWD, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem.
[70] Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[71] Social Tech Academy, A framework to promote the digital jobs and skills in social economy.
[72] Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[73] Gagliardi D., Psarra F., Wintjes R., Trendafili K., Pineda Mendoza J., Haaland K., Turkeli S., Giotitsas C., Pazaitis A., Niglia F., (2020), New Technologies and Digitisation: Opportunities and Challenges for the Social Economy and Social Enterprises. European Commission, Executive Agency for SMEs, DOI: 10.2826/767888.
[74] ibid.
[75] European Commission, 2021, Annual Single market report 2021, SWD(2021) 351 final.

(*Tech4Good means the deliberate use of technology to positive social benefit*).[76] They also make technology adaptable, affordable and accessible, for example through digital commons and open-source technologies.[77]

- The impact of **open-source technologies** on the social economy is expected to be very high, given that its underlying philosophy aligns well with the values of social economy organisations.[78]
- **Blockchain-based solutions** are still in a development phase. Hence, experts expect that its contributions to the digitalisation of the social economy are currently very low. However, there are some interesting applications of blockchain, especially in the field of migration, social energy, community banking, finance and distributed democratic management, indicating that there may be valuable opportunities in its deployment.[79] Moreover, the decentralised structure of blockchain is potentially well aligned with the principles of the social economy, and cooperatives in particular.[80]
- Among social innovation organisations survey by the Social Good Accelerator, 59% report extensive use of **cloud/big data**.[81]
- The successful application of **artificial intelligence (AI)** in the social economy and proximity economy is still in its infancy, with 'AI for Good' initiatives and high-level institutional involvement driving the public discourse. While the technology offers major potential for social value, oversight and regulations are essential. Expectations among experts regarding AI in the social economy are only just forming.[82] A survey on social innovation organisations by the Social Good Accelerator found a growing interest in AI (as reported by 28%) and the Internet of Things (as reported by 14%).[83]

In the context of a recent study for the European Commission, participating experts were asked to assess several advanced technologies based on whether they expect them to "be a key enabler in the Social Economy in the next 15 years". The advanced technology (in distinction to platform technology described above) most widely considered a future key enabler in this context was open-source software and data (89% of experts agreed), big data (64%), cloud computing (61%) and AI (64%). However, Blockchain technology as well as human enhancement technology seemed less relevant in this context, with only 36% and 46% of experts, respectively, agreeing on their role as a future key enabler.[84]

In general, the role and application of digital technology depends on the sector, in which social organisations operate. In the health care sector, digital technologies (particularly tele-assistance) play an increasing role for prevention and monitoring. This sector is also heavily affected by demographic change and has limited resources at its disposal.

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[76] European Commission, 2021, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, building an economy that works for people: an action plan for the social economy.
[77] European Commission, 2021, Building an economy that works for people: an action plan for the social economy.
[78] Gagliardi D., Psarra F., Wintjes R., Trendafili K., Pineda Mendoza J., Haaland K., Turkeli S., Giotitsas C., Pazaitis A., Niglia F., (2020), New Technologies and Digitisation: Opportunities and Challenges for the Social Economy and Social Enterprises. European Commission, Executive Agency for SMEs, DOI: 10.2826/767888.
[79] ibid.
[80] Brülisauer, S. (2020). The digital social economy-managing and leveraging platforms and blockchain for a people-centred digital transformation. Liège (Belgium): CIRIEC International, Université de Liège.
[81] Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[82] Gagliardi D., Psarra F., Wintjes R., Trendafili K., Pineda Mendoza J., Haaland K., Turkeli S., Giotitsas C., Pazaitis A., Niglia F., (2020), New Technologies and Digitisation: Opportunities and Challenges for the Social Economy and Social Enterprises. European Commission, Executive Agency for SMEs, DOI: 10.2826/767888.
[83] Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[84] Ibid.

Not all social economy organisations are in a position (or willing) to pioneer and adopt advanced technology, particularly those that have not yet fully matured.[85] However, there is a potential for social organisations to collaborate with high-tech players, that are more experienced with these technologies. A study conducted by the Social Good Accelerator in 2019 found that 67% of social economy organisations report having already collaborated with Tech players and wish to continue this cooperation.[86]

Overall, most social organisations rather make use of matured technologies to achieve their societal goals than contributing to the digital transformation with advanced technology application or development.

However, some organisations in the ecosystem pioneer digital solutions such as crowdsourcing and crowdfunding, driving the digitally enabled sharing economy. Moreover, there is a tech-intensive segment of the social economy including 'Tech4Good' initiatives and organisations driving trends in open-source data or software. 'Tech4Good' startups are certainly the frontrunners in the adaption of digital technologies in the social economy, building their business model or social purpose around the extensive use of such technologies. Arguably, these companies contribute to the digital transformation. Moreover, key areas of the digital transformation on the social economy include education and training initiatives, such as digital literacy for the elderly. This indicates that social economy ecosystem also contributes to the digital transformation in terms of digital skills and digital participation.

In contrast to the social economy, there is little evidence on the (potential) impact of the digital transition on the **proximity economy**. However, one trend that could be identified with the potential to drive the digital transition of local infrastructure concerns smart city initiatives. Cities have the potential to be powerful brokers for the green and digital transition of their proximity economies, across industrial ecosystems, through decarbonising the built environment, clean tech deployment, circular economy, clean mobility, sustainable urban food systems, reskilling, and through public procurement. Moreover, cities can play an important role in the digital transition in the open data sphere by contributing to the development of open data applications in e-government, construction, energy, retail, and tourism, which may lead to more constructive use of data and innovation dynamics in the local ecosystem.

Smart city initiatives may also exacerbate existing inequalities based on citizens' digital literacy and willingness to adopt digital solutions. Hence, the design of smart city solutions needs to ensure inclusiveness of its applications. In Helsinki (Finland), for example, a GPS application aims at helping the blind and visually impaired to navigate through the city. The app was created and is ran by the developer Ilkka Pirttimaa and is based on open data of public transport for travel route recommendations.[87] Digital-based solutions for improving accessibility and inclusion also links to the need to help certain citizen groups provide feedback in local consultation exercises, facilitate a better social dialogue with citizens, and ensure improvements for transparency and accountability of decision-making processes.

We now consider some of the **challenges** the proximity and social economy needs to overcome in order to fully reap the benefits of the digital transformation. Firstly, the **local nature of the products and services provided by many entities in the sector** makes it less 'natural' to adopt online sales and distribution channels, as this sometimes undermines the principle of local community engagement that many organisations in the sector are committed to. Some proximity and social economy activities require physical contact (e.g., social and household services, work integration social economy

[85] Gagliardi D., Psarra F., Wintjes R., Trendafili K., Pineda Mendoza J., Haaland K., Turkeli S., Giotitsas C., Pazaitis A., Niglia F., (2020), New Technologies and Digitisation: Opportunities and Challenges for the Social Economy and Social Enterprises. European Commission, Executive Agency for SMEs, DOI: 10.2826/767888.
[86] Social Tech Academy, A framework to promote the digital jobs and skills in social economy.
[87] https://oecdcogito.blog/2022/11/10/can-smart-cities-help-achieve-the-sdgs/ and https://www.blindsquare.com/2019/05/04/why-making-your-apps-accessible-is-just-the-right-thing-to-do/.

organisations, those in the hospitality sector) and may thus be less amenable to digitalisation. Another challenge concerns a **lack of financial resources** to invest in the adaptation and adoption of digital technologies and solutions. A third challenge concerns insufficient **access to digital infrastructure** (fast mobile and broadband Internet) in remote areas.[88] A survey on "Social innovation organisations" from the Social Good Accelerator further underlines challenges such as a lack of knowledge with regard to the potential of technological innovations or the incompatibility of technological innovation with their societal values.[89]

In conclusion, the progress made towards a digital transformation of the proximity and social economy varies greatly among the organisations in the sector. While some organisations have been able to seize the opportunities offered by the digital transformation, numerous others can be characterised as laggards of the digital transformation, having only slightly adopted digital tools, often lacking the financial means to invest in digital technologies.

Digital technologies have the potential to enable new value propositions, increase the effectiveness and efficiency of operations, enhance opportunities for networking and collaborating beyond physical reach and foster new models of decision-making, control mechanisms and distributed ownership structures. However, there is a need for digital skills support in the ecosystem, access to affordable and adaptable technology and data.[90] If these conditions are met, the proximity and social economy has the potential to develop fair digital business models based on open-source protocols for data and technology.[91]

2.2 Social entrepreneurship driving the twin transition

Progress of the social economy towards the twin transition has been captured by analysing the Crunchbase and Net Zero Insights data sources (no data is available from these data sources, nor from comparable ones, for the proximity economy). Crunchbase[92] is a widely trusted source of primary data on investment-backed, technology-oriented and innovative companies/organisations in the EU27 and in competing economies such as the USA. Originally built to track startups, Crunchbase contains information on public and private companies/organisations on a global scale. Net Zero Insights[93] is a specialised database of over 19 000 European startups identified as green innovators. Following a review of both data sources, this report identified **2 168 innovative social economy organisations established since 2010**.

The statistical analysis carried out in this section focuses on innovative and entrepreneurial for-profit or non-profit oriented companies/organisations that have an explicit social or environmental purpose, carry out activities in the interest of their members/users and/or have a local orientation and provide services for the local economy. The data do not capture all social economy organisations as defined in relevant literature (Borzaga et al, 2020), but it focuses on social economy organisations with an explicit technological or service model innovation and addressing social objectives. The analysis captures mainly innovative social economy organisations that aim at creating a positive impact for our society. These organisations usually address social innovation and social entrepreneurship. The concrete filters used, along with an assessment of the data validity, are presented in Appendix B.

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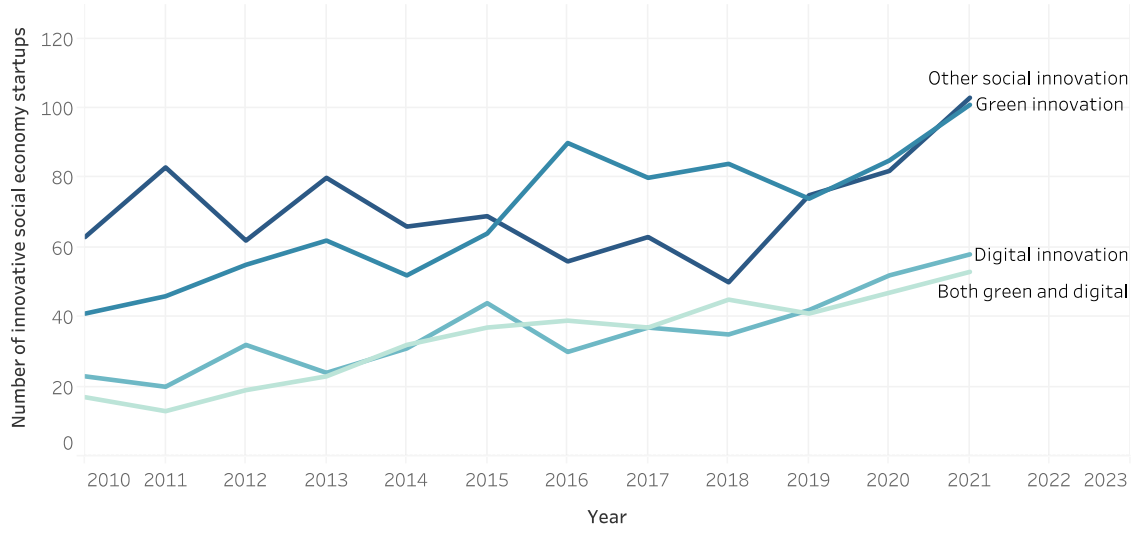
[88] EC, 2021, SWD, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem.
[89] Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[90] EC, 2021, SWD, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem; European Commission, 2021, Annual Single market report 2021, SWD(2021) 351 final.
[91] Ibid, p. 155.
[92] https://www.crunchbase.com/.
[93] https://netzeroinsights.com/.

In the following, we present findings based on innovation data on the progress made in the social economy along the pathway to the digital and green transition. Figure 4 presents the **evolution of innovative organisations fostering social change** and created over time since 2010 as captured by the joint data of Crunchbase and Net Zero Insights. The figure shows that the number of newly created social economy organisations has significantly increased since 2010. Interestingly, in 2020 and 2021, in the midst of the Covid-19 pandemic, social entrepreneurship gathered pace as social needs also increased, including in the context of green and digitally enabled innovations. This shows that innovative organisations in the sector are acting as a driver and contributor to the green transition and, to a lesser degree the digital transition.

Figure 4: Evolution of innovative social economy organisations created over time and their share across innovation domains within the period 2010-2021



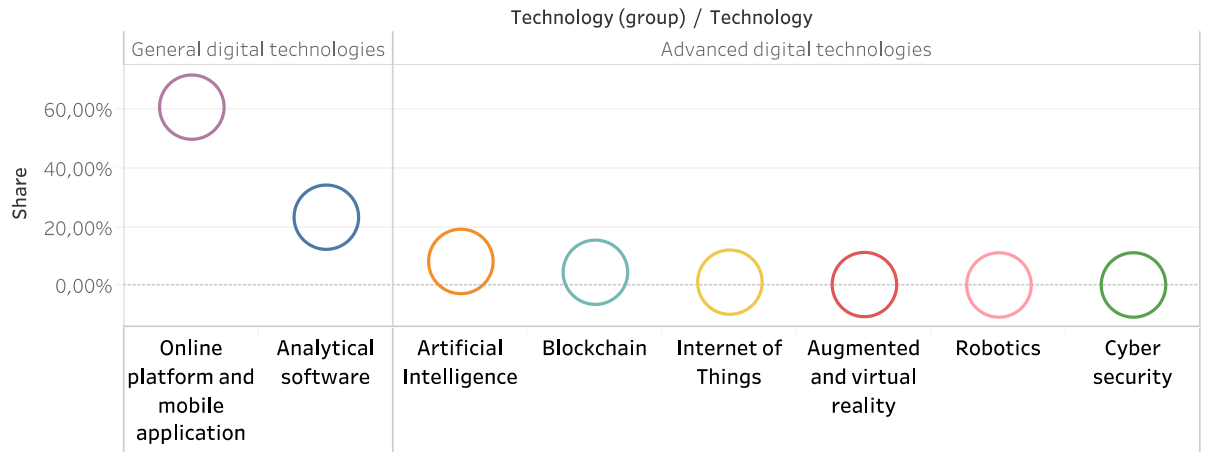
Source: Technopolis Group based on Crunchbase and Net Zero Insights data, 2022

As regards **progress in the sector towards the digital transition**, the data shows that **digital technologies have been applied by 29% of social economy organisations** identified through Crunchbase/Net Zero Insights. The digital technologies most frequently cited are online platforms (which include online marketplaces) and mobile applications, followed by analytical software. Advanced technologies included in the analysis are used by far fewer social economy organisations. Interestingly, blockchain is used by 1.64% of social economy organisation startups in the data. A detailed analysis of the profiles of the companies/organisations in question shows that this is mostly done to create more transparent and equal distribution channels.

