



Report on disruptions in the European value chains and industrial ecosystems, solutions and setting up of EU Rapid Alert Function

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1. Executive summary

In mid-February 2020, Europe registered its first cases of COVID-19. Since then, the outbreak of the coronavirus and the following sanitary and economic crisis has severely impacted our lives and has led to a series of changes that our society and industries are undergoing.

The European economy has been suffering disruptions in its value and supply chains throughout its different ecosystems. To give an example: at the very beginning of the crisis, the main disruptions were related to healthcare (e.g. lack of PPEs) or difficulties to be supplied with raw materials. However, over the last months, the pandemic has continuously interrupted the usual flow of activities for European companies and has brought to light the necessities to adapt and rethink our business models and value chains.

This report summarises the activities of the European Clusters Alliance (ECA) to detect the above-mentioned disruptions in the European ecosystems, to analyse them and to propose solutions. ECA started these activities in mid-March and created the European Alliance Against Coronavirus (EAAC), an open forum joining social and industrial clusters with many other private and public agents and institutions. Some weeks later, ECA was invited to participate in the Rapid Alert Function, guided by the European Commission, with the aim to report evidences, identify needs, suggest corrective actions and try to measure impacts and bottlenecks created by the pandemic. Thus, ECA started then a loop process that improved itself day by day to understand reality, think about needs, identify potential solutions, and transfer these solutions among its networks.

From May 15th to August 20th, all information was summarized in daily and weekly reports. Altogether, 14 weekly reports were realized. Moreover, the European Alliance Against Coronavirus has grown as an open innovation network which involves more than 1,100 experts. To get a full view of the situation of the European companies, the reports explained the evidence from the ground that indicated a disruption, its geographical scope and time frame, the stages of the value chain affected, ideas for possible solutions and actions taken, as well as the further needs from the European Union or other stakeholders. Overall, the European Clusters Alliance collected 84 disruptions in this way.

The need for digitalization and to close the digital skills gap have been one of the most recurring topics, making the digital ecosystem the most referenced ecosystems in the meetings of the EAAC. Regulations, Supply Chain Disruptions, and Material Availability are further keywords that describe the difficulties European industries were and are facing. The measures to contain the coronavirus, the mobility restrictions of people and goods, and unclear legal frameworks led to shortages of component supplies and raw materials, forced businesses to stop their activities across the different ecosystems, and led to an income reduction and financial uncertainties. The most impacted ecosystems in this sense are the Mobility – Transport – Automotive, Energy-intensive Industries, Tourism, Aerospace & Defence, Agri-food, Renewable Energy, Retail and the Creative and Cultural Ecosystem. The evidence given by the members of the European Alliance Against Coronavirus shows that all stages of the value chains can be and were affected in different manners.

The disruptions analysis represents the starting point for designing efficient and effective solutions to revive the European economy in the post COVID-19 period. To fix the disruptions and make the value and supply chains stronger, the ECA collected proposals for cooperation, regulation and funding for the respective issues. The aim is to work together for a greener, more digital and resilient Europe. Clusters can play an important role in achieving this aim, and they have been fundamental in a quick response to COVID-19. They represent all sectors of the European economy, but they are not strictly sectoral. Due to their network nature, they run many cross-sectoral projects at the same time, between multiple companies and researchers from different Member States.

In fact, clusters represent the compass of economic-industrial contexts, able to support companies and supply chains to be more resilient and addressing endogenous and exogenous problems in a more efficient way. Moreover, ECA's activities in disruption mapping, report and daily sessions show a set of best practices for replication regarding the adopted bottom-up approach adopted. The process put in place in these months represents an

effective tool to address disruptions in the fastest and most secured way, providing legal certainty to stakeholders and fast reaction opportunities.

It is a unique resource for detect weak signals, to have a direct contact with policymakers and to receive fast feedback from the economic players, both local and national.

During the crisis we understood that resilience is a property of the network, the European Network, and not of single entities. Now it is necessary to reinforce European leadership through clusters, which connect actors and implement innovative proposals in order to facilitate the post-COVID economic recovery. Clusters should continue to be a partner of the Commission to solve European economic challenges in a long-lasting corporation.

2. How to detect disruptions - the EU Rapid Alert Function

The idea of an EU Rapid Alert Function was mentioned in the EU's roadmap for recovery "Europe's moment: Repair and prepare for the next generation". As part of this function, the European Clusters Alliance, in close collaboration with REI – Reindustria Innovazione, a territorial development agency based in Cremona (Italy), started an iterative process under the umbrella of the European Alliance Against Coronavirus to detect, analyse, and report disruptions in value and supply chains to the European Commission, DG GROW, from May 15th to August 20th 2020.

2.1. An alliance to fight COVID-19

The European Clusters Alliance (ECA) is a bottom-up initiative that gathers 13 National Cluster Associations, representing more than 740 clusters, where 134,000 of our most innovative businesses collaborate with thousands of universities, research centers and public institutions to boost their competitiveness and innovation.

ECA unites industrial clusters across sectors and regions and gives them a common space, facilitating connections and opportunities to meet their short- and long-term challenges at European and global level. The alliance coordinates joint cluster responses, builds recommendations to policymakers, and serve as a bottom-up and top-down channel to connect European institutions and European clusters.

On March 16th, ECA contacted DG GROW making itself fully available to fight the effects of COVID-19. In under an hour, ECA received a very specific request: It was imperative to map the resources and capabilities to produce masks identified as critical in the fight against the virus. After spreading that request to their European network, the Commission received a detailed database only four days later - with more than 1,300 companies and entities at a European level that quickly made their resources available.

ECA immediately reached out to their partners, finding some of them participating in several volunteer networks, social movements, such as Frena la Curva in Spain, or the Makers. Together, they coordinated their respective activities on a daily basis, sharing a practical vision: the most urgent needs have to be rapidly solved without losing sight for mid- and long-term solutions.

These activities showed: Coordination was critical and should be scaled up to the European level. ECA convened the first European online meeting on March 26th, clearly presenting an open and inclusive spirit with a broad spectrum of crisis related topics, based on shared leadership. The European Alliance Against Coronavirus (EAAC) was born, which has been meeting daily, even on weekends.

Those attendees include representatives from a huge spectrum of entities:

- Purely civic movements, e.g. the Italian MyLifeDesign or the Portuguese Plano de Acao
- Social entities, some grouped into Social Economy clusters
- Companies, research centers and universities grouped into Industrial clusters
- and institutions, such the European Economic and Social Committee, or the European Commission (Directorates-General: Grow, Regio, Santé, the JRC, etc.)

With the daily meetings and its open dialogue, the EAAC has created a new approach to connect European stakeholders across sectors and disciplines among each other and with the public institutions. Through the EAAC clusters, policy makers, universities, companies and social economy stakeholders have created valuable new links of cooperation among each other and across Europe.

The daily morning videoconferences of the group have seen the participation of around 1,100 experts from different sectors, and more than 7,000 attendants overall (summing up the daily participation). Thus, the alliance has created - in a very short time frame - an active network and pool of knowledge, which quickly moved with the development of the crisis.

In the daily meetings, the EAAC aimed at understanding reality, thinking about needs, identifying potential solutions, and transferring and acting among networks through exchanging new information, current experiences, and expertise. The detection of “week signals” that indicate disruptions was possible because of the clusters’ closeness to the market and ecosystems. Over the weeks, this has granted a prompt and reliable identification of disruptive trends through a widespread net of «sensors» at local level, which are cluster themselves.

One element of great added value given by the European Clusters Alliance and the Rapid Alert Function is the direct feedback from industries to the European Commission about policy applications, intervention needed, and the awareness about disruptions of value and supply chains. All information was collected in altogether 14 weekly reports and shared with the European Commission. In this way, European Commission had direct access to information on disruptions and bottlenecks for policymaking.

2.2. Making disruptions visible

The European Alliance Against Coronavirus has addressed and identified the main needs and disruptions suffered by European industries after the coronavirus outbreak. The aim was to promptly identify concrete cases of changes in Europe’s ecosystems and to examine actions to be undertaken.

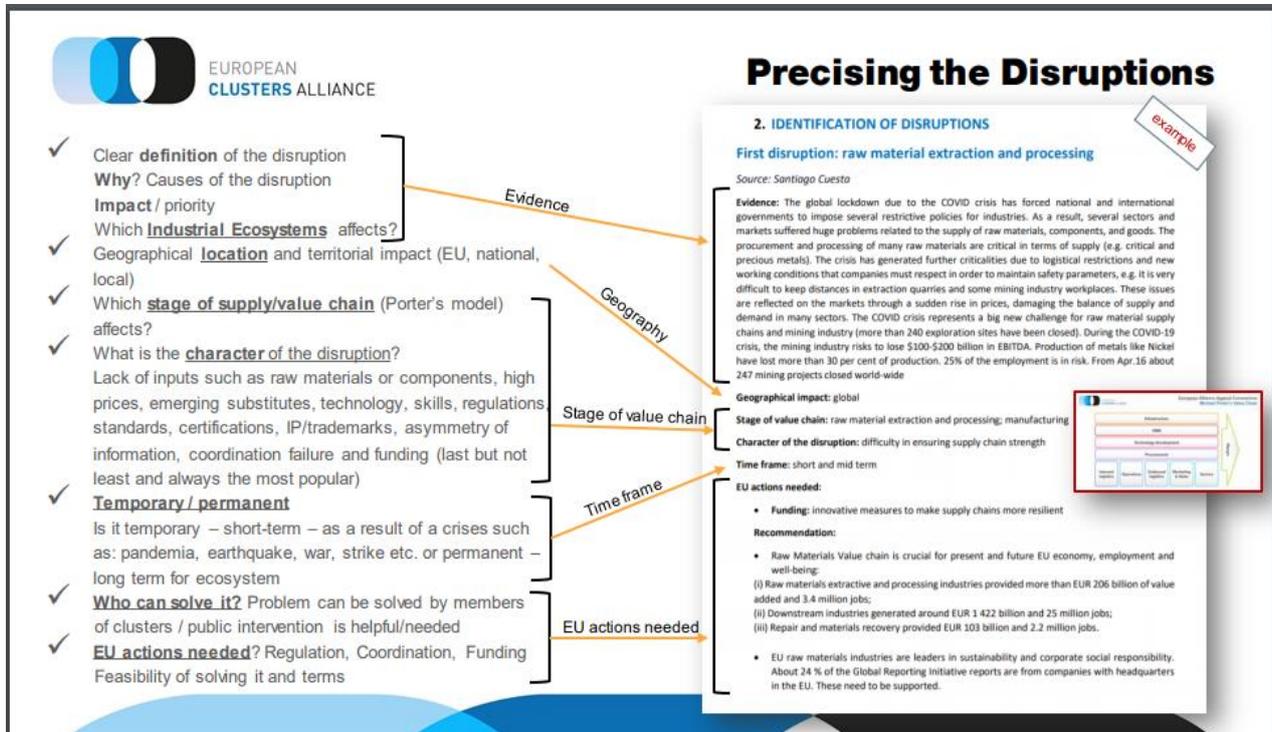
The activities followed the ecosystem approach as introduced by the European Commission for the recovery. Altogether, the Commission defined 14 ecosystems that account for approximately 90 % of the European Single Market to implement the goals of the green and digital transition and resilient value chains. Thus, the EAAC looked at these ecosystems to detect disruptions and propose solutions.

From May 15th to August 20th all information was summarized in daily and weekly reports. 14 weekly reports were realized. Moreover, the European Alliance Against Coronavirus has grown as an open innovation network which involves more than 1,100 experts.



Tools for the EU Rapid Alert Function

For the daily and weekly reports, the European Clusters Alliance and REI – Reindustria Innovazione elaborated a structure to report all disruptions in the same way. To get a full view of the situation of the European companies, the reports explained the evidence from the ground that indicated a disruption, its geographical scope and time frame, the stages of the value chain affects, ideas for possible solutions and actions taken, as well as the further needs from the European Union or other stakeholders.



Daily minutes to report disruptions

The 84 disruptions¹ were collected in a database, specifying the evidence reported in the daily minutes and weekly reports. This procedure allowed to develop a quantifiable analysis of the challenges encountered, which follows in the upcoming chapter. It needs to be noted that the disruptions from the first two weekly report could not be included since they did not yet follow the adapted structure. In the following analysis, each disruption is characterized by the following features: ecosystem, sector, location, value chain stage, action required and the main keywords.

#	Disruption	Ecosystem	Sector	Location	Value Chain Stage	Actions Required	Keywords
1	Lack of financial resources (lack of liquidity)	Real-estate	Construction	ES	Funding	Finance	Financial resources
2	Shortage of critical supply of plastic material	Cross-Industry	ND	EU	Inbound logistics, Procurement	Coordination	Materials availability,PT
3	Certifications, homologation, reliability and quality of products	Healthcare	Machinery	ES,IT	ND	Regulation	Certifications
4	Disruption of supply chain of electronic parts	Electronics	Components	ES	ND	ND	Supply chain disruption
5	Lack of Workforce in construction	Real-estate	Construction	ES,FR,PT	HR	ND	Workforce
6	Upskilling / reskilling in Electronics	Electronics	ND	DE,FR,ES,PT	HR	ND	Skill gap,Digitalisation
7	Lockdowns leading to disrupted supply chains	Automotive	ND	FR,P,LES	Inbound logistics,Operations,Outbound logistics,HR	Funding,Regulation	Supply chain disruption
8	Uncertainty of automotive business models	Automotive	ND	FR,P,LES	All	Coordination	Business model disrupti
9	Uncertainty of customer behaviours	Automotive	ND	FR,PL,FR,PT	Marketing,Sales	Coordination	Customer behaviour
10	Missing flexibility and resilience in supply chains	Automotive	ND	DE,PL,FR,ES	Procurement,Inbound logistics,Outbound logistics	ND	Supply chain disruption,Flex & resilience
11	Complex policy strategies	Automotive	ND	FR, PL	R&D	ND	Policies,Green econom
12	Certifications for safety	Automotive	Shared Mobility	FR,ES	Operations	Funding	Certifications
13	Closure of borders and export disruptions	Cross-Industry	ND	ES	Inbound logistics	Coordination	Import & export,Materials av
14	Commerce disruption	Cross-Industry	ND	SK,ES,PT,IT,LT	Marketing,Sales,Technology	ND	Digitalisation,Access to m
15	Shutdown of construction sites	Real-estate	Construction	FR	Infrastructure & Building	ND	Import & export,Infras
16	Collapses of the ecosystem's activities	Space,Creative & cultural,Tourism	Aviation	EU	Operations,Services	Funding,Coordination,Regulation	Drop in demand & producti
17	Strong reduction of cash flows and financial capabilities	Space,Creative & cultural,Renewable Energy	ND	EU,DE,LT	Finance	Funding,Coordination	Financial resources,Income d
18	Border closures immobilise imports and exports	Agrifood	ND	SK,LT,RO	Sales	Coordination	Import & export,Drop in demand &
19	Strong reduction of staff	Aerospace	Aviation	EU	HR	Coordination	Staff reduction,Income dec
20	Lack of workforce	Agrifood	ND	PT,LT	Operations	ND	Workforce,Regulation
21	Strong reduction of supply chain continuity and competitiveness	Aerospace	Aviation	RO,PT,LT	Operations,Inbound Logistics,Outbound Logistics	Funding	Supply chain disruption,Flexi
22	Demand and production reduction of components	Renewable Energy	ND	DE	Manufacturing	Funding	Drop in demand & production,Inco
23	Project development slowdown	Renewable Energy	ND	DE	Engineering	Funding	Project development del
24	Logistics delays	Renewable Energy	ND	DE	Transportation	Coordination	Logistics,Regulations
25	Demand reduction for Operations & Maintenance operators	Renewable Energy	ND	DE	Operations,Maintenance	Funding	Drop in demand & production,
26	Unsold stocks	Agrifood	ND	LT,RO	Operations,Sales	Coordination	Import & Export,Regulati
27	Strong reduction in freelancers' activities	Creative & Cultural	ND	BG	HR	Funding	Staff reduction
28	Data analysis and sharing availability	Tourism	ND	FI,ES,BG	Design	Funding	Digitalisation,
29	Long-term sustainability	Tourism	ND	ES,PT	Strategy	Funding	Long term sustainabilit
30	Consumer behaviour	Tourism,Agrifood	ND	FI,IT,PT	Demand	Funding	Customer behaviour
31	Change of sector configuration	Automotive	ND	EU	Product Usage	Coordination	Drop in demand & producti
32	Production systems flexibilization	Automotive	ND	EU	Operations	Funding	Digitalisation,Flexibility & re
33	Lack of standardisation and common protocols	IoT	ND	EU	Operations	Funding,Regulation	Digitalisation,Lack of standa
34	Adaption to new trends	Automotive,IoT	ND	EU	R&D	Funding,Coordination,Regulation	Green deal,Digitalisatio
35	IoT solutions to foster green economy	IoT	ND	EU	Operations	Funding	Digitalisation,Long term
36	Redirection of public funds to meet the needs of crisis	Social Economy	ND	BE,NL	Finance	ND	Regulations
37	Social enterprises excluded from Regional Smart Specialization Projects	Social Economy	ND	EU	Strategy,Finance	Funding,Coordination,Regulation	Exclusion from public
38	Importance of mapping impacts on social economy caused by the COVID crisis	Social Economy	ND	IT	All	Coordination	Social impact,Analysis mo
39	Need for new skills	Automotive,ICT	ND	EU,ES,PT	HR	Coordination,Funding	Skill gap, Digitalisation,Wor
40	Income decrease	Social Economy	ND	BE,NL	All	Coordination,Funding	Financial resources,Income d
41	Reduction of services	Social Economy	Social Service	BE,NL	Operations	Funding,Regulation	Regulations,Workforce
42	Collapse of Automotive Ecosystem	Automotive	ND	EU	All	Funding,Coordination,Regulation	Drop in demand & producti

Database of identified disruptions - part 1

¹ See attachment for complete list of disruptions

40	Income decrease	Social Economy	ND	BE,NL	All	Coordination,Funding	Financial resources,Income decrease
41	Reduction of services	Social Economy	Social Service	BE,NL	Operations	Funding,Regulation	Regulations,Workforce
42	Collapse of Automotive Ecosystem	Automotive	ND	EU	All	Funding,Coordination,Regulation	Drop in demand & production,Regulation
43	Shortage of PPE	Industrial & Manufacturing	Social Service	BE,NL	Operations,Procurement	Funding,Coordination	PPE,Materials availability
44	Lack of regulation in secondary materials and resources management	Industrial & Manufacturing	ND	IT	Procurement	Regulation	Availability,Regulations,Circular economy
45	Funding and coordination of circular economy in European economic recovery	Industrial & Manufacturing	ND	IT	Design,Operations,Services	Funding,Coordination	Regulations,Circular economy,Green Deal
46	New sustainable paradigms in the Industrial Ecosystem	Industrial & Manufacturing	ND	DE	Design,Operations	Funding,Coordination	Regulations,Circular economy,Long term sustainability
47	Disruptive trends for industrial partnership	Industrial & Manufacturing	ND	EU,ES	Strategy	Funding,Coordination	Industrial collaborations
48	Raw material extraction and processing	Industrial & Manufacturing	ND	ES	Procurement,Operations	Funding	Availability,Supply chain disruption,Forced economy
49	Long-term strategic plan for European Industry	Industrial & Manufacturing	ND	EU	All	Funding	Digitalisation,Long term sustainability
50	Regulations and investment in UAVs	Aerospace	Defence	EU	R&D	Coordination,Regulation	Dependence from foreign countries
51	European supply chain weakness and issues in raw materials management process	Healthcare,Automotive	ND	FR	Procurement	Coordination,Funding	Supply chain disruption,Materials availability
52	EU dependence from Asian markets and EU know-how as competitive advantage	Cross-Industry	ND	ES	Procurement	Regulation	Supply chain disruption,Materials availability
53	Creation of Euroclusters	Cross-Industry	ND	EU	All	ND	Industrial collaborations,Cluster collaboration
54	Blockchain technology and application in the sanitary crisis	Digital	ND	EU	All	ND	Digitalisation,Blockchain
55	Artificial Intelligence on the edge of the network	Digital	ND	EU	All	ND	Digitalisation,AI
56	Increase of cyberattacks during Covid-19 pandemic	Digital	Cybersecurity	ES	All	Coordination	Digitalisation,Cybersecurity
57	Strong technology dependence from China and USA	Digital	Cybersecurity	EU	All	ND	Dependence from foreign countries
58	Skill gap in cybersecurity	Digital	Cybersecurity	ES	HR	ND	Skill gap,Digitalisation,Cybersecurity
59	Environmental benefits coming from shared value	Social Economy	ND	IT,ES	HR	Coordination	Value,Cluster collaborations,Cybersecurity
60	Rising importance of sustainability paradigm in Social Housing sector	Social Economy	Social Housing	EU	Infrastructure	Regulation,Funding	Social Impact,Green Deal,Infrastructure
61	Analogy between city network and cluster network for a resilience perspective	Cross-Industry	ND	EU	ND	ND	Cluster Collaborations,Flexibility & resilience
62	Circular Economy application on biomass lifecycle	Industrial & Manufacturing	Chemical	IT	Waste management,Inbound logistic	ND	Regulation,Flexibility & resilience
63	Regulation on alcohol usages	Cross-Industry	ND	IT	Procurement	Regulation	Regulation,Flexibility & resilience
64	Raw materials availability & supply chain disruption	Industrial & Manufacturing	Chemical	IT,ES	Procurement	ND	Dependence from foreign countries
65	EU Clusters support for creating a common cyberspace protection	Digital	Cybersecurity	EU	Infrastructure	ND	Cybersecurity,Cluster collaboration
66	Skill development for resilience improvement	Cross-Industry	ND	EU	HR	ND	Skill gap,Flexibility & resilience
67	Potentialities of Social Housing for EU	Social Economy	Social Housing	EU	ND	ND	Social housing,Shared value
68	Regulation on material handling to achieve Circular Economy systems	Industrial & Manufacturing	ND	EU	Procurement	ND	Regulations,Materials availability
69	Increase in requests for digital skills due to Covid-19 pandemic	Cross-Industry	ND	EU	HR	ND	Digitalisation,Skill gap
70	Up-/reskilling difficulties for SMEs	Cross-Industry	ND	EU	HR	Coordination	Digitalisation,Skill gap
71	Value of data in smart cities	Digital	Smart cities	EU	ND	ND	Digitalisation
72	Compliance with GDPR policies on data management	Digital	Smart cities	EU	R&D	ND	Digitalisation,Cybersecurity
73	Change in network's infrastructure configuration	Digital	Smart cities	EU	Infrastructure	ND	Digitalisation,Regulations,Infrastructure
74	EU and global supply chains dependence from China market	Industrial & Manufacturing	ND	EU	All	Funding	Supply chain disruption,Dependence from foreign countries
75	Temporarily more local supply chains	Agrifood	ND	EU	All	Coordination	Supply chain disruption,Customer behaviour
76	Misinformation because of fake news	Agrifood	ND	IT	Marketing,Procurement,Export	Coordination	Customer behaviour,Fake news
77	Workplace saturation and restriction	Cross-Industry	ND	EU	HR	ND	Workforce,PPE,Infrastructure,Regulation
78	Post-Covid-19 workplace configuration and management	Cross-Industry	ND	EU	HR	ND	Workforce,PPE,Infrastructure,Regulation
79	Marketing strategies for Business Event Organization sector	Business Event Organization	ND	EU	Marketing	Funding,Regulation	Marketing,Customer behaviour,Digitalisation
80	Rising competition between tourism countries	Tourism	ND	EU	All	Funding	Cluster collaborations
81	Lack of business opportunities fostered by collaborations	Tourism	ND	EU	All	Coordination	Cluster collaborations
82	Innovation in material sectors to support SMEs recovery	Industrial & Manufacturing	Materials	EU	R&D,Design	Funding	Digitalisation,Green economy,Circular economy
83	Critical access to raw material supply chains for EU companies	Industrial & Manufacturing	Materials	EU	Procurement	Coordination	Availability,Dependence from foreign countries
84	Digital gap in Cultural and Creative Industries	Creative & Cultural	ND	EU	HR	ND	Skill gap,Digitalisation

Database of identified disruptions - part 2

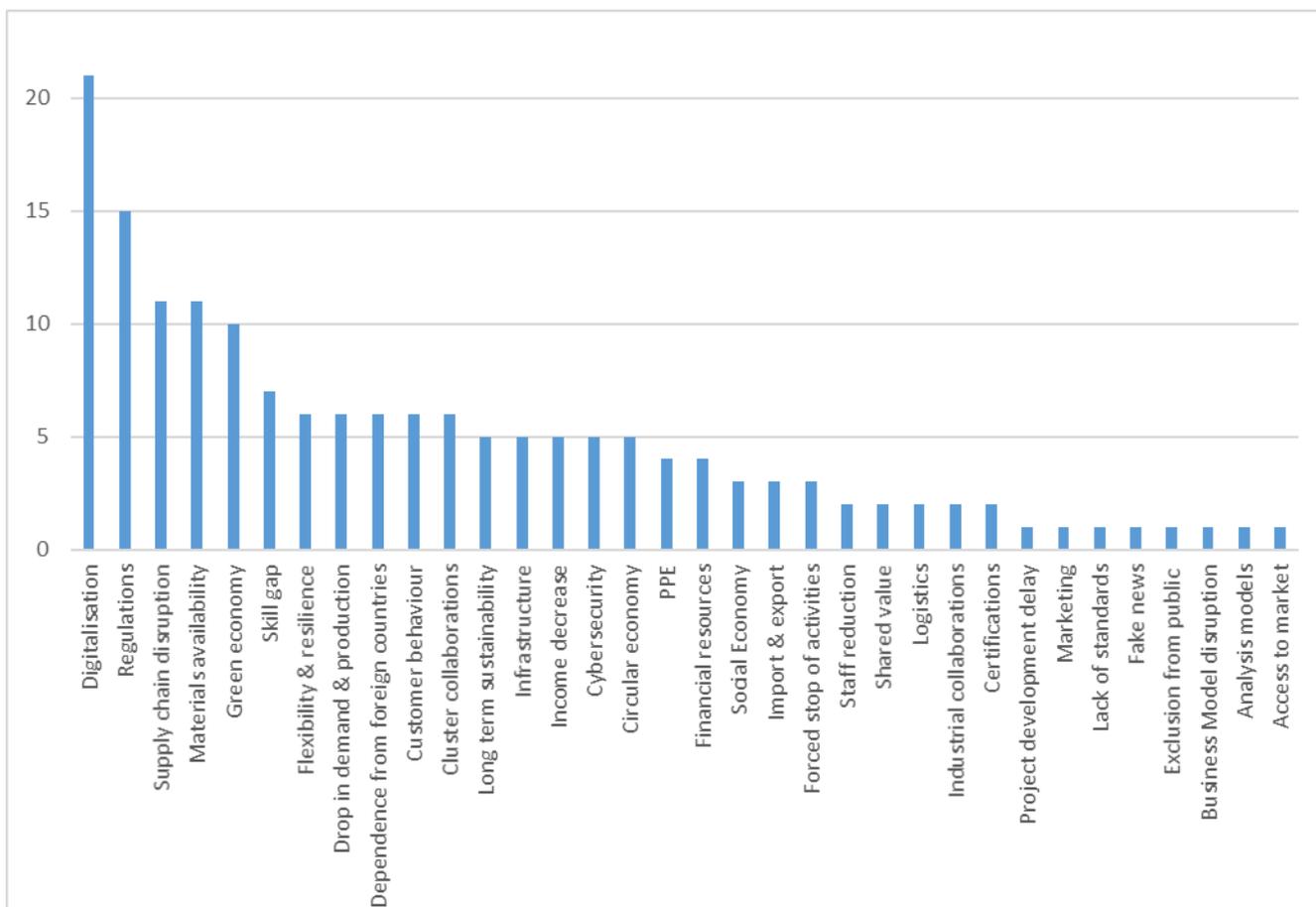
A further source of information was the COVID-19 Response Forum and the website of the European Cluster Collaboration Platform, where all sessions and materials were published for the cluster community. Moreover, the European Clusters Alliance disseminated a survey to all European cluster associations to share knowledge of disrupted supply and value chains across industrial ecosystems, with the aim to find concrete solutions and recovery projects.

3. Disruptions in the European industrial ecosystems

The European Alliance Against Coronavirus identified 84 disruptions, referring to either one of the 14 ecosystems or to cross-sectoral discontinuities. The number of reported disruptions in value and supply chains was especially high in May and June. This can be due to the development of the webinars over time and with the pandemic. The topics set for the webinars were decided in close collaboration with DG GROW, European Commission, and evolved with the necessities of the crisis and the policy responses. In general, the first weeks were more focused on the analysis of very well-defined industrial contexts or ecosystems. Different industrial ecosystems were analysed twice, with the aim of investigating multiple aspects and monitoring its evolution over time. Over the course of the EAAC's activities, several sessions looked at cross-sectoral paradigms or specific topics (i.e. super cluster, network resilience, Digital Innovation Hubs). In the last sessions, EAAC took up the national Recovery Plans and territorial and cross-sectoral synergies as main topics, where clusters need to be included as important and strategic agents.

3.1. Which were the main issues for Europe?

The 84 disruptions² in value and supply chains relate to different issues that the European companies and ecosystems were and – in some cases – are facing. Through the market closeness of the members of the EAAC, the reports draw a picture for future action plans and recovery activities.



Absolute frequency of keywords associated with disruptions³

The results show clearly: *Digitalization* was found to be the most recurring topic. First of all, disruptions related to digitalization refer to digital skills. They are important to meet the ad-hoc need for remote work as well as to

² The list of disruptions highlighted during the daily sessions, divided by ecosystem, are completely reported in chapter 8. *Attachments*.

³ To perform the analysis, a single or a set of keywords was assigned to each identified disruption (e.g. digitalization, regulations, etc.). In this way, it was possible to associate the keywords to each disruption regardless of the industrial sector of reference and to analyze how often each keyword is repeated. The overall occurrence of the topics is seen on the y-axis for each keyword on the x-axis.

innovate and transform the value chain in the long term. The *Skill Gap* and the need to train talent was repeated several times. Secondly, digitalization is a “disruptive” trend for the European recovery, digital transition being one of the main catalysts for European independence from external markets and long-term sustainability. In this context, *Cybersecurity* represents a preliminary requisite for digitalization since data must be managed carefully to implement new digital-based projects and companies need to be protected from attacks.

Regulations, Supply Chain Disruptions, and Material Availability are further recurring topics. The impacts of restrictive regulations generated logistical problems - both for the workplace management and for material handling. Many manufacturing activities came to a stillstand, a *Forced Stop*, and companies suffered difficulties in managing the workforce (safety distance, workplace saturation etc.). During the pandemic, each ecosystem suffered a contraction in *Demand and Production* as well as *Income Reduction* and *Financial Resources Availability*. These issues are connected, as a strong drop in demand and production inadvertently leads to financial impasses.

