

European Expert Group on Clusters

Lead the green transition



Accelerate the digital transition



Build resilience

Recommendation Report

EUROPEAN COMMISSION

Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs
Directorate F — Industrial Policy and Innovation
Unit F.2 — Social Economy

Contact: Marek Przeor, Peter Czaga

E-mail: GROW-CLUSTERS@ec.europa.eu

*European Commission
B-1049 Brussels*

European Expert Group on Clusters

Recommendation Report

Manuscript completed in December 2020
1st edition

LEGAL NOTICE

This document has been prepared for the European Commission, however, it reflects the views only of the authors, and the European Commission is not liable for any consequence stemming from the reuse of this publication. More information on the European Union is available on the Internet (<http://www.europa.eu>).

PDF ISBN 978-92-76-30280-3 doi: 10.2873/025534 Catalogue number ET-02-21-200-EN-N

Luxembourg: Publications Office of the European Union, 2021

© European Union, 2021



The reuse policy of European Commission documents is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under a Creative Commons Attribution 4.0 International (CC-BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated.

For any use or reproduction of elements that are not owned by the European Union, permission may need to be sought directly from the respective rightholders.

Table of Contents

Table of Contents	5
Foreword	6
Executive Summary	7
Introduction	9
1. Lead the green transition	12
1.1. Green transition needs agents of change	12
1.2. Circular economy becomes a new norm	13
1.3. Alliances and missions serve to mobilise SMEs and the civil society	13
1.4. Awareness raising and sharing good practices on green solutions	14
1.5. SME's access to green knowledge and financing	15
2. Accelerate the digital transition	15
2.1. The importance of education and skills for the digital transition	16
2.2. Integration of physical and digital systems.....	17
2.3. Linking Digital Innovation Hubs and clusters	18
2.4. Initiate public-private partnerships for digital transition.....	19
2.5. Supporting European policies and programmes for the digital transition	19
3. Build resilience	20
3.1. Disruptions in supply and value chains	21
3.2. Reskilling and upskilling of the workforce.....	22
3.3. Clusters addressing societal challenges	24
3.4. Facilitating access to global value chains	24
3.5. Joint cluster initiatives – Euroclusters.....	25
Appendices	27

Foreword

The coronavirus has shaken Europe to its core, testing our societies and economies and our way of living and working together. Our small and medium-sized enterprises, the lifeblood of our economy, have been particularly affected.



Clusters have done a great job throughout these difficult times. When the coronavirus hit the EU, the cluster community - led by the European Cluster Alliance – immediately mobilised across EU borders. They reacted effectively to challenges like the need for more masks or ventilators. In a single week, clusters gathered over 1,100 offers, ensuring that more people could benefit from the life-saving medical equipment.

So what are the clusters? Clusters bring together all kinds of companies, research and knowledge institutions, science and technology parks, financial service providers, non-profit organisations and related public bodies. By doing this, they create vital networks at regional, cross-regional national and EU level.

And their importance is growing: there are over 3,000 clusters in the EU, employing over 50 million people and accounting for almost one in four jobs in Europe.

We need them to play a key role as Europe recovers from the crisis and makes a twin transition to a sustainable and digital economy based on our EU industrial strategy and Green Deal.

Just one example: the Transylvania IT cluster brought together companies, research institutes, software companies, public authorities, and universities and developed the Transylvanian Digital Innovation Hub. The leading technologies of artificial intelligence, big data, cybersecurity, robotics or virtual reality are now being developed and applied in creative industries, agriculture, furniture, energy efficiency and agriculture across the region, leading to valuable new jobs.

The report below builds on this: containing fifteen specific recommendations with examples of using clusters in the recovery and twin transition. It offers ideas for policymakers at European, national, regional and local levels. It also informs and can inspire cluster managers and cluster members.

I look forward to seeing these recommendations put into action. But I also hope to see much greater synergies between all our support networks and structures: not just clusters but also our industrial alliances, our Enterprise Europe Network, our Digital Innovation Hubs and others. Just as the clusters have done during the crisis, everyone needs to pull together in a common goal.

Kerstin Jorna

Director-General of the Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs of the European Commission

Executive Summary

The European Expert Group on Clusters¹ reaffirms that clusters have the potential to accelerate twin green and digital transition, build resilience and boost recovery. Clusters demonstrated the capacity to drive change and make European value chains more resilient during Covid-19. Such networks reach quickly European firms, especially SMEs and improve their innovation potential, technological uptake, skills and internationalisation.

The Expert Group on Clusters recommends to focus cluster activities on:

- **Leading the green transition**
- **Accelerating the digital transition**
- **Building resilience**

Leading the green transition

The transition towards a clean, circular, and climate neutral economy requires clusters as agents of change. They connect bottom-up and top-down initiatives. Public authorities and groups of companies will co-design environmental and climate policies and adapt policy instruments to the needs of the industrial ecosystems. Clusters need to develop and implement circular economy strategies and promote an entrepreneurial culture for green businesses among SMEs. They should participate in European green innovation alliances. Further capacity building will enable sets of green-tech firms to advise on the green transition and demonstrate its benefits.

Accelerating the digital transition

Clusters should develop a robust ICT industry and facilitate the uptake of digital solutions. Close cooperation with employment, education and research organisations make these groups part of the local education and training structures. Hence, clusters have to mobilise to implement the European Skills Agenda initiatives like the Pact for Skills. They should be an integral part of Digital Innovation Hubs and reinforce relevant public-private partnerships supporting the integration of physical and digital systems.

Building resilience

Policies should assist clusters in building and using the collective intelligence of their members to cope with challenges and undergo transitions. Groups of enterprises need to anticipate changes and operate as a network for finding supply and market alternatives. The matching of reskilling and upskilling with business needs will happen with an active role of clusters in local labour markets. They need to receive support in social and ecological innovation. Clusters should be used to identify and implement shared value initiatives to address societal challenges (in local communities). Measures are required to create capacity for SMEs to enter global value chains and benefit from the EU's free trade agreements. Cross-sectoral, interdisciplinary and transnational collaboration should be encouraged through the creation of a new generation of strategic partnerships.

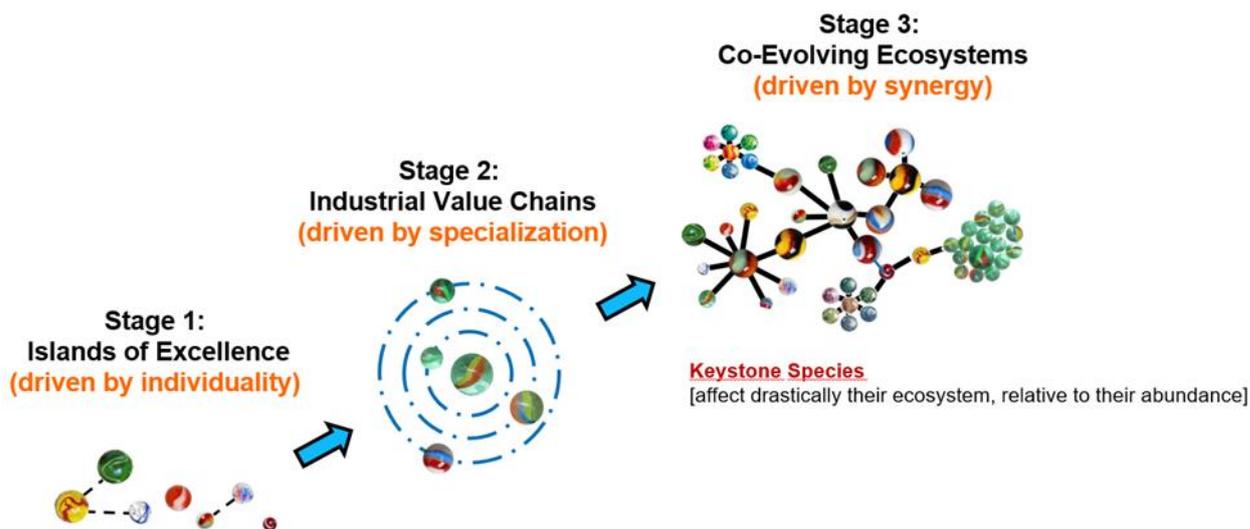
Recommendations mentioned require that clusters:

- are involved in the policy design and implementation at EU, national and regional level,
- engage in reskilling and upskilling of the EU workforce at the local level,
- lead networks of business, research, civil society and public bodies across EU,
- provide specialised services to all actors in industrial ecosystems,
- collect and codify market and technological intelligence of their members,
- promote international activities beyond EU,

¹ This Report has been developed through a collaborative process by the Commission Expert Group on Clusters in accordance with its mandate. The European Cluster Expert Group is an informal Commission expert group, in operation since May 2019 and composed of 23 Member States authorities that were invited to participate and of 10 experts appointed in their personal capacity that were selected after publication of the Call for applications.