Since online platforms and mobile apps can be regarded as rather simple and well-established digital technology solutions, at least if compared to blockchain or Artificial Intelligence, one can conclude from the data that most social economy organisations are at an early stage of their digital transition, as indicated also by the findings presented in section 2.1. Specifically, the relatively widespread use of platforms technology, as compared to advanced technologies found aligns with data from a survey carried out by the European Social Enterprise Monitor (ESEM) (see in Chapter 2.1).

Collectively owned enterprises (e.g., data cooperatives) are regarded as a good vehicle to democratically manage data and to prevent value extraction by large corporations. **Platform cooperatives are still a niche**, with a scope insignificant compared to major digital platforms. However, there is a notable cooperative movement with participatory ownership structures, e.g., with taxi drivers or cleaning or care service providers creating a platform together. Some cooperative platforms start locally and go global later.

Figure 5: Digital technologies developed by innovative social economy organisation startups established since 2010



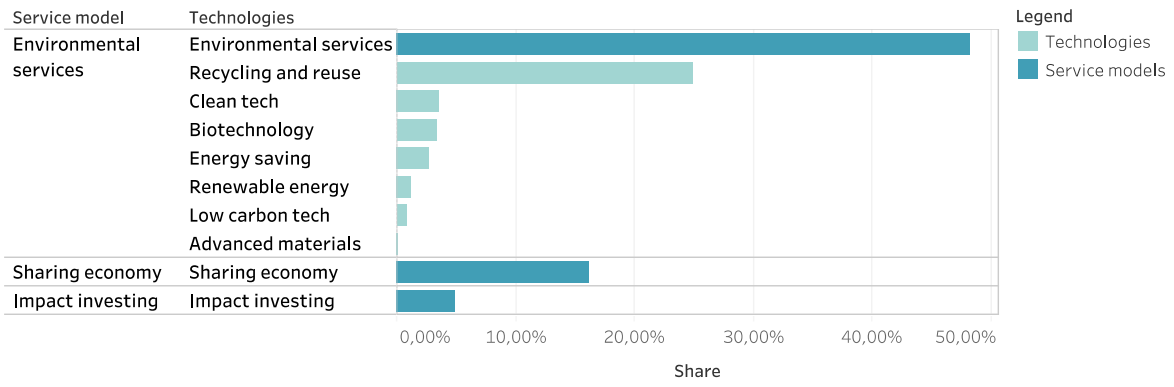
Source: Technopolis Group based on Crunchbase and Net Zero Insights data, 2022

An interesting mission of **2% of the social economy organisations in the database analysed is creating a safer digital world** and addressing the negative social impacts of digital technologies.

In the field of the **green transition**, the data show that **half of the identified social economy organisations** are working on products and services contributing to the **green transformation of the European economy**. Figure 6 shows that the main service models include the provision of various **environmental services**/solutions, **impact investment with around 5%** (financial support and services that aim to generate specific beneficial social or environmental effects in addition to financial gains), and the **sharing economy**.

The category 'environmental services' can be further broken down into distinct technologies, of which **recycling technologies** (including reuse) is by far the most common one applied by social economy operators, followed by **clean technologies** and **biotechnology**. Biotechnology is for example used as part of social innovation startups developing solutions for healthy food or recycling of waste. Energy-saving and renewable energy technologies are used by 3% of all social economy organisations in the data. While 'advanced materials' is not a prominent category in its own right, it is often linked to recycling, hence its overall importance is probably higher than indicated in the Figure below.

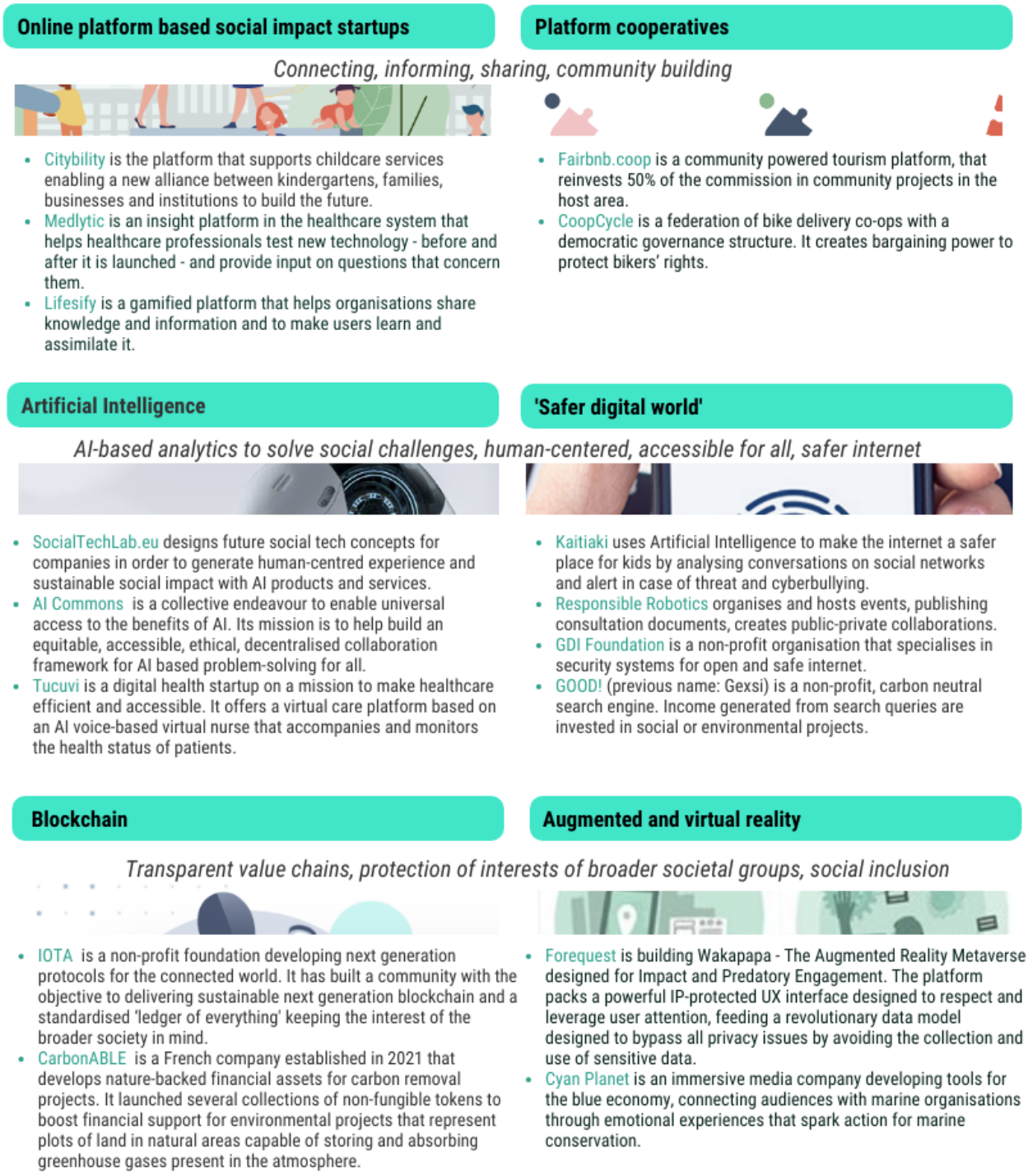
Figure 6: Green transition addressed by social economy organisations created since 2010



Source: Technopolis Group based on Crunchbase and Net Zero Insights data, 2022

The following examples showcase how social economy organisations make use of digital technologies:

Figure 7: Examples of social economy organisation startups combining digital technologies with social impact and societal goals



Source: Technopolis Group, 2023

The following examples showcase how **social economy organisations with a green business model** are part of the green transition:

Sociallgreen[94] is a Greek tech startup that develops a concept for a new recycling approach for smart cities. Sociallgreen's approach integrates game logic and social network theories to enable a unique physical recycling game.

greenChic: Through the circular economy business greenchic, members can exchange items and revamp their style in an affordable, convenient and sustainable way[95].

DiFOLD[96] manufactures the Origami Bottle, which is a compact and collapsible bottle that can be reused. This bottle is designed to be both practical and space-saving. It is a type of drinkware and foodware that can be folded like origami and used as an alternative to single-use packaging.

ECO BTP Environment: In addition to the collection, the company has moved towards the sorting of building waste, in order to promote recycling[97].

Som Energia: A not-for-profit renewable energy cooperative producing and distributing 24.60 GWh/per year of renewable energy to more than 133 000 clients across Spain.[98]

REScoop is the European federation of citizen energy cooperatives, a network of 1 900 European energy cooperatives (and their citizens) who are active in the energy transition.[99]

The **RREUSE** network represents social economy **organisations** active in the circular economy. Overall, RREUSE represents 850 social economy **organisations** handling 1 million tonnes of goods and materials annually in textiles, furniture and electronics, construction materials, food distribution and composting. RREUSE members also encourage citizen engagement in the circular economy through awareness-raising campaigns on sustainable lifestyles, educational events on lowering consumption levels, and workshops on repair and upcycling.[100]

Environmental technologies are often interconnected with digital enablers such as the use of **software, robotics, artificial intelligence or big data**. An interesting example is the following:

Czechitas[101] is a not-for-profit social economy enterprise fighting for increased diversity in the world of IT and a higher level of digital proficiency among women. The enterprise teaches programming, coding, and work with data.[102]

Green impact investing is addressed by:

Zubi Capital[103] is an Asset Management and Wealth Management firm that undertakes impact investment.

UnLtd Spain[104] is an organisation that promotes social impact entrepreneurship. It provides training, advice, and financing to social (green) entrepreneurship projects.

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[94] http://sociallgreen.com/#/mobileapp
[95] https://www.crunchbase.com/organization/wardrobe-green-armadio-verde
[96] https://difold.com/
[97] https://www.crunchbase.com/organization/eco-btp-environment
[98] Social Economy Europe, Annual Report 2021, https://www.socialeconomy.eu.org/wp-content/uploads/2022/05/annual-report-social-economy-2022-interactive.pdf.
[99] https://www.rescoop.eu.
[100] OECD, 2022, Policy brief on making the most of the social economy's contribution to the circular economy, https://www.oecd-ilibrary.org/docserver/e9eea313-en.pdf?expires=1660833787&id=id&accname=guest&checksum=33DE17BE65E80D6C81FAD540EFE82E64.
[101] https://www.czechitas.cz/
[102] Social Economy Europe, Annual Report 2021, https://www.socialeconomy.eu.org/wp-content/uploads/2022/05/annual-report-social-economy-2022-interactive.pdf.
[103] https://zubicapital.com/
[104] https://www.unltdspain.org/

AgriFinTech: Developer of a location-specific Farm Decision Support System intended for the smallholder agriculture sector in Africa.

Local initiatives include:

La ruche qui dit oui[105]**:** is a local consumption initiative that connects consumers and farmers (as proximity producers).

[105] https://laruchequiditoui.be/fr-BE

3. Technological uptake in the proximity and social economy

Key findings

A survey was conducted as part of the project about the status in the uptake of digital and green technologies and related business models in SMEs and other organisations operating in the PSE ecosystem, in particular in the field of the social economy. Regarding the green transition, it was found that:

- **29% of the respondents invested in environmental measures regarding their own operations** over the past five years,
- 17.8% of the respondents invested in renewables over the past five years,
- 10% of the respondents adopted energy saving technologies.
- recycling technologies and also more specifically recycled materials have been adopted by 9.4% of the organisations.

Social economy organisations were surveyed about the adoption of circular business models and other environment-focused service models. The results indicate that

- 15.6% of the respondents adopted resell and reuse business models,
- 12% adopted remanufacturing,
- Repair and maintenance services were adopted by 7.4% of the organisations,
- Transparent supply chains represent a lower share but with the development of the digital product passport and related regulations, there is a potential for this field.

Regarding the digital transition, the EMI survey conducted in the framework of this project indicates that **25% of the social economy organisations participating in the interviews had increased their investments dedicated to digital technologies** during the past five years. This is a low result and demonstrates the challenge of digitalisation for this ecosystem.

- The detailed results reveal that even the adoption of basic digital technologies such as online platform and IT software is relatively low among the respondents.
- 13.6% adopted cloud technologies
- Internet of Things technologies embedded in products have been adopted by 7.4% of the respondents.
- The use of AI and big data is quite low close to 3%.
- The use of blockchain technologies was adopted only as part of payment and financial transactions according to the feedback of the interviewees.
- Augmented and virtual reality, robotics and digital twins are almost not present at all.

3.1 Survey

With the objective to monitor the status in the uptake of green and digital technologies, a business survey has been implemented in the framework of this study. This so-called EMI survey collected data about the progress towards the green and digital transition of European SMEs across industrial ecosystems and gathered information about the related investments, challenges, opportunities and expected future developments. The survey was based on using Computer Assisted Telephone Interviewing (CATI). The final sample included 3 900 companies in all industrial ecosystems and **309 interviews with organisations** for the proximity and social economy industrial ecosystem with the note that only the **social economy part** could be covered. The mainstage fieldwork was conducted between 15 January and 30th April 2023. A prerequisite for each reach-out and interview was to have a respondent with adequate capacities and knowledge to answer the questionnaire (for more details please see the methodological report of the project). The survey respondents come from a mix of non-profit organisations, cooperatives, associations. In terms of geographical coverage, the survey has a balanced coverage of all EU countries.

It has to be noted that the survey complements existing surveys that inquired about similar questions such as the Flash Eurobarometer referenced below, the ICT-usage in enterprises survey[106] and the survey of the European Social Enterprise Monitor (ESEM)[107].

3.1.1 Green transformation

Social economy organisations have been pioneers in ecological innovation and are key contributors to the green transition of other industrial ecosystems as the above analysis also demonstrated. Nonetheless, the social economy itself has to find ways to green its operations.