Moreover, regulations on border closures disrupted import and export to, from, and between European countries. The pandemic emphasized the companies’ links to external markets like China, which are basic suppliers for critical materials (metals, microchips, sensors, advanced materials etc.). It exposed a lack of flexibility in the European supply chains and the strong dependence from external nations for these products. Their unavailability inevitably disrupted the value chains across different industries. In this context, *green economy and circular economy* were identified as possible solutions to reduce the need of materials from abroad and regain them from waste. However, *Regulations* on second-hand materials still make an efficient collection of waste difficult in some countries.

For many activities, *Infrastructures* had to be re-adapted to be compliant with these regulations, or even new infrastructures had to be created. *Shortage of PPE* has been identified as a critical issue in the first weeks considered as well as *Lack of Certifications* for mask and safety gear production.

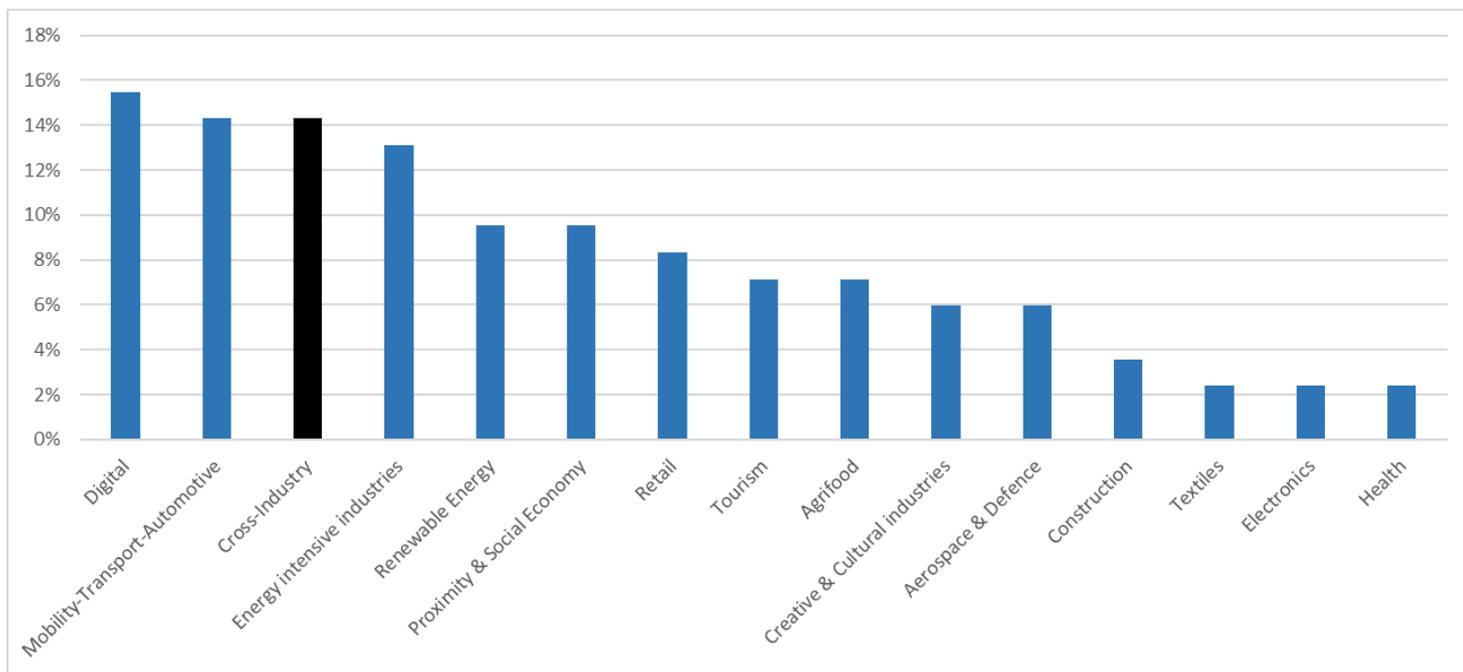
Finally, the keywords *Industrial and Cluster Collaboration* highlight the need to include clusters in the European recovery for their strategic role and, at the same time, the need to include norms and laws at policy-making level that still do not consider these associations as fundamental in the recovery process.

Social Economy also represents an important aspect of the recovery because of its multi-impacting nature. Not only does this approach consider the economic aspects of its activities but takes general well-being and fairness for the society into account. It suits the needs that emerged in this pandemic. However, social enterprises and projects are still not in the foreground for European Recovery.

Proceeding session by session, projects based on the above-mentioned concepts of *Green and Circular Economy, Digitalization, Social Economy and Cluster and Industrial Collaboration* were presented to foster *resilience* of the value chains both for a possible second wave of the pandemic and in the long term.

3.2. Which ecosystems suffered from disruptions?

In their roadmap to recovery, the European Commission identified 14 ecosystems that were severely impacted by the COVID-19 pandemic. They account for around 90 % of the European Single Market. These ecosystems are: Tourism, Creative & Cultural industries, Aerospace & Defence, Textiles, Electronics, Automotive, transport & Mobility, Energy intensive industries, Renewable Energy, Agri-food, Healthcare, Digital, Construction, Retail and Social Economy. Under the umbrella of the European Alliance Against Coronavirus, ECA analysed all 14 of these ecosystems.



Percentage frequency of disruptions among the 14 ecosystems⁴

About 14% of disruption show impact on different sectors equally, impacting the whole European ecosystems. The top three classifications highlight the predominance of the Digital ecosystem (15%), Mobility – Transport – Automotive (14%) and Energy-intensive Industries (like manufacturers of products like steel, plastic and chemicals) (13%).

These three ecosystems were strongly impacted by lockdown measures. In particular for the energy-intensive industries, border closures and import - export disruptions impacted the procurement (materials availability from third countries diminished), the workforce management (safety on the workplace could not be granted instantly and restrictive proximity norms did not allow the complete saturation of the plant in term of workers number) and – in some cases consequently – the demand and production.

In the Mobility – Transport – Automotive ecosystem, the changes in customer behaviour during and after the lockdowns impacted the revenue streams: people were obliged to work from home and limit their mobility, which reduced the transportation needs and demands for new cars. Furthermore, the issue of safety and hygiene on public/shared vehicles strongly impacted the transport services.

⁴ The calculations of the disruption distribution among different ecosystems was based on the number of disruptions identified (84). As it is possible to see in chart, the percentages on the y-axis represent the occurrence of the disruptive trend for each industry considered, based on the evidences reported in the daily sessions (e.g. 15.5% Digital, 14% Automotive & mobility, etc.).

New digital skills are required in workers in order to be able to work remotely in emergency periods. Moreover, digitalisation is considered to be one of the main drivers for the recovery and as an opportunity to restart economy after the collapse.

Other relevant ecosystem strongly hit by the coronavirus crisis were and are Tourism, Aerospace & Defence, Agri-food, Renewable Energy, Retail and the Creative and Cultural Ecosystem. Despite differences in percentage values, it needs to be highlighted that some crucial disruptions were shared by all the different ecosystems. These are border closures, restrictive measures for their operations and mobility, lack of raw materials, or lack of common standards.

The following chapters give an overview of the main challenges in each ecosystem that were detected by the EAAC and reported by the ECA. The full descriptions and the implications are provided in the list of disruptions, see attachment.

The following chapters summarize the disruptions in European value and supply chains that were detected by the European Alliance Against Coronavirus, and the needs and proposals to meet these challenges.

3.1.1. Cross-industry disruptions during the COVID-19 crisis

Several disruptions belong to more than one ecosystem or have a transversal character. The members of the European Alliance Against Coronavirus reported them repeatedly for different sectors.

Disruptions:

- **EU and global supply chains dependence from China market**
- **Availability to critical raw materials and supply chain disruption**
- **Shortage of critical supply of plastic material**
- **Shortage of PPE**
- **Missing certifications, homologation, reliability and quality of products**
- **Regulation on alcohol usages**
- **Border closures immobilise imports and exports**
- **Turnover decrease during the pandemic period**
- **Changes in customer behavior**
- **Production reconfiguration during lockdown**
- **Workplace saturation and restriction (60% of the staff works in 100% of the spaces available)**
- **Increase in requests for digital skills due to Covid-19 pandemic**
- **Up-/reskilling difficulties for SMEs**

Challenges and disruptive trends:

- **Long-term vision for European companies**
- **creation of Euroclusters**
- **Analogy between city network and cluster network for a resilience perspective**
- **Openness to invest within EU Recovery Plan**
- **Need to correct tax schemes distortions**
- **Re-invention of clusters**
- **New sustainable paradigms in the Industrial Ecosystem**
- **Disruptive trends for industrial partnership**

- **Post-Covid-19 workplace configuration and management**

Coordination needed to meet the challenges:

- In the mid-term, a stronger support for the development of new / greener / circular processes, materials and alternatives is necessary
- Central material homologation capacity at European level
- Speed up the industrial processes
- Upgrading SME competitiveness in several sectors and ecosystems: role of clusters, digitalization, access to finance, piloting, and technologies
- Promote sustainability: circular economy, industrial symbiosis, recovery-reuse, reduce pollutants, and social licensing
- Digitalization of the industries (smart and digital solution exploitation)
- Creating Shared Value (CSV) policies require a coordinated and long-term effort by EU (but also national and regional authorities)
- Bridging the gap between research and SMEs is a key task for Europe. Clusters are also playing a central role in building circular knowledge bridges between research and businesses
- More coordination among different institutions
- Up- and reskilling can be improved by many cross-sectoral initiatives. The agenda should not only focus on the sectors, but allow cross-sectoral collaboration and support the movement of people between sectors

Funding needs:

- Invest in research and innovation projects
- Inter-Regional Business Hubs: potential for public funding/financing of SMEs
- Supporting companies to grow and become international, providing expertise, knowledge and funding

Regulation needs:

- Flexibility in the application of the norms related to alcohol usage is needed to timely respond to the environment changes; the results of the unavailability of alcohol might impact both sides of the market in terms of product/material shortage (direct consumer or company's side) and possible customer loss (producer's side)
- Skill development for resilience improvement

3.1.2. Aerospace & Defence

Due to the lockdowns and limitations of mobility, the aerospace & defence ecosystem experienced severe impacts of the COVID-19 crisis.

Disruptions:

- **Collapse of the ecosystem's activities (-90% of aviation travels)**
- **Strong reduction of cash flows and financial capabilities (-50/-60% reduction of investments)**
- **Strong reduction of staff**
- **Strong reduction of supply chain continuity and competitiveness**
- **Raw materials and components supply issues**

Challenges and disruptive trends:

- **Exploitation of drones in pandemic situation for Aerospace & Defence Ecosystem**

Coordination needed to meet the challenges:

- In the short term, a stronger coordination is needed in order to restart the activities; it is also necessary a coordination of the new aviation processes to make the sector adequate to new customers behaviours and safe travel desires
- Support the reactivation of safe travel services
- Cash flow liquidity support through staff retention (salaries and skills), capability protection, supply chain protection
- New European solution for competences development, allowing a competitive advantage for EU in the long term
- Rethink safer workplaces and automation of manufacturing processes

Funding needed:

- Funding to help companies restarting activities
- EU can help preventing the aviation sector collapse through: financial support to customer and supplier
- Cash flow liquidity support for SMEs to help them to survive (more attention since they are the most vulnerable; SME represent 90% of Aviation Ecosystem)
- R&D funding to support innovation for recovery and growth
- Incentives for SMEs and for OEMs

Regulation needed:

- Support for national and regional agencies to harmonize the different measures: EU can help with Public and Personal Health Protection, shaping new legal framework for this ecosystem.
- Regulations and investment in UAVs
- Current legal situation for drones is a barrier. Each country has its own regulations and flight permission (autonomous decisions are taken; an example is represented by Central European Drone Demonstrator in Poland). A regulation homogenisation and standardisation at European level is needed. In general, European regulation are stronger than non-European ones (but it depends also on drone type).

3.1.3. Agri-food

The agri-food ecosystem is closely connected to the tourism ecosystem. Especially the HORECA sector was hit hard by missing customers during the crisis.

Disruptions:

- **Border closures immobilise imports and exports**
- **Lack of workforce**
- **Unsold stocks**
- **Consumer behaviour changes**

Challenges and disruptive trends:

- **Temporarily more local supply chains**
- **Misinformation because of fake news**

Coordination needed:

- Collecting solutions and alternatives to build resilience
- Create a guideline dealing with best practices to be shared with EU members
- Help government and clusters to develop company resilience and share a guideline with best practices
- A transition plan is needed in order to restart with new frameworks based on circular economy, digital transformation and technologies
- Help companies connecting producers and consumers by using new tools and software
- Exchange with European Clusters Alliance and agri-food clusters to make connections with SMEs
- Work together on raising customer awareness and educate customers
- Fighting fake news
- Accelerate digital transformation and promote the use of robots in the harvesting field
- Safety measures implementation for agricultural workforce

3.1.4. Mobility – Transport – Automotive

The mobility – transport – automotive ecosystems differed severe disruptions, especially due to the stop of production.

Disruptions:

- **Lockdowns leading to disrupted supply chains**
- **Missing flexibility and resilience in supply chains**
- **Certifications for safety measures**
- **Closure of borders and export disruptions**
- **Collapse of Automotive Ecosystem**
- **Need for new skills**

Challenges and disruptive trends:

- **Uncertainty of automotive business models**
- **Uncertainty of customer behaviour**
- **Change of sector configuration**
- **Production systems flexibilization**
- **Adaption to new trends**
- **Spread of new trends (Autonomous Vehicle)**
- **Complex policy strategies**

Coordination needed:

- Support urban sustainable mobility and new business models
- Strong effort on European Battery Alliance to foster electrification in Europe, creating a competitive advantage in the long term (R&D, design, production)
- The EU automotive industry must contribute to EU sustainability goals
- Develop a joint vision for the future automotive landscape; imagine and launch (joint) clusters services helping clusters and supply chains members to face the crisis
- Coordination projects for sectoral skills development
- Involve clusters to create joint strategies for recovery
- Find coordinated solutions between supply chain stakeholders in order to foster resilience
- Establish connection with universities and research centres for skill development

Funding needed:

- Financial support and measures to unblock as soon as possible the value chains
- Supporting innovative projects, which are determined by the market
- Facilitating the involvement of the public administrations related to this disruption
- R&D project supporting digital transformation of automotive companies
- Incentives for customers to purchase hybrid and electric cars
- R&D funds for electric solution
- R&D funds to develop and design autonomous vehicles solutions

Regulation needed:

- Environmental regulations
- Reliability in norms for travel

3.1.5. Creative & Cultural Industries

The Creative and Cultural Industries had to adapt their activities rapidly to comply with the measures taken to mitigate the effect of the pandemic.

Disruptions:

- **Stop of activities: 80% of companies had to cease operation activities**
- **Strong reduction in freelancers' activities**
- **Strong reduction of cash flows and financial capabilities**

Challenges and disruptive trends:

- **Digital gap in Cultural and Creative Industries**
- **New Marketing strategies for Business Event Organization (70% expected decrease in Marketing for event organization)**

Coordination needed:

- Coordination of international project to support experienced professional crew
- EU support for professional training program and infrastructure
- Hybrid Meetings can represent a solution to event organization (45.1% of respondents to the survey of Toleranca Marketing chose hybrid as preferred event formula). A mix of virtual meetings and live meetings could be a cost-efficient and time-efficient solution

Funding needed:

- Tax reduction and incentives are needed to better face the strong reduction of overall sector income; moreover, targeted measures for creative and cultural companies are also needed, going beyond the measures designed for traditional industries
- Financing for collateral activities and facilitating the reactivation of people movement, in compliance with government restrictions (e.g. support travel and hotel sectors)
- Specific financing to support freelancers
- Financing to facilitate the organization of big creative and cultural events
- Financing to support digital innovation in creative and cultural sectors (e.g. film and music industries)

3.1.6. Digital

The digital ecosystem is transversal – digital solutions are essential for all European sectors and companies.

Disruptions:

- Increase of cyberattacks during Covid-19 pandemic (10% of attacks use AI and Machine learning technologies)
- Strong technology dependence from China and USA
- Skill gap in cybersecurity
- Lack of standardisation and common protocols
- Lack of workforces and skill gap in the ICT sector

Challenges and disruptive trends:

- Companies to implement the digital transition
- Disruptive challenges related to Smart Cities paradigm: Value of data in smart cities, compliance with GDPR policies on data management, Change in network's infrastructure configuration
- Need to strengthen collaboration between Clusters and Digital Innovation Hubs
- Blockchain technology and application in the sanitary crisis
- Artificial Intelligence on the edge of the network
- IoT solutions to foster green economy
- Sectoral implementation of IoT and digital transformation challenge

Coordination needed:

- For cybersecurity mechanisms, the European countries need to agree and act together, as web criminality does not know borders. There is a need for a clearly communicated international governance model for cybersecurity.
- EU Clusters support for creating a common cyberspace protection
- Partnerships must be created at European level, but then cross-sectoral and local/regional collaborations must be established. ECA can support in all actions
- Provide programs to cover lack of experts and develop a network with local work agencies

Funding needed:

- Research and innovation projects to develop IoT standards
- Local and national funding are needed to help clusters develop and set upskilling programs

Regulation needed:

- Creation of guidelines and standard regulation

3.1.7. Electronics

The electronics ecosystem suffered minor challenges during the COVID-19 but the clusters and their members were not hit as hard as others, according to the references from the European Alliance Against Coronavirus.

Disruptions:

- **Disruption of supply chain of electronic parts**
- **Temporary Covid-19 related reduction or inability of Waste of Electrical and Electronic Equipment (WEEE)**

Challenges and disruptive trends:

- **Upskilling / reskilling needed in Electronics**

Coordination needed:

- Evaluation and selection of the actual emergency in the pick-up requests for WEEE
- Improve exchanges programs across Europe for upskilling in order to identify key competences

Funding needed:

- The ecosystem needs to be funded in different ways in order to achieve more competitiveness (funding in R&D&I projects)

Regulation needed:

- Large scale experiences of preparation for reuse of WEEE are missing, need of support from manufacturers and legislation

3.1.8. Health

The health ecosystem has come under severe stress during this pandemic. The two main disruptions named had a big impact on our societies and initiated many activities to meet the challenges.

Disruptions:

- **Missing certifications, homologations, reliability and quality of products**
- **Shortage of PPE**
- **Plastic material availability and dependence from Chinese suppliers (China loss by 13.5% in productivity of plastic)**

Funding needed:

- Invest in the production of PPE

Regulations needed:

- Definition of common standards for masks and PPE certifications
- Develop a central homologation authority for PPE and medical devices for all EU Member States

Coordination needed:

- Focus on equal distribution of PPE and medical devices rather than on production at national level

3.1.9. Renewable energies

Renewable energies are important for a green future of Europe. During the COVID-19, they suffered the following disruptions of value and supply chains.

Disruptions:

- Demand and production reduction of components
- Project development slowdown (new order drop estimated by 31-50%)
- Logistics delays
- Strong reduction of cash flows and financial capabilities
- Demand reduction for Operations & Maintenance operators
- Circular Economy application on biomass lifecycle
- Lack of regulation in secondary materials and resources management for circular Economy and Sustainability in the Post-Covid-19 economic recovery
- Strong dependence from Chinese markets (Cellulose market – which is around 3.7 b. EUR market shown prices increase up to 500% for imports from China)

Coordination needed:

- Logistics support
- Production process support
- Partnership with chemical and Agri-food clusters to handle waste management from local to centralized areas

Funding needed:

- Financial support for companies exploiting renewable energy sources
- Several companies along the value chains will benefit from EU Green Deal programs. This will help companies with funding for new projects, generating an increase in demand for manufacturers and operations and maintenance operators (for example, investigating new floating turbine solutions within wind industry or new materials recycling techniques)
- The transition of linear production to a more circular one can be complicated and costly, especially for SMEs. Funding are necessary to support the transition

Regulation needed:

- Some companies are not able to act in view of circular economy because of the national difference in terms of regulation. A homologation and standardization processes are required.
- Creation of policies for waste treatment to stop their degradation

3.1.10. Proximity & Social Economy

Due to the closure of the local retail as well as social activities, the actors in this ecosystem could not do business as usual.

Disruptions:

- Income decrease (- 50% income than previous year)
- Reduction of services

Challenges and disruptive trends:

- **Redirection of public funds to meet the needs of crisis (social economy represents 10% of businesses in EU, 6% of EU employees)**
- **Social enterprises excluded from Regional Smart Specialization Projects**
- **Importance of mapping impacts on social economy caused by the COVID crisis**
- **Social economy as a driver for collaboration in the Industrial Ecosystem**
- **Rising importance of sustainability paradigm in Social Housing sector**
- **Potentialities of Social Housing for EU**
- **Environmental benefits coming from shared value**

Coordination needed:

- Facilitate coordination and better involve regional government into the understanding of the strategic value of social economy inclusion in RIS3
- The Social Economy lens helps to collect important information through the EU Rapid Alert Function.
- Promotion of collaboration between financial institutes and social enterprises
- Improve the competitiveness of Social Economy companies through the increase of the added value provided, in an interregional cooperation perspective
- Create European value chains of social economy enterprises belonging to different regions in Europe and improve the cooperation between them

Funding needed:

- Invest into social impact funds and social investments
- Financial support to social services to company for the crisis period
- Funds for Social Housing investment within Recovery Plan. Grants and Public investments need
- Provide specific funds to help sustain the loss from temporary discontinued services
- Specific funds to grant equal recovery among different markets

Regulation needed:

- Include into the calls for proposal rules explicit eligibility for social economy enterprises
- Define clear rules and assets allocation, to sustain and improve online services delivery, adapting to the ecosystem change
- Social Housing is not a European competence. However, Europe can give local authorities a framework. Europe can take the rights of Social Housing and enable better places to live. Local authorities often suffer lack of funds to feed social housing and, even if social housing companies are very innovative, funding is not available

3.1.11. Tourism

The actors of the tourism ecosystem suffered an immense breakdown of their businesses and will take longer to recover than other ecosystems.

Disruptions:

- **Collapse of Tourism Industry through lockdown measures**
- **Lack of business opportunities fostered by collaborations**
- **Lack of tourist's trust**

Challenges and disruptive trends:

- **Data analysis and sharing availability**
- **Long-term sustainability**
- **Changes in consumer behavior**
- **Rising competition between tourism countries**

Coordination needed:

- More clarity on national and international restrictive policies
- Fostering collaboration between clusters and association in order to increase the recovery of the sector (cross-regional cooperation, intra-sectoral cooperation and inter-sectoral cooperation)
- Promotion to boost customer trust for safe and clean places

Funding needed:

- Financing and grants to face the lost income of the past months and avoid the closure of activities or staff cuts
- Financing for new projects and services development
- Funding for digital transformation and technology access for tourism companies
- Financing for sustainability projects; grant for the most proactive activities towards sustainability
- Measure for trust recovery, for example, promotions for tourism structure that have readily adapted to safety constraints and sanitation policies
- Support for the tourism sector to soften the repercussions of business losses

3.1.12. Construction

The temporary lockdown and the following restrictions affected activities in the construction ecosystem, which needs to redefine itself for the future.

Disruptions:

- **Lack of workforce in construction**
- **Commerce disruption**
- **Shutdown of construction sites (92% of sites shut down during lockdown period, activities have re-started at 80% on average)**

Coordination needed:

- Support the industrialization of the processes and the upskilling / reskilling of the labour force.

3.1.13. Energy-intensive industries

The energy-intensive industries reported problems with raw material supply chains and logistics delays.

Disruptions:

- **Supply chain disruptions**
- **Raw material extraction and processing**
- **Critical access to raw material supply chains for EU companies**
- **Melt-blown disruption**
- **EU and Global supply chains dependence from China markets**
- **Logistic delays**

Challenges and disruptive trends:

- **Long-term strategic plan for European Industry**
- **Regulation on material handling to achieve Circular Economy systems**

Coordination needs:

- Launching a study for a shared analysis of the risks and critical points of the complete sectors to identify solutions to improve resilience and security in the medium/long term
- Collaborations have to be pushed at local/regional level

Funding needed:

- Help SMEs that are in the process of launching innovation projects, but are in financial difficulty due to Covid-19 crisis to go through with projects and not give up for lack of means

Regulation needed:

- Improve regulation process for homologation of European innovation, lowering barriers and acting especially from a politics and strategic point of view
- Support innovation in material sectors to support SMEs recovery

3.1.14. Retail

The retail ecosystem encountered different trends: increase in online purchases, disruption of exports, closure of local shops.

Disruptions:

- **Commerce Disruption (20% increase in purchases)**
- **Closure of borders and export disruption**

Challenges and disruptive trends:

- Temporary more local supply chains

Coordination:

- Support local retailers to face demand increase
- Digitalization for markets, products and buildings
- Innovate on new products and business models

Regulation needed:

- Necessity for clear safety and certification rules regarding import and export of finished goods

3.1.15. Textile

The textile ecosystem was deeply involved in the production of masks, development of new designs and finding alternatives.

Disruptions:

- Missing certifications, homologations, reliability and quality of products
- Shortage of critical supply of plastics, filtering and advanced materials

Coordination needs:

- Enhance Europe's capabilities on production of advanced materials for masks

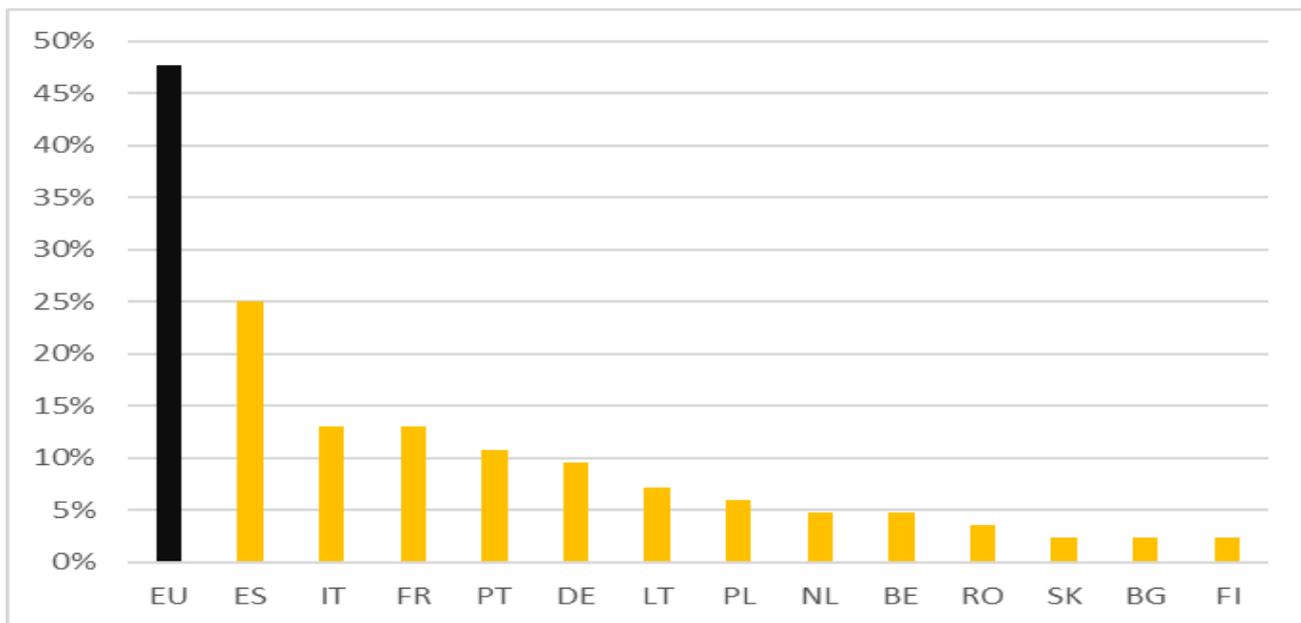
Regulation needed:

- Improve regulation process for homologation of European innovation (homologations of tissue masks)

3.3. Which countries reported disruptions?

The European Alliance Against Coronavirus is made of actors from different European countries. As it is an open forum, it integrates everyone who wants to participate and share their experiences and needs. Many participants come from Southern and South-Western European countries, including Spain, France, Portugal, and Italy, which is why ECA documented many disruptions from those countries.

Nearly half of the disruptions have been identified at European level, meaning that they have an impact on a European level or can be seen in multiple countries. Spain is the second source in terms of number of disruptions identified (25%), followed by France (13%) and Italy (13%). Even though this analysis does not aim at giving a complete picture but reflects the "week signals" from the group, the analysis is significative in showing the wide-spread geographical distribution of the challenges identified and their impacts, involving all the European Union.



Country distributions for which disruptions were identified⁵

3.4. Which stages of the value chain were affected?

The members of the European Alliance Against Coronavirus indicated disruptions in all stages of the value chain during the COVID-19 emergency. Next to the geographical impact, this is another indicator that shows the variety of difficulties that the industries had to answer and is related to the character of the disruption.

Looking at the 84 disruptions that were reported by the European Clusters Alliance, the results show that 17% of them had a strong impact on all the stages. The most disrupted areas are Operations (18%), HR (15%), Procurement (14%), Inbound logistics (8%) and R&D (7%). The reason for this data can be the recurring topics of disruptions.

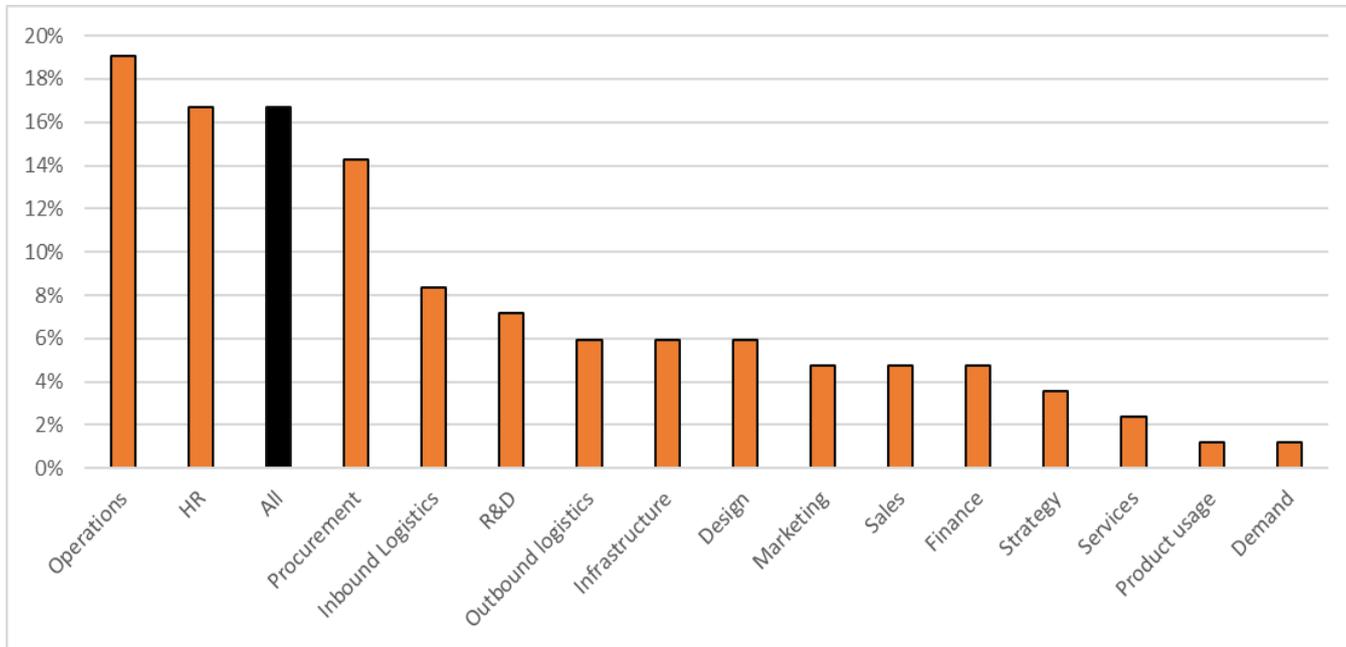
Operations have been disrupted by many factors. First of all, as already pointed out, restrictive measures shut/slowed down manufacturing and industrial activities. Factories found themselves to work with lower numbers of operators, without safety and protection gears (PPE shortage) and with incapability to satisfy the demand also due to logistics delays/stops.