- search actively financial support from different financial sources: public and private,
- create synergies and cooperation with SME organisations (incl. those in the Enterprise Europe Network), employer organisations, sectoral and trade associations, etc.,
- are supported by adequate state aid rules.

In recent years, cluster networks, such as alliances, strategic partnerships, associations, and targeted initiatives, play an active role in the development and implementation of cluster policies and services and also in leading clusters' contribution to public policy priorities.² Such involvement should be further encouraged and supported to create networks which are resilient to external shocks in each industrial ecosystem.



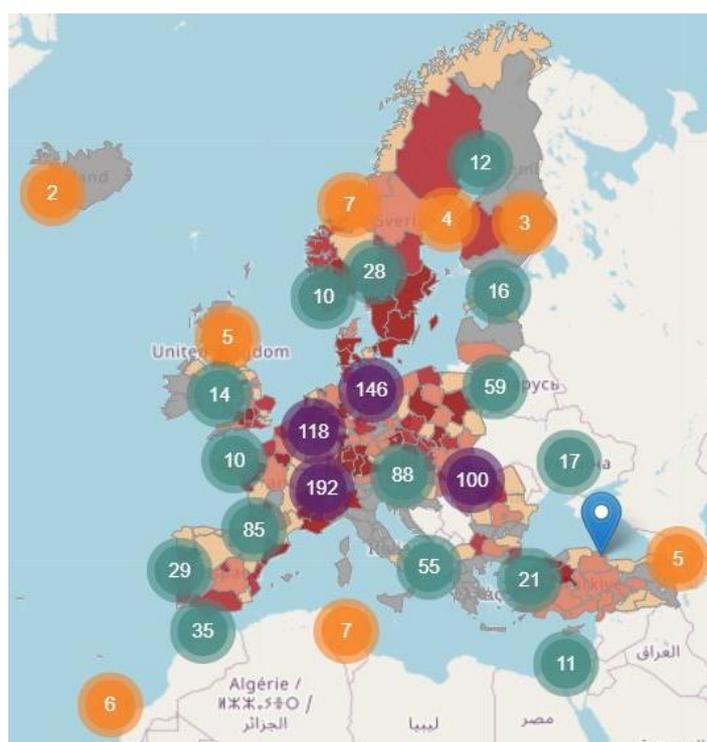
Source: prof. Athanasios G. Konstandopoulos, Presentation of the European Cluster Alliance at the meeting with the Commissioner Thierry Breton on 25 June 2020

² See, for example, the European Cluster Alliance, which gathers 14 National Cluster Associations representing more than 700 clusters, has successfully mobilized its members for cooperation, peer learning, information sharing, interest representation on issues like emergency response to the crisis, value chain disruptions, etc.

Introduction

Clusters constitute a significant part of the European industrial landscape.³ They are dynamic geographic concentrations of interconnected firms and related economic entities that have reached a sufficient scale to develop specialised expertise, services, resources, suppliers and skills.⁴ They include mainly business companies, but also other essential entities of an industrial ecosystem such as research and knowledge institutions, science and technology parks, talents and financial service providers, non-profit organisations, related public bodies.

More than 3000 clusters exist in the EU. Their members employ over 50 million people. They account for almost every fourth job in Europe (61.8 million jobs or 23.4% of total employment) and about half of the jobs in exporting industries (50.3%).⁵



Source: European Cluster Collaboration Platform

Clusters in Europe vary in terms of size and format. They are at different stages of maturity and operate diverse cluster development programmes depending on country and region. The fact that there are 30 national cluster programmes in 20 countries demonstrates the importance of clusters.

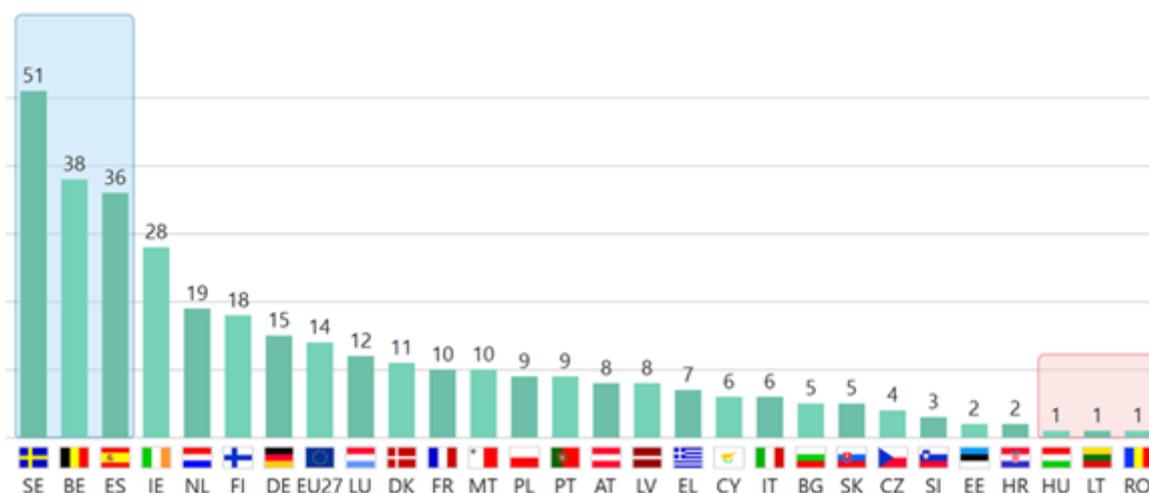
Membership of an industry cluster or SME support organisation varies widely across the EU. According to the Eurobarometer Survey on SMEs, more than half (51%) of all SMEs in Sweden are members of such groups, followed by 38% in Belgium and 36% in Spain, and overall, there are twelve countries where at least one in ten SMEs are members. In contrast, just 1% in Romania, Hungary and Lithuania also say they belong to an industry cluster or other SME support organisation.

³ https://ec.europa.eu/growth/industry/policy/cluster_en

⁴ [Cluster Definitions - European Cluster Collaboration Platform](#)

⁵ 2020 edition of the *European Panorama of Clusters and Industrial Change*, European Observatory for Clusters and Industrial Change https://www.clustercollaboration.eu/sites/default/files/news_attachment/european_panorama_2020.pdf

Q9 Which of the following statements applies to your enterprise? (MULTIPLE ANSWERS POSSIBLE)
 (% - It is a member of an industry cluster or another SME business support organisation in the region)



Base: all SMEs in EU27 (n=12,343)

Source: 2020 Eurobarometer Survey on SMEs, start-ups and entrepreneurship

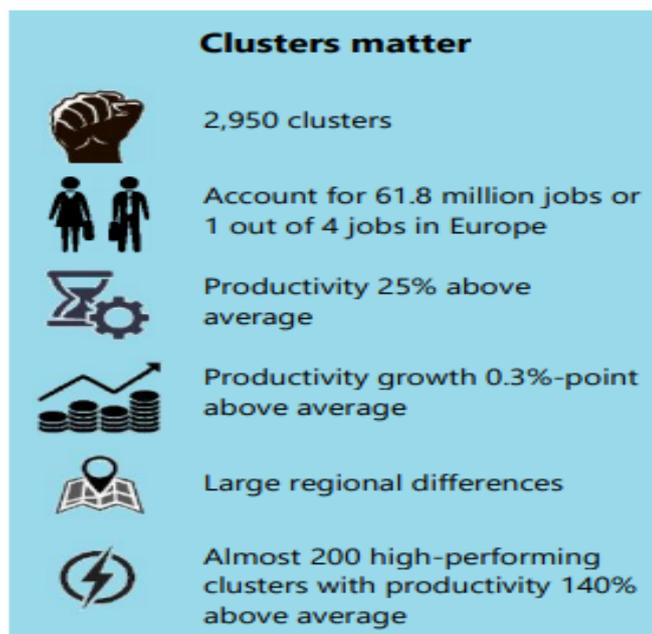
Clusters have a positive impact on economies. The European Panorama of Clusters and Industrial Change⁶ and SME barometer⁷ provide evidence that companies within industrial groupings are more innovative than operating alone, create more and better jobs, conduct more market research, register more international patents and export more than other companies.