The Flash Eurobarometer 498 on SMEs, green markets and resource efficiency of March 2022[108] found that 13% of SMEs in the proximity and social economy ecosystem are not taking any measures to be more resource efficient. This represents a higher share than any other ecosystem (e.g., 4% for textile, 7% for electronics, 8% for agri-food and construction, respectively, and 10% for energy-renewables) except cultural and creative industries, also with 13% of its SMEs not taking measures to be more resource efficient, and the aerospace and defence industry.

With respect to actions, 19% of SMEs in the proximity, social economy and civil security ecosystem SMEs report to design products that are easier to maintain, repair or reuse in order to be more resource efficient, scoring the lowest rate in this regard across all the ecosystems surveyed. Minimising waste and saving energy seem to be more important measures in this ecosystem. However, even in these categories, the ecosystem scores rather low as compared to others.

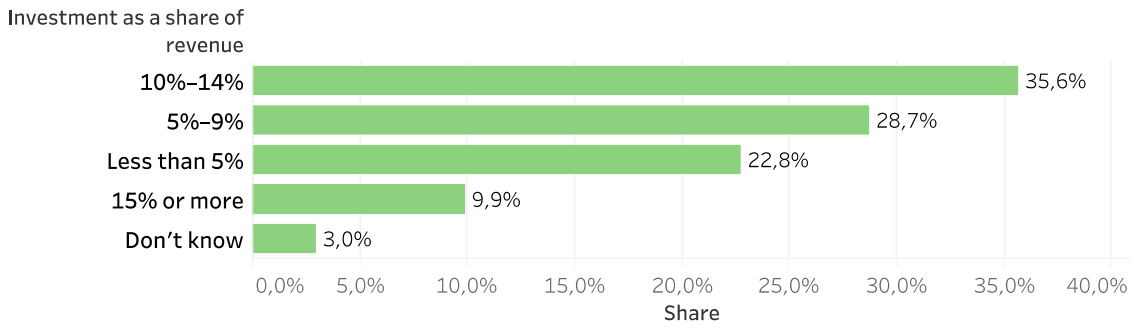
According to the same survey, difficulties of SMEs in the PSE ecosystem in trying to set up resource efficiency actions include the **complexity of administrative or legal procedures, cost of environment actions', lack of specific environmental expertise and the difficulty to adapt environmental legislation** to its company.

The EMI survey conducted in the framework of this project provides some insights into these questions. Firstly, social economy organisations participating in the survey were asked about their investments and use of environmental technologies and solutions. The results show that **it is 29% of the respondents that invested in environmental measures regarding their own operations over the past five years**. A further question was related to the percentage in terms of revenue (net income after tax) that

[106] https://ec.europa.eu/eurostat/cache/metadata/en/isoc_e_esms.htm
[107] https://knowledgecentre.euclidnetwork.eu/european-social-enterprise-monitor-2021-2022/
[108] https://europa.eu/eurobarometer/surveys/detail/2287

organisations had invested in green transformation on average annually. As displayed in Figure 8, 35.6% of the respondents that invested in the green transition, used 10-14% of their revenue for such purposes.

Figure 8: Percentage of the organisations' revenue invested in green transition related technologies on average annually



Source: Technopolis Group and Kapa Research, 2023

The detailed results demonstrate that social economy organisations adopted **renewable energies** the most often among the list of green technologies followed by energy saving technologies; still it is 17.8%, respectively 10% of the respondents that have done so. **Recycling technologies** and also more specifically recycled materials have been adopted by 9.4% of the organisations.

The least cited technologies include carbon-capture technologies and hydrogen, but interestingly also clean technologies (such as for water or waste) and bio-based materials.

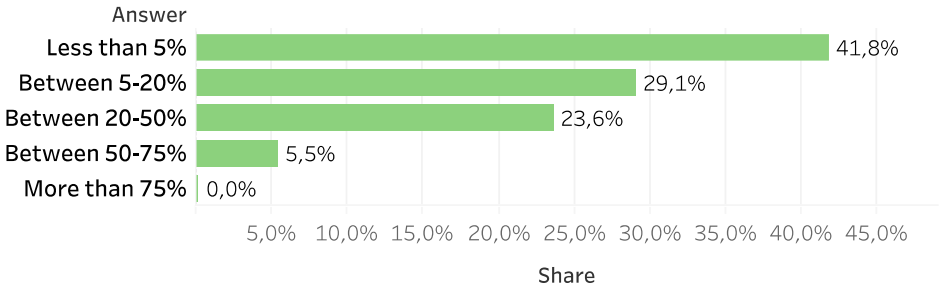
Figure 9: Adoption of green technologies by social economy organisations

	Answer	
Technology	Already using	Planning to adopt
Renewable energies	17,8%	5,2%
Energy-saving technologies	10,2%	7,4%
Recycling technologies	9,4%	3,2%
Recycled materials	8,4%	4,2%
Biotechnology	4,2%	3,0%
Carbon capture technologies	3,2%	4,2%
Advanced bio-based materials	3,2%	3,2%
Clean technologies including water/waste	2,7%	5,0%
Hydrogen	1,0%	5,5%

Source: Technopolis Group and Kapa Research, 2023

With regard to the use of renewable energies, the results indicate that 41.8% of those that responded positively, cover less than 5% of their total energy consumption by renewable energies.

Figure 10: Share of renewable energy use within total energy consumption

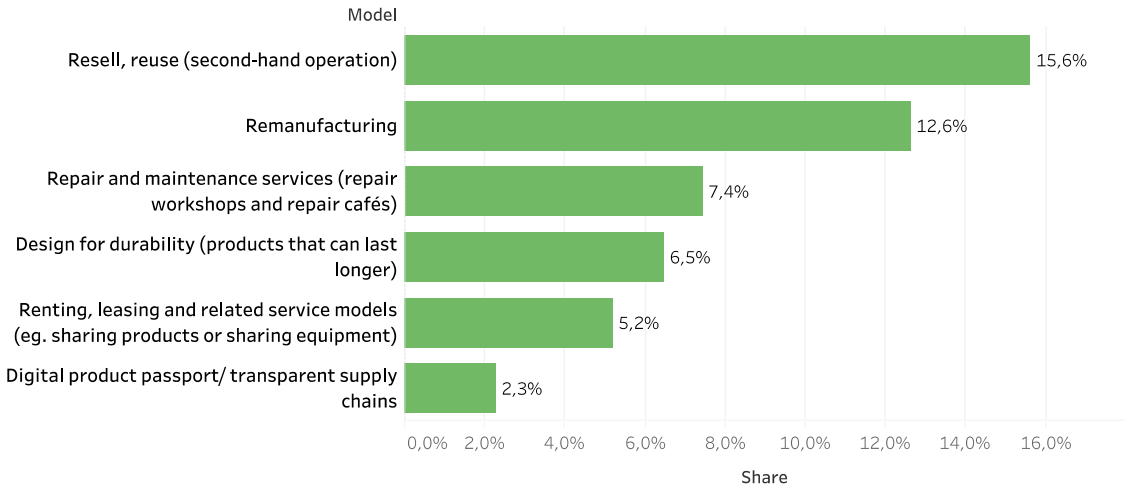


Source: Technopolis Group and Kapa Research, 2023

Social economy organisations were surveyed about the **adoption of circular business models** and other environment-focused service models. Compared to the adoption of green technologies, the link to service and organisational innovation is much more evident. The results indicate that 15.6% of the respondents adopted resell and reuse business models and 12% remanufacturing. Repair and maintenance services have been adopted by 7.4% of the organisations. Transparent supply chains represent a lower share but with the development of the digital product passport and related regulations, there is a potential for this field.

According to the Flash Eurobarometer[109], 19% of SMEs in the proximity, social economy and civil security ecosystem SMEs report to maintain, repair or reuse in order to be more resource efficient, scoring the lowest rate in this regard across all the ecosystems surveyed.

Figure 11: Adoption of green business models and non-technological solutions among social economy organisations

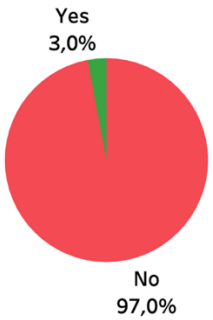


Source: Technopolis Group and Kapa Research, 2023

When asked about the certification on any third party verified environmental standards, it is only 3% of the respondents indicated that they had been certified (see Figure 12).

[109] https://eismea.ec.europa.eu/system/files/2022-12/SMP-COSME-2022SEE_Background%20%26%20policy%20context.pdf.

Figure 12: Share of social economy organisations claiming that they have obtained any third party verified environmental certificate

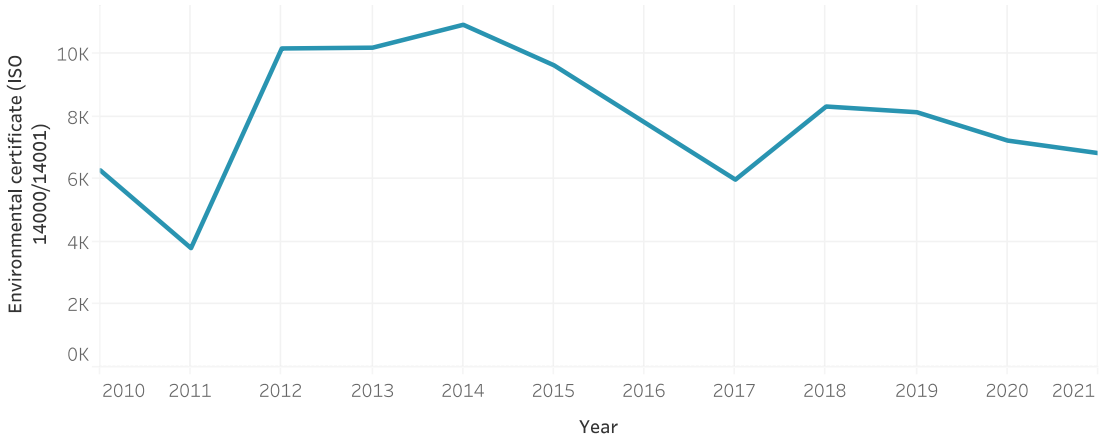


Source: Technopolis Group and Kapa Research, 2023

ISO 14001 is a set of standards that any company can follow to implement an effective environmental management system. By adopting the good practices suggested by the standard, firms can set their objectives and monitor the reduction of their environmental footprint. The number of environmental ISO 14001 certificates issued within the proximity and social economy indicates the progress towards the application of environmentally friendly business practices and production methods. For the purposes of this report, ISO 14001 data were accessed via the ISO survey of certifications to management system standards[110]. The results are also different as above, since here the full proximity and social economy as defined in the ASMR 2021 is taken into account.

The annual ISO survey indicates that there were 3 268 certificates issued to proximity and social economy organisations in the EU27 in the year 2021, which number increased over the years since 2010.

Figure 13: Number of environmental certificates issued for organisations in the proximity and social economy



Source: Technopolis Group, 2022, based on ISO

[110] ISO (2022) ISO Survey of certifications to management system standards. Accessed on https://isotc.iso.org/livelink/livelink?func=ll&objId=18808772&objAction=browse&sort=name&viewType=1

3.1.2 Digital transformation

Social economy organisations may adopt digital technologies within different operational functions, either with the objective of innovating on an organisational level (e.g., by an internal (re)organisation or the integration of operations), or in order to create new social initiatives.[111] Overall, the extent of participation in the digital transition varies greatly among social economy organisations. **Often, the digital needs of social economy organisations are simple** and include either user-oriented (interfaces, etc.) tools, or digital tools for internal use (data analysis, collaborative tools, etc.).[112]

Some literature sources stress that **social economy organisations are generally characterised by a low digitalisation level**, with data processing, management and collection not yet being widespread practices. The potential for participating in the digital transition depends on their own capacities, on territorial conditions such as connectivity, particularly in remote and rural areas, and often on initial investments in basic digital skills. However, the **Covid-19 pandemic accelerated the digitalisation of the social economy** with organisations increasing their digital product and services portfolio as well as their digital outreach.[113][114]

A relevant quantitative data source is survey data from the **European Social Enterprise Monitor** (**ESEM**) on the application of technology in the ecosystem. Moreover, the **Social Good Accelerator** provides survey data of 'social innovation organisations' in Europe. Given the different target groups of these studies, numbers should be interpreted accordingly, assuming that findings may not apply to the entire population of the social economy as defined in section 1.2.

ESEM survey data provide evidence of an **increasing digitalisation of social economy** organisations, with more than half of the social economy organisations indicating that the use of technology is important for their business and/or impact model.[115] According to the survey, 12% of social organisations operate in the information and communication (ICT) sector. Specifically, 28% of startups and 8% of companies in the seed stage belong to the ICT sector. According to the report, this non-negligible share of social organisations in ICT points to an "*increasing importance of technology and digitalisation for the growth of social economy organisations and the potential for new technologies to be leveraged in the creation of social impact (the 'tech for good' approach*)" (p. 34).[116]

Overall, according to the report, **55.4% of ESEM social economy organisations perceive at least one innovative technology to be relevant to their business** and/or impact model at present. This percentage has gone up from 49% in the year before. Most relevant to the social economy organisations surveyed in 2021/22 are **platform technologies** (27.8%), **mobile apps** (23.9%) and **artificial intelligence** (AI)/machine learning (11.0%).[117]

Digital tools benefitting the social economy can be divided into two categories: **Digital platforms** and **advanced technologies**. As indicated by ESEM data, there is a **higher**

[111] Gagliardi D., Psarra F., Wintjes R., Trendafili K., Pineda Mendoza J., Haaland K., Turkeli S., Giotitsas C., Pazaitis A., Niglia F., (2020), New Technologies and Digitisation: Opportunities and Challenges for the Social Economy and Social Enterprises. European Commission, Executive Agency for SMEs, DOI: 10.2826/767888.
[112] Social Tech Academy, A framework to promote the digital jobs and skills in social economy.
[113] European Commission, 2021, Building an economy that works for people: an action plan for the social economy
[114] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final.
[115] Dupain, W., Scharpe, K., Gazeley, T., Bennett, T., Mair, J., Raith, M., Bosma, N., 2022, "The State of Social Enterprise in Europe – European Social Enterprise Monitor 2021-2022". Euclid Network.
[116] Ibid.
[117] Ibid.

use of digital platforms among social economy organisations as compared to advanced technologies. This pattern is generally confirmed by other studies and literature sources.[118]

The EMI survey conducted in the framework of this project indicates that **25% of the social economy organisations participating in the interviews had increased their investments dedicated to digital technologies during the past five years.** This is a low result and demonstrates the challenge of digitalisation for this ecosystem. A further question was related to the percentage in terms of revenue that had been invested in digital transformation on average annually. The responses show that close to **38% invested between 10-14% and another 35% below 5%** of their revenues in digital technologies.