Inbound Logistics and Procurement suffered discontinuities caused by border closures, lack of certifications on materials and difficulty in retrieving and treating second-hand inputs, which overall caused the temporary stillness of their supply chain. Costs to retrieve resources have increased, both in terms of materials and staff.

HR was heavily disrupted, too. During the lockdown period, new types of skills - particularly digital skills - were required to work remotely when possible, due to the inability to grant safety measures on the workplace.

⁵ Starting from the daily session, the location of the disruptions was collected in the database. This “location” represents the country or region of identification of a certain trend, considering the association that reported evidence on the disruption (National Cluster Associations, European Associations, etc.).

Finally, R&D efforts and New Product Development were disrupted due to the absence of necessary certification, homologation and regulation of outputs which slowed down or stopped the whole processes.

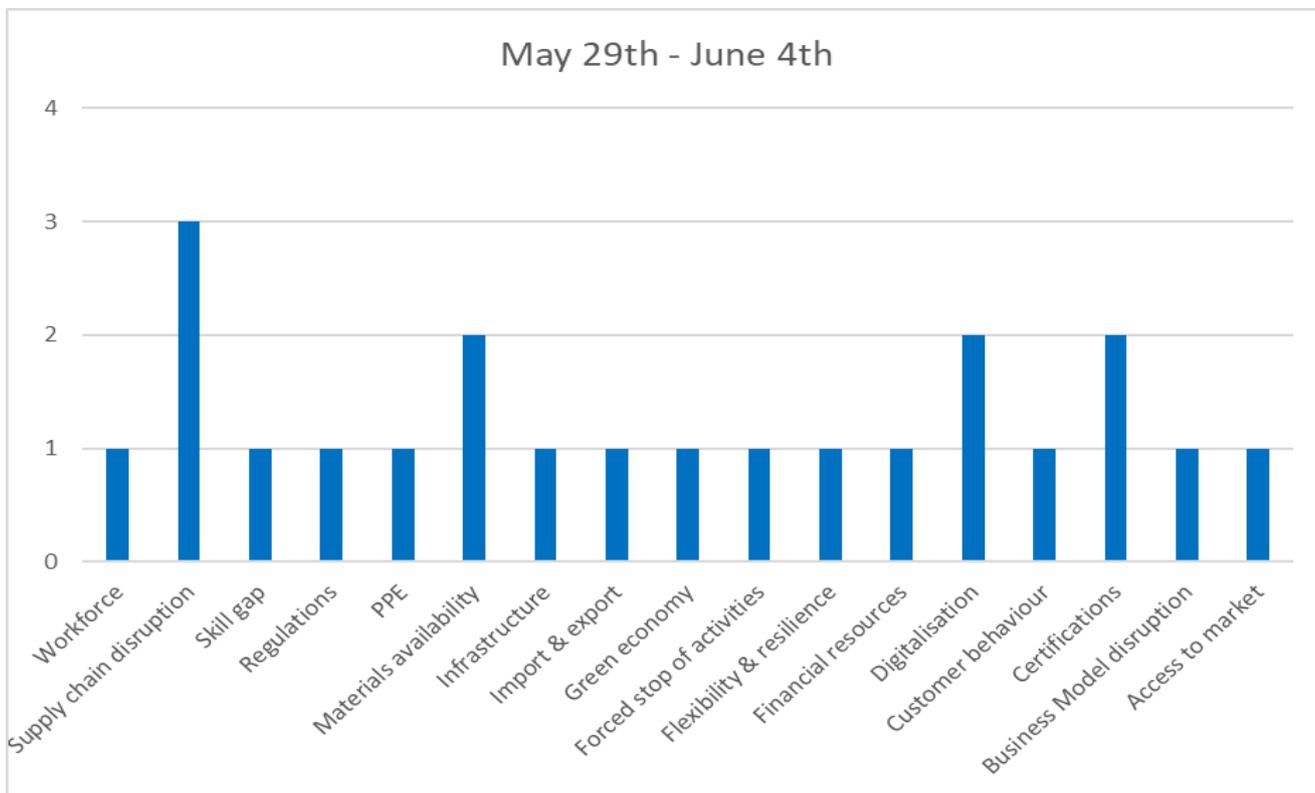


Percentage of value chain stages impacted by disruptions⁶

3.5. Which were the most recurring disruptions?

The European Alliance Against Coronavirus has been meeting on a daily basis, adjusting their topics of discussion with the development of the crisis. To see the evolution over time of the disruptions, this analysis takes into consideration the recurrence of general issues identified for several ecosystems and areas over the course of the daily meetings. The time horizon considers spans from May 29th to July 24th 2020. The weekly development is outlined in each chart, showing the most recurring trends for each period.

⁶ The identified disruptions were divided on the bases of the value chain stages impacted. The stages of the value chain are shown on the x-axis and the percentages on the y-axis represent the occurrence of these trends calculated on the basis of the total number of disruptions (84).



Absolute number of recurring disruptions analyzed during Week 1⁷

In the first week analyzed, the main topics that emerged were **Supply chain disruption, Material availability, Digitalization and Certifications**. In this first period, the sanitary emergency in Europe brought by COVID-19 was still at its peak. The members of the European Alliance Against Coronavirus shared with the group that restrictive norms on the movement of people and materials brought difficulties for many businesses and industries.

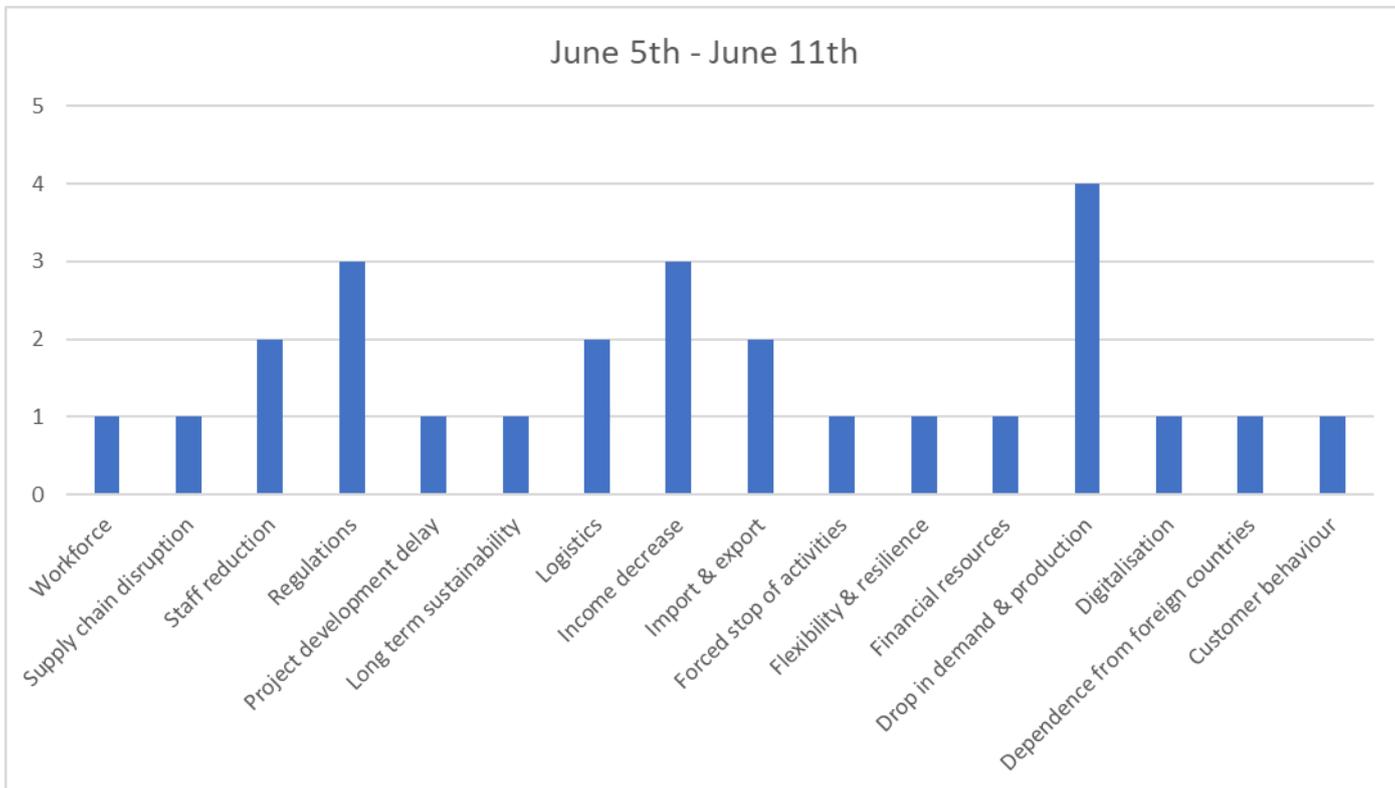
International supply chains were stopped or delayed by border closures and the impossibility to grant safety for imported goods and materials, especially for critical materials like chemical and electronic components, which have always been imported for the most part from suppliers outside the EU, like China.

In addition, the impossibility to grant safety measures in the workplace, given by the shortage of safety gears, slowed down the activities of many industries. The lack of commonly shared certifications and standards for newly produced masks and gear impacted prevented to quickly implement new solutions which were needed, given the enormous demand for these devices in the period.

For the companies able to shift their activities online, change their business models and to quickly implement remote work, the need for more digital skills and further training became another critical aspect.

⁷ The numbers on the y-axis represent the occurrence of each topic during the week considered, calculated on the basis of evidences gathered in the daily sessions. The x-axis shows the keywords of the disruptions.

Consequently, many businesses had to close temporary while others had to switch their workplace online, creating a disruption in the skills requested to workers.



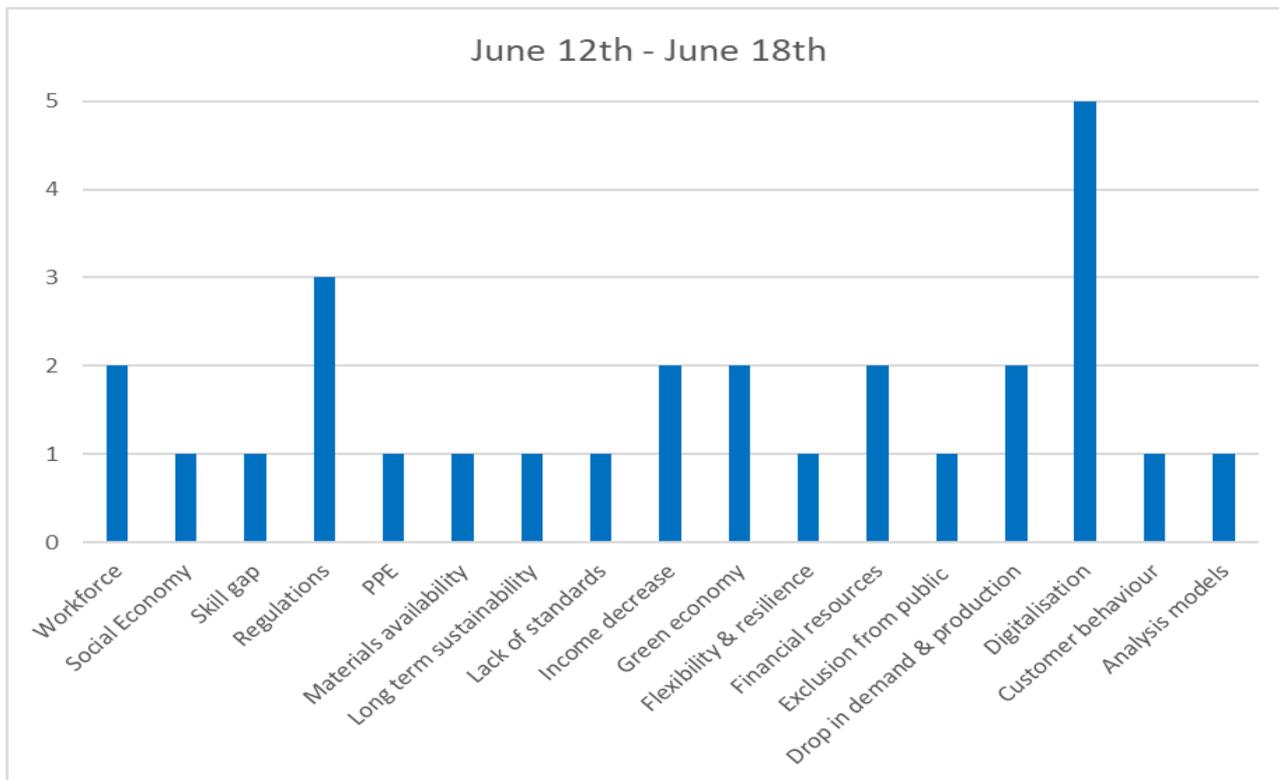
Absolute number of recurring disruptions analyzed during Week 2

In the second week, the pressures imposed by **Regulations** showed its impact on European Industry. As seen in the chart, it remained one of the most relevant topics talked about by the European Alliance Against Corona-virus. With the lockdowns and restrictions on mobility, ECA reported a **Drop in demand and Production** for different ecosystems like Tourism, Mobility – Transport - Automotive and Creative and cultural industries.

Both **Availability of workers** and **Customer behavior** have changed due to restrictions. Especially for transportation and seasonal business, this fact led to a general **Income Decrease** by 40% to 80% compared to the previous year.

Considering Human Resources, this critical situation led to the reduction of staff on the one hand to the inability to hire new personnel due to restrictive norms and business insecurities with regard to the future on the other hand.

Finally, **logistic delays** and disruption in **import and export** still persisted in this second period analyzed for the afore-mentioned reasons.

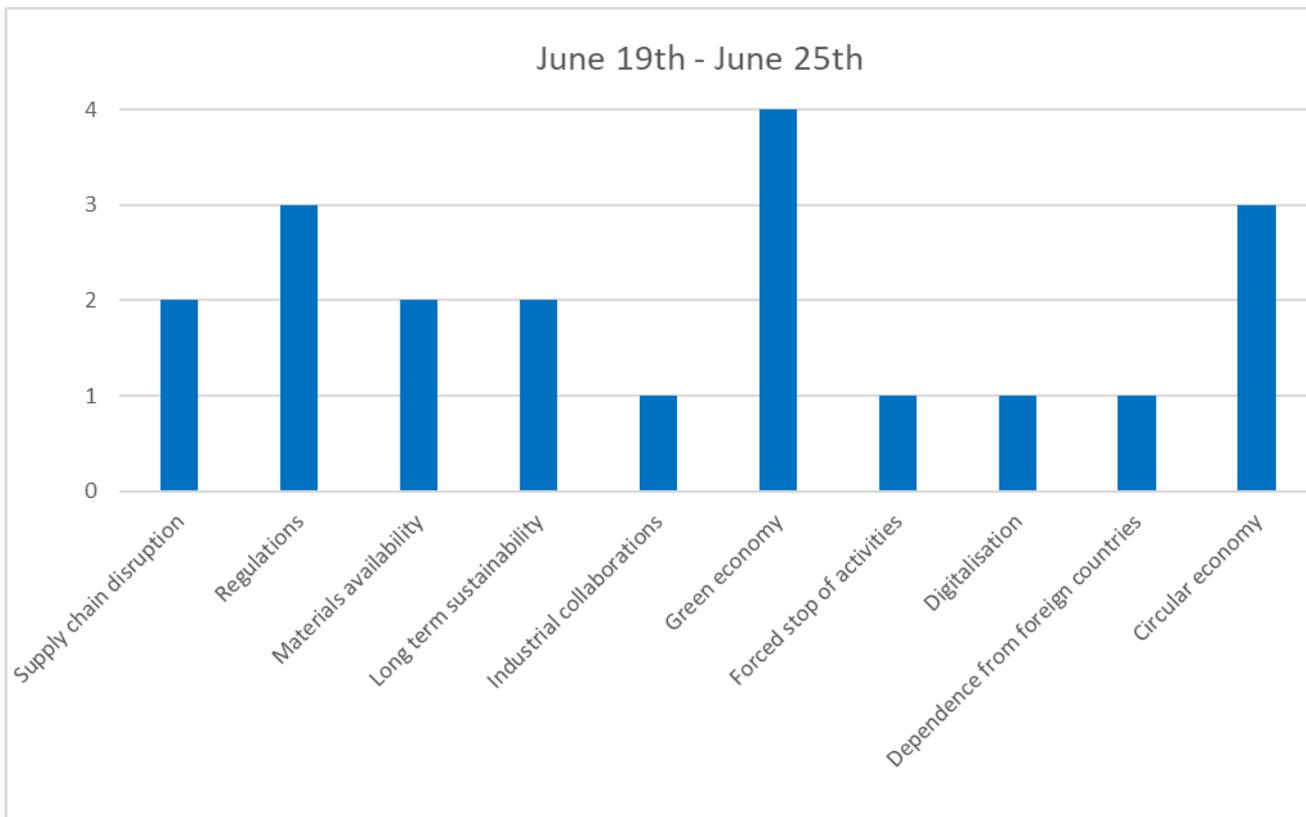


Absolute number of recurring disruptions analyzed during Week 3

To contain the spread of COVID-19, many European countries were still under lockdown measures between the first and second half of June. Therefore, restrictive **Regulations** continued to be a discussed topic in the EAAC. The issues of **Workforce Management and Income Decrease** emerged again in the meetings, but in this week, disruptions were also connected to the lack of **Financial Resources** brought by the critical situation of the previous weeks. Supply chain disruptions and stop/delay of operations started to show consequences in financial terms.

In this context, the first hints for the European recovery started to emerge, revolving around the topics of **Digitalization**, especially at manufacturing level, **Social Economy, and Green Economy**. These macro-trends have been the pivot for the first proposals gathered this week to proactively respond to the situation, since the long-term scenario for European companies could not tolerate the same criticalities encountered and forced stop of activities.

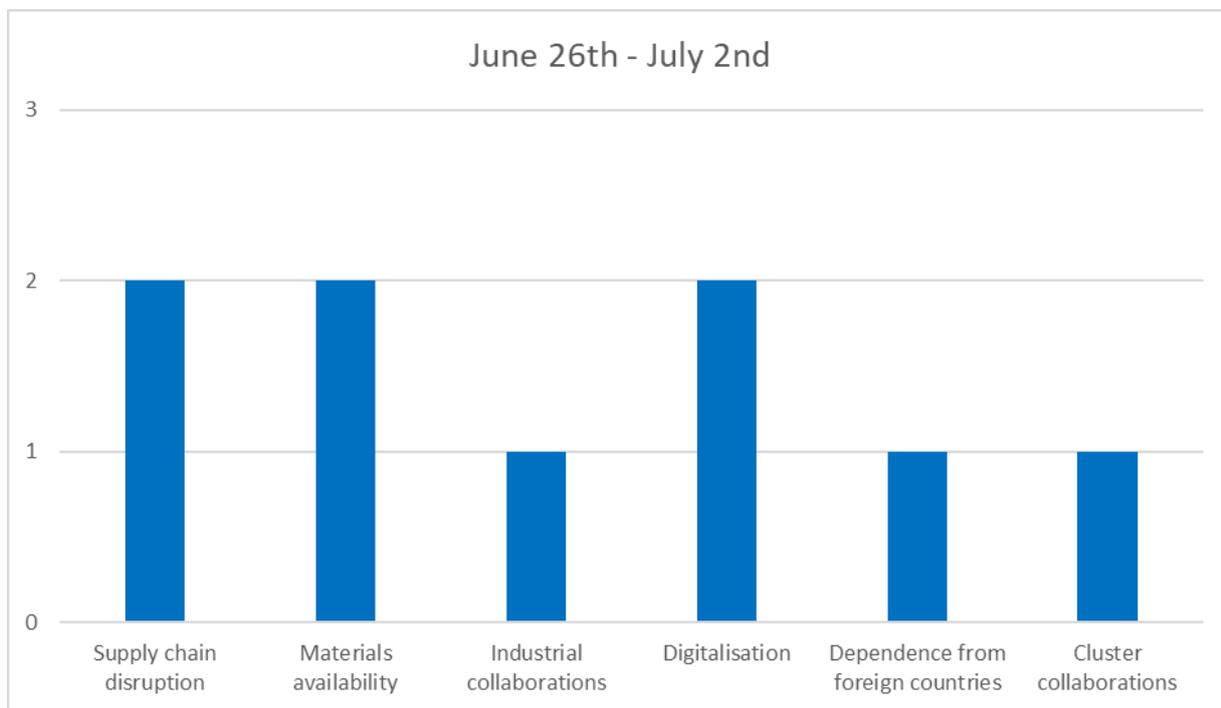
Moreover, these guiding principles follow the aim to obtain **Long-Term Sustainability**, supporting the EU to increase its independency from foreign countries and create resilient supply chains. The aim is not to go back to the pre-COVID situation but enhance our industries.



Absolute number of recurring disruptions analyzed during Week 4

Considering the fourth period, the EAAC still referred to **Supply chain disruptions, Material availability and Regulations** in their respective sectors and areas of work as the most recurring topics of the week. However, the group turned to discussing “disruptive opportunities” which were presented with the aim to achieve *Long-term sustainability* of the European Single Market.

In particular, while the previous week was characterized by strong Digitalization proposals, **Circular and Green Economy** were emphasized as drivers in the process of recovery from the sanitary and economical discontinuity imposed by the pandemic. The EAAC shared the view that **Green Economy** is beneficial for the European economy because of its environmental impact and its cross-cutting opportunities for the different sectors. On the other hand, its branch of *Circular economy* would allow to detach the EU to a certain extent from external markets to increase European **Material availability**, a critical aspect that hit hard during the lockdown periods, by collecting and treating waste to transform outputs into valuable inputs, reducing the quantity of imported raw materials.

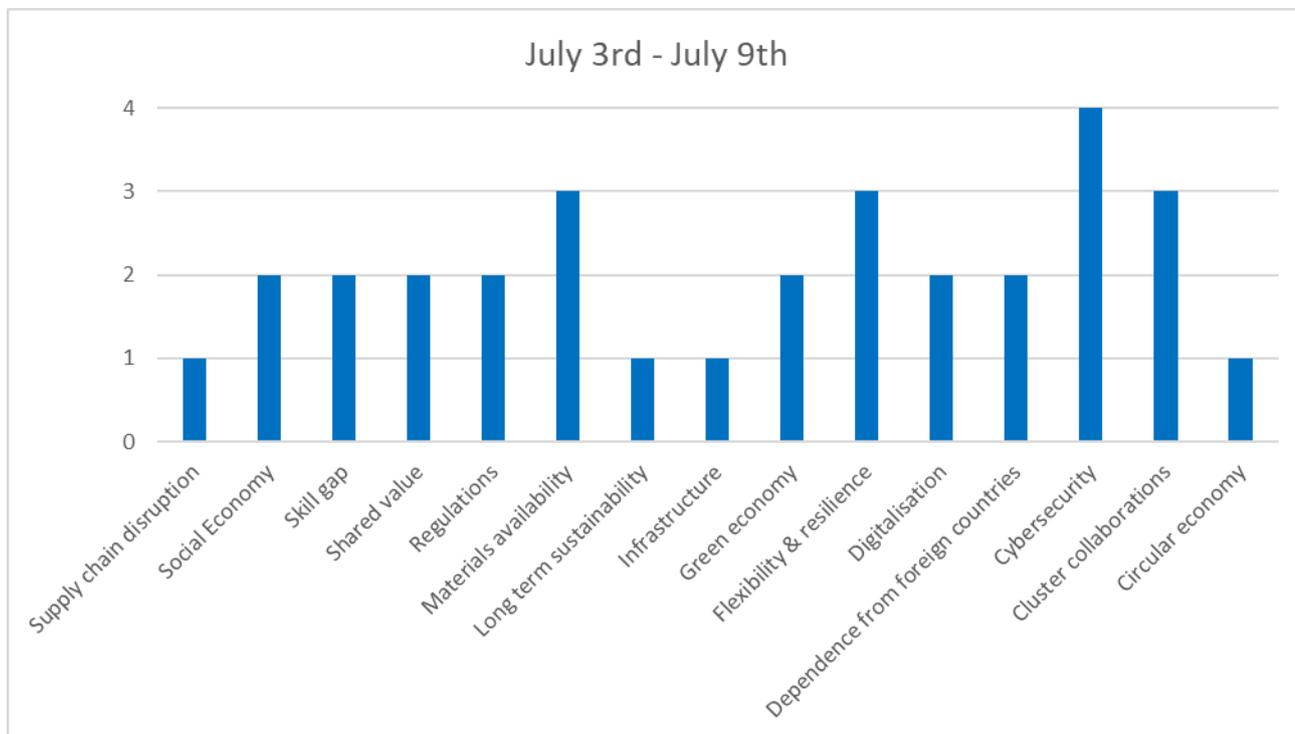


Absolute number of recurring disruptions analyzed during Week 5

In the fifth week, the EAAC continued to give evidences of *Supply chain disruption*, **Material availability** and **Dependence from foreign countries**. The strong dependence of EU supply chains on Asian market became visible in the COVID-19 crisis. The sharp contraction of the Chinese market influenced supply chains in all over the world.

The EAAC highlighted the role of **Digitalization** as a driver for the European recovery - in particular for the Industrial and Manufacturing ecosystems. Digitalization has been found to be a key aspect to foster **Industrial and Cluster Collaborations** and to reinforce the strategic role of clusters in the recovery, being the fundamental node of communication between policymakers and local businesses. One possible next step for recovery is a shift from cluster organization based on sectoral or geographical categorization to “Digital Clusters”, building a net for common knowhow, collaboration and mutual help across EU.

This further step, would improve the resilience of both the whole aggregated value chains across different ecosystems through active collaboration on recovery projects beyond geographical and sectoral limits and of the single clusters, making a prompt identification of signals and intervention measures at local level and the exploitation of good practices from other associations in the European ecosystem possible.

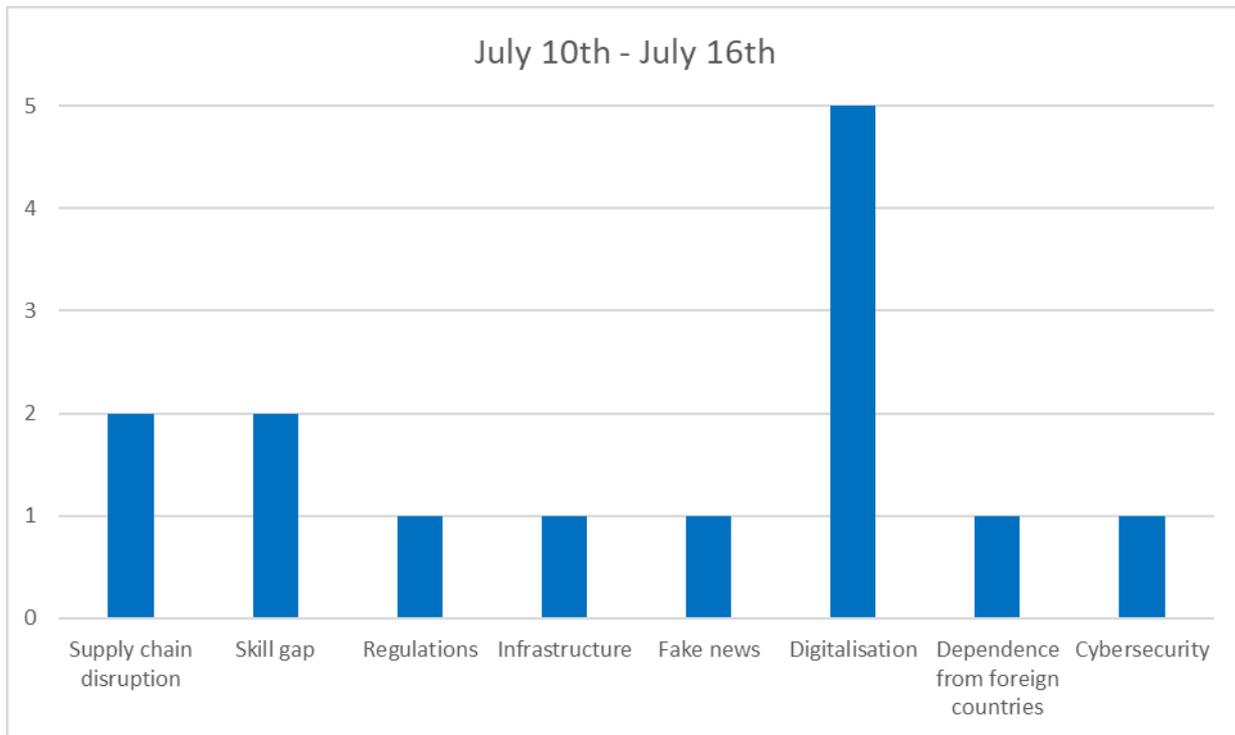


Absolute number of recurring disruptions analyzed during Week 6

Cluster Collaborations and **Flexibility and Resilience** were key topics in the daily sessions of the first week of July, as well as **Material Availability and Dependence form foreign countries and Regulations**. Linking to the topics of the previous period, the members of the EAAC presented proposals and difficulties for cluster collaboration across EU, underlining the importance of these partnerships to boost resilience and flexibility. **Circular Economy, Green Economy and Digitalization** were once again reinforced as fundamental for recovery projects.