The documents point out that productivity in clusters is 25% higher than the average productivity. Cluster members are more likely to be planning to grow turnover than non-members, are more likely to have adopted advanced technologies and have a higher propensity to digital and sustainable innovation.

All SMEs in Europe will have to make the digital and green transition. In this respect, clusters and SME organisations should receive capacity building and clear information on EU programmes, tools and instruments to allow them to facilitate this transformation.

⁶ https://www.clustercollaboration.eu/sites/default/files/news_attachment/european_panorama_2020.pdf

⁷ <https://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/flash/surveyky/2244>



Source: 2020 edition of the European Panorama of Clusters and Industrial Change, European Observatory for Clusters and Industrial Change

The role of clusters in the EU is the following:

- strategic leadership to address recovery efforts and system-level challenges,
- development and implementation of industrial policy in multilevel governance,
- linking actors from different EU member states, regions and their industrial ecosystems,
- leading the entrepreneurial discovery process in smart specialisation strategies,
- active involvement in reskilling and upskilling,
- reaching out to non-EU international markets,
- channel EU public funding to SMEs,
- build own capacity to facilitate collaboration, capitalise and disseminate technological and market intelligence and provide specialised services.

1. Lead the green transition

The transition towards a clean, circular, and climate neutral economy is crucial for the prosperity of the European industry and society. The European Union and its Member States have established the green transition as a significant priority. The European Green Deal⁸ was set as the new growth strategy for Europe and was confirmed and reinforced by the EU Recovery Plan.⁹

Europe should put in place adequate mechanisms to accelerate the transition towards a green economy. An integrated approach is needed to coordinate different stakeholders locally and across industrial ecosystems. Start-ups need to grow, and SMEs scale up into mid-caps and large companies. Clusters need to support this process. There is also a need for orchestrators of supply and demand for green solutions and smart tools for public administration to implement and adapt legislation effectively.

They can identify and support their members' access to green technologies, innovation, business solutions, dedicated funding and markets and thus facilitate the green transition. They build trustful relationships among their members, which is crucial to accelerate green innovation and massive uptake in the world.

There are around 250 so-called green-tech clusters registered under the European Cluster Collaboration Platform¹⁰ that are successful in developing innovative green solutions. They help their members create technologies, products, services and business models that are environmentally and climate-friendly.

1.1. Green transition needs agents of change

Policymakers at all levels need to recognise the value of clusters as effective intermediaries for accelerating the green transition. Clusters must act as agents of change in favour of the green economy. Cluster organisations facilitate interactions in the local environment. They analyse and articulate the needs and ambitions for change and constitute an ideal forum to influence the creation and the implementation of relevant policies.

On the one hand, policymakers need to assign to cluster organisations a relevant role in the design, development and implementation of environmental policies. On the other hand, cluster support programmes should have a stronger focus on encouraging and enabling clusters to consult their members and represent their views on issues related to the green transition.

Recommendation:

- 1) Use clusters as drivers of change, accelerators and enablers of the green transition** through mobilising and facilitating cooperation among stakeholders in industrial ecosystems.

⁸ COM(2019) 640 final, available at https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

⁹ https://ec.europa.eu/info/strategy/recovery-plan-europe_en#atest

¹⁰ <https://www.clustercollaboration.eu>

EXAMPLE: The 2018 national Danish Strategy for Circular Economy¹¹ launched 15 ambitious initiatives. These aim at accelerating the transition to a more sustainable industry to minimise waste and recirculate materials and products.¹² Supporting SMEs in becoming more circular, greener and competitive is a crucial objective of the strategy. Industrial clusters put the plans into action as critical players.

1.2. Circular economy becomes a new norm

Nowadays, many countries, regions and cities have circular economy strategies and action plans. They focus on waste management and end of pipe solutions as well as on design, production and consumption. “In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept with the economy when a product has reached the end of its life, to be used again and again to create further value.”¹³ This definition implies that everyone is impacted - directly or indirectly - by the circular economy and that the intensity of cooperation among actors is especially relevant.

Clusters are at the centre of the local ecosystems and have the full picture on the activities within their ecosystems. Therefore, they can detect opportunities for circular solutions and develop and implement such strategies and plans. A recent report of the European Resource Efficiency Knowledge Center suggests that cluster actors have a strong potential to “offer a nurturing environment to promote circular business models among their members effectively.”¹⁴

Recommendation:

- 2) **Use clusters to develop and implement circular economy strategies and action plans**, detect opportunities for circular solutions and bring circularity in the business processes.

EXAMPLE: The Waste4Think¹⁵ project seeks to apply information and communication technology to the management of the waste generated by urban environments to save costs and promote sustainability. It is funded by Horizon 2020 and includes several clusters as participants. The project targets the validation of 20 highly innovative solutions addressing the monitoring of real-time data, the creation of integrated IT tools, the launch of awareness campaigns, and the construction of two pilot plants for organic waste.

1.3. Alliances and missions serve to mobilise SMEs and the civil society

Many recent European level policy initiatives are aiming at bringing together companies, governments and research organisations around greening ideas. These include the EU Battery Alliance, EU Clean Hydrogen Alliance, EU Circular Plastics Alliance, European Raw Materials Alliance, Low-carbon Industries Alliance. The main objectives of these

¹¹ <https://mfvm.dk/publikationer/publikation/pub/hent-fil/publication/strategy-for-circular-economy/>

¹² <https://stateofgreen.com/en/sectors/waste/waste-policy-planning/>

¹³ EU Action Plan for the Circular Economy, COM (2020) 98 final

¹⁴ [The implementation of the circular economy in Europe \(resourceefficiency.eu\)](https://www.resourceefficiency.eu/)

¹⁵ <https://waste4think.eu/partners-7>

alliances are to create a competitive manufacturing value chain in Europe, covering the specific products or sectors.¹⁶

Missions are an integral part of the Horizon Europe framework programme beginning in 2021.¹⁷ European research and innovation missions aim to deliver solutions to some of the most significant challenges facing our lives, such as adaptation to climate change and climate-neutral and smart cities. Clusters want to engage in a continuous process for the design, monitoring and assessment of these missions. Each mission is a mandate to solve a pressing challenge in society, and clusters can actively contribute.

Recommendation:

3) Recognise clusters as essential contributors to European alliances and missions relevant for the green economy mobilising their members and engaging in sustainable development.

EXAMPLE: The European Clean Hydrogen Alliance¹⁸ aims to work on identifying technology needs, investment opportunities, regulatory barriers and enablers to build a clean hydrogen ecosystem in the EU. The participating stakeholders are representatives of EU Member State governments, regional governments, civil society organisations, industry associations, research initiatives, and individual companies.

1.4. Awareness raising and sharing good practices on green solutions

Surveys suggest that more awareness-raising is necessary for companies and their managers on how their operations are affected by resource efficiency, environmental and climate issues. They need direct practical advice and guidance on how to identify and adopt the necessary technologies and business models.

Experience shows that often cluster organisations and managers do not yet possess the necessary knowledge to raise awareness and trigger the greening of their members. Build up their capacity is crucial so that they can convincingly and effectively engage with their members. Training and skills programmes for cluster managers and professionals in charge of talent development can help in this regard.

The Enterprise Europe Network (EEN),¹⁹ European Resource Efficiency Knowledge Centre (EREK),²⁰ the ClusterXchange pilot,²¹ EU Circular Economy Stakeholder Platform,²² the EU Intelligent Cities Challenge marketplace for city solutions and the EIT Climate Knowledge and Innovation Community (KIC),²³ the European Cluster Accelerator,²⁴ already provide useful resources for capacity building.

¹⁶ https://ec.europa.eu/growth/industry/policy/industrial-alliances_en#:~:text=Industrial%20alliances%20are%20a%20tool,by%20all%20the%20interested%20partners

¹⁷ https://ec.europa.eu/info/horizon-europe/missions-horizon-europe_en

¹⁸ https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance_en

¹⁹ <https://een.ec.europa.eu/>

²⁰ <https://www.resourceefficient.eu/en>

²¹ Since 2019, ClusterXchange has been supporting short-term exchanges to better connect Europe's industrial ecosystems by facilitating transnational cooperation, peer learning, networking and innovation uptake between actors of different industrial clusters across Europe. ClusterXchange was notably used to foster the adoption of new technologies, digitalisation and green low-carbon solutions. <https://www.clustercollaboration.eu/clusterxchange>

²² <https://circulareconomy.europa.eu/platform/>

²³ <https://www.climate-kic.org>

Recommendation:

- 4) **Develop capacity-building programmes to help clusters provide sustainable advisory services** and convince business about the importance of the green transition.