The adoption of specific digital technologies is shown in Figure 14. The detailed results reveal that even the adoption of basic digital technologies such as online platform and IT software is relatively low among the respondents. As a study of the European Commission already in 2017[119] pointed out budget constraints, digital skills shortages and technological gaps are some of the key barriers for the social economy to uptake new digital technologies. Digital technologies however are key also for the social economy in the sense of enabling them to increase their efficiency, reaching out to a wider target audience (eg. to the digital natives) and to achieve higher societal impact.

Figure 14: Adoption of digital technologies among social economy organisations surveyed

		Status	
Type	Technology	Already using	Planning to adopt
Basic	Software	17,8%	12,6%
	Online platform	16,8%	10,7%
Advanced	Cloud computing	13,6%	9,4%
	IoT	7,4%	9,8%
	Big Data	3,2%	8,8%
	Artificial Intelligence	3,2%	9,0%
	Blockchain	2,3%	3,5%
	AVR	1,0%	0,6%
	Robotics	0,6%	0,8%
	Digital twin	0,0%	0,0%

Source: Technopolis Group and Kapa Research, 2023

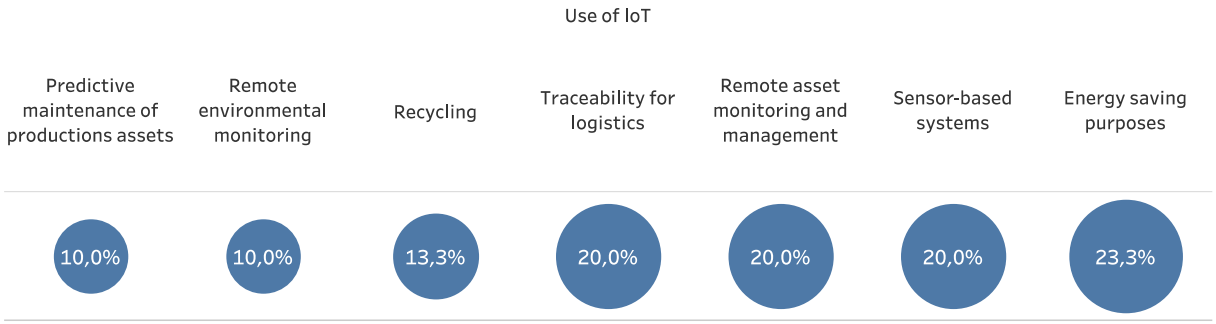
Social economy organisations have been present on **online platforms or adopted platform technologies in 16.8% of the cases**. The results are lower compared to the ESEM survey given the different definition and scoping used in the two studies. As analysed in the previous chapter, online platforms hold a lot of potential for the social economy in particular fostering the sharing and collaborative economy model.

The survey results suggest that **software technologies** (indicated only by 17.8% of the organisations) **have been used most for accounting and administration and secondly for marketing** purposes (including digital media).

[118] E.g., Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[119] European Commission (2017). Digital technologies and the social economy

Among the advanced digital technologies, **cloud technologies (13.6%) have been adopted the most, followed by the Internet of Things (7.4%)**. The use of IoT is presented per type of use in Figure 15 and reveals that IoT has been used most as part energy-saving products, followed by sensors (including smart buildings, wearable sensors) and remote monitoring.

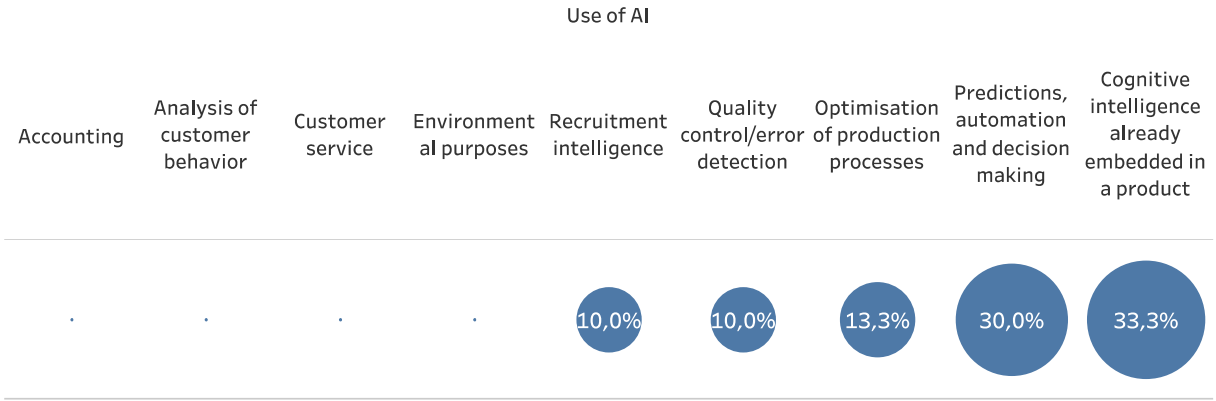
Figure 15: Use cases of Internet of Things - share of respondents that use IoT for the purposes mentioned



Source: Technopolis Group and Kapa Research, 2023

The use of AI and big data is quite low close to 3%. The use cases reveal that 33% of the respondents that have adopted these technologies, AI and big data analytics are already embedded in an existing product. This points to the importance of creating linkages between AI service providers and social economy organisations that will most probably not have the financial means to develop in-house AI tech capacities.

Figure 16: Use cases of AI and big data - share of respondents that use AI and big data for the purposes mentioned



Source: Technopolis Group and Kapa Research, 2023

The use of blockchain technologies was adopted only as part of payment and financial transactions according to the feedback of the interviewees. Augmented and virtual reality, robotics and digital twins are almost not present at all.

4. Investment and funding

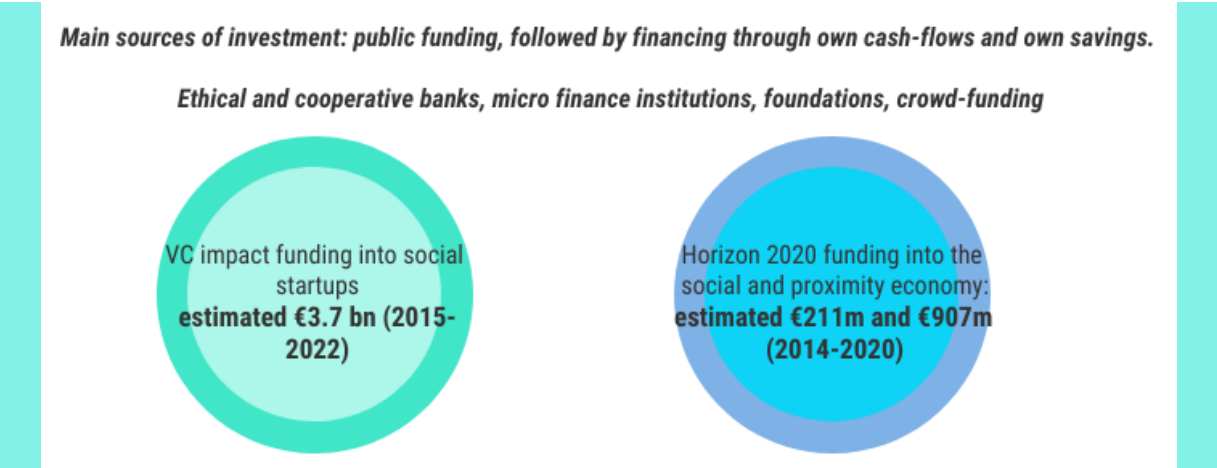
Key findings

Survey data provided by the European Social Enterprise Monitor (ESEM) suggest that the most sought-after source of external financing for social economy organisations was **public funding, followed by financing through own cash-flows and own savings.** Nevertheless, *ethical and cooperative banks and financiers, micro finance institutions, credit unions, mutual insurers, philanthropic organisations, and foundations, and equitable institutions* are also key sources of investment in sustainable entrepreneurship and the green transition and can often themselves be considered part of the social economy.

According to calculations based on Net Zero Insights and Crunchbase, **venture capital and social impact investment in innovative economy organisations has steadily increased in recent years, peaking in 2021**. This trend means an **estimated €3.7 bn of total cumulative capital invested into twin transition social-goal oriented organisations** in the EU27 since 2015.

Own **analysis based on Horizon 2020 data find a total investment in social economy pre-selected topics of €211m.** In those projects with participation by social economy organisations, technological investments are made predominantly in Artificial Intelligence. **The total Horizon 2020 investment in proximity economy pre-selected topics is €907m** and focuses on urban development.

Figure 17: Funding innovation in the social economy



Source: Technopolis Group based on Crunchbase, Net Zero Insights and CORDA data, 2023

As highlighted in section 2, insufficient funding can pose a challenge to adopting digital technologies in particular in the proximity and social economy. Another factor shaping the sector's readiness for the twin transition concerns the availability of skills. This section looks at the level of investment and availability of funding and of skills relevant for the adoption of digital and green technologies in the sector.

4.1 Capital investment in innovative social economy organisations

Data on **investments in the social economy** can be found in the European Social Enterprise Monitor (ESEM). The ESEM survey results from 2021-22 show that the **most important source of financing**, defined as the highest share of ESEM organisations reported requesting it in the past 12 months, were **public financing** (44.2%), **self-financing (cash-flow)** (41.1%), **own savings** (39.4%), **private donations** (24.7%) and **foundation funding** (21.3%). Interestingly, considerable shares of ESEM organisations also reported having requested investment from **family and friends** (16.3%) and **crowdfunding** or crowd investing (10%) in the past 12 month.

Venture capital, business angel (BA) investment, impact investment, incubators/company builders/accelerators and venture debt on the other hand, are relevant only for a smaller sub-group of social economy organisations. Only 7% reported requesting BA financing in the past 12 months, 5.5% impact investment, 5.3% VC, 10% crowdfunding/crowd investing, 8.5% incubator/company builder/accelerator and 2.2% venture debt.[120] Access to private investment may be more difficult for social economy organisations due to their democratic and participatory ownership structures conflicting with venture capitalists' stakes in ownership.

Public financing, but also ethical and cooperative banks and financiers, micro finance institutions, credit unions, mutual insurers, philanthropic organisations, and foundations, and equitable institutions are key sources of investment in sustainable entrepreneurship and the green transition and are themselves part of the social economy in many cases.[121] Overall, the ESEM survey indicates that social economy organisations have generally been quite successful in accessing the financing that they sought. A relatively small share of respondents reported unsuccessful attempts.[122] This may be interpreted with caution given a potential bias in self-reporting.

Despite the limited role of venture capital (VC) and private investors in social economy companies, VC and in particular **social impact investors offer diverse opportunities to innovative organisations that aim at generating a positive social and environmental impact**. Social impact investing addresses social and/or environmental needs with the explicit expectation of a measurable social, as well as financial, return[123].

Over the past years, capital investment (including seed financing, accelerators, grants, venture capital, private equity investment) in innovative tech organisations with an explicit social objective has steadily increased. Early and late development has soared in 2021 as indicated in Figure 18. This trend is also confirmed by a related analysis conducted by Atomico[124] about the state of purpose-driven technology. According to their latest report in 2022, investment in purpose-driven tech companies has increased at a huge scale, spiking materially in 2021 across the globe. As suggested by Crunchbase and Net Zero Insights data, this trend means **€3.7 bn of total cumulative capital invested into twin transition social-goal oriented organisations in the EU27 since 2015.** After the 2021 peak, the level of investment has moderated but it continues to be strong.

There are several key impact investor VC funds in the EU. For example, 4Impact is a Dutch VC fund that empowers ambitious tech4good entrepreneurs to accelerate the transition to a sustainable world with technology. Aenu is a green impact fund that focuses on multi-stage long-term investments in climate-tech and social impact companies.

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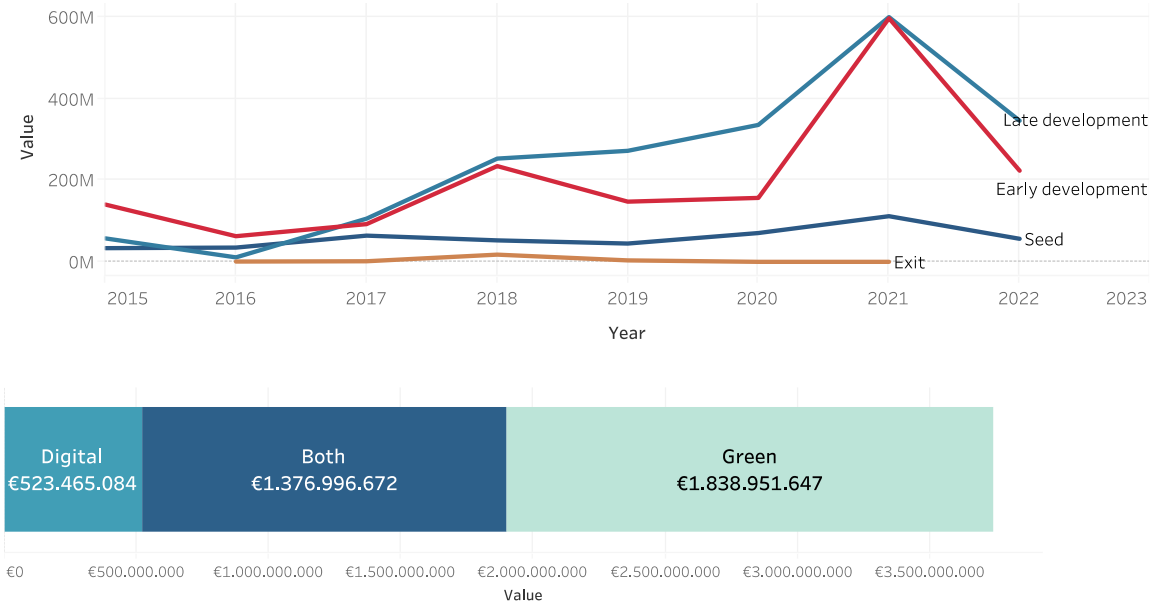
[120] Dupain, W., Scharpe, K., Gazeley, T., Bennett, T., Mair, J., Raith, M., Bosma, N., 2022, "The State of Social Enterprise in Europe – European Social Enterprise Monitor 2021-2022". Euclid Network.
[121] Social Economy Europe (SEE), 2022, Towards a Council Recommendation on developing social economy framework conditions, Social Economy Europe contribution to the EC call for evidence Brussels, 29 September 2022.
[122] Ibid.
[123] https://www.oecd.org/social/social-impact-investment.htm
[124] https://stateofeuropeantech.com/reading-tracks/reading-track-resilience1.