Furthermore, the alliance talked about **Cybersecurity, Skill gaps and Social Economy**. Cybersecurity is crucial for the digital transformation, however, members of the EAAC see the need for a bigger support from public authorities in this field. The number of cyber-attacks increased in the pandemic period, since hackers tried to exploit the emergency to retrieve sensitive data. This was possible because people took their workplaces home, partly using their personal devices for remote working. In addition, a large Digital Skill gap in cybersecurity was identified. Experts in the field tend to accept work opportunities outside the European Union, especially in the US and Japan. This situation leaves the EU with few resources to fight efficiently against cyber-attacks, an activity which is extremely money and time consuming.

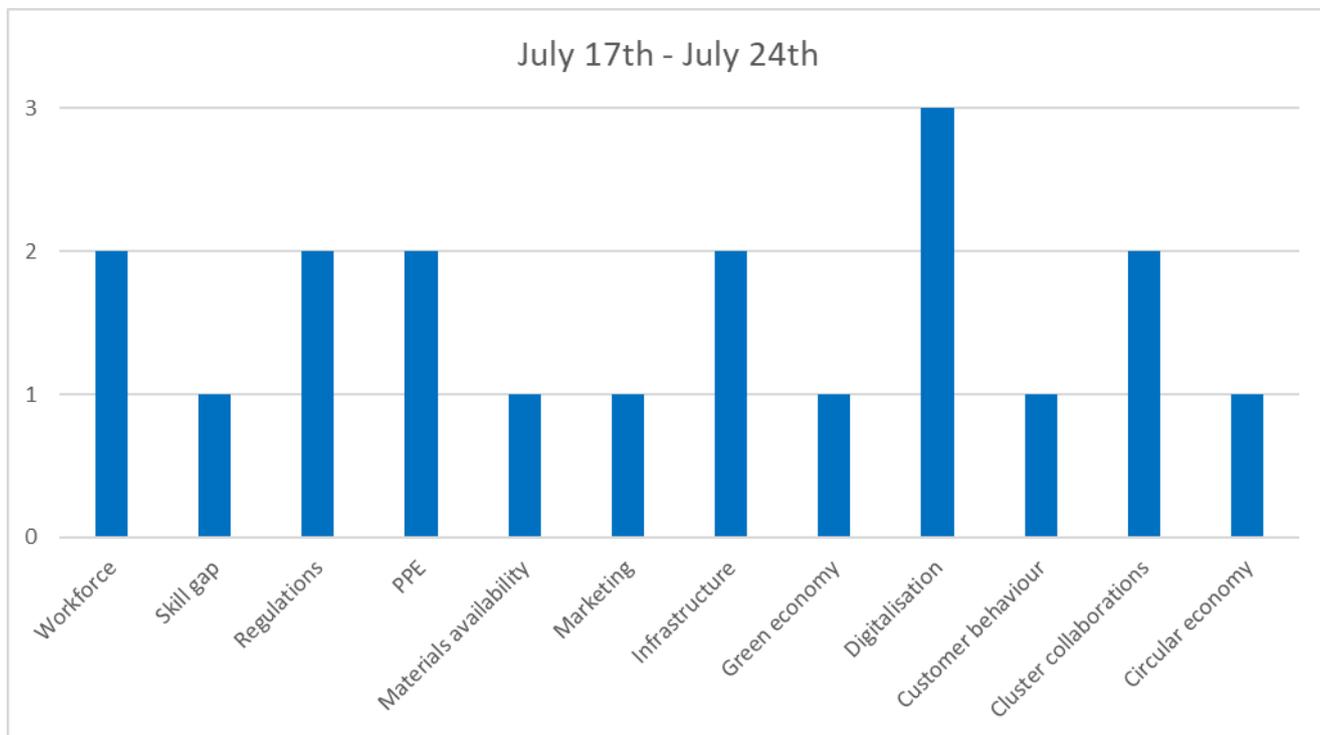
The EAAC looked moreover at the **Social Economy**. Its importance stems from the cross-cutting impact both on the economy and social well-being and inclusion. In the context of the pandemic, social enterprises can address crisis-related unemployment, re-evaluate structures and buildings through social housing initiatives and generally grant a local economic and social reboot after the pandemic (concept of **Shared Value**). Social Economy can also be a catalyst for collaborations between public entities, NGOs and private companies.



Absolute number of recurring disruptions analyzed during Week 7

In the seventh week, the European Alliance Against Coronavirus often returned to the topic of **Digitalization** as one of the core challenges for building a resilient economy. **Cybersecurity, Infrastructure and Regulations** are keywords for future projects in the European Recovery. These technologies involve a large amount of data to be processed and stored, making them a subject for privacy issues and restriction on exploitation (GDPR). Regulations can present a barrier in this aspect, since there are not clear or common rules for data applications to wide and pervasive nets (for example smart cities).

In addition, the group foresees infrastructural problems related to the application of sensors, antennas and controllers for these proposals to create a net which includes not only “traditional” application (for example application to the manufacturing process) but also to Mobility, Transportation, Energy and Retail. The feasibility of installing and connecting this hardware is subject to specific rules and norms about privacy issues and interference creation with other transmitters/receivers.



Absolute frequency of disruptions analyzed during Week 8

Business and event organization are usually part of a cluster’s activity. Therefore, the EAAC discussed how to deal with event planning and gatherings after the pandemic; social distancing measures are still in place in many European countries. Because of the new challenges through **Regulations and Infrastructure**, the EAAC underlines the opportunity to organize in the future hybrid events (partly digital and partly presential) as possible solutions to safety risks.

In addition, previous topics like **PPE shortage, Workforce and Workplace management, Skill gaps and Materials Availability** came up again.

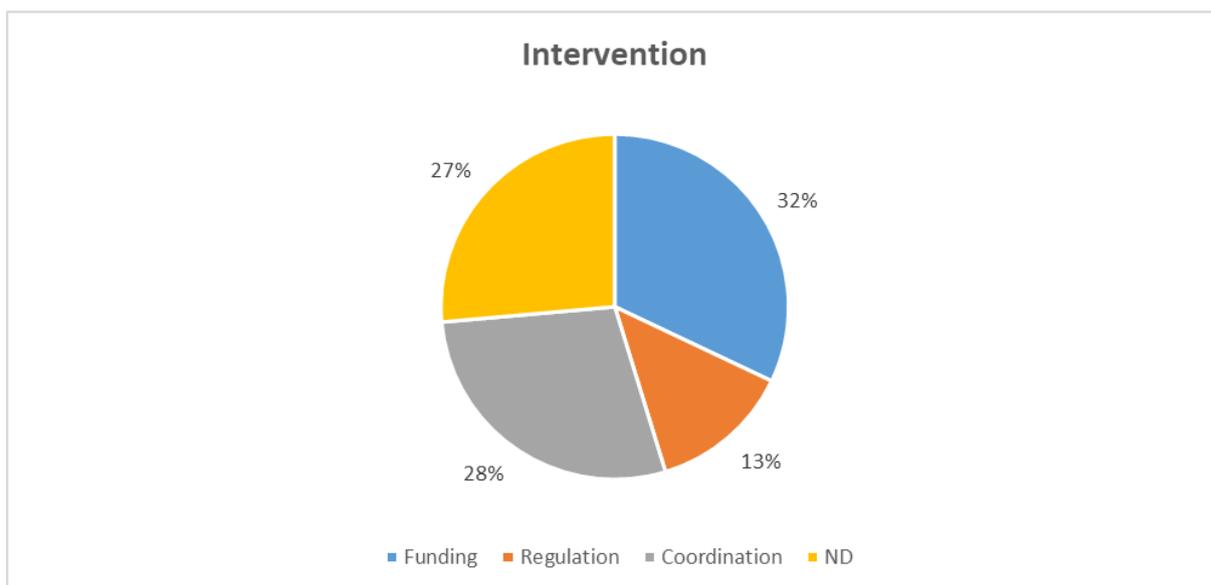
3.6. How can we fix disruptions and learn for the future?

The European Alliance Against Coronavirus unites stakeholders from different entities – from clusters to universities to companies to policymakers to other associations. While looking at the disruptions in the European value chains, everyone brought their particular needs for their areas of work on the table. To get an overview, this analysis divides them into funding, coordination and regulation. Most of them require or would benefit from the involvement of European bodies – to be implemented properly, receive the necessary resources, or reach a European scale.

Funding actions summarize all the possible financial supports that the European community can allocate to alleviate the situations of economic or financial difficulty and to accelerate the recovery. Some examples are non-repayable loans, business funds, funding for research and development projects, financial aid and many others.

Coordination actions encompass the decisions between different stakeholders to facilitate collaboration across countries, regions, and ecosystems. This can affect businesses, supply chains, industrial networks or entire sectors. Single and poorly coordinated economic activities do not allow the efficient growth of a single European market. For this reason, a stronger bridge between the EU level, national levels and regional levels is needed. Finally, **Regulations** actions mean all the possible decisions that can be undertaken to improve laws and regulations within different contexts.

Funding actions are recommended in 32% of cases in order to financially support the recovery, **Coordination** activities in 28% of the cases and **Regulation** in 13%. 27% of the challenges did not allow the identification of direct actions by the EU, as their either described disruptive trends on which the actors are currently working, or they were already tackled by cluster interventions, e.g. with a specific regional or national projects.



Percentage distribution of EU action identified⁸

⁸ These interventions have been divided following the daily minutes structure in *Coordination, Funding and Regulation*.- Data and calculation have been based on the total number of necessary actions identified. Through the analysis of the disruptions for each daily session, corrective actions have been suggested for each problem identified and to summarize their distribution, a pie chart has been reported here.

Examples for coordination

The actions identified emerged as suggestions proposed by speakers and participants of the daily meetings; here are listed significant examples for coordinative actions. The specific EU action needed related to the different disruptions are reported in the attachment of this report.

Reduction of staff in the Aviation Ecosystem

- Increase cash flow liquidity to support industries through staff retention (salaries and skills), capability protection, supply chain protection
- New European solution for competence development, allowing to achieve competitive advantages for EU in the long term

Changes in consumer behaviour in the Agri-food Ecosystem

- Development of a transition plan in order to restart with new frameworks based on circular economy, digital transformation and technologies development
- Help companies connecting producers and consumers by using new tools and software
- Accelerate the digital transformation by using e-commerce to deliver local food to local markets
- Addressing the urgency to find solutions both in the short, to be quickly responsive, and in the medium term, in order to rethink and redesign the whole value chain
- Deeply analyse the disruption in a specific session, in order to stress the topic more, keep the opportunities and influence the policy makers

Importance of mapping COVID-19 impacts on social economy

- The Social Economy lens help to collect important information through the EU Rapid Alert Function. This Function, recalled into the Recovery strategy, is connected to the possibility to collect weak signals. The mapping of relationships between stakeholders should become a standard for all types of businesses, not only for Social Economy.

Social economy as a driver for collaboration in the Industrial Ecosystems

- Improve the competitiveness of Social Enterprises through the increase of the added value provided, from an interregional cooperation perspective
- Creation of European value chains of social enterprises belonging to different regions in Europe and improve the cooperation between them. Actors may not have enough resources, so it happens that collaborations are always established between those actors with more resources, creating in this way an unbalanced network respect to the ecosystem. In this sense, Social Economy could be the solution.

Long-term vision for European companies

Especially for Small and Medium Enterprises:

- Upgrade SME competitiveness in several sectors and ecosystems through redefining the role of clusters, support digitalization, promote access to finance, piloting, and technology developments
- Adopt sustainability means for of concepts of circular economy, industrial symbiosis, recovery-reuse, reduce pollutants, and social licensing
- Inter-Regional Business Hubs development, having a great potential for public funding/financing of SMEs

- Social and industrial related value chains require highly synergic raw materials procurement and distribution through value chains
- Value chain elements such as digitalization of the industry, stronger exploitation of smart and digital solutions.

Examples for Regulation

The EAAC touched on various topics that require a regulatory action to advance. The following examples show some of the issues – the attached complete list of disruptions contains all proposed actions for each issue.

European drone industry fragmentation for Aerospace & Defense Ecosystem (UAV)

- The actual legal situation for drones represents a barrier. Each country has its own regulations and flight permission (autonomous decisions are taken; an example is represented by Central European Drone Demonstrator in Poland). A regulation homogenisation and standardisation at European level is needed since, in general, European regulations are stronger than non-European ones (but it depends also on drone type).

Rising importance of sustainability paradigm in Social Housing sector

- Social Housing is not only a European competence. However, Europe can give local authorities a framework. Europe can take the rights of Social Housing and enable better locations for living. Local authorities often lack funds to feed social housing and, even if social housing companies are very innovative, funding is not available.

Regulation on alcohol usages

- Flexibility in the application of regulation is needed to timely respond to the environment changes. Alcoholic based products are available in Italy at production level, but regulations limit their consumption. The results of the “unavailability” of alcohol might impact both sides of the market in terms of product/material shortage (direct consumer or company’s side) and possible customer loss (producer’s side).

Examples for Funding

Funding is important – without funding, there are neither innovation projects nor resources to main business activities. The funding needs have been explicit for several disruptive trends, as seen in the following examples. The complete list for which disruptions funding is needed can be found in the attachment.

Stop of Creative & Cultural Ecosystem

- Tax reduction and incentives are needed to better face the strong reduction of overall sectors income; moreover, targeted measures for creative and cultural companies are also needed, going beyond the measures designed for traditional industries
- Financing for collateral activities and facilitating the reactivation of people movement, in compliance with government restrictions (e.g. support travel and hotel sectors)

- Financing to support digital innovation in creative and cultural sectors (e.g. film and music industries); digitization can greatly help the sector recovery and attract new investments, especially for the creation of cultural digital contents.

Project development slowdown in Renewable Energy Ecosystem

- Several companies along the value chains will benefit from EU Green Deal programs. This will help companies with funding for new projects, generating an increase in demand for manufacturers and operations and maintenance operators (for example investigating new floating turbine solutions within wind industry or new materials recycling techniques).

Adaption to new trends for Industrial Ecosystem

- Process flexibility and intelligent data management enabled by IoT and digital solutions are characteristics that can generate a great competitive advantage for Europe in the long term. The COVID crisis represents a further barrier to digital transformation since many companies had to close and stop their operations and activities for several weeks. This is a strong brake against digitalization. However, it also generated the further need to “reinvent” the structure of the factories to face the crisis, which must now be even more digital, automated, agile and safe.

4. Good practices and strategic proposals for cluster activities

The European Alliance Against Coronavirus has shared many good practices in their daily meetings, which inspired concrete actions to mitigate the effects of the crisis and served as an example to build strategic plans for cluster policies and activities. The following examples were presented by speakers during various EAAC daily sessions, giving evidence of concrete actions adopted at regional or national level and providing useful hints for replication at European level.

4.1. France: Cluster proposals for the national recovery plan

EuraMaterials, a materials cluster with 260 members and 1,000 associated partners, participated in drafting a **proposal submitted by 7 clusters and led by AFPC to the French Government for the national recovery plan**. The Covid-19 crisis has highlighted the key role of the materials processing industries (examples: plastics for respirators, masks and visors) in the value chains and the absence of certain key technologies on the French territory. Their proposal is based on the concept: “**everything is material**”. Materials serve all strategic markets, but their transversal and upstream positions mean that their roles are often misunderstood or even forgotten. It is clear there can be no recovery plan without a special consideration of materials. In addition, the materials processing industries are characterized by a **driving role of manufacturing SMEs/SMIs** scattered throughout the national territory.

First of all, it is necessary to **perpetuate the sovereignty of production chains in the materials processing industry** because the disappearance of links in these value chains is a critical factor with significant risks. **It is recommended that the CSFs (Strategic Committees for the application sectors) integrate the materials dimension in the actions**. It is also important to encourage a **mutually supportive interaction** between large industrial groups as suppliers and SMEs to develop a national commercial strategy aimed at securing the import of critical raw materials into the national territory.

For the recovery, it is vital to:

- help SMEs that are in the process of launching **innovations projects** since innovation should be the key to SME recovery;

- facilitate the **access of start-ups to innovation projects**, by revising the equity rules that limit their participation in collaborative projects;
- in the medium/long term, it is necessary to **rethink the industrial value chain to ensure self-sufficiency** for Europe's and France's raw material production.

The French clusters submitted these recommendations to be considered for the national recovery plans. Thus, they were actively involved in giving concrete ideas and representing the needs from the industry.

4.2. Belgium/Flanders: Regional expert groups to give advice

In federal Belgium, drafting the recovery plan is carried out by the regional government. In Flanders, the government installed two expert group to advise the government in the creation of the plans: the economic advisory expert group and the societal advisory expert group. The innovation clusters will **be part of the economic advisory expert group**. As foreseen in the recovery plan, clusters will need to continue working in the **smart specialisation strategies**.

Furthermore, they will increase their activities in:

- Connecting more in **regional transformation priorities**;
- Play a greater role in **international R&D&I on sustainability** (whereby sustainability is understood in a broad sense);
- Deeper connections between 6 spearhead clusters in Flanders;
- Be more active on **internationalisation**.

4.3. Portugal: Stronger cluster collaboration for more impact

The Portuguese Agency for Competitiveness and Innovation recognized that the success of public policies depends on the capacity of the civil society to define a common strategy and mission, in particular on the ecosystem structures associated with the dynamics of clustering. It was important to establish close relationships of cooperation and collaboration that favour the development of concerted initiatives in several areas of intervention to achieve common objectives. Therefore, they signed **sixteen Sectorial Pacts for Competitiveness and Internationalisation** with the Ministry for Economic and Digital Transition.

The main outputs include:

- a closer dialogue between the Cluster Managing Entity and the members of the Monitoring Committee and other organisations whenever necessary;
- better understanding of the cluster needs;
- more intra- and inter-cluster activities and networking;
- clusters studies aiming at identifying solutions;
- working groups between cluster, representatives of the government and representative of private and public entities.

The recovery plans actions are the domain of the single EU Member States: it is important to take advantage of the strategic local spread of clusters and effective role in identifying weak signal to stimulate interventions at national level.

4.4. Italy: Monitoring Smart Specialization Strategies for more synergies

Smart specialisation in Italy has a regional and national dimension. There is one national S3 plan with 5 thematic areas and 21 regional S3s with different objectives, timing and approaches as the Italian regions are characterized by different levels of administrative abilities and experience in managing and monitoring R&I policies. Moreover, each Italian region has its own monitoring system following EC regulation. Therefore, it is possible to find different skills and monitoring capabilities as well as different degrees of stakeholder engagement in S3 monitoring.

In June 2016, the Italian Cohesion Agency conducted a survey and the results showed that the regions would like to receive support in the national coordination activities. This is the reason why the Monitoring Unit of the Agency for Territorial Cohesion gives methodological support to regions for S3 monitoring. They developed a monitoring system at central level containing information on the 21 regional S3s.

Furthermore, the National Agency for Territorial Cohesion and State General Account Department launched an activity with regions: identifying S3 projects in the National Monitoring System in order to identify the projects contributing to regional and national strategies by priority.

4.5. Romania: Clusters as the backbone for S3

The Regional Development North East of Romania's vision is based on these main ideas:

- Clusters can promote sectorial collaborative leadership
- Clusters can consolidate capacity to:
 - support start-ups and scale-up;
 - simulate international cooperation;
 - encourage digital transformation.

In Romania, clusters become a backbone for change strategy for smart specialisation, by contributing to RIS3 NORTH-EAST, engaging in the entrepreneur discovery process, and promoting leadership and collaboration. The main instrument 2021-2027 ROP North-East will include investments in clusters, including investments in start-ups and SMEs to develop competitiveness in specific areas, R&I projects, internationalisation and networking.

4.6. Green, digital, resilient: Proposals for the recovery

The European Cluster Collaboration Platform organized on July 23rd – in collaboration with the European Clusters Alliance – a webinar on the industrial cluster response to COVID-19 and the role of European clusters in the recovery strategies. The participants discussed these main challenges and lessons learned during the COVID-19 outbreak:

- Shortage of strategic and protection gear (masks and alcoholic products)
- Supply chain disruption in all stages
- Digitalization of local shops
- Re-orientation of the production
- Funding initiatives
- Industrial network creation for strategic gear supply
- Intensification of contacts with industrial ecosystem and SMEs
- Improving collaboration among clusters of the region for Covid-19 related projects

According to Orkestra, cluster associations took on different roles in the last months. They acted with a supportive role to the running businesses in the so called “**re-establish phase**” after the shock caused by the virus. Until May, European industries were immersed in the “**resistance phase**” with initiatives to cope with the shock. Then, we moved to the “**reflection phase**” and will soon enter the “**re-orientation phase**” with reconceive and reinforce actions.

Now clusters need to be included in the national recovery plan. ECA presented ideas for the three leading concepts:

- **Greening:** introducing the **Integrated Value Chain Pilot**, which emerged from an interregional project focused on the bio-based industry. The project covered three value chains: eco-construction, bio-based packaging and phytopharmaceuticals. First, gaps were identified and ranked. Then, a roadmap and an action plan were produced. The project ended before implementing the action plan. In this context, clusters should be responsible for integrating the whole value chain and coordinating the action plan due to their complete vision on the whole ecosystem (source: *Union of Slovak Clusters*).
- **Digital:** supporting **digital transformation** and assisting SMEs, including training sessions, economic rescue kits, and the digitalisation of local administration and non-IT companies. When the pandemic hit, the cluster promptly reacted, shifting these services online overnight. They also increased the dialogue with public administrations to share the concerns of the cluster members, and shared information about support initiatives for SMEs. Also, at country level, they worked with regional development agencies and promoted clusters as drivers of innovation having increased the dialogue with the Ministry of Research and Innovation and the Ministry of European Funds. Cluster members also developed innovative solutions during the pandemic (e.g. a start-up that receives EU funding designed a detector inside public spaces that would alert if someone is not wearing a mask properly) (source: *Transilvania IT Cluster*).
- **Resilience:** clusters represent the **backbone of the industrial ecosystem** and can act as catalysts because they bring together various actors from different ecosystems. Linked to this is the concept of resilience, defined by the United Nations as:

“The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions”.

Opportunistic approaches disrupt value chains, which leads to the conclusion that actors cannot be resilient unless they work together. The cluster approach is collective, working on holistic strategies for behavioural, social, economic, and environmental impacts (source: *Aerosol & Particle Technology Laboratory, CERTH*).

The greening and digitalisation pillars can facilitate new approaches such as circular economy, local sourcing, and sustainable technology. These changes cannot be done by one company or society alone: they need to be done at EU level and with the support from clusters.

4.7. Dialogue with European Commissioner Thierry Breton: Next steps for clusters

The role of clusters in the European economy was furthermore addressed in a dialogue between European Commissioner Thierry Breton and the European Clusters Alliance during the videoconference on June 30th 2020. They agreed that clusters play a critical role in the economic recovery of the European markets towards a green, digital, and resilient future.

European Commissioner Thierry Breton highlighted the next steps for the clusters and the collaboration:

- **Include Cluster Associations in European recovery plan:** representing a vibrant economical sector, cluster associations must be part of the recovery plans of the EU Member States, which the Member States will present to the Commission in the last quarter of this year. Commissioner Breton will inform the Ministers of the State members about this meeting.
- **Shift from physical clusters to digital clusters:** geographical and industrial constraints in cluster organization and management can be overcome through digital channels, which have been proved to be very effective during the last few months of emergency. Creating digital clusters allows to synergistically act as whole entity representative of different clusters and needs across the territory and to improve promptness in reactivity and decision making.
- **Apply digital technologies and IT technologies in the cluster ecosystem:** aligning industrial ecosystem with best practices and infrastructure to improve recovery and sustainability in the long term.
- **Act as bridge and pivot for communication:** acting as a connection point between decisional spheres and local entities and actors, given the deep roots in the local industrial ecosystems that clusters have as key feature.
- **Adopt Digitalization and Sustainability Goals (Green Economy, SDG, etc.):** with the aim to recover from the sanitary crisis of Covid-19 and to increase resilience of the value/supply chains in the European Industrial Ecosystem.

Clusters have shown their potential since the beginning of the COVID-19 crisis, managing large groups of companies from different sectors at the same time and across different countries, in close and continuous collaboration with DG GROW, to help in this time of crisis and to look for ways and solutions for the recovery.

5. Recommendations for a green, digital, and resilient Europe

During the ECA activity, recommendations and suggestions to fight the immediate impacts of the crisis as well as to reinforce and reinvent European value and supply chains came from clusters, companies, research organisations, development agencies, policymakers, DIHs, networks, and other entities. They exchanged information and suggestions on:

1. Needs in the ecosystems
2. Best practices and actions at local/regional/national level
3. Examples of collaboration and projects
4. European policies and funding schemes
5. National/regional policies and programmes
6. Blueprints for cross-sectorial solutions

The specific recommendations to the disruptions are included in the list of disruptions (see attachment).

In general, the COVID-19 pandemic has highlighted more than ever that the probability of survival of an industrial system is directly proportional to its **resilience**. It means that the ability to absorb and react to external and internal changes represents a must-have skill for long-term sustainability. The crisis has shaken several sectors, generating economic losses, reductions in cash flows, staff cuts, changes in consumer behaviour and business models, undermining the survival of different business activities. Having more robust value/supply chains is vital to resist the backlash brought by COVID-19 to our economy.

In this paragraph, the report will regard the role of clusters for the European recovery and project recommendations at regional/national level, and Smart Specialization Strategies.

5.1. The potential of clusters for the national recovery plans

The role of clusters is crucial in identifying the needs of European industries and where to invest. For these reasons, clusters will play a key role supporting the recovery plan for Europe. Clusters can lead the transformation and the recovery by improving resilience, identifying bottlenecks, collecting needs, sharing solutions and best practices, enabling green and digital solutions.

Clusters are probably the most effective framework of supporting SMEs' development because they are physically close and present in SMEs' daily activities. They represent all sectors of the European economy, but they are not strictly sectoral. Due to their network nature, they run many cross-sectoral projects at the same time, between multiple companies and researchers from different Member States. Clusters are probably the best tool for integrating science with economy, operating not only at the interface of these two environments, but "incorporating" these environments inside the movement.

Clusters should continue to be a partner of the Commission to solve European economic challenges in a long-lasting corporation. NextGenerationEU foresees 750 billion EUR for the period 2021-2024, divided into several packages. Harnessing these funds, clusters can make suggestions for national recovery plans and generate more locally driven actions. Since the recovery plans will be managed at national level, it is necessary to build a connection and put in place dialogue spaces between clusters and national governments, organizing adequate meeting moments to support the allocation of the funds towards the areas most in need. Clusters can help in identifying these areas as they have a widespread net of "sensors" on the European territory.

In order to generate a profitable coordination between the national recovery plans, strong coordination between the clusters of the different Member States is necessary, fostering green and digital transitions within the Innovation, Digital and Sustainability packages.

5.2. Bridging administrative levels

The main recommendations that should be considered related to the recovery plans and to the bridge that clusters can build bridges between EU level and local level. Therefore, their ability to connect should be used to reinforce collaboration for the recovery:

1. To have a stronger national vision and coordination activities, it is important to improve the governance with a national vision on what is happening at territorial level. This includes (i) providing comparable information across regions by priority area; (ii) supporting the monitoring and implementation of **S3 (Smart Specialization Strategies)** strategies through capacity building initiatives; (iii) providing a space for peer-exchange and sharing experiences between regions.

2. It is helpful to document S3 projects in the National Monitoring System, harmonizing priorities across the regions. The main scope is to identify the projects contributing to regional and national strategies by priority (project financed by national and EU cohesion policies). The main need is to share information with regions, supporting, monitoring and evaluation activities, revision processes, cooperation between administration and stakeholders, comparison and benchmarking with other national and EU regions, defining synergies with the national S3.
3. Clusters offer entrepreneurial support, fostering collaboration between companies and taking care about new needs and challenges. The challenge is to increase international cooperation to consolidate the collaboration between similar clusters from different countries. At the same time, clusters need more support from regional authorities.
4. The connection between clusters and regional challenges allows to reinforce the link between EU strategies, leadership and territorial needs. In this sense, S3 has to be an integrated part of the Recovery Plan, rather than a separate solution. In this way, clusters can become (i) the backbone for territorial change strategy, promoting sectorial collaborative leadership and can (ii) consolidate capacity to support start-up and scale-up, stimulate international cooperation, encourage digital transformation.
5. Investment in clusters can be done through: (i) investments in start-up and SMEs for developing new industrial activities, according to the needs identified in their value chain; (ii) R&I projects; (iii) support for the internationalization and networking.
6. Administrative capacities can be improved by: (i) development of skills for smart specialization and industrial transition; (ii) access to one stop-shop for R&I projects preparation; (iii) access to the regional Digital Innovation Hub.
7. The Article 27 of the General Model Grant Agreement (General MGA - regulating EU funding actions) treats the protection of results and visibility of EU funding. Currently restrictions are in place on this article, which are limiting clusters innovation initiatives, imposing a limit on grants by 50% for public financing and a five-year limit for the time horizon in which funds will be delivered. Given the special period of recovery that EU is going through, and the role of clusters as instruments for government actions, more flexibility in funding restriction are needed in order to effectively support industries.

6. Learnings and achievements

The European Clusters Alliance reported the disruptions in value and supply chains, disruptive trends, and possible solutions to the European Commission through:

- Daily minutes of the webinars with experts from all over Europe
- Publication of minutes, recording of webinar and presentations of the speakers on the European Cluster Collaboration Platform ([LINK](#))
- Weekly reports from ECA to the EC

The shared experiences allowed to rapidly map the situations of European industries geographically and at sectoral level, identifying solutions and posing suggestions in the meetings to face the difficult situation.

Under the umbrella of the European Alliance Against Coronavirus, the European Clusters Alliance achieved remarkable results in this sense:

1. **Mutual knowledge:** The daily sessions allowed to exchange information on relevant topics during and post lockdown (masks, respirators, demands of materials, digital matchmaking solutions are just some examples). Moreover, these meetings allowed each participant to get a clear overview over the situation of other countries or ecosystems. ECA managed to create a network through the participants including representatives of European clusters. A valuable set of shared knowledge about COVID-19 related disruptions and best practices has been created. In addition, attendants from *DG Grow* and other European institutions participated actively during the sessions, creating a dialogue between clusters and institutions, including the special session with European Commissioner Thierry Breton.
2. **Mutual help:** Participation and shared experience not only provided a good understanding of the European situation in crisis time, but the gathering of signals from the ground became a point for collaboration in developing solutions for the crisis. This happened in two ways. Firstly, mutual knowledge allowed to create national/international collaborations between cluster associations and, secondly, shared initiatives implemented at national/local level could be adapted to other European ecosystems (e.g. French standards development for masks certifications).
3. **Identification of possible solutions:** During the daily meetings, several trends impacting different ecosystems emerged. These trends have been recurring in local and national recovery projects but also have been discussed at policy making levels for the European recovery. Hence, digitalization, green and circular economy, international collaboration, flexibility in the supply chain and resilience have been at the base of many proposals discussed in the meetings to allow a sustainable development of the countries in the recovery.
4. **Increasing the role of clusters in the recovery:** Since the recovery plans will be managed at national level, it is necessary to develop a connection and transparent dialogue between clusters and national governments. Due to their strategic position, clusters represent the best source of information to understand priorities and areas of intervention. Clusters should be able to support national governments in funds allocation and guidance over recovery projects
5. **Detection of week signals:** Due to their market and ecosystem closeness, clusters and ECA act as the best “sensors” in identifying signals from the industries. These “week signals” are collected through a bottom-up approach which strengths lies in the rapidity of identification and in the direct experiences shared by cluster associations. These information - coherently with the dynamics of European industries – helped to find promptly disruptive trends, areas of intervention and proposals with the changes of the market reconfiguration.
6. **Direct involvement of policymakers:** Finally, ECA’s activities represent a bi-directional node of communication between industries and policymakers. ECA has been able to directly raise awareness on the European situation every week through its reports and daily publications on the ECCP platform, giving useful information to the European Commission about the main needs for intervention. Moreover, ECA directly reported **feedbacks from industries** to the European Commission about policies application and intervention, creating a cycle for continuous improvement.