EXAMPLE: The Watertur project²⁵ is led by the Catalan Water Partnership that is the cluster focusing on sustainable water use in Catalonia integrating. It aims to promote the efficient managing of the water cycle in the hospitality sector through the application of innovative water treatment technologies, smart control of the water cycle, real-time evaluation of water and carbon footprints.

1.5. SME's access to green knowledge and financing

Many traditional SMEs are less successful in adopting green business models than larger companies. They suffer from limited capacities, resources, time and available knowledge to invest and deal with the related regulations and standards. At the same time, many innovative SMEs have a strong potential to develop breakthrough green solutions, but they often have difficulties in finding the right financing and partners

Clusters can be useful in helping SMEs to meet the above challenges. They can support SMEs in finding the right funding in terms of debt (loans, guarantees) and equity instruments. They can assist in opening the doors to new markets (both within Europe and globally), and in partnering with multinationals and large corporates to develop demonstration projects of their green solutions. Clusters can also help innovative SMEs exploit the business opportunities based on the increasing demand for green products, technologies, services and business models.

Recommendation:

- 5) Use clusters as **intermediaries to support the green transition and channel expertise and financing to SMEs** for becoming more resource-efficient and carbon neutral.

EXAMPLE: VIDA (Value added Innovation in foOD chAins)²⁶ is an INNOSUP project that involves industrial clusters. It supports the innovation potential of SMEs that work across European agrifood value-chains interested in improving the efficient use of water, food, energy and key enabling technologies (KETs). Support to SMEs is provided through direct funding in the form of innovation vouchers, online platform, B2B's and distance training.

2. Accelerate the digital transition

Digital solutions and the data-based economy are transforming industry along with the whole society. The opportunities of digitalisation have existed for long, and now the COVID-19 crisis further accelerated this need. The EU and its Member States are pursuing many initiatives to guide and accelerate the digital transition.²⁷

²⁴ <https://clustersofchange.eu/thecap2021/>

²⁵ <http://www.cwp.cat/en/item/20791/>

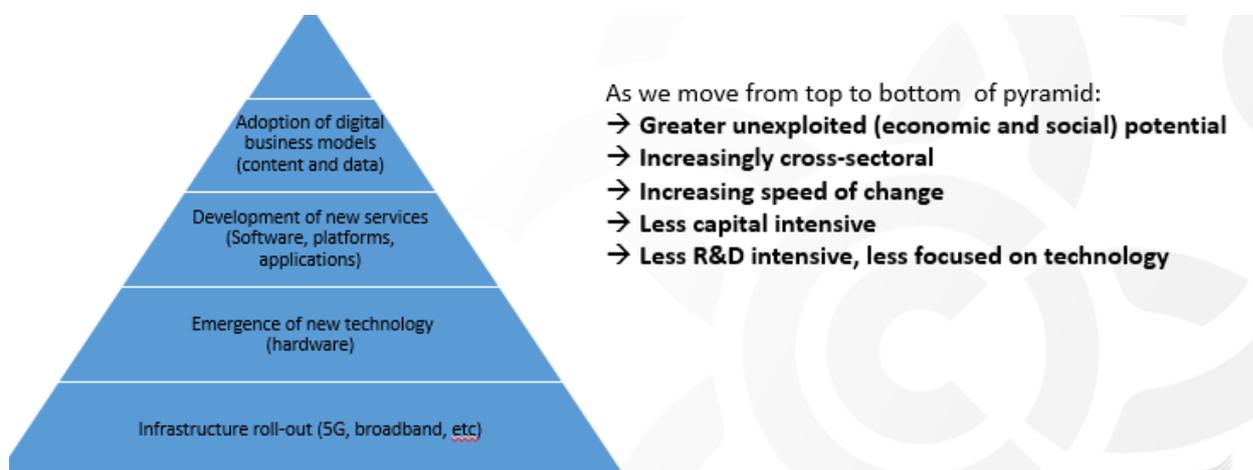
²⁶ <https://vidaproject.eu/>

²⁷ See more on page 16 of this document.

First, the digital transition requires the uptake of solutions by virtually all businesses. The transformation generates new competitive fields as it brings in new opportunities and new ways to create value. Those who do not adopt digital instruments or do not develop a digital component in their business model are certain to fall behind in competitiveness and growth.

Second, Europe also needs a strong and competitive ICT industry. ICT markets have been growing fast globally. European firms could exploit the opportunities generated for industrial and services growth, increased profitability and advanced competitive innovation. The European ICT industry is also crucial for strengthening our technological sovereignty. The development of a European data economy and the creation of robust digital infrastructure in Europe is critical in this respect. There are around 400 ICT clusters in Europe that concentrate actors with business activities and competencies primarily in the digital sector.

Studies distinguish among four levels of digitalisation. These are infrastructure roll-out, the emergence of new technologies, development of new services (apps, platforms, software), and adoption of digital business models. Clusters and their members can be active and contribute successfully simultaneously to business activities related to any of these levels. At the same time, clusters can be most effective in promoting the adoption of ready to use IT solutions and digital business models in early-stage businesses, as these are the least R&D and capital intensive.



Source: European Cluster Collaboration Platform

2.1. The importance of education and skills for the digital transition

Successful uptake of digital solutions in businesses and organisations requires employees with relevant skills, with upskilling and reskilling being specifically important. The recent pandemic brought an acceleration of digitalisation trends, automation, teleworking, with related demands on employees' abilities. The ICT sector requires explicitly highly skilled professionals (e.g., software engineers) and workers, so attracting, maintaining and continuously upskilling the workforce are crucial for the industry.

Cluster organisations, need to step up their efforts to adequately respond to the increasing demands from their members to support reskilling, upskilling and talent attraction regarding digitalisation. Clusters could play such a role effectively as they bring together the main actors in regional and local industrial ecosystems, both those demanding skills

(industry, research and public administrations) and those most influencing their supply (education, government).

Clusters should build up their infrastructures, knowledge and capacities in this area, to be able to develop and enhance the skills related services that they could provide to their members. To be more effective, they should engage in regional skills ecosystems and in European and national level initiatives that foster the development of services providing digital skills. Close cooperation with educational and research institutions that work on digital skills is also needed.

Automation, robotisation and digitisation of business processes are quite complex. Very often, firms and their managers, mainly of micro and small businesses, are not able to understand the advantages of these modernisations. For this reason, entrepreneurs and managers need to increase the level of their competences. Only capable leaders, including in cluster organisations, could be able to compete in the international markets, to understand the necessity of technological changes and, consequently, the importance of increasing the competences of their members and existing workforce.

Clusters should also participate in the leading digital skills initiatives at EU level, like the implementation of the Pact for Skills²⁸ in strategic industrial ecosystems²⁹ from 2021 onwards, the European Skills Agenda,³⁰ including the Blueprint for sectoral cooperation on skills, the Digital Skills and Jobs Coalition, efforts for increasing STEM³¹ graduates or the Digital Education Action Plan.

Recommendation:

6) Mobilise clusters to participate in digital and green skills initiatives like the EU Pact for Skills and embedding them to local education and training structures while promoting STEM.

EXAMPLE: The SMARTENERGY³² project aims to develop new skills for providing customised support services. The project mainly targets SMEs (that are members of the clusters being part of the network), cluster management staff, regional authorities involved in S3 implementation, and the actors being part of their innovation ecosystems. The improved skills and cooperation level of the SMARTENERGY ESCP-4x will result in a more substantial capacity of supporting market outreach in the emerging industry of digital energy transition.

2.2. Integration of physical and digital systems

EU companies face a new industrial revolution, brought on by a new generation of advanced technologies³³, which are a fusion of digital and key enabling technologies

²⁸ <https://ec.europa.eu/social/main.jsp?catId=1517&langId=en>

²⁹ aerospace&defence, agrifood, construction, creative&cultural, digital, electronics, energy intensive industries, health, mobility, proximity&social, renewable energy, retail, textile, tourism

³⁰ <https://ec.europa.eu/social/main.jsp?catId=1223&langId=en>

³¹ STEM is an acronym for the fields of science, technology, engineering and math

³² <https://www.clustercollaboration.eu/escp-4x-profiles/smartenergy>

³³ The Advanced Technologies for Industry project of the European Commission offers analytical overview of 16 advanced technologies: <https://ati.ec.europa.eu/about/what-is-ati> : *Advanced Manufacturing Technology, Advanced Materials, Artificial Intelligence, Augmented and Virtual Reality, Big Data, Blockchain, Cloud Computing, Connectivity, Industrial Biotechnology, Internet of Things, Micro- and Nanoelectronics, Mobility, Nanotechnology, Photonics, Robotics and Security*

(KETs), and represent a growing trend towards servitisation, and the integration of physical and digital systems. Internet of Things, cloud computing, artificial intelligence and big data analytics are prerequisites for smart manufacturing and industrial competitiveness. They give rise to innovative business models and new processes, and the creation of smart and more customised products and services. They underpin the shift to a greener economy, are instrumental in modernising Europe's industrial base, and drive the development of entirely new industries.