Figure 18: Annual funding of innovative social economy organisations since 2015 and share per twin transition for the period 2015-2022



Source: Technopolis Group calculations based on Net Zero Insights, 2022

4.2 Role of EU funding in social innovation

Horizon 2020 data has been used to capture research and innovation investments in the industrial ecosystem of the proximity and the social economy. To identify relevant Horizon 2020 projects, the proximity economy and the social economy have been scoped separately. The scoping has been guided by the definitions provided in the EU's industrial strategy. In the social economy, two criteria were applied to identify projects: 1) all projects with participation of social economy organisations and 2) all projects tagged in CORDIS by social economy topics. The social economy topics have been pre-selected manually and include a selection of topics that are well aligned with the social economy definition.

A similar approach was applied for the proximity economy, using the following two criteria to identify projects: 1) all projects with the participation of cities' municipalities and 2) all projects tagged in CORDIS by proximity economy topics. Similarly, as above, the topics were pre-selected including those conceptually well aligned with the proximity economy definition.

Social economy

The **total Horizon 2020 investment in social economy pre-selected topics is €211 m**. Two topics capture nearly 50% of the funding:

- 'Towards Climate-Neutral and Socially Innovative Cities' with 25% of the budget, and,
- 'Collective Awareness Platforms for Sustainability and Social Innovation' with 22% of the budget.

The second topic underlines the importance of digital platforms for transforming the social economy which was already indicated by survey results presented in section 2.1.

Projects with social economy organisations as participants which gather most of the funding are the projects '*Demonstrating innovative nature-based solutions in cities'* with 35% of the budget followed by '*Smart Cities and Communities solutions integrating energy,*

transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects' with 18% of the budget. Projects on '*New governance, business, financing models and economic impact assessment tools for sustainable cities with nature-based solutions (urban re-naturing)*' follow with 15%.

In those projects with participation by social economy organisations, technological investments are made predominantly in **artificial intelligence (AI)** (machine learning and computational intelligence). Investments in AI are particularly relevant given the needs identified in section 2.1.

Table 1: Selected topics in Horizon 2020 – social economy

Topics - Social Economy	Share in total (using Total cost)
Social innovation Community	1.4%
Towards Climate-Neutral and Socially Innovative Cities	25.0%
Participatory approaches and social innovation in culture	1.9%
Virtual museums and social platform on European digital heritage, memory, identity and cultural interaction.	5.4%
Collaborative approaches to cultural heritage for social cohesion	6.6%
Transforming historic urban areas and/or cultural landscapes into hubs of entrepreneurship and social and cultural integration	11.9%
IoT/Cloud/Big Data platforms in social application contexts	1.5%
Future Hyper-connected Sociality	10.3%
SMEs for social innovation – Challenge platform	1.7%
Collective Awareness Platforms for Sustainability and Social Innovation	6.4%
Ocean literacy – Engaging with society – Social Innovation	3.4%
Unlocking the growth potential of rural areas through enhanced governance and social innovation	2.8%
Collective Awareness Platforms for Sustainability and Social Innovation	21.7%
A European Social Catalyst Fund to scale up high performing social innovations in the provision of social services	0.1%

Source: Technopolis Group calculations based on CORDA, 2022

Proximity economy

The **total Horizon 2020 investment in proximity economy pre-selected topics is €907 m.** The funding is four times bigger than that of the social economy and focuses on urban development. Among the pre-selected proximity economy topics, funding is spread across some of the main building blocks of cities' twin transition, including mobility, energy and, to a lesser extent, food.

The projects with cities' participation that gather most of the funding are on '*Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration) projects*' with 26% of the budget. They are followed by '*Smart*

Cities and Communities lighthouse projects' with 18% and '*Demonstrating innovative nature-based solutions in cities'* with 15% of the total funding.

In projects with participation of cities, investments in technologies are predominantly made on green technologies, namely on 'wind, solar and other (geothermal, hydropower, biomass) power', at a total project funding of €568 m. Among the digital technologies, the focus is on AI, robotics and the Internet of Things.

Table 2: Selected topics in Horizon 2020 – proximity economy

Topics – Proximity Economy	**Share in total (using Total cost)**
Small business innovation research for Transport and Smart Cities Mobility	18%
Demonstrating innovative nature-based solutions in cities	12%
Cities as climate-resilient, connected multimodal nodes for smart and clean mobility: new approaches towards demonstrating and testing innovative solutions	3%
Cities as a platform for citizen-driven innovation	0%
FOOD 2030 - Empowering cities as agents of food system transformation	4%
New governance, business, financing models and economic impact assessment tools for sustainable cities with nature-based solutions (urban re-naturing)	2%
Smart Cities and Communities lighthouse projects	11%
Smart Cities and Communities	15%
Innovative and citizen-driven food system approaches in cities	2%
Demonstrating innovative nature-based solutions in cities	12%
Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects	13%
Local / small-scale storage	9%
Strengthening the knowledge and capacities of local authorities	1%
Realising the potential of regional and local bio-based economies	1%

Source: Technopolis Group calculations based on CORDA, 2022

5. Skills

Key findings

While **basic digital skills seem to be prevalent among many social economy organisations, more advanced capabilities are far less widespread**. The development of digital skills in the social economy faces a number of challenges, particularly a *lack of vision for the digital transition, a lack of digital training, a shortage of financial resources to acquire state-of-the-art technology, and the state of development of connectivity in the territory*.

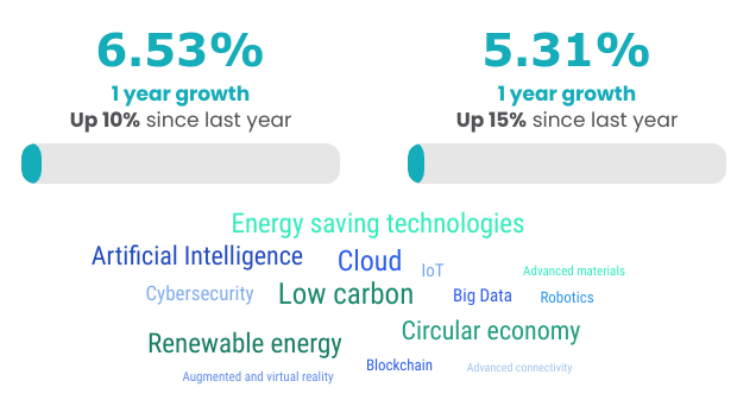
Among professionals registered on LinkedIn and employed in the social economy (more specifically in civic, social and non-profit organisations), **5.31% indicate to possess at least one type of green skill and 6.53% to have at least one advanced digital skill**.

The most mentioned **advanced digital skill is related to cloud technologies, followed by artificial intelligence** as suggested by LinkedIn data. The low prevalence of skills related to augmented and virtual reality, robotics, big data and the Internet of Things among social organisations aligns with findings on the uptake and use of these technologies.

Low carbon and renewable energy related skills appear to be the most prominent among the social economy professionals, which is in line with the role of social economy organisations in addressing climate issues and the energy change. The relatively lower level of green skills available among social economy professionals can be explained by the focus on civic, social and non-profit organisations that deal with a broad range of social topics (environment is only a smaller part of this).

The existing evidence suggests that the availability of **relevant skills appears to be growing among the ecosystem's workforce** – faster so for digital than for green skills. The prevalence of skills needed for the twin transition of the social economy varies greatly by EU27 country.

Figure 19: Digital and green skills among social economy professionals as captured by LinkedIn



Source: Technopolis Group calculations based on LinkedIn data, December 2022

5.1 Green and digital skills challenges

This section aims at analysing trends in the supply and demand of skilled professionals relevant for the green and digital transition. It first presents secondary data, mostly based on surveys carried out in the social economy, before presenting results of an analysis of LinkedIn data on the availability of skills relevant for the twin transition carried out for this study. With regard to secondary data sources, the Social Tech Academy provides quantitative data on skills and social economy organisations in four European countries (France, Belgium, Italy, Spain). The Social Good Accelerator surveyed European social innovation organisations.

As outlined in section 2, both platform technology and advanced technologies such as AI, mobile applications, digital software and cloud have grown in importance for the social economy, but a lack of the right skills slows down the twin transition of the ecosystem.

In a survey carried out by the Social Tech Academy, half of the survey respondents rate the **overall level of digital skills in their organisation as good or very good, and all organisations surveyed consider their employees to have some data management skills**. However, while 40% report to have mastered basic digital skills, only 25% claim to have mastered professional digital skills. The main digital skills need of technology-intensive social economy organisations are (i) creating and maintaining websites, (ii) managing data, and (iii) designing new digital products or services.[125]

Survey data from 'The Social Good Accelerator' show that 91% of respondents want to further develop their digital skills internally. In this context, the value of cooperation on technological innovation was emphasised with 86%.[126]

The development of digital skills in the social economy faces a number of challenges, particularly a lack of vision for the digital transition, a lack of digital training, a shortage of financial resources to acquire state-of-the-art technology, and the state of development of connectivity in the territory.[127][128] The aforementioned survey also indicates that there is a lack of financial means in social organisations to invest in the digital training of their workers.[129]

Regarding **green skills**, a survey carried out by the Social Tech Academy shows half of the organisations surveyed consider "*skills related to eco-design and the environmental impact of digital technology*" useful for their organisation.[130]

The transition towards a **circular economy**, too, requires both industry-specific (technical) and crosscutting skills.[131] On the technical side, skills related to **green/circular technologies** and **the development of circular products**, services and business models are crucial. Crosscutting skills include change management, collaboration, problem solving, communication and adaptability.[132] On the other hand, according to the organisation RREUSE, social economy organisations active in the circular economy (e.g., reuse, repair, and recycling) provide skills development and lifelong learning opportunities.[133] The organisation RESCOOP provides a network, facilitating international exchanges and

[125] Social Tech Academy, A framework to promote the digital jobs and skills in social economy.
[126] Social Good Accelerator, 2019, The cooperation between social utility and technology organisations in Europe. Issues, impacts, obstacles and catalysts. European study part 1 – 2019. https://socialgoodaccelerator.eu/wp-content/uploads/2019/11/Exec-sum-En-BD-corr.pdf.
[127] Social Tech Academy, A framework to promote the digital jobs and skills in social economy.
[128] Malta, M. C., Azevedo, A. I., Bernardino, S., & Azevedo, J. M. Digital Transformation in the Social Economy Organisations in Portugal: a preliminary study.
[129] Social Tech Academy, A framework to promote the digital jobs and skills in social economy.
[130] Ibid.
[131] OECD, 2017, "Green skills and the transition to a green economy", in Boosting Skills for Greener Jobs in Flanders, Belgium, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264265264-3-en.
[132] OECD| European Commission, 2022, Policy brief on making the most of the social economy's contribution to the circular economy.
[133] Rreuse, Briefing, Job Creation in the Re-Use Sector: Data Insights from Social Enterprises, April 2021.

cooperation between energy cooperatives.[134] COPA-COGECA is another interesting example, being involved in European projects related to agriculture, environmental protection and rural development, including for reskilling and upskilling the workforce, such as in the agrifood and veterinary sectors.[135] Social Economy Europe provides a platform for exchange for organisations of the Social Economy.[136] B-WISE is a project funded by the Erasmus+ programme, aiming to develop a European strategy to address skills needs, particularly digital skills, in the Work Integration Social Enterprises sector.[137] The baSE project, also co-funded by the EU Erasmus+ programme, aims to develop a European strategy to address skills mismatches and provide new skills, particularly in the digital and green domains, in the social economy and proximity sector.[138]

5.2 Professionals with green and digital transition skills

The following analysis on the availability of skills relevant to the digital and the green transition in the social economy is based on LinkedIn. LinkedIn is the largest professional network platform with rich information like profile summary, job title, job description and field of study, which can be used for the identification of skilled professionals in advanced technologies and both in digital and green transition. It represents the single most comprehensive source currently available for the construction of technology-specific skills related indicators. To harvest the data from LinkedIn, keywords capturing skills by advanced technology were defined and reviewed by technology experts. Queries were subsequently constructed to filter data for location and industry.

The social economy has been captured by using the tags '**Civic and social organisation**' and '**Non-profit organisation'** since these allow to filter for professionals working in social economy organisations. Other codes such as **environmental services** have been used only partly, since not all environmental organisations can also be considered to be social economy organisations.

The availability of **green skills** among professionals in the social economy was assessed by filtering for skills related to environmental protection, environmental services, low carbon technologies, renewable energy, the circular economy and clean production technologies and business models related skills.

The availability of (advanced) **digital skills** was assessed in the context of the main digital technologies covered in this study, notably artificial intelligence, cloud computing, connectivity, robotics, Internet of Things, augmented and virtual reality and blockchain. The methodological note in Appendix B provides more information on the approach taken for this analysis.