7. What next – Long-term planning for future activities

Economic sustainability of the actions

Building bridges between universities and companies has been the main goal and achievement of cluster organisations for a long time, helping to stimulate innovation at different scale of action. In some countries, science parks are depending on EU funds, creating artificial economy, creating demand and offer, generating some benefit but with a non-sense meaning, as it is not 100% sustainable and not connected with market roots. Similarly, the disruption mapping and the solutions search need to find ways for long-term sustainability, new business models and market innovation, without creating a dependence on public funding.

Challenge practice

One possible way is to build frameworks that focus on creating favourable environments for private investment to reach problems and solutions, evidencing business opportunities.

The good practice of organising a “Challenge” is the way to attract good ideas of business and let the private investors drive the concrete implementation in market environment.

8. Attachment

This Final Report has the following attachment:

- List of all reported disruptions of value and supply chains

List of disruptions

Attachment to "Disruptions in the European value chains and industrial ecosystems, solutions and setting up of EU Rapid Alert Function"

1.	Cross-industry	5
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1. Cross-industry

Lack of financial resources (lack of liquidity) (04.06.2020)

Source: Xavi Perez, Cluster HABIC (ES)

Evidence: Due to the shutdown of construction sites and procurements, companies will encounter lack of cash flow in the immediate future due to the unbalance between the products sold and not received payments. The lack of financial liquidity impacts all the supply chain, in the very short term, creating a cascade negative effect on unemployment and poverty, then very difficult to recover.

Geographical impact: EU

Stage of value chain: Financial and payment

Character of the disruption: lack of liquidity

Time frame: short term in future

Recommendation:

- Financial support

EU action needed:

- Yes, funding schemes.

Shortage of critical supply of plastic material

Evidence: The European Clusters Alliance is reporting shortages of plastic products, such as transparent shields made from PMMA and PVC, needed to ensure safe workplaces and provide the population with PPEs.

These shortages stem mainly from limited manufacturing capacities.

Raw materials which are available also from other industries (e.g. automotive) cannot be processed.

Adapting manufacturing capacities is complicated, very expensive, and requires months.

The business plan is doubtful, as probably the relation production/demand will reach an equilibrium by the end of the year. It needs to be reviewed how and if the adaption of production lines is feasible.

The market is covering the needs using other materials (i.e. glass), at a higher cost.

This crisis can provide opportunities to foster innovation in this area, restructure greener and digitised productive facilities and products, as well as create new strong partnerships, co-evolving towards a more resilient and dynamic productive network in Europe.

Recommendation: There are challenges that need to be addressed

- Short term: To meet the urgent demand for transparent protective barriers.
- Mid-term: To re-structure existing and/or create new value chains for transparent protective barriers, towards European self-autonomy mobilizing circular economy, social responsibility, and ecological optimization approaches (e.g. using alternative/recycled/repurposed materials).

EU action needed:

- Yes at mid-term, supporting the development of new / greener / circular processes, materials and alternatives.

**Long term vision for European companies
(19.06.2020)**

Source: Marek Przeor, DG GROW

Evidence: Referring to the *Triple European long-term goal for Industry* mentioned above, the expected impacts stemming from its application aim to:

- A) Reinforce existing value chains
- B) Creation of new value chains towards emerging industries
- C) Leverage and/or complement support for innovation in SMEs and other funding at national/regional/private levels
- D) Contribution to smart specialization strategies
- E) Short-term contribution to innovation performance of supported SMEs and wider medium-term impact
- F) Improved business environment

Geographical impact: EU

Stage of value chain: strategy

Character of the disruption: innovation for long-term competitive advantage

Time frame: long term

EU actions needed and proposed:

- **Funding:** research and innovation projects
 - **Coordination:** especially for Small and Medium Enterprises:
- (i) Upgrading SME competitiveness in several sectors and ecosystems: role of clusters, digitalization, access to finance, piloting, and technologies;
 - (ii) Sustainability: circular economy, industrial symbiosis, recovery-reuse, reduce pollutants, and social licensing;
 - (iii) Inter - Regional Business Hubs: potential for public funding/financing of SMEs;
 - (iv) Social and industrial related value chains: highly synergetic raw materials and distribution value chains;
 - (v) Value chain elements: digitalization of the industry (smart and digital solution exploitation).

Recommendation:

- The European Commission adopted its first proposal for the EU's long-term budget, the 2021-2027 multiannual financial framework (MFF). To respond to the economic and social fallout of the COVID-19 pandemic, the Commission proposed a revamped long-term EU budget. The proposal includes an emergency recovery instrument, Next Generation EU, to help repair immediate damage brought by the crisis and kick-start the recovery (see also figure below). Clusters can play an important role in the implementation.

New sustainable paradigms in the Industrial Ecosystem

(22.06.2020)

Source: Kaspar Nielsen, Cluster Excellence Denmark

Evidence: Among the big impacts and challenges that COVID-19 crisis has generated within several industrial sectors, there are: investment stop, unemployment, unequal economic impacts (e.g. automotive vs renewable energies), uncertainty, lack of global stability and many others. Green transition and an efficient resource consumption can represent the right way to accelerate the rebirth of the European economy. The depletion of resources and the downgrading of the environment, driven by globalization and consumerism phenomena, is worldwide pushing the interest on the Circular Economy (CE) concept. Supposed to substitute the end-of-life notion with restoration and closed-loop product lifecycles, CE wants to eliminate wastes, retain the value embedded into products and materials, foster the use of renewable energies and eliminate toxic chemicals. In this way, CE represents one of the main trends related to Sustainable Paradigm that is affecting research and industries during the last years. In this context, clusters are building green partnerships for circular transition of SMEs through: (i) building networks with other companies for knowledge sharing on circular transition; (ii) access to the right smart green investors; (iii) building bridges to relevant circular knowledge institutions and research; (iv) getting the right skills (from specialists designing the circular transition to more labour intensive resources), also considering SDGs as a direction for circular transition; (v) opening doors to green new markets – commercial, public and international; (vi) putting policy into action (supporting implementation of national/international policies on CE).

Covid-19 crisis has given a strong shock to many sectors, often causing companies to review their priorities. Some companies have postponed their circular transition projects, but the transition have not been cancelled. They are still interested in innovation and, moreover, some circular transition activities have gone digital.

Geographical impact: EU

Stage of value chain: design, manufacturing and products/services lifecycle management

Character of the disruption: CE strategies and best practices to support the post-crisis EU economy restoration

Time frame: mid and long term

EU actions needed:

- **Funding:** the transition of linear production to a more circular one can be complicated and costly, especially for SMEs. Funding are necessary to support the transition
- **Coordination:** bridging the gap between research and SMEs is a key task for Europe. Clusters are also playing a central role in building circular knowledge bridges between research and businesses

Recommendation:

- Finding best practise around the world, considering SDGs importance
- Finding funding
- Sharing knowledge
- Matching with partners
- Concrete tools
- Highlighting how clusters are key in building green partnerships
- Resource efficiency in eco-design and production processes as key to sustainable growth
- Generating awareness
- Potential and benefits are recognised by the company with the aid of consultants
- Implementing available concepts, approaches and methods
- For the implementation, the need for tangible and independent support is particularly relevant for SME
- Further training for all networking partners (lifelong learning)
- Networking to exchange knowledge and work together about current challenges in supply chain management
- Demand-oriented approach is required to earning trust in SME
- Local supply chains represent a key approach for the transition toward circular systems:
- Main benefits for companies are: resilience to supply/value chain shocks; material availability and diversification of raw material supply; waste management; higher revenues from waste; compliance with forthcoming legislation; easier audit of supply chain. s
- Main benefits for environment and for EU economy: reduction of emissions (GHG, pollution, etc.); reduced material dependency; reduced resource extraction; value maintained in the EU; green growth and jobs e.g. from recycling, remanufacturing and beyond

Disruptive trends for industrial partnership

(24.06.2020)

Source: *Esteban Pelayo, EURADA*

Evidence: Europe is very diversified. It boasts an innumerable series of industrial excellences and experiences in various sectors which throughout history have been specialised in specific geographical areas. However, global competition and threats of big non-European players oblige the EU to maximize industrial collaborations between the various regions and sectors. Often, excellences or sectors (both for research and for industry) operating in the same areas, should have the possibility to collaborate, but they have very different infrastructures and resources, both in terms of availability and type. This represents a great barrier to partnerships for obtaining a long-term strategic competitive advantage and developing a common vision. Working together to understand the state of development of the various industrial sectors and to outline European roadmaps to achieve new goals is the key to being stronger and more resilient.

Geographical impact: EU

Stage of value chain: strategic collaboration and partnership

Character of the disruption: lack of infrastructure and resources homogenisation

Time frame: mid and long term

EU actions needed:

- **Coordination:** more coordination among different institutions
- **Funding:** supporting companies to grow and become international, providing expertise, knowledge and funding

Recommendation:

- Clusters' role is to support collaborations between companies and find partnership opportunities. The Covid-19 crisis has created big issues against the synergies identification process, but now it is starting again in this recovery phase.
- Collaborations have to be pushed at local/regional, European and global level.
- Often, the involvement of some clusters in partnerships is critical. Complexity in participating is a barrier.

The creation of Euroclusters

From the example of French Water Teams, a French federation composed by three clusters, there was a discussion on about the **possibility of exporting this super-cluster model – or named “Euroclusters” by Commissioner Thierry Breton – at European level**. This is certainly an interesting project, but it shows a whole series of **questions** starting from the legal nature of the cluster, also considering the differences in regulations between the European states.

The discussion addressed the issue of **how to structure this super-cluster at the operational level** and whether it is necessary to **define a strategy** in order to **ensure continuity**. What would be the main outlook of Euroclusters – strategic or operational?

On the one hand, Euroclusters can become an **operational and pragmatic tool** that can **incubate** the various actions by creating a concrete **roadmap** to achieve the objectives. This would **facilitate** the possibility of **access to the funds**. On the other hand, Euroclusters could work on a European strategy for clusters, elevating the view. It is important to think strategies both at **European level and local, regional and national levels**. One issue to consider is the existence of different strategies implemented by different European countries, which need to be aligned.

Euroclusters may be able to develop new value chains with a new ecosystem that is able to integrate and relate with other industrial ecosystems.

Analogy between city network and cluster network for a resilience perspective

(06.07.2020)

Source: Céline Rozenblat, Université de Lausanne

Evidence: Resilience in multi-networks is a concept that has been analysed for a long time. In this morning's session it was highlighted how there can be an analogy regarding the analysis and optimization of resilience between city networks and cluster networks. The resilience that can be built for cities is the same that can be

built for clusters because it is based on a network of relationships between interconnected networks (density, diversity and network capacity).

Geographical impact: EU

Stage of value chain: cluster network

Character of the disruption: resilience analysis in a multi-level perspective

Time frame: medium – long term

Recommendation:

- Resilience is one of the three main goals of European long-term strategy (Green, Digital, Resilient).
- The quality of communication within networks is very important. Most individual actors do not have a strategic overview over the networks they are part of. This overview is difficult to maintain and changes very quickly. For this reason, it is necessary to always generate updated information, even if there are delays for the data. From this point of view, Artificial Intelligence can help the construction of possible evolution scenarios. Even during the COVID pandemic, it is evident that communication needs to flow.
- It is fundamental to be able to measure resilience, that is a critical point. There are several studies and works related to resilience measurement and several indicators can be used (e.g. GDP, population growth, unemployment, and many others). Attention has to be paid on the balance between local indicators (more details) and global indicators (they allow to make comparisons).
- Cluster managers need to know how to apply network tools and scientists should be aware of clusters so that they are included in the mappings.

Regulation on alcohol usages

Source: Mattia Adani (IT)

Evidence: alcohol availability in many EU countries does not represent a critical issue in terms of production; however, regulations still partially prevent the adaption of alcohol usage for new purposes, related to the hygiene during the crisis. This lack of flexibility in regulation application is impacting both on the producer's and customer's side. The alcohol could be used for adaptation of production lines, however it is currently stored to be used for its original purpose.

Geographical impact: Italy

Stage of value chain: raw material procurement

Character of the disruption: regulative norms to limit alcohol consumption

Time frame: medium – long term

EU action needed:

- **Regulation:** flexibility in the application of the norms is needed to timely respond to the environment changes; the results of the unavailability of alcohol might impact both sides of the market in terms of product/material shortage (direct consumer or company's side) and possible customer loss (producer's side)

Skill development for resilience improvement

For all networks, including clusters and industrial networks, resilience represents a useful and powerful feature, since it provides robustness to the system (“Interdependent similar networks are more robust to random failure than a randomly independent network”). It gives the strength to better react to exogenous and endogenous system threats. During this week, the question came up on how technology can be used to measure network resilience – especially Artificial Intelligence might have some applications which would be interesting to explore.

Technology application for resilience improvement is also strictly related to skills development and training of people, that are two of the main important topics to foster resilience within clusters. Cluster managers, policymakers, and scientists must come together, and skills must be developed to collaborate to map networks across disciplines and to develop tools. The greater the skills that are developed, the stronger the collaborations can be. Moreover, the development of tools and methods for analysis, optimisation and measurement of multi-level network resilience for cluster managers and policymakers is needed.

EU and global supply chains dependence from China market

(15.07.2020)

Evidence: This trend has already been highlighted in many other sessions, because of the strong dependence of European markets on Chinese industries (this is not only a “EU problem”, since all the world is facing this issue). The Covid-19 crisis generated a sharp contraction in the Chinese market, which influenced supply chains all over the world. One of the strategies implemented by the US companies that had plants in Asia is to recover the crisis through re-shoring policies, bringing industrial activities back to the US. This is what the EU should also do. However, it is not a simple action. Many companies confirm that they do not want to leave China despite the crisis, especially for low-cost reasons. However, China doesn’t mean only “low-cost”. They are also strong from the innovation point of view (China is the country with the higher number of patents in the world). Reducing the dependence on their industries is crucial for EU.

Geographical impact: EU / worldwide

Stage of value chain: entire value chain

Character of the disruption: supply chain dependence from China

Time frame: short – mid term

EU action needed:

- **Funding:** more subsidies for EU companies

Recommendation:

- Be pessimistic regarding forecast of recovery from China
- Conserve capital and resource
- Expect large-scale simultaneous supply chain realignment

Openness to invest within EU Recovery Plan

Openness to investment is part of an economy's resilience. To be resilient, companies need to invest more, especially in time of crisis. But to invest more in this difficult period, they need more support from the EU. More subsidies are needed.

Need to correct tax schemes distortions

Article 116 of the EU treaty gives Brussels the power to correct tax scheme distortions within the single market, but it never has been used. Bringing Article 116 into play could stop unfair practices in EU tax havens (as an example, FCA requested to Italian Government 6.3 billion € for Covid-19 crisis; however FCA has partially production in Italy and it has legal seat in Nederland and fiscal seat in UK; it does not pay any income taxes to Italy).

Potential solution: role of clusters in the Recovery Plan

Role of Clusters in the Recovery Plan. The Recovery Plan foresees 750 billion € for the period 2021-2024, divided into several packages. Within these, clusters can play a very important role, they can be the "infantry" of the recovery. In particular:

- (i) draft recovery and resilient plans and (ii) more locally driven actions within the Recovery and Resilience Facility package
- Identify and draft territorial plans for Green and Digital transitions within the Innovation, Digital and Sustainability packages

In general, clusters can intervene increasing cohesion, creating shared values and strengthening collaborations. They are facilitators and accelerators of recovery. Then, the individual specific actions depend also from companies and reference sectors. Resilience is the keyword and clusters are the platforms to share best practices: they can help also to detect priorities for companies and to identify the right partnership to tighten.

Re-invention of clusters

Evidence: The role of clusters during Covid-19 crisis has been fundamental, especially in order to bring companies together, connect them to government and to knowledge centres, and to enable fast and agile problem solving. Now, it is time to strength this role in recovery plans. The main actions are:

- Continue cluster support
- Connect clusters to regional transformation priorities (industry 4.0, digitalisation, climate initiatives, ...)
- Connect clusters to international R&D&I initiatives on sustainability
- Get clusters more active on internationalisation
- Need to reinvent themselves in the heart of their actions
- Find new tools, new habits, new ways to connect

The main results coming from these actions could be, among the others, economic growth, jobs, and the transformation of industry.

Geographical impact: EU

Stage of value chain: Ecosystem configuration

Character of the disruption: role and importance of clusters

Time frame: mid and long term

Turnover decrease during the pandemic period

Changes in the cosmetic value chains (29/07/2020)

Evidence: The cosmetic ecosystem suffered a decrease in turnover because of the sanitary emergency. From an increase of 2.5% registered in February, compared to the previous year, the turnover variation reached – 8.5% in the month of June, heavily affecting most of the companies in the sector. In addition, a reduction in export have been identified in lockdown period (-21.45%) with a partial recovery in the post emergency period, showing unsteady trends in revenues generation.

Geographical impact: spotted in IT, FR

Stage of value chain: Revenues

Character of the disruption: Turnover disruption

Time frame: short term

Changes in customer behavior

Changes in the cosmetic value chains (29/07/2020)

Evidence: The Covid-19 crisis has generated several negative impacts on consumers:

- Mental stress: negative news daily, lack of physical activity, weight gain, impact on self-confidence
- Less social interaction (i.e. less cosmetics): reduced toiletries, less shaving, fragrance decrease, makeup slowdown

This has led to a steady or even increased demand and consumption of hygienic products (like sanitary gel, etc) during lockdown periods at the expense of other chemical and cosmetics products, which suffered a heavy disruption in demand.

This behaviour changes highly impacted this ecosystem; however, such disruption has been particularly limited to quarantine period rather than post Covid19 recovery.

Geographical impact: EU

Stage of value chain: Sales

Character of the disruption: changing customer behaviour towards safety care

Time frame: short – mid term

Recommendation:

- Support for quick adaptation of production lines and development of new value chains
- Providing online service to consult
- Develop new sustainable business models

Production reconfiguration during lockdown

Evidence: During the sanitary emergency, many cosmetic industries temporarily shifted their production layout and planning in order to contribute to the production of sanitary gel, in order to foster its availability during the crisis and satisfy the demand.

Geographical impact: spotted in IT and other EU countries

Stage of value chain: Operations

Character of the disruption: Production reconfiguration

Time frame: short term

Recommendation:

- Production shifting affected not only the cosmetic ecosystem, but also other industries (i.e. many textile companies shifted their production to make safety masks during pandemic, in presence of shortage of PPE). It needs to be analysed to what extent this shift can be permanently needed, and whether the companies can further develop their business models.

Covid-19 impact on workplaces

(17/07/2020)

A) Workplace saturation and restriction

Evidence: The disruptions concerns the very strong acceleration that Covid-19 has brought on to change what was already underway and which would materialize further in the coming years. The pandemic forced companies to integrate remote working and social distances into the way employees are managed. The way people work, go to work, and conceive work has changed. Researches presented by the experts show that in the short term, 60% of the staff will work in 100% of the spaces available pre Covid-19. The objective during the pandemic period (short-term) is to maximize remote working and provide safety, health, and hygiene in the offices (compliance with sanitation rules and social distances). Despite the constraints, the goal remains to maximize productivity (through concentration, collaboration, and shared knowledge).

Geographical impact: EU

Stage of value chain: human resources

Character of the disruption: impact on workplace management

Time frame: short term

Recommendation:

- Agile implementation of safety measures in the office
- Adaptable redesign of the office space to increase security of the employees

B) Post-Covid-19 workplace configuration and management

Evidence: This disruption concerns the way in which workplaces will need to be designed after the pandemic crisis. In fact, many companies consider remote work as a permanent change. Experts state that in the long term, about 40% of staff will work in 60% of spaces. The main characteristics of new workplaces are:

- Design space to ensure right distances
- Design expansion of flexible posts
- Design office with space for secondary uses (restrooms, transition areas)
- Re-design bar/canteens/restaurants
- Design and build surfaces with easy-to-clean materials
- Maximize the use of digital tools to boost social distances and productivity
- HAVC systems to ensure air quality
- Guarantee health, hygiene, safety (digital tools for hygiene, new “touchless office”)
- Work tasks that require face-to-face relation, creativity, design. The workplace will no longer be a collection of desks and offices
- Representation of company values towards the staff and the exterior (both visitors and media)

Geographical impact: EU

Stage of value chain: human resources

Character of the disruption: impact on workplace design

Time frame: medium – long term

Recommendation:

- Many companies are moving towards more flexible contracts and in some contexts, they are thinking of adjusting (reducing) the salary for people who do smart working.
- This re-configuration is an opportunity for the European companies’ value chains. In fact, it is possible to unite supply chains and value network companies that deal with the supply of digital tools, suitable materials and instruments to build these new offices.

Marketing strategies for Business Event Organization sector

(22/07/2020)

Evidence: The Business Event Organization sector have been disrupted heavily and even faster than other industries. Firstly, restrictive measures completely stopped this business during quarantine periods; secondly, social distances measures still act as obstacles to the business recovery. According to the surveys conducted by Toleranca Marketing, almost 70% of European meeting planners expect a decrease in the Marketing budget, and more than 30% express as top priority in 2020 to carry out postponed events.

Major challenges have been brought by the post-crisis situation, changing the customer’s behaviour towards travelling and meeting participation:

- **Distrust and fear of travelling abroad**
- **Security problems with transportations**
- **Security problems during events with many people:** distrust in live meetings
- **Disinfection of hotels and restaurants**
- **Information overload:** due to excess of advertising

- **New formats for events:** cheaper and more flexible
- **Market segmentation for recovery:** not all markets will recover at the same time
- **Lower budget**

Policies and changes in habits require to re-target the customer using different marketing strategies and adapting to the current situation.

Geographical impact: EU

Stage of value chain: Marketing

Character of the disruption: Disruption in marketing approaches for business events

Time frame: short/medium term

EU actions needed:

- **Funding:** specific funds to grant equal recovery among different markets
- **Regulation:** Reliability in norms for travel

Recommendation:

In this volatile situation, new marketing strategies for events organisation prove to be necessary, including:

- **Communication Personalization:** in terms of content customization.
- **Flexibility in planning**
- **Shift to digital and mobile environments:** Optimize online meetings
- **Adopt agile approaches:** Including trial-and-error cycles and early contact with the customer
- **Hybrid Events:** it may represent a rising trend in the future Event planning and organisation. As data from the survey show 45.1% of respondents chose Hybrid Meetings as preferred way to event organization. Clearly Face-to-face meetings cannot be replaced entirely, but a mix of virtual meetings and live meetings could be a cost-efficient and time-efficient solution, without losing the communicative impact of live meetings.

2. Aerospace & Defence

Collapse of the ecosystem's activities (05.06.2020)

Source: Krzysztof Krystowski

Evidence: The global lockdown due to the pandemic crisis has forced governments to impose restrictive policies to reduce people movements. As a result, all the transport sectors suffered a sudden stop and among these, the aerospace sector suffered a very strong drop because of the airports closure and of the tourism sector decline. It is for sure the worst crisis that the sector has ever faced.

Geographical impact: Global

Stage of value chain: Final stage of the value chain, i.e. transport usage and use of the service by end consumers.

Character of the disruption: Travel demand drop

Time frame: short term

EU actions needed:

- **Coordination** in the short term to restart the activities
- **Coordination** of the new aviation processes to make the sector adequate to new customers behaviours and safe travel desires
- **Funding** to help companies restarting activities
- **Regulation:** support for national and regional agencies to harmonize the different measures: EU can help with Public and Personal Health Protection, shaping new.

Recommendation:

- The short-term goal is to survive, creating awareness of the current and future limitations due to the pandemic situation.
- Support SMEs, which represent 90% of the aerospace ecosystem, to stay/become more independent from foreign investments and develop the capacity of making critical mass

Strong reduction of cash flows and financial capabilities (05.06.2020)

Source: Krzysztof Krystowski, President Aerospace ESCP and Vice President ECA

Evidence: The reduction of travels and airports closure generated the decrease of the income for travel businesses. Because of the aerospace sector shutdown, companies have to face issues of liquidity. The cash flow reduction leads to the inability to invest in R&D and to attract external investment; experts are pessimistic for future investment in aerospace sector. It is important to find new strategies like working with advanced payment or launching an EU support plan.

The expected number of new aircrafts to be build is decreasing. The shock for OEMs will be even bigger than expected. Taking the Boeing example: There is now an enormous pressure on the company, given the 737 Max crisis and the COVID crisis.

Geographical impact: Global impact for Aviation

Stage of value chain: financing, investments and insurance

Character of the disruption:

- Incoming cash flow reduced and consequent reduced financial capacity of the aviation sector

Time frame: mid-long term

EU actions needed:

- **Funding:** EU can help preventing the aviation sector collapse through: Financial support to customer and supplier
- **Funding:** cash flow liquidity support for SMEs to help them to survive (more attention since they are the most vulnerable)
- **Funding and coordination:** R&D funding to support innovation for recovery and growth in “New Normal”
- **Coordination:** supporting the reactivation of safe travel services

Recommendation:

- Aerospace Ecosystem: The reduction of the financial capacity generates a reduction of the investments, including the manufacturing of new airplanes as well as in research and development. In the long run, the sector's technological innovation will suffer greatly. There is a strong potential for technological innovation in the sector, both in the automation of manufacturing processes and in the automation of aviation (drones). The crises should push the technological evolution and the evolution of the regulatory progress, but the lack of liquidity represents a big barrier in this sense.

Strong reduction of staff (05.06.2020)

Source: *Krzysztof Krystowski*

Evidence: The cash flows and corporate liquidity reduction create difficulties for maintaining the staff. Companies have to lay off staff as they cannot afford them any longer. These employees are highly skilled, as the sector is a high-end tech sector requiring specialised knowledge. For these employees, the closest possibilities of similar tasks lay in the automotive sector, which is equally under pressure during the crisis.

Geographical impact: Global

Stage of value chain: Human Resources

Character of the disruption: lack of work and lay-off of employees

Time frame: short term

EU actions needed (legislation, coordination, funding):

- **Coordination:** cash flow liquidity support through staff retention (salaries and skills), capability protection, supply chain protection
- **Coordination:** New European solution for competences development, allowing a competitive advantage for EU in the long term

Recommendation:

- The innovation technology can help companies to face the crisis, also in the job environments.
- It is necessary to design and rethink safer workplaces and the automation of manufacturing processes can help in this sense. If this would happen, many other stakeholders in the supply chain could also benefit from it, such as specialized automation providers.
- The skills, competences and electronics and avionics profiles can boost the technology support for facing the crisis. They are strong profiles related to sub-sectors of aerospace, which will grow more and more in the coming years.

Strong reduction of supply chain continuity and competitiveness

(05.06.2020)

Source: Krzysztof Krystowski, Holger Lipowsky

Evidence: The crisis is generating a widespread vulnerability along the entire supply chain, including the reduction of possible acquisitions. One of the main critical points is that most SMEs in the aerospace sector also work in the automotive sector, which is another sector that has suffered a lot. A competitive repositioning is needed, which implies a greater coordination among the stakeholders to face the crisis. Currently, China is rising the quickest, giving Chinese OEMs bigger opportunities on the market. In recent years, Chinese companies have invested heavily in Europe. One possibility for European players is to become suppliers of Chinese programs rather than trying to rebuild everything on their own. This has pros and cons, as it would allow for a faster recovery but would create a long-term competitive disadvantage for Europe.

Geographical impact: EU

Stage of value chain: Design, Operations, Manufacturing, Logistics

Character of the disruption: lack of investments; potential Chinese influence

Time frame: mid-long term

EU actions needed:

- **Funding:** Incentives for SMEs and to OEMs

Recommendation:

- R&D investments and technological innovation can represent an advantage for the European value chains. However, cuts in national budgets have been made in many countries, including military budgets. Historically, technological innovation in the aerospace sector derives from innovation in the military sector and if the military budget suffers because costs cuts, the aerospace's innovative capacity is consequently reduced.
- The collaboration with China has pros and cons and needs to be discussed.

Regulations and investment in UAVs (25.06.2020)

Source: Krzysztof Krystowski, Silesian Aviation Cluster

Evidence: The drone industry represents one of the most promising sectors and business for the future. Nowadays, the specialisations concern the transport of goods, services and surveillance, but in the very near future, we will have applications for the transport of people. Several enterprises operating in transport and travel sectors are working on drone projects.

At the same time, however, it is a very young industry which is still extremely fragmented in Europe (there are several small high-level companies in many countries). To strengthen European industry, greater cohesion and cooperation between these realities is needed. The supply chain is currently highly dependent from China, especially in terms of the supply of raw materials and components. In fact, China is a large drone manufacturer, which exports all over the world, including Europe. In Europe there are small companies that produce drones (design, software development), but they buy components from Asian suppliers.

Geographical impact: EU

Stage of value chain: geographical industry configuration

Character of the disruption: fragmentation and lack of competitiveness

Time frame: mid and long term

EU actions needed:

- **Coordination:** foster collaboration and cooperation between European industries
- **Regulation:** Current legal situation is a barrier. Each country has its own regulations and flight permission (autonomous decisions are taken; an example is represented by Central European Drone Demonstrator in Poland). A regulation homogenisation and standardisation at European level is needed. In general, European regulation are stronger than non-European ones (but it depends also from drone type).

Recommendation:

- 90% of the drone cost regards the sensors that are installed, which in most cases come from China. This situation should change. There are many sensor manufacturers in Europe, but they are often for other applications (e.g. automotive). Those for drones are miniaturized and very specific and in this China is very strong.

Exploitation of drones in pandemic situation for Aerospace & Defense Ecosystem (25.06.2020)

Source: Christiana Eisenberg, CURPAS

Evidence: Drones have a potential beneficial use in the current pandemic situation in order to achieve several objectives. Among the others: (i) places/environment disinfection; (ii) people search; (iii) creation of simulation (e.g. thanks to images and videos gathered during flights); (iv) supply of water and food; (v) transport of goods, sanitary material and people. Given the numerous applications of this sector, this industry has the potential to re-start stronger after the crisis than it was before.