European companies persistently lag behind the US and China in the patent adoption and uptake of such technologies. The COVID-19 pandemic has, however, accelerated their uptake and uncovered their potential. See, for example, the role of 3D printers in filling in for the shortages in the supply chain and the making of ventilators and protective equipment.

Industry and in particular, SMEs should use digital strategic foresight and trend monitoring tools. New, different skill-sets are needed both for businesses members of clusters, as well as for the cluster organisations themselves, to overcome the gap in technological uptake. It is crucial not only to understand but also to anticipate and react quickly to future trends, markets developments and identified opportunities.

Recommendation:

7) Increase cluster capacity to provide advanced business services shifting from knowledge-based intelligent manufacturing to data-driven/knowledge-enabled smart manufacturing.

EXAMPLE: The Artificial Intelligence 4.0 strategic program³⁴ in Finland aims to address the “behind the first row” manufacturing companies and challenge them to leap digitalisation. The program integrates regional and national ecosystems, including clusters, and also European Digital Innovation Hubs.

2.3. Linking Digital Innovation Hubs and clusters

Clusters and Digital Innovation Hubs should connect and reinforce their respective efforts. Groups of enterprises can contribute to strategic decisions, represent the voice of business actors, and, therefore, can make the activities of the Digital Innovation Hubs more relevant for local business and other actors of industrial ecosystems.

There is a need to build trust and make hubs and clusters understand that taking an integral part in each other's functioning would strengthen their respective organisations and clients. The practical cooperation between cluster members and Digital Innovation Hubs can materialise in such areas like raising awareness among cluster members on digital transformation opportunities, the development of internal and external capacities and capabilities for digital competencies, offering vouchers for digitalisation, organising demonstration projects and providing “non-commercial” information on potential technologies to be used.

Recommendation:

8) Make clusters an integral part of Digital Innovation Hubs through incorporating clusters into their governance and operations in a continuous collaboration on the digital transition.

³⁴ https://tem.fi/-/tekoaly-4.0-ohjelma-vauhdittaa-liiketoiminnan-digitalisaatiota?languageld=en_US

EXAMPLE: The Transilvania Digital Innovation Hub³⁵ is an initiative developed by the Transilvania IT cluster and by ARIES T, a non-profit organisation, in collaboration with relevant stakeholders. The Hub's mission is to identify collaborative projects for digitalisation of all the relevant stakeholders, such as companies, clusters that activate in various areas (creative industries, agriculture, furniture, energy efficiency and agriculture), research institutes, software companies, public authorities, and universities. The leading technologies that the Hub focuses on are artificial intelligence, big data, HPC and edge computing, cybersecurity, robotics and VR/AR.

2.4. Initiate public-private partnerships for digital transition

The EU's Digitising Industry Strategy³⁶ reinforced the role of Public-Private Partnerships (PPPs) for enhancing digital technology value chains and platforms. Ongoing PPPs in this area, among other topics, focus on cybersecurity, photonics, high-performance computing and robotics. They have proven track records for successfully stimulating investments for innovation, facilitating the implementation of EU-wide digital industrial strategies, and for coordinating great but often fragmented R&D&I efforts.

Clusters can be effective actors in the creation and functioning of PPPs, given their core function to enable/boost collaboration and partnering both between their members and with external public and private actors.

Recommendation:

9) Use clusters to initiate new and to reinforce existing Public-Private Partnerships (PPPs) for boosting digital and advanced technologies value chains and technological platforms.

EXAMPLE: The Strategic Cluster Partnership for increased competitiveness of European Medical Diagnostics SMEs thanks to Artificial Intelligence (AI4diag)³⁷ has a triple ambition: fostering companies' development, fostering regions' co-investments and laying the foundation of a long-term collaboration strategy between clusters. AI4Diag helps SMEs overcome barriers they face related to innovation, skills, cooperation and investment. The global objectives are: a) open up new opportunities for SMEs and help them develop new innovative prediction/detection services; b) enable business organisations to increase skills in companies on AI applications, and c) promote public-private collaboration.

2.5. Supporting European policies and programmes for the digital transition

The Recovery Plan for Europe references several European programmes to enable and strengthen the growth of EU digital industries and the digitalisation of the economy.³⁸

³⁵ <https://transilvaniadih.ro/>

³⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0180&from=EN>

³⁷ <https://www.clustercollaboration.eu/escp-s3-profiles/ai4diag>

³⁸ For instance, the EU's digital strategy plan to invest in more and better connectivity through support to the rapid deployment of 5G infrastructure. Europe also wants to build a real data economy by creating European data spaces in order to ensure enhanced access to privately held data, via industrial and personal data platforms. A further objective is to create fairer and easier business environment by mitigating the dominance of big platforms, widening access to data, supporting digital start-ups, etc. Many of these issues will be addressed through the Digital Services Act.

Beyond governance and legislation, the EU is also investing in the ICT industry and in actions that support digitalisation.³⁹

Clusters, as trust-based collaborative ecosystems, can play a significant role in the above initiatives by acting as drivers of change, channelling industry interests and views, and by accompanying and supporting their members in implementation and compliance.

While many digital policies and initiatives focus on the ICT industry, it is also vital that ICT clusters help to connect their members to users and clients in other industrial ecosystems. Clusters can use remote connections and build trustful collaboration regardless of the geographical location of their members.

Recommendation:

10) Use clusters as strategic agents for the implementation of European digital policies and development of initiatives reaching out to SMEs and other users of digital solutions.

EXAMPLE: GALATEA (Grow and Accelerate your smArt projecTs in nEw value chAins of the European Blue Economy)⁴⁰ brings together 7 ICT, aerospace and maritime clusters and one research and technology organisation from 5 European countries: France, Greece, Romania, Poland and Spain. The main objective is to develop new cross-sectoral and cross-border value chains supporting innovative SMEs to foster the development of crucial Blue Growth industries in Europe. This development is driven by the integration of technologies and know-how from aerospace and ICT sectors in the following domains: ports, ships, shipyards and maritime surveillance.

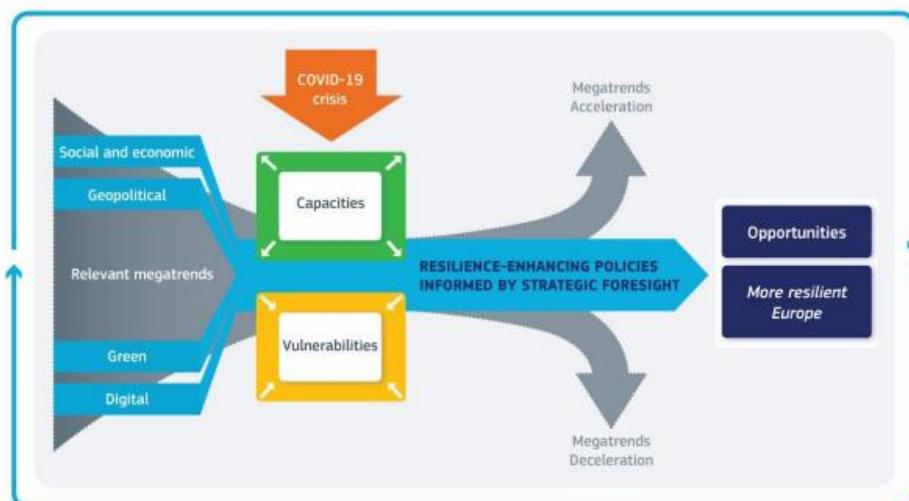
3. Build resilience

Resilience has become a new compass for EU policies after the arrival of the COVID-19 crisis. The concept refers to the ability not only to withstand and cope with challenges but also to undergo transitions in a sustainable, fair, and democratic manner. Strengthening resilience is necessary in all policy areas in parallel with accelerating the green and digital transitions while maintaining the EU's core purpose and integrity in a dynamic and at times turbulent environment. A more resilient Europe will recover faster, emerge stronger from current and future crises, and better implement the United Nations' Sustainable Development Goals.⁴¹

³⁹ For example, the Digital Europe Programme, with a total budget of EUR 8.2 billion, will support the digital transition, including boosting the EU's cyberdefences. One of the five policy windows of the InvestEU³⁹ programme is for "Research, innovation and digitalisation".