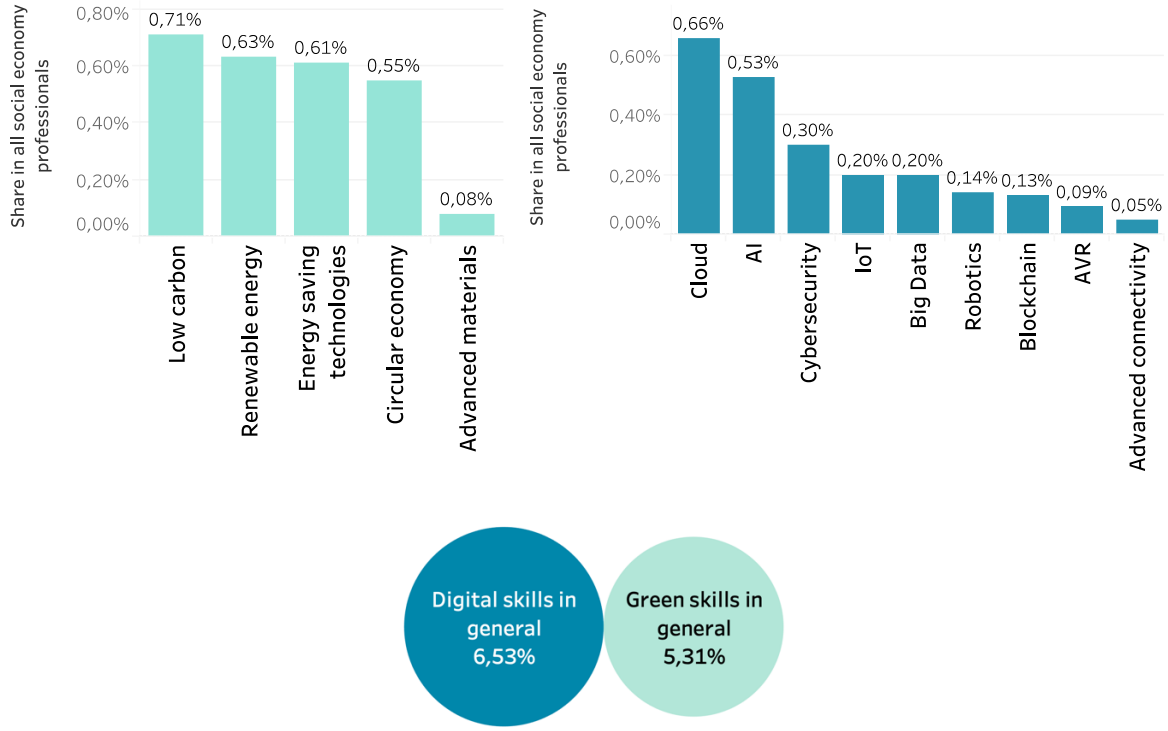
Figure 20 gives an impression of the supply of professionals with green and digital technological skills relevant for the social economy. Among professionals registered on LinkedIn and employed in the social economy (more specifically in civic, social and non-profit organisations), **5.31% indicate to possess at least one type of green skill and 6.53% to have at least one advanced digital skill.**

The most mentioned advanced digital skill is related to cloud technologies, followed by artificial intelligence. The low prevalence of skills related to augmented and virtual reality (AVR), robotics, big data and IoT among social organisations aligns with findings on the uptake and use of these technologies. Among the green skills, the most frequently mentioned keyword relates to low carbon, followed by renewable energy. These skills are in particular relevant for social economy organisations focusing on climate change, decarbonisation and the energy challenge. The relatively lower level of green skills among

[134] https://www.rescoop.eu/about-us.
[135] https://copa-cogeca.eu/projects.
[136] https://www.socialeconomy.eu.org/about/.
[137] https://www.bwiseproject.eu.
[138] https://www.socialeconomy.eu.org/2022/10/25/kick-off-base-project/.

the professionals captured via LinkedIn can be explained by the nature of civic, social and non-profit organisations in most cases dealing with social services, care and support to disadvantaged social groups.

Figure 20: Share of professionals with green and digital skills employed in the social economy



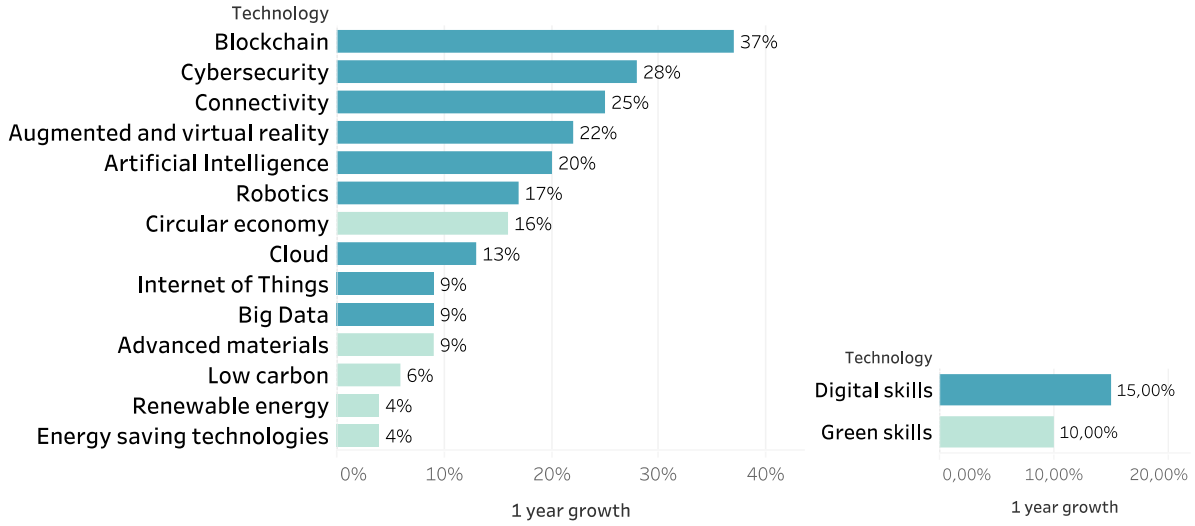
Source: Technopolis Group calculations based on LinkedIn data, December 2022

The change in the number of professionals with digital or green skills have to be put in the context of the overall employment patterns. The total number of professionals employed in the social economy on LinkedIn has remained stable over the period from 2020-2022. This is not the best period to monitor change due to the Covid-19 pandemic, but the analysis is limited due to data availability. This means that any change in the number of professionals with digital or green skills represents not only an absolute growth, but also a growth in the share of professionals in the sector with such skills.

Figure 21 shows the growth between 2021 and 2022 in the number of professionals with green and digital skills employed in the social economy. Overall, the data indicate a higher growth rate for professionals with digital skills compared to the number of professionals with green skills. The growth in the number of professionals with digital skills is mostly driven by a growth in skills related to blockchain, cybersecurity and connectivity. However, the overall prevalence of these skills in the social economy is still very low (cf. Figure 20). Growth in the number of professionals with green skills most prominently includes growth in skilled professionals with respect to the circular economy.

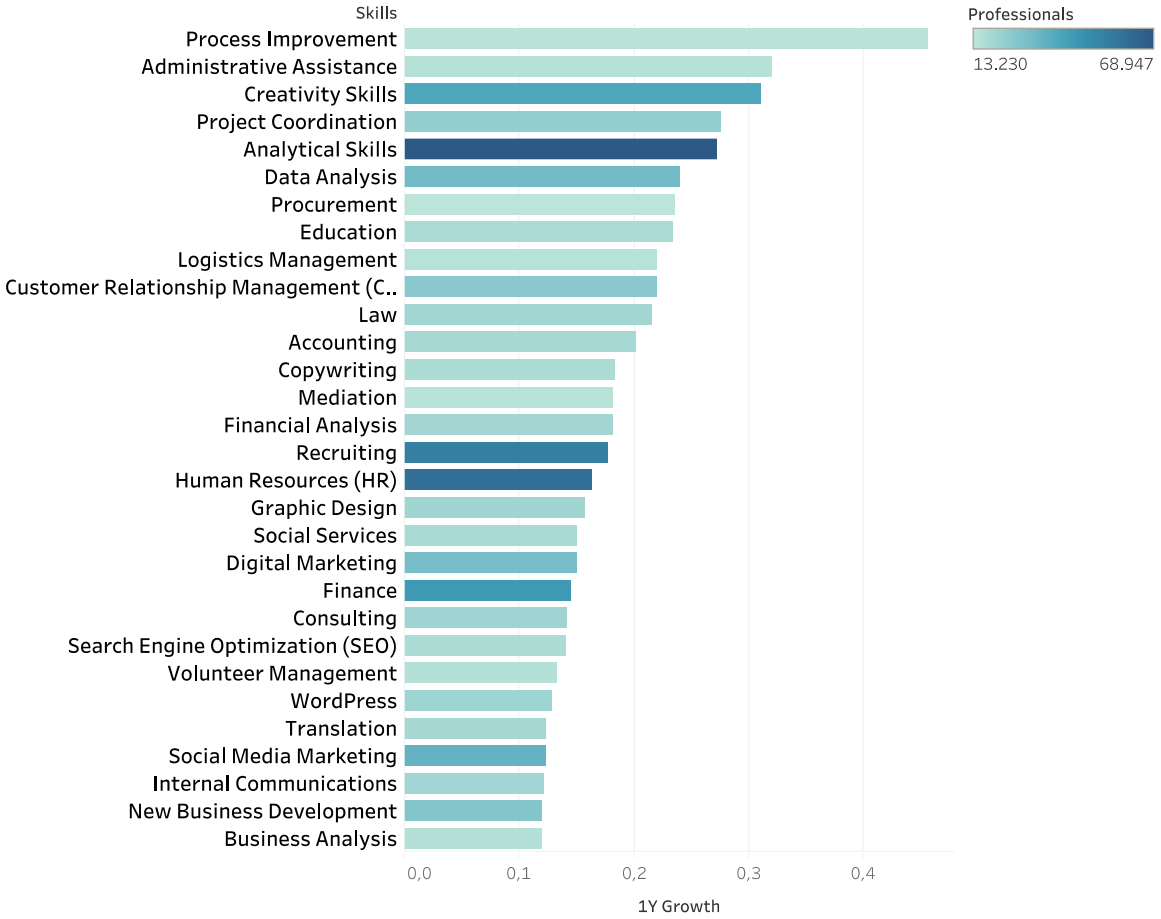
The diagram below shows the skills growing the fastest in prevalence in the social economy on LinkedIn (2020-2022), with the colour shades indicating the absolute number of professionals with the respective skill (the darker, the higher). The two skills growing fastest in prevalence are process improvement and administrative assistance. However, the number of professionals equipped with these skills is (still) relatively low. Fast growing skills with a considerable number of related professionals are e.g., creativity and analytical skills. The figure also reflects the considerable prevalence of professionals equipped with skills related to basic digital tools/tasks, such as analytical skill, data analysis, as well as digital- and social media marketing.

Figure 21: growth in the number of professionals with green and digital skills and employed in the social economy between 2021 and 2022



Source: Technopolis Group calculations based on LinkedIn data, 2022

Figure 22: Highest growing skills in the social economy on LinkedIn



Source: Technopolis Group calculations based on LinkedIn data, 2022

5.3 Skills demand

Skills demand in the PSE industrial ecosystem has been analysed following the skills intelligence insights of Cedefop, the European Centre for the Development of Vocational Training[139]. This dataset covers the EU27 Member States (plus UK) and is based on the collection and analysis of more than 530 online job advertisement sources (424 distinct websites) which are open-access sites. The dataset provides information on most requested occupations and skills across European countries based on established international classifications, e.g., ISCO-08 for occupations, ESCO for skills, and NACE rev. 2 for sectors.

Specific to the PSE industrial ecosystem[140], there were **517 734 unique job advertisements** from companies in 2022 in the EU27. These job advertisements have been text-mined and the required skills analysed from the perspective of the green and digital transitions. The green pre-defined skills are from ESCO v1.1 and the digital are predefined from ESCO v1.1.1 which is currently being updated.

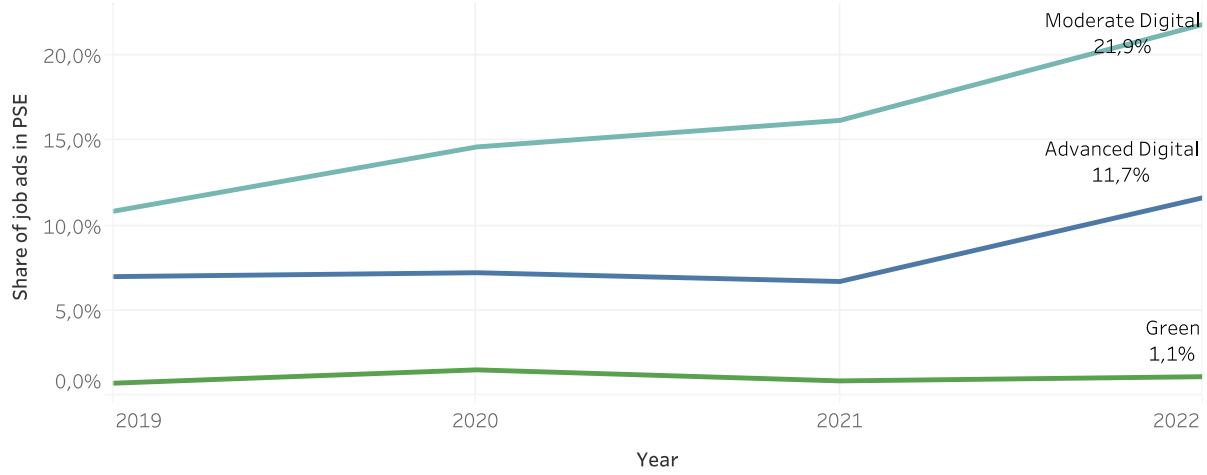
The European multilingual classification of Skills, Competences, Qualifications and Occupations (ESCO) is used as follows:

- **Green transition related skills** (ESCO v1.1.) are those knowledge and skills which reduce the negative impact of human activity on the environment. The labelling of skills and knowledge concepts as green follows a methodology based on a 3-step process, which combines human labelling and validation, and the use of machine learning algorithms.
- **Moderate and Advanced Digital skills** (ESCO v1.1.1 which is currently being updated) are competences which involve the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. The labelling of skills and knowledge concepts follows a 5-steps methodology, which combines human labelling and validation with the use of machine learning algorithms.

The share of online job advertisements that required any form of **moderate digital skills (excluding basic IT office skills) was 16.04%** over the period from 2019-2022, while this percentage was **8.29% for advanced digital skills.** Requirements related to the **green transition** appear less often on the advertisements notably in a very small share **1%** of the cases.

[139] https://www.cedefop.europa.eu/en/tools/skills-online-vacancies
[140] In the case of the retail industrial ecosystem the dataset was filtered for the NACE industries as defined in the Annual Single Market Report.

Figure 23: Share of online job advertisements that demand digital and green transition related skills in the PSE industrial ecosystem within the total number of retail job ads



Source: Technopolis Group calculations based on Cedefop data, 2023

The more sought after advanced digital skills include the following:

- Database
- Computer programming
- Online analytical processing
- SAP R3
- SQL
- Microsoft Access
- Object-oriented modelling

The more sought-after green transition related skills are in line with what has been highlighted in the analysis of the survey:

- corporate social responsibility
- energy efficiency
- environmental legislation
- solar energy.