Geographical impact: Global

Stage of value chain: usage and application

Character of the disruption: benefits of drone application in pandemic situation

Time frame: short term

Recommendation:

- Investment in this sector, including standards among Europe with regards to regulations

Raw materials and components supply issues for Aerospace & Defense Ecosystem (25.06.2020)

Source: Krzysztof Krystowski, Silesian Aviation Cluster

Evidence: Component manufacturers and raw materials suppliers have suffered timeline disruption and supply issues caused by COVID-19 crisis. Given the potential and useful applications of drones, especially in this pandemic period, there has been no drop in market demand, but several problems in the production and supply phases (especially from China).

Geographical impact: EU

Stage of value chain: supplies and manufacturing

Character of the disruption: delays and supply problems for raw materials and components

Time frame: short term

Recommendation:

- The sector in Europe should work on its interdependencies and become more independent from the Chinese market

3. Agri-food

Border closures immobilise imports and exports (11.06.2020)

Source: Katarina Blicklingova (SK), Grigoris Chatzikostas (LT), Felix Arion (RO)

Evidence: The agri-food sector is one of the few sectors that couldn't stop their production and the pandemic spread just to coincide with the harvesting period. In addition, border closures affected all the stages of the value chains. Many products, in different countries, come from abroad.

As a consequence of the mobility restrictions policies, the decline in tourism has an impact on the HORECA sector, strictly affected by the emergency. No food demands from hotels, restaurants, and catering.

Logistics, even if is becoming slower and expensive, is not the main issue anymore. It had its peak in the immediate emergency situation. But regarding a possible rebound or a future new blockage of borders, it is im-

portant to find solutions and alternatives. In the past, there were three pillars of sustainability: economic, social, and environmental. Resilience is needed to become the fourth pillar.

Geographical impact: Global

Stage of value chain: Sales

Character of the disruption: lack of mobility and exchanges

Time frame: short term

EU actions needed:

- **Coordination**
 - Collecting solutions and alternatives to build resilience
 - Create a guideline dealing with best practices to be shared with EU members

Recommendation:

- Promote and deliver genuine products (also coming from countryside) by using ecommerce platforms for local market
- Ecommerce is needed for local producers /sellers to stay alive, to keep the supply chain open and to have the product reach the market and not to be cut away from the market
- Find solutions to forecast better, adapting the models to “new normality”

Lack of workforce

(11.06.2020)

Source: Felix Arion (RO), Aurora Baptsista (PT), Grigoris Chatzikostas (LT)

Evidence: Harvesting is a seasonal job related to the cycle of nature. The pandemic spread in the most extensive work period. Due to lockdown and restriction mobility, workforces were not able to move easily within countries. More robotic and technologies in harvesting are needed for a possible rebound.

Geographical impact: EU

Stage of value chain: Production

Character of the disruption: lack of workforces

Time frame: short period

Recommendation:

- Accelerate the digital transformation and promote the use of technologies and robot in harvesting field
- Support for local government
- Safe return of agricultural workforces for harvesting
- Educate student and people from HORECA sector to work in agriculture in order to have new skilled workforces and develop new activities

Unsold stocks

(08.06.2020)

Source: Grigoris Chatzikostas (LT), Felix Arion (RO)

Evidence: The border closures generated a lot of unsold stock composed by short-life products, such as milk. In Slovakia, the unsold stock has been stored in a state reserve, which could be a good practice to share with other countries. Unfortunately, the ecosystem shows its inability of being resilient and transforming short-life products.

Geographical impact: EU

Stage of value chain: production and sales

Character of the disruption: unsold stocks

Time frame: short term

EU actions needed:

- **Coordination:** Help government and clusters to develop company resilience and share a guideline with best practices

Recommendation:

- A more efficient way to collect food is needed
- Find solutions regarding production decrease or price reduction

Consumer behaviour changes in the Agri-food Ecosystem

(11.06.2020)

Source: Katarina Blicklingova (SK), Felix Arion (RO)

Evidence: During the crisis, people prefer to consume local products, because of the belief they are safer. As a main consequence in Romania, the competition between small/local and big companies is increasing. Local companies increasingly use e-commerce solutions to directly connect with the customers, thus breaking the usual supply chain via retailers. There are many difficulties in making good predictions and forecasts.

The “new normality” is highlighting the increasing of plastic waste used to package and deliver food to encounter new consumer behaviours; this is also impacting the environment and circular economy processes.

Geographical impact: EU

Stage of value chain: Sales and marketing

Character of the disruption: consumer behaviours

Time frame: short and medium term

EU actions needed:

- **Coordination:**
 - A transition plan is needed in order to restart with new frameworks based on circular economy, digital transformation and technologies
 - Help companies connecting producers and consumers by using new tools and software

Recommendation:

- Accelerate the digital transformation by using ecommerce to deliver local food in local markets
- Addressing the urgency to find solutions both in the short, to be quickly responsive, and in the medium term, in order to rethink and redesign the whole value chain
- Deeply analyse the disruption in a specific session, in order to stress the topic more, keep the opportunities and influence the policy makers
- Circular economy and digital transformation are going to be the two main drivers to develop the “new normality”

Temporarily more local supply chains

(16.07.2020)

Evidence: The main disruptions that affect agri-food sector have already been explained and analysed during the previous session on this topic, held on Thursday 11 June. These regard: (i) the border closures which immobilise imports and exports and (ii) consumer behaviour changes that affect this sector. For further details, it is possible to refer to the daily minutes of Thursday 11 June.

During this session, it has been highlighted how the pandemic has affected in particular small producers, since for them it is more difficult to reach final consumers. To facilitate the reaching of final consumers by small producers, it is necessary to make the food chains more local, considering also the HoReCa crisis, and observing the consumer behaviour during the crisis:

- Increasing direct selling (safer because of less distance, domestic product, delivered at home, etc)
- Ignoring conventional value chains (processors, market, supermarket)

It is necessary to set up an ecosystem approach within the agri-food sector, including the entire value chain and the stakeholders involved – especially because there is a majority of micro enterprises and SMEs which often do not have the strength to pursue strategic actions to increase their competitive advantage alone. For this reason, the supply chain resilience is a fundamental concept for the sector.

Geographical impact: EU

Stage of value chain: entire value chain

Character of the disruption: temporary change of sector dynamics

Time frame: short term

EU action needed:

- **Coordination:** exchange with European Clusters Alliance and agri-food clusters to make connections with SMEs

Recommendation:

- To support the local producers, AgroTransilvania is working to put the following proposals in action: (i) governmental direct buying; (ii) public auction (advantage of local products - certification/label of quality); (iii) fiscal facilities for cooperative/associations (for selling together); (iv) consumer awareness and education (short value chain).

Misinformation because of fake news

(16.07.2020)

Evidence: As seen in the case of Italy, circulating fake news create mistrust in the food suppliers among the consumers. The Italian team around Prof. Lorenzo Morelli reoriented a project to conduct a survey about the misperception that the COVID-19 virus can be transmitted through food. The result: 24% of Italians feel the risk of infecting themselves with COVID-19 due to possible contamination of food products. 32% of the survey participants do not have a clear idea on the topic and would like reassurances. There needs to be work done to inform and educate the consumers.

Geographical impact: reported for Italy

Stage of value chain: marketing, supply, export

Character of the disruption: misinformation

Time frame: short term

EU action needed:

- **Coordination:** work together on raising customer awareness and educate customers
- Fighting fake news

Recommendation:

- Educative webinars have proven to inform the customers and set facts straight. They could be useful tool to connect directly with the consumers

4. Mobility – Transport - Automotive

Lockdowns leading to disrupted supply chains (automotive)

(02.04.2020)

Evidence: Because of the lockdowns in Europe and Asia/China, the factories of the automotive industry had to close, disrupting the production of components and the assembly of vehicles, and affecting various stages of the supply chains. This has already come up in various meetings of the EAAC.

Geographical impact: worldwide

Stage of value chain: inbound logistics, operations (manufacturing), outbound logistics, human resources management

Character of the disruption: regulations, coordination failure, lack of input

EU action needed: Yes, financial support and measures to unblock as soon as possible the value chains.

Uncertainty of automotive business models

(02.04.2020)

Source: Isabelle Dussutour, ID4CAR (FR); Luk Palmén, Cluster Silesian Automotive (PL); Clotilde Nadé, Pole Vehicule du Futur (FR); Sonsoles Jiménez Pérez, RSC Talent (ES)

Evidence: Various developments are playing into the growing uncertainty concerning the automotive business models. There is a drop in customers and revenue, not only for the automotive industry, but also in railway and bus. On international level, the tensions between the United States and China influence the markets, making the future situation uncertain. However, the extent of these disruptions is not yet assessed.

Furthermore, there are actions on national and regional/local level to promote innovative mobility. Examples are given on city roads being reshaped for bikes (green solutions) and on the use of autonomous vehicles in deliveries and mail.

All these developments feeds into growing uncertainties about the business models of the companies. This disruption is interconnected with the disruption “uncertainty in consumer behaviour”.

Geographical impact: worldwide

Stage of value chain: all stages

Character of the disruption: emerging substitutes

Recommendation:

- Clusters can be involved to support the companies, creating joint strategies. Furthermore, clusters and the public administration on EU/national/regional level should align the analysis of needs and the support through funding. Close cooperation is needed.

EU action needed:

- Supporting the recommended actions.

Uncertainty of customer behaviors

(02.06.2020)

Source: Isabelle Dussutour, ID4CAR (FR); Luk Palmén, Cluster Silesian Automotive (PL); Bruno Grandjean, Pole Vehicule du Futur (FR); Jaime Quesado (PT)

Evidence: A disruption in mobility models occurs because people are reconsidering their transportation mode. Car sharing, public transport and scooters are gaining customers. Adding to this trend, the crisis has led to emerging alternatives to transportation: telework and delivery. People don't necessarily need to go to the office, conference, or meeting anymore, being able to attend them virtually. Business trip will probably decline. Also, there is an increase in deliveries. Due to the confinement, people ordered more things so that they don't have to go to the shops.

This is clear change in behaviour. However, it is unclear whether or how long it lasts. People could mostly resume living like before. The real consequences are not yet known. This disruption is interconnected with the disruption in the business model.

It will be very interesting to verify how the intelligent mobility agenda will be influenced by the different behaviours of our society and economy - will people be available to maintain their habits in terms of their daily mobility agenda?

Geographical impact: EU

Stage of value chain: Marketing and sales

Character of the disruption: emerging substitutes

Recommendations:

- There is a need to work with citizens and end users to know better their behaviours. These changes in behaviour need to be analysed so that the impact on the mobility ecosystem can be determined.
- Those analysis should be shared by the industry to better align their strategies and action plans with this reality.
- Clusters can play a key role in this analysis and strategic alignments.

EU action needed:

- Supporting the recommended actions.

Missing flexibility and resilience in supply chains (automotive)

(02.06.2020)

Source: Luk Palmen, Cluster Silesian Automotive (PL); Athanasios Konstandopoulos, CERTH (GR); Bruno Grandjean, Pole Vehicule du Futur (FR); Sonsoles Jiménex Pérez, RSC Talent (ES); Lukas Gorecki, Cluster Silesian Automotive (PL)

Evidence: When the value chain in a region is composed by one or very few agents of a stage in the chain, e.g. one customer, one supplier, the chain is not resilient and collapses easily. This is sometimes the case in Spain or France, where many value chains in the automotive sector work this way. In central Europe, there are chains in which a network of suppliers is working with a network of clients, making it more resilient. The disruptions created by this non-flexible structure need to be addressed.

Furthermore, the clusters refer to the new regionalisation of supply chains, in this case of how the French government is supporting the automotive sector. They are uncertain how the crisis will be used to reorganise value and supply chains, and expect this strategy to have an impact on local automotive SMEs all across Europe as new regional concentration of certain production models in new regions are possible.

The sector has been driven by efficiency in the past years and has cut down what was unnecessary. About relocation of production, this is considered mainly a question of cost.

Geographical impact: especially Southern Europe (but not exclusively)

Stage of value chain: procurement, inbound logistics, outbound logistics

Character of the disruption: coordination failure

Recommendation:

- Clusters can play a role at the local level to ensure that local chains are resilient, efficient and flexible enough. They need to be involved in all stages of the value chain and be in close connection with the public authorities. Rapid reconfiguration of production lines: There is a clear need to differentiate the production and to be able to reconfigure the production for other markets and alternative customers. Concepts could be transferred to other ecosystems, bringing opportunities to use techniques from the automotive value chain in other local productions, e.g. (smart) construction as we have to develop a more protective environment.
- Clusters can also play a role in this transition, but it also needs incentives at national level.

EU action needed:

- Supporting the recommended actions.

Complex policy strategies (automotive sector)

(02.04.2020)

Source: Isabelle Dussutour, ID4CAR (FR); Lukas Gorecki, Silesian Automotive cluster (PL)

Evidence: The automotive sector feels to be moving in a complex policy field. It is a big industry which creates significant employment, and which needs to increase the demand for cars for an economic recovery. However, the green priorities and climate policies led to a need to invest in innovation. For example, the French government is focused the financial support to buying electric vehicles, and investment in H2 is growing. This trend needs to be further analysed in the context of more independency from external countries in the energy provision.

Geographical impact: EU

Stage of value chain: Research and development

Character of the disruption: Technology, regulations, standards

EU action needed: Yes, but complex to specify.

Certifications for safety

(02.04.2020)

Source: Isabelle Dussutour, ID4CAR (FR); Elena Lluch, AVIA (ES)

Evidence: To ensure safety in shared mobility, e.g. car sharing, there is a need to develop new systems of disinfection.

Geographical impact: EU

Stage of value chain: operations

Character of the disruption: Standards

Recommendation:

- In the “new normal”, there is need for clear standards on disinfection for vehicles of shared mobility.

EU action needed:

- Yes partially, supporting innovative projects. But the market should take care of it, mostly.

Closure of borders and export disruptions

(04.06.2020)

Source: Xavi Perez, Cluster HABIC (ES)

Evidence: Due to the closure of the borders, supply of components and materials from abroad are temporary suspended either for production processes and market order collections.

Geographical impact: EU

Stage of value chain: inbound logistics

Character of the disruption: lack components and materials

Time frame: short – medium term

Recommendation:

- Be as much ready as possible for the unblocking of the borders, planning the different phases to follow.
- Looking for how to adopt digitalization tools in the value chain
- Adopt circular economy to reuse materials and components: European companies are not able to recycle yet and cannot disassemble materials
- Digitalisation for market, products and building in order to achieve the circular economy implementation
- Invest in new R&D projects

EU action needed: Yes, facilitating the involvement of the public administrations related to this disruption.

Change of sector configuration

(15.06.2020)

Source: Thomas Röhr

Evidence: The reduction in movements and in car usage has generated a very strong drop in the sector in the short term. However, the effect of the COVID crisis will also affect the medium term, since there could be a change in the way people use and consider different transport means. This is, at this moment, mainly due to restrictive policies and people's fear of being in crowded places. An increase in the use of the car, bicycle and walking is expected, against a decrease in the use of public transport means.

Geographical impact: EU

Stage of value chain: products usage and perception by end users

Character of the disruption: customer behaviour; change in several companies' business model

Time frame: Short and mid term

EU actions needed:

- **Coordination:** support urban sustainable mobility and new business models

Recommendation:

- Pandemic consequences will fashion the urban mobility landscape in a long term. Plan for it.
- Increased intermodal travels: strong need for seamless information and ticketing (Mobility as a Service)
- Flexible and reactive mobility services responding to volatile travel demand
- The sharing economy is another important trend that has been characterizing the sector in recent years. It has suffered a huge drop due to the crisis, but it will remain an important trend also in the future. It must be taken in account

Production systems flexibilization

(15.06.2020)

Source: Thomas Röhr

Evidence: The third main disruptive technological challenge that characterizes the automotive supply chain regards the automatization and flexibilization of production processes. Smart technologies and digital solutions underpinning the so-called “Industry 4.0 (I4.0) paradigm” are changing the way automotive companies are structured and managed. Horizontally, the supply chain is being modified as the bonds between the companies are being transformed thanks to the data availability. Vertically, the IT structure of manufacturing companies is suffering a total transformation into an integrated complex system. These changes can be supported by new technologies and strategies, allowing companies to take total advantage of the potential benefits and new or enhanced business models that I4.0 brings within automotive production systems. By adopting core technologies such as Cyber-Physical Systems (CPS), Internet of Things (IoT), and Machine-to-Machine (M2M) communications, companies have the possibility to manage manufacturing processes in a more intelligent and more agile way, achieving a higher flexibilization.

Geographical impact: EU

Stage of value chain: production plants and systems

Character of the disruption: technological trend (fourth industrial revolution disruption)

Time frame: short and mid term

EU actions needed:

- **Funding:** R&D project supporting digital transformation of automotive companies

Recommendation:

- Production system must become much more flexible and automated. The sector needs to invest especially in Tier 2 and 3 companies as they are weaknesses in the value chain. They should be seen as partners in this transformation

Adaption to new trends

(15.06.2020)

Source: Thomas Röhr

Evidence: The automotive sector and in general the transport sectors are among of the main protagonists in the dynamics concerning pollution, climate change and environmental problems. In fact, one of the major trends that has characterized the sector in recent years concerns electrification, since this represents a possibility to face the incessant environmental problems and the expected reduction of fossil fuel supply. This trend was predominant before the COVID crisis and is even more important now, mainly due to an expected increase in the use of the car in urban environment (see second disruption).

Geographical impact: EU

Stage of value chain: new products and solution and consequent evolution of supply chain

Character of the disruption: technological disruption

Time frame: mid and long term

EU actions needed:

- **Funding:** (i) incentives for customers to purchase hybrid and electric cars; (ii) R&D funds for electric solution
- **Coordination:** (i) strong effort on *European Battery Alliance* to foster electrification in Europe, creating a competitive advantage in the long term (R&D, design, production); (ii) The EU automotive industry must contribute to EU sustainability goals
- **Regulation:** environmental regulations

Spread of new trends (Autonomous Vehicle) for the Automotive & Mobility Ecosystem

(15.06.2020)

Source: Thomas Röhr

Evidence: The second main technological challenge that characterizes the automotive sector concerns R&D, the design and diffusion of autonomous vehicles. This trend is not new. The main applications are for public transport and taxis, rather than for own vehicles.

Geographical impact: EU

Stage of value chain: new products and solution

Character of the disruption: technological disruption

Time frame: mid and long term

EU actions needed:

- **Funding:** R&D funds to develop and design autonomous vehicles solutions

Need for new skills

(15.06.2020)

Source: Thomas Röhr

Evidence: The continuous evolution of trends and technological challenges that characterize the automotive sector (see other disruptions) push different supply chain stakeholders to constantly look for new professional figures to be included in the company. These professional figures have the necessary skills and backgrounds to face these challenges (electronics, mechanical, automation, management, marketing, data scientists, etc).

Geographical impact: EU

Stage of value chain: Human Resources

Character of the disruption: new sector skills development

Time frame: mid and short term

EU actions needed:

- **Coordination:** coordination projects for sectoral skills development

Collapse of Automotive Ecosystem

(15.06.2020)

Source: Thomas Röhr

Evidence: The global lockdown due to the COVID crisis has forced national and international governments to impose several restrictive policies to reduce short and long movements of people, vacation places and industries. As a result, the use of the car as a means of transport has suffered a huge drop, generating a demand reduction, that caused issues for all the supply chains. Experts estimate a 10-15% of reduction in EU car production and a 40% reduction of car registration in the first quarter of 2020 compared to previous year. Component manufacturers and all the stakeholders have suffered the timeline disruption, creating a strong cash flows liquidity reduction that leads to difficulties in the management of short- and medium-term financial flows. Tier 2 and 3 companies are more affected since they don't have any financial margins.

Geographical impact: EU

Stage of value chain: car usage; component manufacturers lead time disruption and suppliers' difficulties; production reduction

Character of the disruption: demand drop and overall reduction of Automotive sector in terms of profit and cash flows liquidity

Time frame: Short term

EU actions needed:

- **Coordination:** develop a joint vision for the future automotive landscape; imagine and launch (joint) clusters services helping clusters and supply chains members to face the crisis
- **Funding:** funding and grants to face the crisis and the financial liquidity reduction
- **Regulation** to give joint vision a framework

Recommendation:

- The automotive industry already faced multiple challenges before the pandemic, but COVID crisis impacts are creating additional short-term pressure on companies
- Reduced financial capacity due to demand drop shall not delay further technological innovation
- It is necessary to find coordinated solutions between supply chain stakeholders because in this way they are stronger in trying to face the crisis (partners more than suppliers). To make this possible, it is important to gather and share knowledge and experiences among different actors and clusters

5. Creative & Cultural Industries

Stop of Creative and Cultural Industries

(09.06.2020)

Source: *Liana Ruokyte Jonnson & Romanas Matulis, Vilnius film Cluster (LT)*

Evidence: The global lockdown due to the pandemic crisis has forced world governments to impose several restrictive policies to reduce people movements, aggregations of people, travels and events. As a result, all the companies that operate in the cultural and creative industries suffered a sudden stop in most of the activities (such as events organizations, production services, distribution and exhibition services, rental services, etc). Experts state that about 80% of the companies had to cease the operations activities. Moreover, all the activities and the collateral businesses of these sectors have suffered stops or declines in products and services demands (e.g. catering sectors, travels, hotels, technical staff and many others), with a consequent reduction in all related economic activities.

One reason was that the Lithuanian government announced quarantine and banned gatherings which stopped even small local filming. Furthermore, the government's measures of Covid for traditional industry proved to be difficult to apply for the cultural ecosystem.

For these reasons, the overall sector has undergone a huge reduction in revenue and cash flows.

Geographical impact: EU

Stage of value chain: operation activities and services

Character of the disruption: sharp drop of use of goods and services by end users in all the Creative and Cultural industries

Time frame: short term

EU actions needed:

- **Coordination:**
 - coordination of international project to support experienced professional crew
- **Funding:**
 - tax reduction and incentives are needed to better face the strong reduction of overall sector income; moreover, targeted measures for creative and cultural companies are also needed, going beyond the measures designed for traditional industries;
 - financing for collateral activities and facilitating the reactivation of people movement, in compliance with government restrictions (e.g. support travel and hotel sectors);

Recommendation:

- The closure of events and projects within the sector due to the global lockdown and to the quarantine imposed by governments around the world has affected both large international projects and small local projects without any distinction.
- The sector has stopped completely for several weeks. However, to cope with COVID crisis by trying to survive without having to cut personnel, many companies quickly activated alternative businesses, mainly exploiting the potentialities of the digital market. In fact, many industries have converted, where possible, a series of events, contents and services for online use, allowing people to benefit from these services during the “*stay-at-home*” period. Another clear example of the sector resilience is brought by film industry, which in several countries has reactivated services that allow it to fulfil the social distance restrictions (e.g. drive-in cinema). This is a very strong signal from this sector, that had shown reactivity and flexibility to face the crisis.
- Many companies operating in this sector receive inputs from other industrial sectors (i.e. electronic industry for technical staff of big cultural events and textile supplying for fashion industry). The sharp decline that also characterized these sectors, has further damaged creative and cultural industry.
- Vilnius film cluster took the initiative and proposed a package of adjusted financial measures for the creative industry which are currently being discussed in Lithuanian ministries.

Strong reduction in freelancers' activities

(09.06.2020)

Source: Teodora Jilkova, Veritas Cluster (BG)

Evidence: in general, the creative and cultural industry is very fragmented, and this high fragmentation does not help the growth and the recovery of the market, since it is not attractive for new investments (high risks during the crisis). In addition, besides companies, the sector is characterized by a very large number of freelancers. Sector closure for these professional figures resulted in many cases in a total lack of work, without the possibility of being able to take advantage of the economic support of the companies.

Geographical impact: EU

Stage of value chain: human resources (freelancers' professional figures)

Character of the disruption: lack of income and cash flows

Time frame: short term

EU actions needed:

- **Funding:** specific financing to support freelancers

Digital gap in Cultural and Creative Industries

(20/07/2020)

Evidence: Interregional cooperation is important in Cultural and Creative Industries since it allows to enhance a triple innovation objective: (i) innovation in processes, (ii) innovation in products and (iii) innovation in organization. For this reason, a more innovative approach must consider:

- Culture as an integrated part of the tourist experience
- Co-creation and involvement of the local stakeholders
- Balance between sustainability and physical and virtual visitor's experience
- Building capacities in tourism and creative SMEs
- S3: mobilising "creative industries"

However, innovation cannot disregard technological advancement. During the session, it has been highlighted a widespread gap in digital transformation and digital skills in the CCI. One of the main weakness is the access to advanced technologies for SMEs and micro firms.

Geographical impact: EU

Stage of value chain: digital transformation

Character of the disruption: skill gap and difficulties to exploit digital technologies

Time frame: medium term

Recommendation:

- Increase participation in this thematic S3 area to give more projects access to advanced technologies

Strong reduction of cash flows and financial capabilities

(09.06.2020)

Evidence: The shutdown and the mobility restriction generated a sharp reduction in revenue and cash flows, which in turn generated weakness in financial capacity of the market. As a result, the financial strength of the sector decreased, with a consequent drop in investments and involvement of insurance companies (especially in the field of big project and events organizations). *Source: Liana Ruokyte Jonnson & Romanas Matulis, Vilnius film Cluster (LT)*

Geographical impact: Global impact for Aviation and Renewable Energy. EU impact for Creative & Cultural Industries.

Stage of value chain: financing, investments and insurance

Character of the disruption:

- Lack of financial capability of the Creative & Cultural Ecosystem

Time frame: short-mid-term in the Creative & Cultural Ecosystem

- **Funding:**
 - financing to facilitate the organization of big creative and cultural events
 - financing to support digital innovation in creative and cultural sectors (i.e. film and music industries)
- **Coordination:**
 - EU support for professional training program and infrastructure

Recommendation:

- Creative & Cultural Ecosystem: Digitization can greatly help the sector recovery and the attractiveness of new investments, especially for the creation of cultural digital contents.
- Another important factor that emerged from the experts concerns *Design Thinking* paradigm. Besides digitalization, the sector innovation is also brought by the creation of new products and services that facilitate the recovery in the “New Normal” (e.g. new innovative products to improve customer safety in hotel sector)

6. Digital

Companies' Digital Transformation

(03.06.2020)

Source: Hervé Ribot, Minalogic, FR

Evidence: Companies need to improve their digital tools and competences in order to enhance their web visibility.

Geographical impact: EU

Stage of value chain: technology

Character of the disruption: lack of input

Time frame: mid term

Recommendation:

- Accelerate high speed infrastructure and digital transformation
- Balance with collaboration at European level: digital innovation hub will give access to technologies

EU action needed:

- Supporting the recommended actions.

Disruptions in cybersecurity during Covid-19 pandemic

(09.07.2020)

A) Increase of cyberattacks during Covid-19 pandemic

Source: Eduardo Gistau, Mutua MAZ

Evidence: Criminal organizations have several areas where to hit. Over the years, more and more criminal organizations have moved towards the web world because they are less exposed to checks and law enforcement. During the COVID-19 pandemic, there was an increase in smart working and in all activities managed remotely. People use their personal devices more with a greater exposure of credentials and private information. This has generated a sharp increase in cyberattacks. The problem of the increase in cyberattacks within companies is often due to an incorrect update of information systems. Companies don't always have the time and resources to stay protected. In industries, these attacks involve stopping production, logistics and

turnover, among other things. For companies it is always a trade-off between the operations flexibility and the systems security. Cybercriminals have always taken advantage of opportunities and they do it even more in times of crisis. The hardest attacks to defend are the personalized ones. The main way that is used for attacks are e-mails (60% of attacks). 90% of cyberattacks are easier to defend, though even more advanced techniques as Artificial Intelligence and Machine Learning are used.

Geographical impact: EU

Stage of value chain: data and production tools protection

Character of the disruption: increase of cyberattacks

Time frame: short term

EU actions needed:

- For cybersecurity mechanisms, the European countries need to agree and act together, as web criminality does not know borders. There is a need for a clearly communicated international governance model for cybersecurity.

Recommendation:

- The collaboration between the private and public entities needs to be strengthened. Ideally, the public entities should establish effective real-time defense support for the European companies, as time is crucial in this area.
- Need to raise awareness in SMEs and employees about the need for proper security, especially when working remotely.

B) Strong technology dependence from China and USA

Source: Athanasios Konstandopoulos, Eduardo Gistau

Evidence: In terms of technology used for protection, the speakers indicated a strong dependence on China, Israel, and the US, both for software and hardware. Up to date, there is no strong technological solution developed in Europe, which could be used by the European companies.

Geographical impact: EU

Stage of value chain: data protection, operations

Character of the disruption: dependence

Time frame: medium - long term

Recommendation:

- Strengthen the effort to create European cyber-defense technologies
- Another path would be to redefine common ways and use new technologies to work online

C) Skill gap in cybersecurity

Source: Eduardo Gistau

Evidence: Highly trained professionals in cybersecurity are leaving Europe to work in the US or in Japan. There, the salaries are much higher, making it more attractive for the professionals.

Geographical impact: EU

Stage of value chain: HRM

Character of the disruption: talent

Time frame: medium - long term

Recommendation:

- Giving incentives and making the workplaces in Europe more attractive for the talents

EU Clusters support for creating a common cyberspace protection

The cybersecurity session has underlined what is important to improve in order to be protected from a cyberattack and what are the main weaknesses: (i) more public-private collaboration, (ii) cyber law doesn't cover to return the attacks, (iii) dependence from USA/Israel/China, (iv) no technological defense in Europe in case of cyber war; (v) difference in salary with USA and Japan that pushes the flight of talents and increases the skill gap.

Europe should implement a single cyberattack real-time protection system (high priority). In order to have a single European model, however, the consent of all states is needed and this is not easy because every country has its priorities, its constraints and its resources on this topic. The current public-private collaboration needs to be increased to respond faster to the attacks and to support the creation of an EU cyberattacks protection system. Clusters can help in narrowing down the specific needs of the companies in Europe to increase their protection. They can build the bridge between the public authorities and the companies.

Disruption affecting digital skills in European Industry

(10.07.2020)

A) Increase in requests for digital skills due to Covid-19 pandemic

Evidence: The sanitary crisis of Covid-19 and the consequent lockdown imposed in all the countries around the world have forced companies to revolutionize their way of working. In many contexts, smart working has increased. This was possible thanks to a massive support of digital tools available for employees. However, digital skills are not always widespread in job contexts and the Covid-19 crisis has highlighted the need for companies to adapt fast on this front.

The main goal is to upskill and reskill people of working age, since the crisis has forced a reshaping of skills in many sectors. With the Covid-19 crisis, Europeans need digital skills are needed more than ever.