⁴⁰ <https://galateaproject.eu/>

⁴¹ COM (2020)493 – 2020 Strategic Foresight Report



Source: *Strategic Foresight Report – Charting the course towards a more resilient Europe*, September 2020

Clusters have proven to be an essential asset for social and economic resilience in Europe. When Covid-19 hit the EU, the cluster community - led by the European Cluster Alliance⁴² – immediately mobilised across internal EU borders. They reacted effectively to challenges like the lack of masks or ventilators. Clusters gathered over 1100 offers during one week and thus helped overcome disruptions in the supply chains of the personal protection equipment.

In this moment of crisis, clusters and their members demonstrated capabilities to ensure fast information flow, technological and engineering capacities, flexibility to reshape value chains, geographical diversity, territorial embeddedness and international connections. Policies to improve resilience, by mitigating vulnerabilities and strengthening capacities, can open new opportunities for clusters.

3.1. Disruptions in supply and value chains

Disruptions of supply and value chains resulting from Covid-19 lockdowns created the need to rethink value chain management practices. The troubles particularly become visible when supply schemes based on outsourcing broke down stopping just-in-time deliverables. Some production facilities outside the EU were not able to deliver due to lack of transport.

The revealed vulnerability of Europe's industrial ecosystems has led to concerns about their lack of sovereignty. Clusters need to help reduce EU dependence on external input providers and restore European value chains. It requires a network approach with multiple players at different stages of the value chain including design, research, manufacturing, and supporting services

In this context, there is a need to identify strategic dependencies, particularly in the most sensitive industrial ecosystems such as health. Such measures could focus on diversifying production and supply chains, ensuring strategic stockpiling, as well as fostering production and investment in Europe.⁴³

In the document "Joint European Roadmap towards lifting COVID-19 containment measures,"⁴⁴ clusters are included as the agents to take part in the Rapid Alert Function,

⁴² <https://clustersalliance.eu/>

⁴³ Council Conclusions of 2 October 2020

⁴⁴ https://ec.europa.eu/info/sites/info/files/communication_a_european_roadmap_to_lifting_coronavirus_containment_measures_0.pdf

through identifying supply and value chain disruptions and proposing best available solutions to tackle them. Clusters could also play a role in Strategic Foresight activities that will become increasingly important in the years to come.

Clusters can contribute to identifying business trends and emerging activities often occurring at the cross-roads of different but connected sectors. This area could be explored in the framework of the activity carried out by the Joint Research Centre (JRC) of the European Commission,⁴⁵ and, possibly, in collaboration with similar national and regional initiatives.

The existence of the national cluster associations builds appropriate scale and capacity of coordinated activities to enable engagement in international projects. Adequate representation of clusters and their members is capable of engaging and supporting the EU strategic partnerships, associations, alliances or targeted initiatives and thus build networks in the EU which are resilient to external shocks.

Clusters are well-positioned to create synergies and develop cooperation between them and SME and employers' organisations, and sectoral and trade associations. This should facilitate a broader outreach to SMEs across Europe and encourage their involvement in cluster activities. This is particularly relevant for SMEs which operate in geographical locations where cluster organisations are less developed. Moreover, some SMEs have an activity not covered by clusters.

Recommendation:

11) Use the collective intelligence of EU clusters to make value/supply chains more resilient, creating synergies and cooperation with SME and employer organisations to anticipate risks and prepare for new opportunities and challenges.

EXAMPLE: The European Cluster Alliance has initiated the “European Alliance against Coronavirus” (EAAC)⁴⁶ to share experience and find solutions to urgent and longer-term challenges from the crisis. One specific example: in Spain, members of the packaging cluster have coordinated their response to COVID-19.⁴⁷ Several initiatives have been conducted, including the development of protective equipment by technology centres or the development of protection screens by machinery manufacturers.

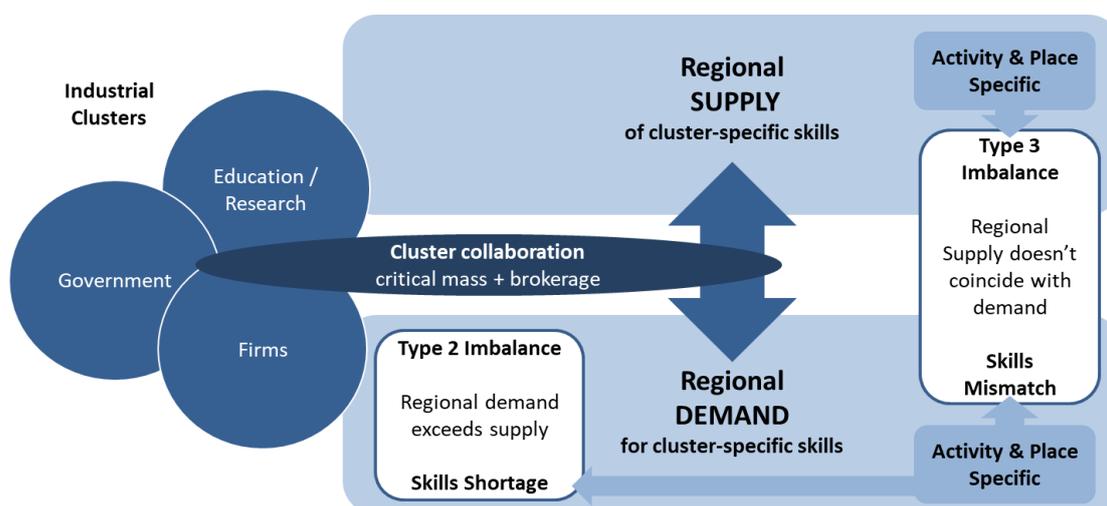
3.2. Reskilling and upskilling of the workforce

Skills development is essential for industrial transition and entrepreneurship due to the significant impact of automation and robotisation on the existing workforce. At the same time, AI and new digital technologies have the potential to create new types of jobs and new opportunities for workers.

⁴⁵ https://ec.europa.eu/info/strategy/priorities-2019-2024/new-push-european-democracy/strategic-foresight/2020-strategic-foresight-report_en

⁴⁶ <https://www.clustercollaboration.eu/news/fighting-covid-19-european-alliance-against-coronavirus>

⁴⁷ www.clustercollaboration.eu/profile-articles/discover-everything-members-cluster-have-done-combat



Source: Supporting skills for industry through clusters, ECCP Discussion Paper 1, James Wilson, Orkestra

The new labour market demands new and more advanced types of competencies. Skills must match the specific needs of industrial ecosystems to enable the diffusion and uptake of innovation and industrial transformation. Reskilling and upskilling of the workforce is even more urgent now when the Covid-19 has accelerated restructuring and modernisation processes in enterprises, in particular in the most affected sectors like tourism, creative industries or aerospace.

The European Skills Agenda, adopted on 1 July 2020, aims at fostering large-scale public-private multi-stakeholder partnerships through the Pact for Skills focused on reskilling/upskilling. It is a new engagement and governance model for skills, where clusters can play an important role. The Pact aims to help industry, public and private employers, social partners, education and training providers and employment agencies, to work together and to create a shared vision and action.

Clusters can act as intermediaries between industry actors and the partnerships/roundtables by directly and effectively connecting the two sides, as they often already closely cooperate inside clusters. They can also envision to propose partnerships under the Pact (e.g., to support reskilling and mobility between sectors, for example).

Recommendation:

12) Develop an active role of clusters in local labour markets through building their capacities for reskilling and upskilling and participating in the implementation of the Pact for Skills.

EXAMPLE: AS-Fabrik Alliance⁴⁸ is an initiative for city-level collaboration to build a skills ecosystem for current and future workers in the knowledge-intensive business services sector in Bilbao (Spain). It is developed by an alliance comprising local government actors, university research centres and two cluster organisations (ICT cluster GAIA, and audio-visual cluster EIKEN) and has leveraged initial funding from the ERDF Urban Innovative Actions programme. The alliance focuses on building a “factory for the creation of advanced services for the industry” which will develop the virtual and physical infrastructure required to identify the mid-term needs of local manufacturing with regards Industry 4.0, implement interdisciplinary training programmes for students, entrepreneurs and professionals, build a long-term methodology for collaborative working and support related start-ups.