6. Green performance of the ecosystem

Key findings

The **proximity and social economy by definition includes a broad range of activities that address critical environmental challenges and provide alternatives to mainstream production and consumption of goods**. There is a strong link between the proximity and social economy, which comprises many entities that are strongly rooted in local communities and cautious about their environmental impact in these, and the concept of a circular economy which encompasses products and services that extend the lifespan of materials and products and the reuse and recycling of them. Through energy cooperatives, which are typically locally organised and serve social purposes, the ecosystem is also making a significant contribution to the deployment of renewable energy across Europe. Other industrial cooperatives are also active in recycling, reuse and repurposing initiatives.

The proximity and social economy as a whole have various negative impacts on the environment including greenhouse gas emissions, land use and water use, where trends are being shaped by the sub-sector of residential care activities and social work activities, followed by retail, accommodation and food. **The ecosystem is responsible for 6.2% of greenhouse gas emissions and 5.75% of materials extraction in all industrial ecosystems focused on in this project.** The impact over time shows a positive development (less environmental burden) between 2012 and 2015 but **the negative impact has slightly been increasing in absolute volumes** since then. **The main core industry that contributes to greenhouse gas emissions in the ecosystem is residential care and social work activities** accounting for 61.8% of the ecosystem's emissions in the year 2010, whilst its share increased to 64.4% in the year 2020.

Figure 24: Environmental impact summary table

Environmental impact	Compound annual growth rate from 2010 to 2021 (CAGR)
GHG emissions	-1.1%
PM emissions	0.3%
Material use	-0.9%
Land use	+2.2%
Water use	+0.3%
Damage to the environmental ecosystem	+0.9%

Source: Technopolis Group calculations based on Exiobase, 2023

6.1 The contribution of the proximity and social economy to the circular and low-carbon economy

This sub-section focuses on the contribution of the proximity and social economy to a low-carbon and circular economy, focusing on recycling and energy cooperatives as key proximity and social economy actors.

The **ownership structure of social economy organisations**, particularly cooperatives, enables them to pioneer solutions contributing to the green transition. Given that social economy organisations are typically strongly embedded in their local communities, they may be more sensitive to negative externalities for their local community and therefore more sensitive to adopting green transition strategies. At the same time, there may be a trade-off in adopting new technologies and maximising economic interest in a producer cooperative.

The **circular economy**, according to one definition[141], is restorative and regenerative by design. It relies on system-wide innovation, aiming to redefine or pioneer products and services to extend the lifespan of materials and products for as long as possible and reduce waste, while minimising negative impacts and providing cost-saving opportunities to consumers and creating local jobs.[142] The need for the circular economy, particularly with regard to activities such as re-use and repair, are expected to be driven by a rising demand for scarce critical raw materials and a growing generation of electric and electronic waste.[143] The crucial role of an effective circular economy in a successful green transition is highlighted in the European Council's strategic agenda for the next five years.[144]

There is a close **link between the proximity and social economy** and the **circular economy**, as many organisations in the ecosystem provide re-use, up- and recycling services, operate in local waste management, or generate sustainable products and services.[145] A significant part of the social economy is made up by organisations operating in the reuse and recycling of different consumer goods. This includes in particular the collection, sorting and redistribution of used textiles and clothing, electrical and electronic waste (WEEE), furniture and other bulky waste, collection and recycling of paper, cardboard, wood, plastics, paints, metals, books and toys.[146]

Social economy organisations also contribute to other circular activities such as restoring natural ecosystems through regenerative farming techniques, the eco-design of products (optimisation of resource use), and collaborative economy approaches. Social economy organisations can further engage in circular value chains to reinforce social inclusion, by providing training and work opportunities to vulnerable groups. They may also help to drive awareness of the circular economy through the improvement of the affordability of circular goods and services for low-income households.[147]

According to the organisation Rreuse, social economy organisations are using digital solutions such as e-commerce, traceability and reporting software, and ICT-enhanced warehouses in the context of product lifetime extension through re-use and repair. These

[141] Sebastjan Pikl, 2019, Social economy and green transformation in the European Union, p. 19

[142] ibid

[143] Rreuse, How Social Enterprises contribute to the digital transition, 8 December 2021.

[144] Felicita Medved, 2019, The New Plastics Economy: Policy and Social Innovation, in: Social economy and green transformation in the European Union: p. 73.

[145] European Commission, 2021, Scenarios towards co-creation of a transition pathway for a more resilient, sustainable and digital Proximity and Social Economy industrial ecosystem, SWD(2021) 982 final

[146] Sebastjan Pikl, 2019, Social economy actors as a part of a circular economy approach in the reuse and recycle of textiles and clothing, in: Social economy and green transformation in the European Union: p: 97.

[147] OECD| European Commission, 2022, Policy brief on making the most of the social economy's contribution to the circular economy.

digital applications can also facilitate and scale-up digital (and inclusive) training opportunities, benefitting the circular economy.[148]

In the context of the circular economy, the intersection between the proximity and the social economy is particularly clear. Proximity and collaboration are two elements that are critical for organising circular activities and value chains at a local level, facilitating the collaboration among local stakeholders. An interesting example concerns used clothes traders. Experience with these organisations show that clothing and textiles sorting facilities, that prepare for processing in a reuse and recycling centre, should cover a rather small area. This infrastructure would ideally allow for relatively short logistic chains while maintaining a sufficient reach.[149] Moreover, the replacement of raw materials with industrial waste from partner companies as a circular approach is made possible only by geographical proximity of economic actors, given the need for short supply chains.[150] In general, short supply chains tend to exhibit **reduced carbon emissions**, as compared to more complex supply chains.[151] Another example is the effective treatment of waste and its use as a resource in the future as it plays a major role in achieving environmental sustainability and in moving towards circular economy principles.

While there is a great diversity in social economy actors working on building a circular economy, experts expect the biggest impact to come from **agricultural and consumer cooperatives**, given their large number relative to the overall size of the social economy. Examples include supermarkets shifting away from plastic, large agriculture cooperatives reducing the use of pesticides or using energy produced from biomass (often based on by-products).

The development of bottom-up concepts for cooperative production and financing, and the use of low carbon technologies, can play an important role in fostering the adoption of low carbon technologies. In particular, the emergence of decentralised renewable energy technologies such as solar panels, wind turbines and small hydroelectric installations has been accompanied by the creation of renewable energy cooperatives based in local communities.[152] While these cooperatives are not necessarily innovative from a technological point of view, they are actors in social innovation.[153]

Another relevant proximity and social economy actor driving the green transition phenomenon concerns **energy communities** that support citizens' participation in energy production and the energy system. Energy communities are already well-established in several European countries and are supported by the EU's renewable energy directive II (REDII) and the European Commission's Clean Energy for All Europeans Package. Energy communities are often organised in cooperatives or foundations but can also be incorporated associations or companies, depending on the country. At present, there are approximately 3,400 renewable energy cooperatives in the EU.[154]

Energy communities are a typical example of proximity and social economy organisations as they are usually locally rooted and **benefit local communities** by investing in local jobs and infrastructure.[155] This way, they can contribute to rural development. In some

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[148] Rreuse, How Social Enterprises contribute to the digital transition, 8 December 2021.
[149] Sebastjan Pikl, 2019, Social economy actors as a part of a circular economy approach in the reuse and recycle of textiles and clothing, in: Social economy and green transformation in the European Union: S: 97.
[150] Velenturf, A. and P. Jensen, 2015, "Promoting Industrial Symbiosis: Using the Concept of Proximity to Explore Social Network Development", Journal of Industrial Ecology, Vol. 20/4, pp. 700-709, http://dx.doi.org/10.1111/jiec.12315.
[151] Paciarotti, C. and F. Torregiani, 2021, "The logistics of the short food supply chain: A literature review", Sustainable Production and Consumption, Vol. 26, pp. 428-442, http://dx.doi.org/10.1016/j.spc.2020.10.002.
[152] As of 2014, there were about 2,400 renewable energy cooperatives in Europe. (Source: Bauwens, T., 2017, Toward a polycentric low-carbon transition: the roles of community-based energy initiatives in enhancing the resilience of energy systems, Springer.)
[153] Stephanie Cesbron, Louise Evans, Neil Walmsley and James Tweed, Koen Rademaekers, Roel van der Veen, Nick Rothengatter and Jessica Yearwood, 2014, Cooperative production, financing and use of low carbon technologies, Case studies.
[154] https://socialres.eu/news/sharing-power-to-foster-renewables-the-cooperatives-model/.
[155] Caramizaru, Aura, and Andreas Uihlein. Energy communities: an overview of energy and social innovation. Vol. 30083. Luxembourg: Publications Office of the European Union, 2020.

countries, for example in Germany, the Netherlands and Sweden, other regional actors such as small businesses, municipalities, churches, and non-governmental organisations (NGOs) engage in energy communities. Together with individuals, they ensure the **participation** of the community in decision-making processes.[156] Energy cooperatives can foster democratic participation of citizens as they usually operate in line with the "one-member-one-vote" principle.[157]

Since members of cooperatives invest their own money[158], cooperatives enhance the **mobilisation of private capital for renewable energy projects** and allow its members to benefit financially from the energy community. Energy communities often provide financial returns for its members or, depending on the community's legal form, shareholders.

Furthermore, energy communities can provide **lower and more stable energy prices**.[159] Given that both members and customers benefit from the lower energy prices, energy communities can contribute to a more equal and inclusive energy transition and to alleviating energy poverty.

Energy communities foster the **green transition** in the energy sector in several ways. By benefiting the local communities and increasing the democratic participation of the affected citizens in the decision-making process, energy communities can facilitate the decentralisation of the energy system and the acceptance for renewable energy infrastructure.[160] As public opposition is one of the main barriers for the expansion of renewable energies,[161] energy communities can play an important role in settling or even preventing these kind of conflicts and help **overcoming local resistance to renewable energy** deployment.

(Renewable) energy communities increase the independence of fossil fuels and reduce the need to import energy, hence they can contribute to a more stable energy system. Evidence from Germany suggests that a combination of central and decentral elements, like energy communities, can contribute to a stable and renewable energy system.[162] Furthermore, a recent analysis of the capacity expansion in Europe suggests that energy communities could reduce the transition costs to a European energy system.[163]

6.2 Impact of the industrial ecosystem on the environment

Industrial activity in general has negative consequences for the environment as it consumes natural resources (that might not be able to renew themselves), it emits pollution to the atmosphere and water and generates waste. Proximity and social economy organisations very often provide a solution to environmental challenges as presented in

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[156] Caramizaru, Aura, and Andreas Uihlein. Energy communities: an overview of energy and social innovation. Vol. 30083. Luxembourg: Publications Office of the European Union, 2020.
[157] Yildiz, Özgür, et al., 2015, "Renewable energy cooperatives as gatekeepers or facilitators? Recent developments in Germany and a multidisciplinary research agenda." *Energy Research & Social Science* 6 (2015): 59-73.
[158] https://e360.yale.edu/features/can-europes-community-renewables-compete-with-big-wind-and-solar.
[159] Caramizaru, Aura, and Andreas Uihlein, 2020, Energy communities: an overview of energy and social innovation. Vol. 30083. Luxembourg: Publications Office of the European Union, 2020.
[160] Leiren, Merethe Dotterud, et al., 2020, "Community acceptance of wind energy developments: Experience from wind energy scarce regions in Europe." *Sustainability* 12.5 (2020): 1754.; Caramizaru, Aura, and Andreas Uihlein. Energy communities: an overview of energy and social innovation. Vol. 30083. Luxembourg: Publications Office of the European Union, 2020.
[161] Walker, Benjamin JA, Bouke Wiersma, and Etienne Bailey, 2014, "Community benefits, framing and the social acceptance of offshore wind farms: an experimental study in England." *Energy Research & Social Science* 3 (2014): 46-54.
[162] acatech/Leopoldina/Akademienunion (Hrsg.): Zentrale und dezentrale Elemente im Energiesystem: Der richtige Mix für eine stabile und nachhaltige Versorgung (Schriftenreihe zur wissenschaftsbasierten Politikberatung), 2020.
[163] Backe, Stian, et al., 2022, "Impact of energy communities on the European electricity and heating system decarbonization pathway: Comparing local and global flexibility responses." *Applied Energy* 323 (2022): 119470.

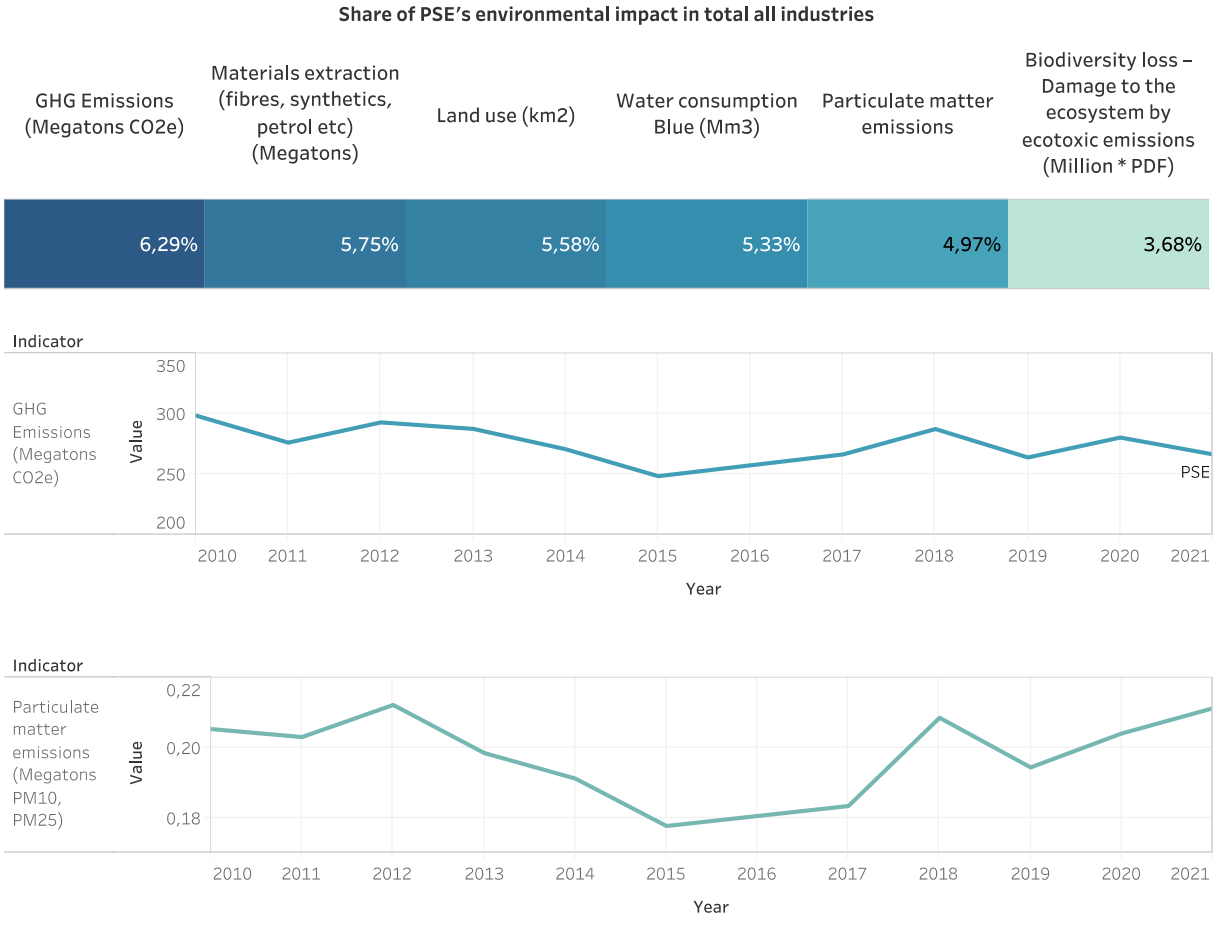
the previous chapters; however, the industrial ecosystem as a whole still has activities that puts a burden on the environment (even if relatively less than other industries).