Geographical impact: EU

Stage of value chain: Human Resources Management

Character of the disruption: lack of digital skills

Time frame: short-term

Recommendations:

- Up- and reskilling can be improved by many cross-sectoral initiatives. The agenda should not only focus on the sectors, but allow cross-sectoral collaboration and support the movement of people between sectors.
- The lockdown has generated a crisis of labour market in many sectors, creating many difficulties for young people. As provisioned in the skills agenda, they need to have opportunities to do apprenticeships.
- Online training has increased a lot during pandemic period. This developed needs to be monitored and included in the implementation of the agenda
- Sectors most affected by the crisis are: health, construction, automotive & transport and tourism. These sectors will take longer to be up- and reskilled and need special focus.

B) Up-/reskilling difficulties for SMEs

Evidence: Training and up-/reskilling often represent a difficulty for SMEs because they have fewer resources available and must concentrate their efforts on other fronts. The big companies are those that benefit most from funds to support training, since they have more robust bureaucratic structures to request and obtain them. The result is that SMEs, which are the ones that need the support the most, are the ones that get the least. Clusters can help in this point.

Geographical impact: EU

Stage of value chain: Human Resources Management

Character of the disruption: lack of opportunities in training programs for SMEs

Time frame: short and mid term

EU action needed:

- **Coordination:** partnerships must be created at European level, but then cross-sectoral and local/regional collaborations must be established. ECA can support in all actions

Recommendations:

- Clusters should be included in the implementation of the skills agenda. One of their tasks should be to support SMEs to access funding.
- Methods and tools (e.g. KPIs) for evaluating and monitoring the evolution of skills should be better conceived and structured
- Industrial associations, which provide training programs, should be considered for cross-sectoral collaborations

Disruptive challenges related to Smart Cities paradigm

(13.07.2020)

A) Value of data in smart cities

Over the last ten years, data has become a primary source of value for many existing businesses and technological drivers for new enterprises, showing its relevance among different industries, from the digital sectors to manufacturing ones. Smart cities are architectures build on a “*phygital*” network (both *physical* and *digital*), connecting different data across urban areas by means of sensors installed on field (i.e. traffic lights, street-lamps, etc.). The amount of data generated has increasing importance for existing businesses and for both private and public services. Moreover, creating an “urban network” allows to increase the value of the data since on one hand, it allows to create a real time mapping of different areas of the city, using different point of views (i.e. Traffic situation rather than pollution levels, etc); on the other hand, it increases consistency and representativeness of the information, allowing matching analysis between different types of data. Hence, smart cities may represent a primary source for reliable information, acting as catalysts for innovative projects, involving different sectors.

B) Compliance with GDPR policies on data management

The development of smart cities requires the application of sensors to physical objects, using them as a mean for gathering, transferring, and processing data through specific software. Data represents an incredible source of Value for businesses hence their regulation at European level by the GDPR (*General Data Protection Regulation*) policies. Smart cities generate enormous amounts of data due to the quantity of sensors that must be installed, connecting all the parts of the city. With such volume, it becomes more and more expensive for companies to keep the pace to homologate the data gathered to the principles of GDPR, especially regarding transparency and security.

C) Change in network’s infrastructure configuration

Considering the hardware necessary to build a smart city’s network, this mainly includes two types of devices: (i) sensors, to gather data that will be processed afterwards, and (ii) antennas, in order to exploit the 3G/4G/5G standards for remote data transfer. Due to the necessity to place sensor on physical objects, antennas must be necessarily placed on the infrastructure too. Antennas must be then moved to the “street level”, undergoing specific regulations limiting the transmitting power (especially for 5G, in order to copy with the radiation emission; this represents a design challenge, since antennas have now lower range, due to the transmitting power lowering). They also have to be mounted on a large number of exiting physical object; as a consequence, these devices must be produced in smaller dimensions to be easily integrated in compliance with the current laws. All sensors in the cities need to be secured. For this, the cities need to work closely together with the manufacturers.

Need to strengthen collaboration between Clusters and Digital Innovation Hubs

A cross-sectoral approach is needed to foster the collaboration between Clusters and Digital Innovation Hubs. The aim is to give complete services to the companies to increase the market and industrial value stream, the global competitiveness and the digitalization. The main idea of this approach is to cooperate through the value chain to have multiplicative effects. Every region has its own specific assets, which are buildings blocks for the DIHs. In the regions, clusters have an advanced stage of trust. Therefore, they should be included as an integral part in the work of the DIH.

Even though it is a common notion, clusters and DHI are not competitors and they have to move forward together in order to create these multiplicative effects. They need to establish strong and long-term collaborations, which was explicitly highlighted during the session held on 14th July. Clusters create high-value chains and networks within sectors and industries, while DIHs are promoters of digital transformation, providing

knowledge, skills, experience, and technological support to the public and private sector. As pointed out by Kristina Šermukšnytė-Alešiūnienė (expert involved during the session on DIHs), it is essential to establish collaborations between clusters and DIHs, since they are complementary, and their synergy can push a lot digital transformation in Europe. Industry clusters are the representatives, the constituents, and the creators of value networks, while DIH enhance these value networks through the digitization of processes, products, and services. The use and promotion of digital technologies and innovation enable DIHs to have multiplicative effects on cluster value networks. In addition, this type of collaboration can support an "EU-local" approach, unifying the European vision and local companies' management. This can allow a faster digitization and cross-sectorial innovation transfer.

Lack of standardisation and common protocols (18.06.2020)

Source: Antonio Novo Guerrero, Nuno Lopez

Evidence: IoT solutions make factories more flexible and intelligent. In general, there are not particular barriers and critical issues in finding technologies and components for the implementation of digital transformation (sensors, machines, etc). In Europe, there are big companies that are world leaders in designing and implementation of IoT solutions for industries and factories (Bosch, Siemens). However, the solutions are mostly not compatible with each other, generating gaps for a widespread implementation. Thus, the real challenge is standardization. In order to be leaders and mostly independent from world competitors (e.g. USA, China and Japan), we have to improve standardisation of communication protocols and network architectures (e.g. FI-WARE). MQTT and OPC-UA are clear examples of increasingly widespread communication protocols, but today's solutions on the market which are compatible with their integration are still a minority. The creation of common standards would be an opportunity for European companies, especially for SMEs, which would benefit from these common standards.

Geographical impact: EU

Stage of value chain: operations

Character of the disruption: lack of standards

Time frame: mid and long term

EU actions needed:

- **Funding:** research and innovation projects to develop that standards
- **Regulation:** creation of guidelines and standard regulation

Recommendation:

- The absence of common standards generates risks. When companies want to integrate solutions, devices, or cloud systems for data management, they often choose free or low-cost solutions (sometimes they customise them on their own). This process generates disadvantages and inefficiencies from multiple points of view, in particular the lack of competitive advantage. Therefore, standardizations would boost the competitiveness of our economy.

IoT solutions to foster green economy

(18.06.)

Source: *Guillaume Roux*

Evidence: Several digital solutions have already been developed to connect I4.0 and green economy. Trying to put together the sustainability-oriented and technology-oriented views under the same umbrella, the concept of Smart Sustainability has been proposed more and more by research and companies as a new way for making goods and managing production processes in a more sustainable way by exploiting smart technologies. Among many, experts consider some main ways to describe benefits achievable from the interaction between digital solutions and the green economy and sustainable manufacturing:

1. digitisation of the Circular Economies, considering I4.0 technologies as a set of opportunities supporting enterprises in increasing their circular degree and to foster resources recovery (e.g. disassembly processes and other EoL techniques digitalization);
2. the role that I4.0 technologies have in enabling circular business models related to the stakeholder's involvement (e.g., customers, shorter supply chains, local supply chains, etc.);
3. IoT solutions for monitoring and optimising energy and resource efficiency during lifecycle management.

Geographical impact: EU

Stage of value chain: factories and supply chain management

Character of the disruption: need to improve solutions

Time frame: mid and long term

EU actions needed:

- **Funding:** research and innovation projects

Sectoral implementation of IoT and digital transformation challenge

(18.06.2020)

Source: *Guillaume Roux*

Evidence: Due to volatile and fast-moving markets, increasing competition, as well as more complex products and production processes, industrial companies are facing increasingly intricate challenges. Among these, digital transformation represents one of the biggest challenges that a company has to face nowadays, since it represents not only a technical issue, but also a cultural shift. In fact, the change does not only affect industrial processes, but they require a shift from the present company values toward a continuous improvement philosophy. Even if the Industry 4.0 solutions and smart technologies are available for some time, not all organizations and sectors can claim to have reached a mature implementation. Some sectors are more advanced than others in digital transformation and the advances in IoT (Internet of Things), e.g. automotive, aerospace and defense, energy, and electronics. Industry 4.0 refers to the industrial exploitation of Cyber-Physical Systems (CPS) for the intelligent decentralization in the factory. The result is the so called "smart factory" where, Information and Communication Technology (ICT), IoT, Customer-to-Machine (C2M), Customer-to-Customer (C2C), Machine-to-Machine (M2M) communications are integrated with distributed sensing, processing and actuating capabilities. Digital transformation is no longer an opportunity, but a necessity for the competitive-

ness of European companies. As the speaker stated, he still sees potential in ecosystems like tourism, textiles, and agri-food.

Geographical impact: EU

Stage of value chain: all company's functions and processes

Character of the disruption: lack of IoT implementation and digitisation

Time frame: mid and long term

EU actions needed:

- **Funding:** research and innovation projects

Recommendation:

- Process flexibility and intelligent data management enabled by IoT and digital solutions are characteristics that can generate a great competitive advantage for Europe in the long term.
- The COVID crisis represents a further barrier to digital transformation since many companies had to close and stop their operations and activities for several weeks. This is a strong brake against digitisation. However, it also generated the further need to "reinvent" the structure of the factories to face the crisis, which must now be even more digital, automated, agile and safe.

Lack of workforces and skill gap in the ICT sector (17.06.2020)

Source: Cristina Urtiaga (ES), Vasco Lagarto (PT)

Evidence: The main disruption noticed by the speakers is the lack of workforces and the skill gap in the ICT sector. There are too few talented or graduated people for the ICT sector to meet the demand. The most important issue is providing new solutions to attract new employees, both coming from university as well as from other sectors.

Geographical impact: EU

Stage of value chain: HRM

Character of the disruption: Lack of workforces and skill gap

Time frame: medium – long term

EU actions needed:

- **Coordination**, in order to provide programs to cover lack of experts and develop a network with local work agencies.
- **Funding**, local and national funding are needed to help clusters develop and set upskilling programs.

Recommendation:

- Establish deep connection with universities and VET centres, in order to reach more information and connect students with ICT companies.
- Develop tools able to train people in all stages of the value chains.

- Re- and upskill people coming from other sectors to reduce the workload of specialised experts, so that the specialists can focus on their main activities.

Blockchain technology and application in the sanitary crisis

Distributed Ledger Technology (also referred to as DLT, of which the blockchain technology is part) represents a new technological trend potentially disruptive in terms of business model configuration, value proposition and information management. Blockchain technology has the potential to play an important role in the post COVID-19 scenario, providing a quick reaction to the uncertain economic conditions of the imminent future. Blockchain is based on a system of distributed ledger among different nodes, with the characteristic to be immutable, transparent, and more secure as the number of the nodes in the network increases. Its applications are not Industry-specific, meaning that it presents a strong cross-sectorial usage: different areas of application include public administration, insurance, research, and finance.

In the context of European clusters, Blockchain could represent a quick, low cost solution to develop a public network shared among associations across Europe, providing fast communication and collaboration, strong reliability of data exchange and security as built-in aspect of the technology itself. Benefits stem from its application, in terms of **resiliency**, giving the possibility to the single European cluster to **share information** in a **secured and transparent way** with the network and allowing to **react timely and precisely in critical situation**, like a sanitary emergency (“Resiliency is a property of the network, not of the single nodes”).

1. **Using Blockchain as a traceability facilitator** for COVID-19 tests, in order to get easy, fast and secure access to their information, certifying origin, distribution and results. Blockchain permits real-time access to critical information such as date and location of test results, allowing to map affected areas by tracking positive results (not patients) giving snapshot of the situation. As the Blockchain expert Marco Crotta said, the blockchain was used in some cases as a **collaborative platform** in order to make experiments and researches available to the public to find a vaccine and to protect who discovers it.
2. **Harnessing the power of distributed computing:** Blockchain can be used to harness the power of the distributed computing nodes to help calculation in order to run simulation, searching for a treatment to COVID-19. Currently, hundreds of nodes donate computing power to contribute to the research focused on the Covid-19.
3. **Data Notarisation & Smart contracts:** due to the impact of the pandemic on many business activities, proving to be a powerful tool for:
 - a. **Certify and notarise** smart working activities;
 - b. **Track Record** of verbal processes, videoconferences, webinars, training and related documentation;
 - c. Enable **Digital Signature** through smart contract and cryptography.

For a potential implementation of blockchain, there is a need to

- Achieve trust in data management;
- Build a legal framework to regulate responsibilities and accountabilities;
- Integrate Blockchain infrastructure to facilitate connections with decentralized organisations;
- Design blockchain applications to suit business requirements.

Artificial Intelligence on the edge of the network

Artificial Intelligence (AI) concerns the development of a computer system able to imitate human capabilities and apply them to different fields like data management, product improvement and decision making. AI is developed exploiting **Machine Learning** (ML) algorithms which shift the traditional programming approach.

While in the traditional approach data and predefined rules are given in input together to obtain a specific data output, Machine Learning algorithms take data as input returning rules in output; the result is a computer system that is able to recognize specific data without writing specific code for the machine, creating an environment that is able to learn data processing and categorization autonomously.

Thinking about systems of connected devices, it is possible to integrate AI with sensors **on the edge** of the network (hence, integrating **Machine Learning** and **Artificial Intelligence** algorithms downstream on the single devices/machine rather than accessing them through cloud computing). This type of action generates three kind of **advantages**:

- **Low latency:** because there are fewer cloud structures and data is processed into the sensor (computation take place in a local environment)
- **Data security:** reduces trust issues and risks of security breaches linked to the storage and computation of data enter in the cloud.
- **Energy efficiency:** since there is a lower amount of data transfers that consumes energy in terms of electricity and computational power

The main limitations to the design and widespread application of AI are still slowed down due to different reasons:

- **Moore's Law validity:** Moore's Law states that the average number of transistors per area unit increases year by year, keeping computational power equal or higher and reducing the cost for single transistor; the curve representing this law has almost reached a steady phase. This means that there is no more an exponential trend in transistor increase inside components and that transistor price is likely to increase over time, which has led to parallelization of tasks management for CPUs (working then on efficiency rather than pure computational power).

In this paradigm, Artificial Intelligence application require chipsets with great computational power that are now characterized by higher development and implementation costs, and this is particularly true in order to implement AI solutions on local devices (sensors, IoT, etc) since the number of transistor needed is higher than pure cloud computing solutions.

- **Upskilling/Reskilling:** Building systems like AI based on Machine Learning is not the same process as traditional programming. Although languages used to code may be similar, the core task is to build an environment that has self-learning characteristics; this means that the system must be led, through proper data preparation, ingestion and validity check, by a path of continuous update, until its self-sufficiency in handling the task required. These peculiarities demand different skills level, not only for employees that are not expert in coding, but also for the ones with basic programming knowledge, who have to develop code following different procedures.
- **Knowledge and Ethics:** AI topic is very critical in terms of trust, for two main reasons:
 1. It is a subject that has not a diffused and standardized knowledge basis, meaning that there are different theories on its application, not concurring give a definition uniquely accepted in the business field.
 2. AI is subject to ethical issues, on two different fronts: First, data privacy and treatment, since AI devices take in input huge amount of data of different types (structured and not structured) in a way that is not so transparent to the user; secondly, regarding the practical application, there are issues in some sectors, like automotive (i.e. an autonomous driving car could be put in this emergency condition, choosing between two options: hit a vehicle on the road or hit a pedestrian; in this case, programming

the car system response in such situations is still object of discussion since both choices would bring damages to the driver or to the pedestrian).

Europe can embrace the opportunity to specialise in Edge AI, as is **fits with a decentralised and privacy-driven European policy**. It is core to keep technologies development within Europe. Furthermore, **Edge AI aims to reduce energy consumption, which aligns the technology with the aims of the Green Deal**.

7. Electronics

Disruption of supply chain of electronic parts (24/07/2020)

Source: Mikel Idirin, *System-on-chip Engineering*, ES

Evidence: European supply chain of electronic ecosystem strongly depends on China, US, India and Japan suppliers for components and electronic manufacturing services: EU is not well positioned as chipmaker and key component provider.

It is crucial to change business model, boost capacities in terms of electronic component manufacturing and reinforce the European role as key component design. In addition, during the pandemic, supplying in short time was difficult: the elements take, at least, three weeks to be transported in countries, slowing down all production processes.

Geographical impact: EU

Stage of value chain: inbound logistics (importation of key components and strongly dependence on China)

Character of the disruption: lack of input

Time frame: medium – long term

Recommendation:

- Identify key electronic components
- Identify key services that play a relevant role in growth and competitiveness of companies
- Develop smart working components
- Reduce global dependency
- The ecosystem needs to be funded in different ways in order to achieve more competitiveness (funding in R&D projects)
- Support from private banks and States
- Increase support on cluster pillars in terms of networking, innovation and business growth
- Use innovation clusters to accelerate recovery of regional ecosystems

EU action needed: Yes, to implement most of the recommendations suggested or support their implementation.

Upskilling / reskilling in Electronics (GR, FR, ES, PR) (24/07/2020)

Source: Aurora Baptista, PT, and Mikel Idirin, System-on-chip Engineering, ES

Evidence: The ecosystem shows a relevant gap regarding skills in competences like scientific, technology, electronics and mathematics: more workforce is needed to be engaged into electronic sectors.

Geographical impact: EU

Stage of value chain: HRM

Character of the disruption: lack of skills

Recommendation:

- Improve exchanges programs across Europe for upskilling and in order to identify key competences
- Engage more clusters and companies in programs as Erasmus+

EU action needed:

- The ecosystem needs to be funded in different ways in order to achieve more competitiveness (funding in R&D&I projects)

Temporary Covid-19 related reduction of Waste of Electrical and Electronic Equipment (WEEE) (24/07/2020)

Evidence: The collection of electronics waste involves several sectors, both public and private and are related to design, production, distribution, consumption, use and repair. Among the consequences of the pandemic, it is highlighted that the ordinary monthly flow of WEEE managed on a national scale was reduced by 80% during the months of sanitary emergency, which is linked to the drop in sales for appliances and electronic devices. This drop was temporary during the lockdown measures.

Geographical impact: Reported for Italy

Stage of value chain: End of product life, input management

Character of the disruption: Drop in amount of gathered WEEE

Time frame: short term

Recommendation: implement safety measures for the collection of WEEE

Instability of WEEE collection (24/07/2020)

Evidence: The WEEE collection trend showed different curves during the pandemic and manifested an unstable trend: during the months of March, April and May, there have been an overall decrease in sales of electronics, and consequently there was a reduction in waste collected. However, in the period of June and July, the sales of electric and electronic appliances skyrocketed. The sharp increase led to difficulties in collecting the materials and to the inability in responding efficiently to the growing demand for collection.

Geographical impact: Reported for Italy and Spain

Stage of value chain: All

Character of the disruption: Instability of WEEE flow

Time frame: short term

Recommendation:

- Establish longer intervention times to favour suppliers (from 5 to 10 days)
- Selection of the necessary pick-up requests: evaluation of the actual emergency in the pick-up requests and interruption of ordinary pick-up requests at smaller picking points
- Increase of the formal storage limits to avoid WEEE and secondary raw materials stock saturation
- Large scale experiences of preparation for reuse of WEEE are missing, need of support from manufacturers and legislation

8. Health

Supply and value chain disruptions for European industries in material procurement

A) European supply chain weakness and issues in raw materials management processes

(29.06.2020)

Source: *Dolors Pla*

Evidence: The COVID-19 crisis is generating a widespread vulnerability along entire supply chains, including the raw materials supply. A competitive repositioning is needed which implies a greater coordination among the stakeholders to face the crisis. During the session on advanced materials, raw material criticalities of healthcare supply chains have been discussed. Supplies for surgical gowns, gloves, masks, respirator protective devices and many others. The reduced availability of materials necessary to manufacture sanitary devices has created a bottleneck in logistics, with a consequent increase of supply delays and good prices. Moreover, reduction in Chinese production capacity (main global producer) and the increase in world demand have aggravated the situation. In fact, China lost 13.5% of productivity in the months of January and February alone. In this emergency context, innovation represented a solution. New solutions, materials and techniques (such as 3D printing) have made it possible in some cases to react quickly. The big issue is the quality and the homologation process. Also, 3D printing cannot alone meet the demand. Furthermore, the high usage of single-use material has generated an increase in infected waste, which could contain pathogens and could pose a risk of disease transmission.

Shortage of PPE

(12.06.2020) Shortage of safety devices in Social Service sector

Source: *Thomas Bignal (BE), Suzanne Huiskes (NL)*

Evidence: Personal Protective Equipment (PPE) shortage has created a bottleneck upstream in the supply chain for the Social Services delivery. Caused by the sanitary emergency that Europe is facing in this period, this shortage is preventing social operators to perform their working tasks in total safety, worsening the situation of economic and financial difficulty. One of the solutions adopted by the companies was adjusting their activities in order to produce new PPE.

Geographical impact: EU

Stage of value chain: Operation activities and services / Raw materials supply

Character of the disruption: Lack of medical materials in support to the activity

Time frame: Short term

EU actions needed:

- **Funding:** invest in the production of PPE
- **Coordination:** help companies becoming more resilient and adapt quickly to the new scenarios

Recommendation

- If PPE production is managed at government level, it is necessary to focus also on their distribution; regulation must guarantee that PPE are supplied to all the companies involved in Social Services Eco-system, avoiding unlevelled supplies between different providers.

Certifications, homologation, reliability and quality of products (ES, IT)

Evidence: Numerous testimonies state disruptions related to homologation processes for **health machines and components**. There is a long certification and homologation path that has many bottlenecks. Products have different authorizations in national markets: companies need to have common policies to EU Commission. For instance, why a product authorized in a country cannot be automatically accepted in another country?

Recommendation:

- A central homologation authority for PPEs and medical devices for all EU Member States.

EU action needed:

- Yes, to enable that central homologation capacity at European level.

9. Renewable energies

Demand and production reduction of components (08.06.2020)

Source: Hartmut Hohns, WAB Arbeitskreis (DE)

Evidence: Experts declare this is one of the biggest disruptions that has hit the renewable energy industry. In fact, the slowdowns in the engineering phases and the weakening of financial and insurance capacity of the plants generated a demand drop of the order of new plants and component construction. For this reason, component manufacturers have suffered more the timeline disruption, being them the stakeholders with the lower lead time along the value chains.

Geographical impact: Global

Stage of value chain: Manufacturing of components for renewable energies plants

Character of the disruption: demand drop

Time frame: short-mid term

EU actions needed:

- **Funding:** financial support

Recommendation:

- Companies have put in place some repairs to avoid staff cuts (i.e. “short-time work” actions, like as holidays). For the moment, most of companies are not planning layoffs.
- A strong interaction with politics (European and National governments) is needed to support actions to mitigate the crisis.
- The materials recovery in the de-commissioning and recycling phase can help the supply chain re-growth. Many companies are active in the separation, processing, and recovery of precious materials at the end of life of renewable plants.

Project development slowdown

(08.06.2020)

Source: Hartmut Hohns, WAB Arbeitskreis (DE)

Evidence: Compared to many other markets and industrial sectors (i.e. automotive, aerospace, travels, tourism, and many others), the renewable energy supply chains have suffered a lower impact due to the COVID crisis. Sector operators state that the impact is not so big for the moment. However, the crisis has been affected the entire value chain, from the project development phase to operations and maintenance life cycle phase. The crisis does not affect the usage and exploitation of renewable plants but has generated several delays and demand reduction for all the stakeholders involved. In fact, the lockdown that characterized companies leads to a strong delay in the project development and engineering phases of new renewables plants, which has inevitably generated delays, limits and reductions along the entire value chain (experts estimate a new orders demand drop of about 31-50%).

Geographical impact: Europe

Stage of value chain: Project development phase and engineering

Character of the disruption: blocked and delayed projects

Time frame: mid-term

EU actions needed:

- **Funding:** Several companies along the value chains will benefit from EU Green Deal programs. This will help companies with funding for new projects, generating an increase in demand for manufacturers and operations and maintenance operators (for example, investigating new floating turbine solutions within wind industry or new materials recycling techniques).

Recommendation:

- In order to face the crisis, several companies are considering to re-adjust their business scope and company organization outside renewable industry, i.e. new businesses or shift the main corporate business on other business functions. As an example, some companies that operate in the wind tur-

bine industry as components suppliers (i.e. cables, gearbox, ...), are planning to start within the heavy machinery sectors. This aspect represents a key factor of this industry, since several companies are showing resilience and flexibility to survive in the market, and is not only related to the Covid situation.

Logistics delays

(08.06.2020)

Source: Hartmut Hohns

Evidence: Construction suppliers mainly come from EU, USA and Asia. The global lockdown and governments restrictions on transports around the world have affected some logistics routes for the movement of goods and people. Many companies have not found solutions to bridge these delays. Travels limitations have also generated delays and cancellations of contracts and insurance for plants construction. These delays also link to the missing components.

Geographical impact: Global

Stage of value chain: Transportation and construction

Character of the disruption: delays and limits regarding movements of people and goods

Time frame: short time

EU actions needed:

- **Coordination:** logistics support

Demand reduction for Operations & Maintenance operators

(08.06.2020)

Source: Hartmut Hohns

Evidence: The previous four disruptions inevitably generate issues for Operations and Maintenance operators, since the delays in project developments, the logistics issues and the reduction demand of components manufacturers leads to a loss of work for O&M companies. Many projects or construction sites already open have been postponed to next year due to the COVID crisis.

Geographical impact: Global. Most of these companies have a high rate of exportation and for this reason the impact has also affected a lot the relationship with stakeholders outside Europe.

Stage of value chain: Operations and Maintenance

Character of the disruption: demand reduction

Time frame: short-mid term

EU actions needed:

- **Funding:** financial support

Strong reduction of cash flows and financial capabilities

(08.06.2020)

Source: Hartmut Hohns, WAB Arbeitskreis (DE)

Evidence: The delays that hit the projects development phase due to the crisis has inevitably influenced the financing and insurance capability of renewable plants. Regarding new corporate investments possibilities, the few companies that do not survive to the economic crisis will be mainly purchased by large utilities companies.

Geographical impact: Global impact

Stage of value chain: financing, investments and insurance

Character of the disruption:

- Delays in projects and construction sites and consequent loss of financial liquidity for plants construction in Renewable Energy Ecosystem

Time frame: mid-long term

EU actions needed:

- **Funding:** financial support
- **Coordination:** process support

Circular Economy and Sustainability in the Post-Covid-19 economic recovery

A) Lack of regulation in secondary materials and resources management

(23.06.2020)

Source: Giacomo Copani, Lombardy Intelligent Factory Cluster (IT)

Evidence: The circular economy (CE) systems provide for a more efficient and more effective use of resources, where the flows are not static and bound by one-directionality, but they fall circularly in the upstream phases of the production system or within other production systems. The possibility of reusing natural resources several times increases the efficiency and effectiveness of economic systems, with the consequent possibility of reducing the exploitation of natural resources and the consequent environmental impacts. However, when materials are discarded from economic processes, they must follow waste management rules. In fact, when waste is reusable, it could be a clash of regulations, because waste reuse rules are regulated at the national level and often, each country has their own. The European Community has drawn up guidelines, but their application is made on a national basis. In this context, some Member States show more flexibility and agility to act than other. Because of this regulation barriers, some companies and value chains are ready to operate fostering circular economy paradigm: they own the technologies and processes, but production is blocked by national regulations.

Geographical impact: EU

Stage of value chain: Raw materials management

Character of the disruption: Regulation

Time frame: short and medium terms

EU actions needed:

- **Regulation:** some companies are not able to act in view of circular economy because of the national difference in terms of regulation. A homologation and standardization processes are required.

Recommendation:

- The potential of circular economy is present in all value chains. Companies need to be supported to implement and adopt circular economy actions.
- Research and development of new products and processes that follow circular economy concept arise, but also regulations and bureaucracy must keep up.

B) Funding and coordination of circular economy in European economic recovery

(23.06.2020)

Source: Giacomo Copani (IT)

Evidence: In the recovery from the economic crisis generated by the pandemic, implementing Circular Economy activities can help already in the transition phase. Covid-19 crisis has given a strong shock to many sectors: some companies have postponed their circular transition projects, but the transition has not been cancelled.

As it was reported in the minutes of June 22nd, the transition phase can be supported in terms of green, digitisation and resilience development. Technology as a tool to support the circular economy can help in the conversion of production processes. Digital technologies, such as the use of VR or robotics, can help companies recover and maintain safe distances.

Geographical impact: EU

Stage of value chain: design, manufacturing and products/services lifecycle management

Character of the disruption: CE strategies and best practices to support the post-crisis EU economy restoration

Time frame: mid and long term

EU actions needed:

- **Coordination:** in order to speed up the process
- **Funding:** the transition of linear production to a more circular one can be complicated and costly, especially for SMEs. Funding are necessary to support the transition

Recommendation:

- In this transition phase, it is possible to resort to both a top down and a bottom up approach. The first is the issue of regulations and proceeds from the EU to the member states. The second moves from companies and their production processes.

Circular Economy application on biomass lifecycle

(07.07.2020)

Source: Mattia Adani (IT)

Evidence: Circular Economy represents a cross-sectorial trend for industrial application, showing potentials to open new frontiers of value chain creation and increasing at the same time resource efficiency. Considering the field of chemical industry, its application to biomass recycling shows promising opportunities to reduce resource consumption and fostering the shift towards a Green Industrial Ecosystem (see Bi-Rex project).

Biomasses, which are the waste from farms and agri-food environments, can be exploited to extract materials like cellulose, which has manifold applications (from cellophane to paper production), without the need to cut new trees. In this way, the waste from the first process can be used as input for cellulose production, by treating biomasses with separate water and organic compounds (like sugar) before processing it for cellulose extraction.

Global cellulose proved to be a critical material in the COVID-19 crisis since it can be used to produce sanitizers and has been imported from China with prices increase up to 500%. The cellulose derivatives market is worth globally around 3.7 billion EUR, representing a potential solution for economic recovery and sustainable achievements in the industry. At the same time, it is a market in which Europe is dependent on foreign countries like China and India. Hence, circular economy in cellulose production can improve supply chain resilience and reduce the dependence from foreign suppliers.

Geographical impact: EU

Stage of value chain: waste management, input management

Character of the disruption: new paradigm of biomass application for chemical industries

Time frame: medium – long term

Recommendation:

- **Regulation:** agri-food waste is produced in decentralized local areas in Europe; it is necessary to give clear policy for waste treatment in order to stop its fermentation and use it as input of the recycling process (through solvents treatment at the end of the cycle for example)
- **Coordination:** partnerships with chemical and agri-food clusters are necessary to practically manage the movement and storage of biomasses from local entities to aggregated sites. This is due to the continuous flow necessary for the process to carry on in an economically sustainable way.