⁴⁸ <https://www.uia-initiative.eu/en/uia-cities/bilbao>

3.3. Clusters addressing societal challenges

The COVID-19 crisis has demonstrated that many opportunities exist for integrating different stakeholders, perspectives and assets to achieve broader (system-wide) value-driving initiatives that address societal challenges while also fostering innovation and industrial competitiveness. For example, the digital commons communities acted as critical enablers as they helped SMEs to access manufacturing guides, instructions, and tools needed for the production of emergency and medical equipment, as well as tools for services to support citizens and businesses in critical situations (COVID-19 mapping, social service apps, e-commerce).

The concept of “Shared Value”⁴⁹ reflects the need of all clusters to undertake activities which contribute to addressing social and environmental problems of local communities. It refers to the notion of ‘social glue’ and mutual learning where financial, human and tangible resources are pooled together to enable joint project development. Clusters can provide an ideal ground for identifying and implementing such shared value projects based on their strength of connecting different stakeholders in the value chain and of providing inter-disciplinary leadership.

Social Economy organisations, similarly to other traditional businesses, are also organised in clusters, although often less known. A specific GECES⁵⁰ working group studying this phenomenon has labelled them as „Clusters of social and ecological innovation”. Policymakers need to promote them to complement efforts to meet specific societal challenges such as work integration, inclusive education or circular economy ambitions.

Recommendation:

13) Use clusters to identify and implement shared value initiatives to address societal challenges at the community level.

EXAMPLE: The 4-werk cluster⁵¹ (BE) is grouping 24 social enterprises in work integration. They are operating mainly in manufacturing industries as suppliers for big enterprises and in a region that suffers from labour market shortage, especially for technical profiles. This cluster is a game-changer in the area as they use technology to assist their employees (people with cognitive, physical disability or psycho-social difficulties) by applying and developing technology. The cluster started a joint Applied Technological Innovation lab for this purpose. They invested commonly in rapid design mode technology (use of 3D printers, simplified CAD software, co-engineering systems). As a result of this, social enterprises started to cooperate with the biggest manufacturers in their region.

3.4. Facilitating access to global value chains

About a decade ago, many clusters started developing different internationalisation services. Member companies expected to tap into international market opportunities and to access investment, technologies and skills through partnering in global value chains.

⁴⁹ Creating Shared Value by Michael E. Porter and Mark R. Kramer, *Harvard Business Review*, January–February 2011 Issue

⁵⁰ Commission Expert Group on the social business initiative (GECES); <https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=2753>

⁵¹ <https://4werk.be/>

The services provided by clusters range from business collaboration to long term research projects.⁵²

The European Commission has been supporting this internationalisation through the organisation of matchmaking events, and via the “Clusters Go International”⁵³. These actions provided cluster partnerships with funding to develop and implement internationalisation strategies for the benefit of their SME members.⁵⁴ However, the budget for internationalisation partnerships has been relatively low and split between many partners, making it difficult to create a lasting impact.

Global markets and value chains have changed significantly due to Covid-19 crisis which requires a more strategic and long-term approach to international collaborations. Public authorities should promote more sustainable partnerships and enable SMEs access to global value chains with a long-term impact. Many clusters and their companies are now exploring new ways of rebuilding and reconnecting international supply and value chains, reshaping their global possibilities to a new reality and taking rational positions in risk exposure. Clusters should specifically play a role in turning the EU's existing and future free trade agreements into practice for the benefit of their SME members.

Recommendation:

14) Reinforce activities to develop a strategic approach to international cluster collaboration and build a critical mass of SMEs, businesses and researchers to enter global markets.

EXAMPLE: The EU's “Clusters Go International “(ESCP4i) action supported The New Frontiers in Food Fast Forward (NF4)⁵⁵ partnership. The partnership mobilised five clusters and around 560 SMEs across Europe active in food innovation, including in improving sustainability. The action helped the participating clusters and their SME members to develop trade, investment and collaboration activities with third-country partners. Four countries (Brazil, Canada, China and the US) were being targeted through business missions, granting vouchers directly to SMEs for internationalisation activities and operating a “help-desk” offering on-demand assistance to SMEs. Activities with Canada brought specifically strong results where European SMEs participating in the project signed five non-disclosure agreements (NDAs) and four business contracts, set up one collaborative assignment and opened one subsidiary. The business contracts resulted in a significant increase in turnover for the SMEs involved. The partnership, as an entity, also signed Memoranda of Understanding with Natural Products Canada and with a regional business association in Brazil.

3.5. Joint cluster initiatives – Euroclusters

Building on experience from various forms of cluster partnerships in Europe⁵⁶, the European Commission has proposed the Joint Cluster Initiatives – Euroclusters as a flagship action within the new Single Market Programme. They will aim to improve the

⁵² The exploitation of markets abroad has proved to be an important challenge especially for many EU SMEs. According to the SME Performance Review of 2018, exports of EU SMEs increased by 20% since 2012, but only 30% of all EU SME exports go beyond the EU.

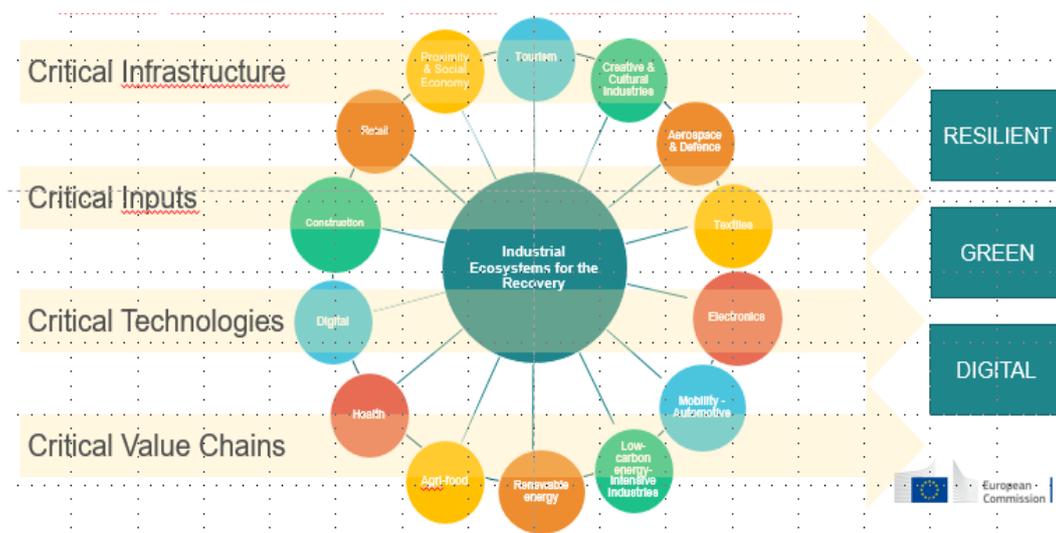
⁵³ <https://www.clustercollaboration.eu/eu-cluster-partnerships/escp-4i>

⁵⁴ The interim evaluation of COSME highlighted that this programme has been amongst those COSME action lines with a very high EU added value.

⁵⁵ <https://newfrontiersinfood.eu/2019/12/13/project-update/>

⁵⁶ Current actions include: European Strategic Cluster Partnerships for Internationalisation (ESCP-4i) and for smart specialization (ESCP-S3), as well as INNOSUP cluster facilitated projects for new industrial value chains. See at <https://www.clustercollaboration.eu/>

competitiveness of businesses, especially SMEs. Euroclusters will focus on finding solutions on critical inputs and technologies and apply them in business to support resilient, green and digital Europe. The Euroclusters will be a new generation of strategic partnerships of cluster initiatives within Europe – connecting ecosystems across regions and sectors to strengthen value chains, to boost innovation, internationalisation and scaling up support to SMEs, and to facilitate industrial transformation.



Source: European Commission

Recommendation:

15) Initiate cross-sectoral, interdisciplinary and transnational cluster collaboration to develop new products/services, which guarantee EU companies critical inputs and technology.

EXAMPLE: The Internet of Things For Industry (IoT)⁵⁷ partnership of clusters from different countries supported 40 projects with 3,6 million EUR allocated to the demonstration, prototypes or feasibility studies for using technologies like: big data, artificial intelligence, internet of things and wearables, simulation and modelling, data processing and visualisation, machine learning and cybersecurity of industrial applications such as monitoring&control, predictive maintenance, safety&security, logistics and supply chain, track&trace. The scope covered different sectors, e.g., automotive, packaging, furniture, electronics, chemicals, wood, textile, mechanical, metalworking, plastics&rubber, nanotechnologies, marine, building and construction in collaboration of SMEs and research organisations from different EU countries like France, Germany, Spain, Belgium, Italy, Czech Republic, Slovakia, United Kingdom.