In this sub-section, trend data on the environmental impact of the proximity and social economy was assessed based on data from Eurostat and Exiobase[164]. Resource utilisation has been captured by four variables: embodied **Land use**, embodied **Water consumption**, embodied **Materials Consumption and Damage to the environmental ecosystem**.

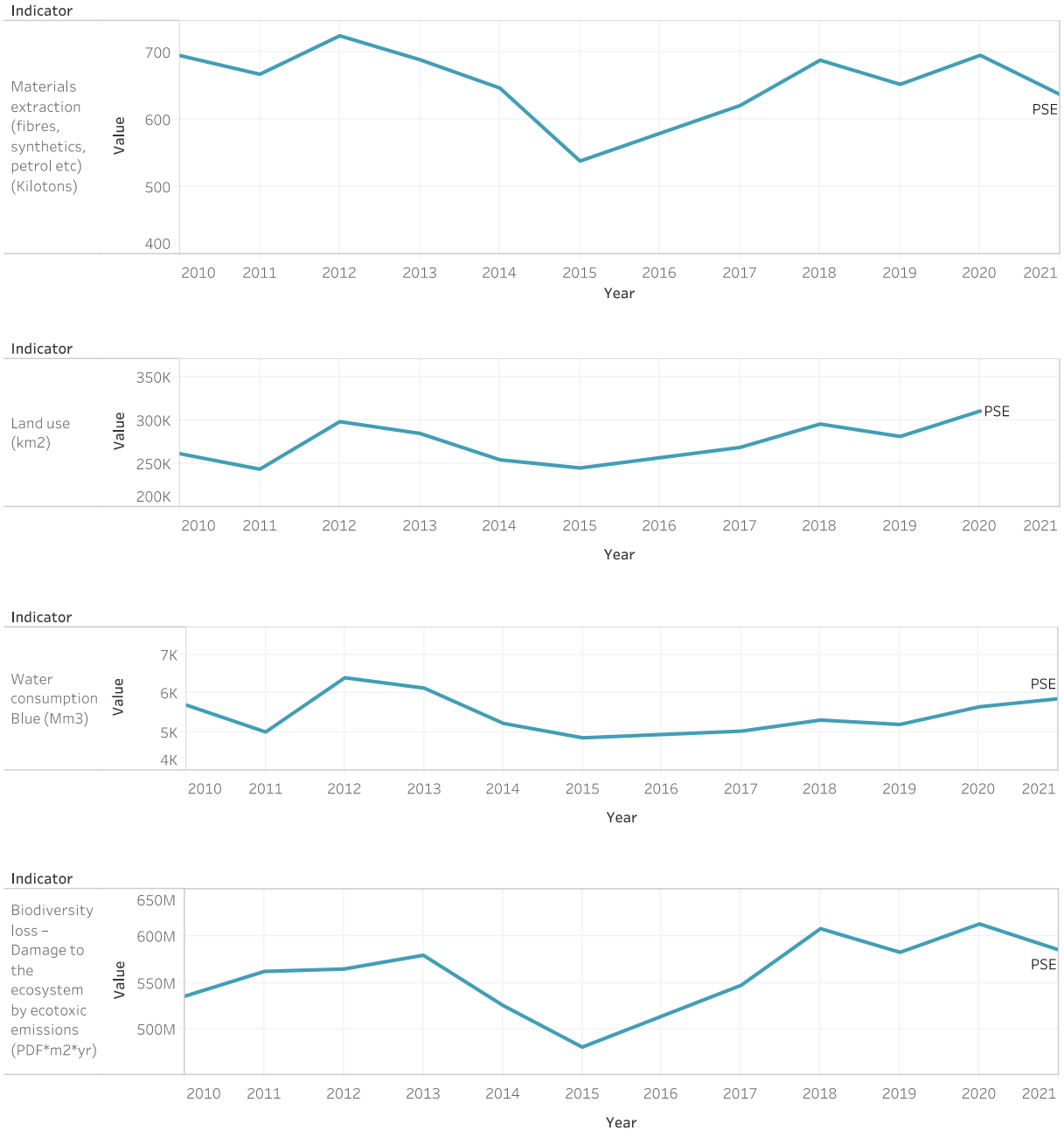
It has to be noted that the analysis is based on NACE industrial classification codes and cannot account for the difference in the nature of companies within each sub-classes such as retail, food or accommodation.

Figure 25 shows the **summary of green performance indicators** at EU level over time, from 2010 to 2021.

Figure 25: Environmental indicators that capture the green transition of the proximity and social economy, including both production and consumption accounts based on Exiobase data



[164] Exiobase is a time series of environmentally extended multi-regional input-output (EE MRIO) tables. Its coverage is by country and industry from 1995 to 2021 and has EU and extra rest of the world coverage. Source: Stadler, Konstantin, Wood, Richard, Bulavskaya, Tatyana, Södersten, Carl-Johan, Simas, Moana, Schmidt, Sarah, Usubiaga, Arkaitz, Acosta-Fernández, José, Kuenen, Jeroen, Bruckner, Martin, Giljum, Stefan, Lutter, Stephan, Merciai, Stefano, Schmidt, Jannick H, Theurl, Michaela C, Plutzar, Christoph, Kastner, Thomas, Eisenmenger, Nina, Erb, Karl-Heinz, … Tukker, Arnold. (2021). EXIOBASE 3 (3.8.2) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.5589597



Source: Technopolis Group, 2022, based on Exiobase data

Emissions

The first figure above shows the level of greenhouse gas emissions as measured in megatons of CO_2 equivalent. The second figure illustrates local emissions of fine particles (PM_{10}, $PM_{2,5}$)[165]. Both figures exhibit the same pattern, with a decreasing trend from 2010 to 2015 and an upward trend from 2015 onwards. Global emissions of CO_2e reached their lowest point in 2015 with a value of slightly above 260, followed by a sharp increase until 2018 when it reached a value of slightly over 300. The development has continued in an unclear trend. Local emissions of fine particles display a similar pattern, with the lowest value of 0.18 in 2015 and the highest value of 0.21 in 2012 and 2021.

[165] EEA, 2022, Particulate matter definition. https://www.eea.europa.eu/themes/air/air-quality/resources/glossary/particulate-matter

The main core industry that contributes to the emissions in the ecosystem is residential care and social work activities. This sub-industry alone accounted for 61.8% of the ecosystem's emissions in the year 2010, whilst its share increased to 64.4% in the year 2020. Another industry that increased its share of emissions in the ecosystem is Retail trade, except of motor vehicles and motorcycles, passing from 7.4% to 7.8% in the same period. As for the rest of the core industries of the ecosystem, in general they reduced their share of emissions in the ecosystem during the same period.

Resource consumption

The following three figures include indicators for the resource consumption and feature materials extraction (fibres, synthetics, petrol, etc.), land use (km^2) and water consumption (Mm3), respectively.

The main contributor to resource consumption in general of the ecosystem is the Residential care activities and social work activities without accommodation. This industry alone accounts for between 60% to 70% of the materials extraction, land consumption, and blue water consumption of the ecosystem.

All three figures exhibit a similar trend as the indicators illustrating emission, especially in the time period 2012-2021. After a short upward trend from 2010 to 2012, the trend decreases until 2015, before the trend for the respective resource consumption starts to rise again. In 2021, materials extraction reached 637 megatons, after it had fallen to 537 megatons in 2015. Land use was the lowest in 2011 and 2015, with approximately 243,000 km^2. Water consumption in the proximity and social economy amounted to 5,838mm3 in 2021, with levels increasing (again) after 2015, when it had hit a low point of only 4,823mm3.

Biodiversity loss

Regarding biodiversity loss as a damage to the ecosystem by ecotoxic emission[166], the respective value also exhibits the broad trend as described for the indicators above, with an increase in the first three years, a drop from 2013 to 2015 and an uprising trend ever since. After biodiversity loss in the proximity and social economy had reached a low point (with respect to the time period observed) of 12 868, it rose to a level of 15 642 in 2021.

As in the previous environmental indicators, the main contributor to the biodiversity loss is the Residential care activities and social work activities without accommodation. However, in this case, the trend over time was for this industry to reduce its impact, contributing with 59% of the potential impact in the year 2010 to 53.7% in the year 2021. The industries in this ecosystem that increased their impacts the most were Retail trade, Real estate activities, and Other personal service activities.

[166] As measured as PDF*m2*yr*million; PDF=Potentially Disappeared fraction of species

Appendix A: References

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Appendix B: Methodological notes

Crunchbase and Net Zero Insights

To identify social economy organisations, various industrial tags have been used such as 'social', 'social shopping', 'social entrepreneurship', 'green consumer goods', 'charity'; 'collaborative consumption'; 'homeless shelter'; 'non-profit'; 'sharing economy'; 'social impact'; 'social recruiting'; 'green building'; 'recycling', 'pollution control'; 'car sharing'; 'ride sharing'.

Organisations relevant for the proximity economy have been identified via the tags 'facilities support services'; 'housekeeping service'; 'office administration'; 'local advertising'; 'laundry and dry-cleaning', 'shopping mall,' 'flowers', 'tutoring', 'concerts', 'nightlife', 'wedding', 'bakery', 'farmers market', 'food trucks', 'restaurants', 'winery', 'funerals'; 'elder care'; 'home health care'; 'wellness'; 'janitorial service'; 'food delivery'; 'last mile transportation'; 'ferry service'; 'courier service'; 'limousine service'; 'parking'; 'casino'; 'museums' and 'historical sites'.

Exiobase analysis

Exiobase is a time series of environmentally extended multi-regional input-output (EE MRIO) tables. Its coverage is by country and industry from 1995 to 2021 and has EU and extra rest of the world coverage. Source: Stadler, Konstantin, Wood, Richard, Bulavskaya, Tatyana, Södersten, Carl-Johan, Simas, Moana, Schmidt, Sarah, Usubiaga, Arkaitz, Acosta-Fernández, José, Kuenen, Jeroen, Bruckner, Martin, Giljum, Stefan, Lutter, Stephan, Merciai, Stefano, Schmidt, Jannick H, Theurl, Michaela C, Plutzar, Christoph, Kastner, Thomas, Eisenmenger, Nina, Erb, Karl-Heinz, … Tukker, Arnold. (2021). EXIOBASE 3 (3.8.2) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.5589597

For the calculations, the ASMR 2021 definitions of the PSE have been used with the same weighting.

Environmental certificates

ISO annual surveys report the number of companies/organisations with environmental certificates. Environmental certificates were the ISO 14000, which was updated requiring more stringent standards and practices in the year 2015. The new standard was then named ISO 14000/2015. Holders of the ISO 14000, starting from the year 2015, had to be re-certified to gain the new ISO14000/2015 certificate. New sustainability and environmental practices had to be put in place; with organisational change and financial requirements implied. Accreditation bodies had also to adopt new verification procedures, with their corresponding time lag. This may explain the drop in number of certified companies/organisations from 2015 to 2017.

The Proximity, Social Economy and Civil Security ecosystem is comprised of 9 industrial activities, identifiable with the NACE codes rev2 described in the definition in the first section. In contrast, the ISO survey uses its own industry classification. It is important to note that ISO classification is less detailed than the NACE rev2 classification, posing to limitations to the analysis of the environmental efforts captured by ISO environmental certifications standards.

Table 3 shows the concordance between the EMI PSE ecosystem industry definition and the ISO industry classification. The table shows in some instances, the EMI industry is more specific than the ISO; such is the case of G47 retail trade, whose concordance in the ISO classification is with Wholesale & retail trade, repairs of motor vehicles. In this case, the number of companies/organisations in the ISO will overrepresent EMI's industry G47 industry. Furthermore, some industries in the EMI definition of the PSE ecosystem do not have a concordance in the ISO classification, which then underestimates the measurement

of the PSE ecosystem's environmental efforts. Thus, on the one hand some industries are overrepresented, while in others, they are underrepresented.

Since there is no way to disaggregate the ISO data, and since it is not possible to estimate data for the EMI industries missing in the ISO classification, the analysis needs to be taken as a general indication of the performance of the ecosystem, and not as a precise measurement. Thus, the weights of the PSE industries as defined in the single annual market report are applied in the corresponding ISO industry to have an indication of the evolution of the PSE environmental efforts.

Table 3: Concordance between the EMI PSE ecosystem industry definition and the ISO industry classification

EMI			ISO
NACE rev2	Industry	Weight to PSE	Industry
G47*	Retail trade, except of motor vehicles and motorcycles	0.16	Wholesale & retail trade, repairs of motor vehicles
I	Accommodation and food service activities	0.14	Hotels and restaurants
L	Real estate activities	0.08	Financial intermediation, real estate, renting
N81	Services to buildings and landscape activities	Not applicable due to missing concordance with ISO	
N82	Office administrative, office support and other business support activities	Not applicable due to missing concordance with ISO	
Q87_Q88	Residential care activities and social work activities without accommodation	1	Health and social work
S95	Repair of computers and personal and household goods	Not applicable due to missing concordance with ISO	
S96	Other personal service activities	1	Other social services
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	Not applicable due to missing concordance with ISO	