⁵⁷ <https://www.iiot4industry.eu/>

Appendices

Annexe 1:

RECOMMENDATIONS INCLUDED IN THE REPORT

Lead green transition	Use clusters as drivers of change, accelerators and enablers of the green transition through mobilising and facilitating cooperation among stakeholders in industrial ecosystems.
	Use clusters to develop and implement circular economy strategies and action plans , detect opportunities for circular solutions and bring circularity in the business processes.
	Recognise clusters as essential contributors to European alliances and missions relevant for the green economy mobilising their members and engaging in sustainable development.
	Develop capacity-building programmes to help clusters provide sustainable advisory services and convince business about the importance of the green transition.
	Use clusters as intermediaries to support the green transition and channel expertise and financing to SMEs for becoming more resource-efficient and carbon neutral.
Accelerate digital transition	Mobilise clusters to participate in digital and green skills related initiatives such as the EU Pact for Skills and embedding them to local education and training structures while promoting STEM.
	Increase cluster capacity to provide advanced business services shifting from knowledge-based intelligent manufacturing to data-driven/knowledge-enabled smart manufacturing.
	Make clusters an integral part of Digital Innovation Hubs through incorporating clusters into their governance and operations in a continuous collaboration on the digital transition.
	Use clusters to initiate new and to reinforce existing Public-Private Partnerships (PPPs) for boosting digital and advanced technologies value chains and technological platforms.
	Use clusters as strategic agents for the implementation of European digital policies and development of initiatives reaching out to SMEs and other users of digital solutions.
Build resilience	Use the collective intelligence of EU clusters to make value/supply chains more resilient , creating synergies and cooperation with SME and employer organisations to anticipate risks and prepare for new opportunities and challenges.
	Develop an active role of clusters in local labour markets through building their capacities for reskilling and upskilling and participating in the implementation of the Pact for Skills.
	Use clusters to identify and implement shared value initiatives to address societal challenges at a community level.
	Reinforce activities to develop a strategic approach to international cluster collaboration and build a critical mass of SMEs, businesses and researchers to enter global markets.
	Initiate cross-sectoral, interdisciplinary and transnational cluster collaboration to develop new products/services, which guarantee EU companies critical inputs and technology.

Annexe 2:

European Cluster Expert Group

The European Cluster Expert Group set up in May 2019 as the informal European Commission expert group. The representatives of 23 Member States' authorities participate and ten experts in their capacity selected through an open call for applications.

Its Terms of Reference has requested the Expert Group to deliver a report “containing its main findings and recommendations” and to submit it to the relevant Commissioners by 31 December 2020.

The Expert Group has developed its Recommendation Report through the following activities:

- The Expert Group held five meetings. The meetings provided the opportunity for Members to discuss and review preliminary drafts and adopt the final version of the Report. The meetings took place respectively on 18 October 2019, 06 February 2020, 26 June 2020, 13 October 2020, and 15 December 2020.
- An Expert Sub-group on Clusters and Skills was established and held four meetings to address precisely the skills related elements of cluster policy. These meetings took place respectively on 24 January 2020, 24 April 2020, 16 June 2020, and 08 October 2020.
- Six drafting groups made up of members of the Expert Group were established, and each produced a paper on a specific issue relevant to cluster policy that used as inputs into the Report.
- Two input papers were delivered by an external consultant that fed into the work of the Expert Group. One addressed the role of clusters in supply chain adjustment,⁵⁸ and the other one looked at the issue of supporting skills for industry through clusters.⁵⁹
- Three working webinars discussed the role of clusters in facilitating the digital transition (14 September 2020), the green transition (18 December 2020) and the strengthening of resilience (23 September 2020) with a purpose to feed into the Report.
- On 01 December 2020, a working webinar was held that provided an opportunity for last comments on the final draft before the adoption of the Report.

⁵⁸ <https://www.clustercollaboration.eu/news/eccp-discussion-paper-supply-chains>

⁵⁹ https://www.clustercollaboration.eu/sites/default/files/WYSIWYG_uploads/discussion_paper_skills_final_2.pdf

Members of the European Cluster Expert Group
Member States authorities at national, regional or local level (Type D members)

Austria	Mr. Stefan BUCHINGER	Federal Ministry for Digital and Economic Affairs
Austria	Mr. Herwig MEYER	Federal Ministry for Digital and Economic Affairs
Belgium	M. Vincent LEPAGE	Public Service of Wallonia (PSW) Economy, Employment, Research
Belgium	Ms Annie RENDERS	Flemish Government, Agency for Innovation and Entrepreneurship (VLAIO)
Bulgaria	Ms. Tihomira PALOVA	Ministry of Economy
Czech Republic	Mr. Robert WENZEL	Ministry of Industry and Trade
Czech Republic	Mrs. Kateřina PÍCLOVÁ	Ministry of Industry and Trade
Denmark	Mr Kasper Juel GREGERSEN	Danish Business Authority
Denmark	Mr Alexander ASTOLA FUGL	Ministry of Industry, Business and Financial Affairs
Denmark	Ms Online Hedvall	Ministry of Industry, Business and Financial Affairs
Estonia	Ms Kaie NURMIK	Ministry of Economic Affairs and Communications
Estonia	Ms Anu KULL	Ministry of Economic Affairs and Communications
Finland	Ms. Anita SILANTERA	Ministry of Economic Affairs and Employment
France	Mr. Matthieu LANDON	Direction générale des entreprises (DGE)
Germany	Mr Ole JANSSEN	Federal Ministry for Economic Affairs and Energy
Greece	Mr. Timotheos REKKAS	Ministry of Development and Investments
Greece	Mr. Christos PAPAVASILEIOU	Ministry of Development and Investments
Hungary	Mr Tamás STUKOVSZKY	Ministry for Innovation and Technology
Hungary	Mr Péter LUCZ	Ministry for Innovation and Technology
Ireland	Ms Céline MCHUGH	Department of Business, Enterprise and Innovation
Italy	Mr Paolo CARNAZZA	Ministry of economic development
Latvia	Ms Evita FELDBERGA	Ministry of Economics of the Republic of Latvia
Latvia	Mr Aigars LAZDIŅŠ	Ministry of Economics of the Republic of Latvia
Lithuania	Ms Ilona GOLOVACIOVA	Ministry of the Economy and Innovation
Lithuania	Mr Kęstutis SABALIAUSKAS	Ministry of the Economy and Innovation
Malta	Mr Cain GRECH	Malta Enterprise
Poland	Mr. Jan Filip STANIŁKO	Ministry of Entrepreneurship and Technology
Poland	Ms. Beata LUBOS	Ministry of Entrepreneurship and Technology

Portugal	Ms Helena MOURA	Portuguese Agency for Competitiveness and Innovation (IAPMEI)
Portugal	Ms Maria Manuel BRANCO	Portugal Global - Trade & Investment Agency (AICEP)
Portugal	Ms Maria JORDÃO	Directorate-General for Economic Activities (DGAE/MAEC)
Romania	Dragoş NEAMŢU	Ministry of Economy
Romania	Mrs. Anca PODRUMARU	Ministry of Economy
Slovakia	Mr Artur BOBOVNICKÝ	Slovak Innovation and Energy Agency - SIEA
Slovakia	Mr Vladimír TANISTRÁK	Ministry of Economy of the Slovak Republic
Slovenia	Mr Jernej SALECL	Ministry of Economic Development and Technology
Slovenia	Mr Peter WOSTNER	Government Office for Development and European Cohesion Policy
Spain	Mr Jordi LLINARES	General Directorate for Industry and SME
Sweden	Ms. Ewa ANDERSSON	Tillväxtverket, Regional cluster program, Capacity building smart specialisation and innovation
Sweden	Ms. Susanne GYLESJÖ	Vinnova (Swedish Governmental Agency for Innovation Systems)

Individuals appointed in a personal capacity (Type A members) – up to 10 members.

BÖSENBERG Frank
DRAGOMIR Bianca
KRYSTOWSKI Krzysztof
MUNTEAN Bianca
NIELSEN Merete Daniel
NOVO GUERRERO Antonio
PEZZI Alberto
SEEL Lucia
TUBIANA Alain
WILLEMS Véronique
WISE Emily (substitute member)

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696, or
- by email via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from: <https://op.europa.eu/en/publications>. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: <http://eur-lex.europa.eu>

Open data from the EU

The EU Open Data Portal (<http://data.europa.eu/euodp/en>) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.



Publications Office
of the European Union

ISBN
978-92-76-30280-3