10. Proximity & Social Economy

Redirection of public funds to meet the needs of crisis

(12.06.2020)

Source: Thomas Bignal (BE), Suzanne Huiskes (NL)

Evidence: In the context of the global pandemic, public funds from European countries allocated to specific project before the virus outbreak, have been re-distributed, increased and exploited for initiatives with a social and safety impact; as a consequence, the fund for companies delivering social services have been shrinking

Geographical impact: EU

Stage of value chain: Finance and Funding

Character of the disruption: Decreasing funding opportunities for companies in the Social Service sector

Time frame: Short term

Recommendation:

- Possible accounting issue may rise due to the different sources exploited, especially for funds redistribution
- Allocation to resources and measure definition in order to sustain also the environment rotating around Social Services delivery (Hospitals, Operators, devices, etc.)

Social enterprises excluded from Regional Smart Specialization Projects (12.06.2020)

Source: Marek Przeor, DG Grow

Evidence: Several regions are lacking a full inclusion of social economy enterprises into the Smart Specialisation process and definition (RIS3). Thus, social economy actors are excluded from the participation in publicly funded projects, in relation to European Regional Development Funds (ERDF).

Even though at EU level the RIS3 process is strongly based on a quadruple helix, at regional level there are still difficulties in involving the civil society, even though it has full legitimacy confirmed by EU Commission.

Geographical impact: EU

Stage of value chain: strategic, process development, financial

Character of the disruption: Exclusion of the civil society (fourth of the quadruple helix) by the S3 process development and funding.

Time frame: long term

EU actions needed:

- **Funding:** to invest into social impact funds and social investments.
- **Coordination:** to facilitate coordination and better involve regional government into the understanding of the strategic value of social economy inclusion in RIS3.
- **Regulation:** to include into the calls for proposal rules explicit eligibility for social economy enterprises.

Recommendation:

- The Regional authorities are obliged to include social companies.
- Social economy representants should demand to regional government to be included into calls for proposal eligibility.

Importance of mapping impacts on social economy caused by the COVID crisis (16.06.2020)

Source: Alessandro Rancati

Evidence: The current societal, industrial, and governmental environment makes sustainability requirements ubiquitous, pushing organisations of several sectors to reach targets from the three dimensions of sustainability: environmental, economic and social. According to the recent European Commission policies, the key goals for future markets and economic systems are design, manufacturing and sell products and services of the future and guaranteeing this triple sustainability objective. These objectives, well-defined within the Triple Bottom Line (TBL) framework, have been concretized by companies through the concept of Corporate Social Responsibility (CSR). Focusing the attention on the social side, the concept of Social Economy indicates the ability of enterprises to create positive social impacts.

Very often, social impact analysis is not included in the most used business analysis models (e.g. business model canvas, SWOT analysis and many others). For this reason, the creation and use of an analysis model that also includes social impacts is of fundamental importance and should become a standard model for all companies. One of the main concepts underlying social economy is the relationship between actors and stakeholders of a specific network or system (intended as a concept broader than supply chain or value chain) and to map all the dynamics that are created among them, in order to better understand how they are related to each other (macro-scale dynamics, i.e. network landscape) and their social relationship and impacts (micro-scale, i.e. identity).

This type of mapping represents a big opportunity for approaching the social economy, which is struggling to take off or spread in many contexts. This is mainly due to the lack of knowledge and to external bottlenecks or disruptions, such as COVID crisis which has severely damaged many industrial and economic sectors.

Geographical impact: Global

Stage of value chain: entire network or system

Character of the disruption: lack of knowledge and priority

Time frame: short and mid term

EU actions needed:

- **Coordination:** The Social Economy lens help to collect important information through the EU Rapid Alert Function. This Function, recalled into the Recovery strategy, is connected to the possibility to collect weak signals, thanks to the European Alliance Against Coronavirus, guided by ECA.

Recommendation:

- The mapping of relationships between stakeholders should become a standard for all types of businesses.

Income decrease

(12.06.2020)

Source: Thomas Bignal (BE), Suzanne Huiskes (ND)

Evidence: The crisis related to the coronavirus pandemic has disrupted the steadiness of the income sources, leading to its decrease over time. Many companies have lost almost 50% of income. In addition, social enterprises encounter difficulties in the access to funds and loans provided by banks, because lenders don't feel confident in social enterprises business. Furthermore, private donations decreased.

One of the main challenges for the future is how the ecosystem can be better prepared for a possible rebound. Economic solutions could get there from grants, investment capitals, capital funding and public and private sector, but a new financial prospective is needed.

The employers of the ecosystem are working extra and most of hours are still unpaid

Geographical impact: EU

Stage of value chain: Every stage of the value chain

Character of the disruption: Drop of the financial capabilities linked to income generation

Time frame: Short term

EU actions needed:

- **Coordination:** Promotion of collaboration between financial institutes and social enterprises
- **Funding:** Financial support to social services to company for the crisis period

Recommendation:

- Funds to sustain social ventures should be encouraged for banks, proposing, for example, economic relieves for banks deciding to invest in a social business. This could help reduce the friction towards the perceived hesitance by financial providers to invest in these businesses.

Reduction of services

(12.06.2020)

Source: Thomas Bignal (BE), Suzanne Huiskes (NL)

Evidence: The outbreak of Coronavirus pandemic has obliged governments, at different levels, to impose special restriction measures on assets. Movement of human resources and physical assets have been affected, cross cutting different industries across the territory. In particular, in the Social Service sector, the number of services provided in person has been reduced or temporarily shut down and managed through on online channels, if possible.

Geographical impact: EU

Stage of value chain: Operation activities and services.

Character of the disruption: Limitation for resources and assets movement.

Time frame: Short term.

EU actions needed:

Funding: Provide specific funds to help sustain the loss from temporary discontinued services.

- **Regulation:** Define clear rules and assets allocation, to sustain and improve online services delivery, adapting to the ecosystem change.

Recommendation:

- Since not all the services can be moved totally online (Homecare for example), it is necessary to define specific deadlines for in-person service delivery limitations, since activities that are temporary dismissed for this reason, generate income loss and worsening of the service quality

Social economy as a driver for collaboration in the Industrial Ecosystem

(24.06.2020)

Source: Mikel Irujo, Government of Navarra

Evidence: Social Economy can represent a very useful economic paradigm for regional collaboration and growth. There are 2 million social economy enterprises in Europe, representing 10% of all business in EU. More than 11 million people – about 6% of EU's employees – work for social economy enterprises. Social Economy fosters respect, democracy, equality, pluralism, non-discrimination and solidarity in order to put human capital before profit. It unifies society and members interests, representing a good solution to boost increase industrial partnership.

Geographical impact: EU

Stage of value chain: strategic collaboration and partnership

Character of the disruption: social economy impact to boost industrial partnership

Time frame: mid term

EU actions needed:

- **Coordination:** (i) improve the competitiveness of Social Economy companies through the increase of the added value provided, in an interregional cooperation perspective; (ii) create European value chains of social economy enterprises belonging to different regions in Europe and improve the cooperation between them

Recommendation:

- Actors may not have enough resources, so it happens that collaborations are always established between those actors with more resources, creating in this way network always stronger than others. In this sense, Social Economy could be the solution.

Rising importance of sustainability paradigm in Social Housing sector

(03.07.2020)

Sources: Mathilde Gauss, Kaleidoscoop; Jon Ansoelaga, Basque Cluster Eraikune; Sorcha Edwards, Social Housing Europe; Kim van Sparrentak, European Parliament

Evidence: Speaking about social housing, it is necessary to distinguish between: (i) social housing (typically rental housing at below market prices); (ii) affordable housing (typically below, but closer to, the market's rents or housing built to be sold at an "affordable price"); and (iii) cooperative housing (owned and managed by residents groups or non-profit groups). Social housing can also concern the conversion of abandoned structures and places, with the aim of creating new places accessible for the community. The main goals, among

many, are to boost cooperation and accessibility, involving inhabitants, support needs of societies, enable sustainable development for societies (e.g. energy efficiency and *Near Zero Energy Building*). Social housing has a great importance in Europe, that boasts more than 43,000 local housing organisations, 25 million dwellings, roughly 200,000 new dwellings completed per year, over 50 billion € in new investment per year, more than 7,500 staff employed directly by the federations and more than 300,000 staff employed by local housing providers.

The housing sector represents one of the main sectors in terms of environmental impact (in several regions this sector consumes too much). For this reason, the achievement of sustainability objectives in this field is a crucial point for societies green transition. It is necessary to take advantage of the funds already available (Green Deal) to enable projects that foster the transition (e.g. lower housing consumption, renewable energy for housing sector, energy efficiency, zero-impact building, and others).

Geographical impact: EU

Stage of value chain: buildings, places and infrastructures usage

Character of the disruption: sustainability impact within Social Housing sector

Time frame: mid and long term

EU actions needed:

- **Regulation:** Social Housing is not a European competence. However, Europe can give local authorities a framework. Europe can take the rights of Social Housing and enable better places to live. Local authorities often suffer lack of funds to feed social housing and, even if social housing companies are very innovative, funding is not available.
- **Funding:** Funds for Social Housing investment within Recovery Plan. Grants and Public investments need.

Recommendations:

- The COVID-19 crisis has curbed many new projects in social housing, but it is important to underline that the economic crisis is not the only priority. It is essential that the environmental crisis is also a priority and, for this, social housing can make a difference. Both recoveries should be aligned, as together they have big potential.
- There is often a difference between urban and rural areas. People prefer to live in the city, but environmental problems are increasing (pollution, consumption, etc.). Rural areas also need to become more attractive to decongest urban areas.
- Smart cities paradigm and digitalization can improve the quality of life in urban areas and more sustainable cities management.

Potentialities of Social Housing for EU

The three main objectives that can enable Europe grow in this field are: (i) facing social challenges, in terms of accessibility, public promotion and rental; (ii) develop “in house” technologies and knowledge, such as energy efficiency, construction 4.0 and sustainability and (iii) going international involving several countries outside EU.

It is necessary to act strictly connected with the Green Deal to achieve the right to energy, developing affordable homes and resilient communities. Social housing can lead a just energy transition through the promotion of renewable energy and the support to district approach. Social houses need to be efficient, affordable, inclusive, integrated and financed. Social Housing is not a European competence. However, Europe can give local authorities a framework. Europe can take the rights of Social Housing and enable better places to live. Local authorities often suffer lack of funds to feed social housing and, even if social housing companies are very innovative, funding is not available.

Environmental benefits coming from shared value

(09.07.2020)

Source: Alberto Pezzi and Xavier Amores

Evidence: Shared value allows to strengthen the relationship among actors within a network, putting together the stakeholders to be stronger. Clusters can support shared value creation, helping companies to construct new products and services which are better aligned with societal needs, redefining productivity in the value chain with a more efficient use of natural resources and developing skills of local suppliers. Generally speaking, shared value expands companies' businesses creating new value to share between companies and societies. It is the evolution of *Corporate Social Responsibility* concept. Cluster are the ideal grounds for creating shared value since they involve different stakeholders with common strategic long-term visions and challenges.

Shared value can help societies to address 2 of the biggest challenges we are facing nowadays: (i) growing inequality and (ii) climate change. Regarding the second, clusters can foster the achievement of sustainability objective supporting companies' sustainable goals and generating cooperation between stakeholders. One of the most important challenges societies and companies must face is the right assessment and management of productive contents or embodied values of the consumed resources within economic systems. Defining productive content, its real depletion, right consumption, and sustainable impact may be high on impossible. This issue arises because on an economic basis, humankind assumes "ownership" of resources without having to "recompense" resources for any losses of value or damage. Ultimately, resources are economically free to humankind. This inevitably leads to the generation of negative environmental externalities, which represent one of the biggest market failures. For this reason, support stakeholder cooperation can help environment and natural resources preservation.

Geographical impact: EU

Stage of value chain: value for societies

Character of the disruption: impact of shared value on societies and environment

Time frame: medium – long term

EU action needed:

- **Coordination:** (Creating Shared Value) CSV policies require a coordinated and long-term effort by EU (but also national and regional authorities).

Recommendation:

- Territorial competitiveness implies looking beyond simple economic productivity and in this context. Clusters have a strong social value and might already work on projects which with a shared value.
- Horizontal cooperation initiatives often combine business and social objectives with positive effects in a specific community and human component (leadership, trust, strategic change, etc) is key in both cluster development and in creating shared value

11. Tourism

Collapse of Tourism Industry

(10.06.2020)

Source: Kristian Sievers, Lapin Liitto (FI), Teodora Jilkova (BG), Corinne Cerveau (FR)

Evidence: The global lockdown due to the COVID crisis has forced national and international governments to impose several restrictive policies to reduce people movements, close and avoid meeting and aggregation places, accommodation, vacation places and cross-regional travels. As a result, all the tourism sectors suffered a sudden stop and an inevitable decline, generating the decrease of the income for all the industry. Of course, the cash flows liquidity reduction creates difficulties in the management of short- and medium-term financial flows. Among these, there is first of all the staff management, which combined with the reduction of jobs due to the lack of work. This led to cuts in staff and the repositioning of several job positions.

Geographical impact: Global

Stage of value chain: tourism services exploitation by end users

Character of the disruption: demand and income annulment; human resources management issues

Time frame: short term

EU actions needed:

- **Coordination and Regulation:** more clarity on national and international restrictive policies
- **Funding:**
 - financing and grants to face the lost income of the past months and avoid the closure of activities or staff cuts
 - financing for new projects and services development

Recommendation:

- Tourism sector is highly fragmented and is characterized by a high number of micro and small enterprises. The crisis had a major impact on them and many of them struggle to survive.
- After 3 months of total closure, the sector is slowly rising and now the priority is to facilitate the recovery. The short-term goal is to survive, having awareness of the current and future limitations due to the pandemic situation. Companies, especially SMEs, are continuously waiting updated information regarding restriction policies from institutional actors, since it is very difficult for them to foresee the future in a period of total uncertainty (e.g. when and how to open vacation structures).

- Each sector stakeholder is facing different challenges and the recovery will also depend on external factors (e.g. the family tourism sector business will depend from the schools reopening, workers travel by corporate decisions, big events organization by government restrictive policies, etc).

Data analysis and sharing availability

(10.06.2020)

Source: Kristian Sievers, Lapin Liitto (FI), Esteban Pelayo, Sonsoles Jimenez Perez (ES), Teodora Jilkova (BG)

Evidence: The correct exploitation of data analysis processes involves three fundamental steps: (i) collection, (ii) analysis and (iii) sharing. Data analysis is a key factor in the entire tourism industry, even more in times of crisis. It is an essential technology to build information networks and decision-making processes and it helps in driving the digital transformation and overall innovation of the tourism sector.

Each activity of the tourism sector has its own fundamental data to guide decision-making processes. However, it is not always easy to find the right data to analyse and - even more important - to define their ownership. Availability gaps in data gathering regards mainly SMEs, which not always have the possibility and resources to take advantage from data potentialities and benefits. For this reason, it is difficult to share data between tourism SMEs. The crisis the industry is undergoing has further highlighted the importance of data analysis.

Geographical impact: EU

Stage of value chain: decision-making process and information exploitation

Character of the disruption: lack of data and inability to exploit data analytics potentialities by several SMEs

Time frame: mid and long-term

EU actions needed:

- **Funding:** funding for digital transformation and technology access for tourism companies

Recommendation:

- Data sharing for collaboration is fundamental for the future of tourism ecosystem. In this period of data and information scarcity, cooperation between the different players of the tourism sector is fundamental for data sharing and decision-making processes. This cooperation can be mainly of three types:
 - (a) cross-regional cooperation, in order to share useful information and practices among different tourism zones;
 - (b) intra-sectoral cooperation between trade association (e.g. hotels, restaurants, resorts, etc) to foster regional coordination;
 - (c) inter-sectoral cooperation among tourism industry and different but complementary industries (e.g. travels sector).
- The forecast of the tourism sector evolution in the coming months is highly complicated because there is no clarity on future guidelines and restriction policies.

Long-term sustainability

(10.06.2020)

Source: Kristian Sievers, Lapin Liitto (FI), Esteban Pelayo (ES), Jaime Quesado (ES), Aurora Baptista (PT)

Evidence: Despite COVID crisis, one of the most important objectives and success factors for the European Tourism Industry in the long run is sustainability. Due to its intrinsic characteristics, the tourism sector has a strong impact on sustainability. For this reason and because of governmental policies, the tourism sector has more and more integrated sustainability policies into own business strategy in recent year. In this sense, data analytics techniques and information networks can boost sustainability strategies for tourism companies and businesses.

Geographical impact: EU

Stage of value chain: strategy definition

Character of the disruption: importance of sustainability strategies for tourism sector

Time frame: mid and long-term

EU actions needed:

- **Funding:** financing for sustainability projects; grant for the most proactive activities towards sustainability

Consumer behavior

(10.06.2020)

Source: Kristian Sievers, Lapin Liitto (FI), Veronica Bocci (IT), Jaime Quesado (PT)

Evidence: The health crisis generated by the spread of COVID-19 has inevitably generated fears and concerns in people's willingness to move and travel. This means that the tourism sector will face a period of re-growth characterised by trust and fear. Trust is a complicated and very delicate aspect and is one of the key variables of the tourism business management.

Geographical impact: EU

Stage of value chain: exploitation of tourism services by customers

Character of the disruption: lack of trust

Time frame: short term

EU actions needed:

- **Funding:** measure for trust recovery, for example, promotions for tourism structure that have readily adapted to safety constraints and sanitation policies

Recommendation:

- A key factor to boost customer trust is the promotion of safe and clean places. Maintaining high safety standards implies a delicate balance between what needs to be done and the cost of doing it (e.g. material for sanitizing, social distancing, reservation reductions)

- Data analytics and information network (see *second disruption*) are significant to analyse customer behaviour and trust

Rising competition between tourism countries

(22/07/2020)

Evidence: For some European countries, tourism plays a major role for their economies. Due to the travel and mobility restrictions in the current crisis, the tourism sector has been one of the most effected ones, suffering from loss of clients and having to adapt to the safety measures. With the restart of travels, these countries find themselves in fierce competition over the tourists who go on vacation this year.

Geographical impact: EU

Stage of value chain: All stages

Character of the disruption: Increase in competition

Time frame: short/medium term

EU actions needed:

- **Funding:** support for the tourism sector to soften the repercussions of business losses

Recommendation:

- As pointed out in the session, every region has its own highlights to offer. This specialisation of tourism could be a way to sharpen target groups and attract business.

Lack of business opportunities fostered by collaborations

(22/07/2020)

Evidence: The pandemic situation and consequent restrictive norms of the last few months reduced collaborations among clusters and associations in the tourism sector on the European territory. Given the closeness to market of these associations, this represent a heavy loss in business opportunities and for European recovery.

Geographical impact: EU

Stage of value chain: All stages

Character of the disruption: Lack of business opportunities due to the pandemic

Time frame: medium – long term

EU actions needed:

- **Coordination:** fostering collaboration between clusters and association in order to increase the recovery of the sector

12. Construction

Lack of Workforce in construction (ES, FR, PR) (04.06.2020)

Sources: Jean-Luc Sadorge, Pôle Fibres-Energivie, (FR)

Evidence: Working on construction sites is a temporary, seasonal, precarious and sometimes risky activity, considered unattractive to talented people. Young people and workers prefer to be employed in production sites. There is a lack of professionals interested on this activity.

Geographical impact: EU

Stage of value chain: HRM

Character of the disruption: lack of workforce, skills and talents turnover

Time frame: medium – long term

Recommendation:

- Industrialize production: move some tasks to the supplier companies, create pre-made modules, to reduce working time on construction sites
- Improving the conditions of the building process

EU action needed:

- Yes, to support the industrialization of the processes and the upskilling / reskilling of the labour force.

Commerce disruption (SK, ES, PT, IT, LT) (04.06.2020)

Source: Xavi Perez, Cluster HABIC (ES)

Evidence: Due to the discontinued orders and commissions both from public and private sector, companies encounter several issues regarding access to market. Actually companies are asking to produce surface materials that keep virus away, but it is unpredictable if this will be a long term trend and a good market opportunity.

Geographical impact: EU

Stage of value chain: market and sales

Character of the disruption: lack components and materials

Time frame: short – medium term

Recommendation:

- Innovate on new products and business models
- Implement energy control systems connected to personal apps for the population as compulsory in all the new buildings or the one restored with the help of public funds.

- The market have to meet the new costumers' behaviours: buildings must be very active to detect contamination, schedule disinfection and able to recover.
- Houses need to be renewed, adjusting spaces to spend more time in and guarantee recirculation of air.

EU action needed:

- Yes, supporting the recommended actions.

Shutdown of construction sites

(04.06.2020)

Sources: Jean-Luc Sadorge, Pôle Fibres-Energivie

Evidence: Following the governmental decision of containment, companies decided to completely shut down the construction sites. As a consequence, the 92% of factories shut down; actually the activities has restarted at an average of 80%.

Geographical impact: FR

Stage of value chain: infrastructure and building sector

Character of the disruption: temporary

Time frame: short-medium term

Recommendation:

- Safe re-opening as soon as it is possible
- Invest in renovation of existing facilities

EU action needed:

- Yes, supporting the recommended actions.

13. Energy-intensive Industries

Raw material extraction and processing

(19.06.2020)

Source: Santiago Cuesta, MINE.THE.GAP consortium

Evidence: The global lockdown due to the COVID crisis has forced national and international governments to impose several restrictive policies for industries. As a result, several sectors and markets suffered huge problems related to the supply of raw materials, components, and goods. The procurement and processing of many raw materials are critical in terms of supply (e.g. critical and precious metals). The crisis has generated further criticalities due to logistical restrictions and new working conditions that companies must respect in order to maintain safety parameters, e.g. it is very difficult to keep distances in extraction quarries and some mining in-

dustry workplaces. These issues are reflected on the markets through a sudden rise in prices, damaging the balance of supply and demand in many sectors. The COVID crisis represents a big new challenge for raw material supply chains and mining industry (more than 240 exploration sites have been closed). During the COVID-19 crisis, the mining industry risks to lose \$100-\$200 billion in EBITDA. Production of metals like Nickel have lost more than 30 per cent of production. 25% of the employment is in risk. From Apr.16 about 247 mining projects closed world-wide

Geographical impact: global

Stage of value chain: raw material extraction and processing; manufacturing

Character of the disruption: difficulty in ensuring supply chain strength

Time frame: short and mid term

EU actions needed:

- **Funding:** innovative measures to make supply chains more resilient

Recommendation:

- Raw Materials Value chain is crucial for present and future EU economy, employment and well-being:
 - (i) Raw materials extractive and processing industries provided more than EUR 206 billion of value added and 3.4 million jobs;
 - (ii) Downstream industries generated around EUR 1 422 billion and 25 million jobs;
 - (iii) Repair and materials recovery provided EUR 103 billion and 2.2 million jobs.
- EU raw materials industries are leaders in sustainability and corporate social responsibility. About 24 % of the Global Reporting Initiative reports are from companies with headquarters in the EU. These need to be supported.

Long-term strategic plan for European Industry (22.06.2020)

Source: Ulla Engelmann, DG GROW

Evidence: The evolution of today's markets, which is increasingly dynamic and more demanding (and even more characterized by trends such as *shorter lead-time production* and *mass customization*), requires a strong long-term vision to enhance competitive advantage for European Industries and Ecosystems. To assure this advantage, European policies focus their strategies on a *Triple European long-term goal for Industry*, based on three main pillars: (i) sustainable paradigm and green economy; (ii) smart technologies and digital transformation; (iii) more resilient supply chains and global competitiveness. The supports provided by the European Community are manifold and result in a constellation of funding for cross-sectoral and cross-regional innovation ranging from technology to finance, from the market to knowledge and human capital.

According to this triple objective, the Recovery Package of Next Generation EU will be rolled out under three main pillars, as visible in the figure below. Moreover, 14 industrial ecosystems have been identified as main sectors to whom the package is addressed: tourism, mobility-transport-automotive, aerospace and defence,

construction, agri-food, energy intensive industries, textile, creative and cultural industries, digital, renewable energies, electronics, retail, proximity and social economy, health.

Geographical impact: EU

Stage of value chain: all stages

Character of the disruption: new long-term strategies of EU industries and societies

Time frame: mid and long term

EU actions needed:

- **Funding:** funding for SMEs and research innovation

Recommendation:

- Europe needs a digital sector that puts sustainability and green growth at its heart. Among many, digitalisation presents new opportunity for monitoring of air and water pollution; and monitoring and optimize how energies and resources are consumed. There are hundreds of industry clusters ready to implement the European Green Deal (250 industry clusters operating in the environmental technologies and 400 industry clusters operating in digital technologies)

Supply and value chain disruptions for European industries in material procurement

A) European supply chain weakness and issues in raw materials management processes

(29.06.2020)

Source: Dolors Pla

Evidence: The COVID-19 crisis is generating a widespread vulnerability along entire supply chains, including the raw materials supply. A competitive repositioning is needed which implies a greater coordination among the stakeholders to face the crisis. During the session on advanced materials, raw material criticalities of some supply chains have been discussed:

1. **Automotive:** Car usage has suffered a huge drop, generating a demand reduction, that caused issues for all the supply chains. Component manufacturers suffered big problems in raw materials supplies. All the stakeholders have suffered the timeline disruption, creating also a strong cash flows liquidity reduction that leads to difficulties in the management of short- and medium-term financial flows.
2. **Lack of protective plastic components** (e.g. PMMA and PVC): Manufacturing and processing companies have limited production capacity which has been unable to cope with global demand. It has not feasible to increase production capacity in the very short-term.
3. **Vaccine:** 70% of the ingredients comes from China. When the vaccine will become available, there will be a very high global demand and Chinese supplies will not be sufficient. One possible solution is to bring production back to Europe, but it is a choice that must be designed very well from a technological, strategic and political point of view.

Geographical impact: EU

Stage of value chain: Raw materials supply

Character of the disruption: lack of raw materials and strong dependence from Asian markets

Time frame: short-term

EU actions needed:

- **Coordination:** strengthen collaboration and cooperation between European industries
- Incentives for circular economy

Recommendation:

- In general, there is a strong dependence from Chinese markets and supplies within the European sectors and supply chains.
- Innovative technology can be a solution. For example, 3D printing techniques have been represented as a key factor for prototyping of new solutions during the pandemic. However, new solutions are not always easy to homologate and often the main barriers are more political and strategic than technological.
- Furthermore, getting access to materials can be achieved by recycling and thus bringing materials back to the value chain. This needs incentives and sustainable economic conditions, e.g. reducing taxes.

B) EU dependence from Asian markets and EU know-how as competitive advantage

(29.06.2020)

Source: Manuel Miranda Martinez

Evidence: Supplies of critical materials, steel, mining and in general the heavy industries are very critical and fundamental for a huge number of industrial sectors. It must always be kept in mind that for many of these materials, Europe does not have mines and stocks, so it would be practically impossible to obtain independence from the Asian or South American markets. In contexts where it is not possible to compete, such as in the raw materials supply chains or in production capacity of several sectors, Europe must build its competitive advantage on knowledge and know-how. European excellence can allow Europe to be a leader in terms of innovation and research in many sectors. Also, sustainability and cleaner production represent key pillars for long-term competitiveness, where climate issues and environmental problems will be increasingly restrictive. European value chains have to be always greener, integrating ecology as a main strategy.

Geographical impact: EU

Stage of value chain: strategy

Character of the disruption: dependency on China

Time frame: medium and long term

EU actions needed:

- **Regulation:** improve regulation process for homologation of European innovation, lowering barriers and acting especially from a politics and strategic point of view

Recommendation:

- Intellectual Property (IP) management is essential for the protection of European know-how and must be increasingly managed at European level.

- Although in the founding principles of the European green transition there is the goal of not leaving anyone behind, it is equally true that it is essential to have leading companies in this, to avoid going too slow

Raw materials availability & supply chain disruption

Source: Mattia Adani (IT), Maria Dolores Nunez

Evidence: Raw materials treated by chemical industries suffered a disruption in availability, since European industries are not independent; China and India are among the major exporters of raw materials in Europe. The recent pandemic of COVID-19 exposed the lack of resilience in the chemical industry supply chain, since lockdowns have restricted access to products outside the EU.

Geographical impact: EU

Stage of value chain: raw material procurement

Character of the disruption: raw materials access and availability for the chemical European industry

Time frame: medium – long term

Recommendation:

- Green Economy and in particular Circular Economy represent a concrete way to achieve higher flexibility from foreign suppliers, exploiting raw materials already on European field; moreover, resource efficiency goals are present, since input materials are waste from other production processes, allowing cost savings and avoiding natural resources consumption.

Regulation on material handling to achieve Circular Economy systems

According to the recent world policies, one of the key goals for future industrial and societal systems is guaranteeing the triple sustainability objective (i.e. environmental, economic, and social). In this context, the Sustainable Paradigm has attracted a great deal of attention over the last decade as an emerging approach meant to empower enterprises and communities to cope with the sustainability challenges. Within the Sustainable Paradigm, the Circular Economy (CE) systems provide for a more efficient and more effective use of resources, where the resources flows are not static and bound by one-directionality, but they fall circularly in the upstream phases of the production system. Green Economy and in particular Circular Economy represent a concrete way to achieve higher flexibility from foreign suppliers, exploiting raw materials already on European field; moreover, resource efficiency goals are present, since input materials are waste from other production processes, allowing cost savings and avoiding natural resources consumption. Clear regulation on material handling (agri-food wastes, alcohol) to foster the industrial recovery are needed and partnerships through clusters of industries and local entities in order to implement a correct management of the re-usable waste are essential to foster the green transition.

Innovation in material sectors to support SMEs recovery

(20/07/2020)

Evidence: Covid-19 crisis has highlighted the key role of the material processing industries (e.g. plastics for respirators, mask and visors, textiles for masks, tubes for bed, and many others) in the value chains and the

absence of certain key technologies and materials in the EU. This crisis marks a breakthrough for many companies:

- Digital transition impacts the material industries and conversely, materials are essential for the success of these transitions (e.g. robot, sensors, batteries, etc). Moreover, the digital dimension (telework in particular) has shown its effectiveness and can lead to the simplification of companies to go further towards such a transition.
- The innovative solutions are multi-material and therefore they must be thought in cycle of their use: “from cradle to cradle” (respecting Circular Economy concept, a key point of the Green Deal). Supply constraints have shown their weight and therefore the need to find alternative solutions under the Green Deal in a European approach.
- With the recovery, differentiation will become a priority again to position oneself on the market.

Geographical impact: EU

Stage of value chain: design and innovation in materials sectors

Character of the disruption: innovative trends

Time frame: mid and long term

EU actions needed:

- **Funding:** to help SMEs that are in the process of launching innovation projects, but are in financial difficulty due to Covid-19 crisis to go through with projects and not give up for lack of means

Critical access to raw material supply chains for EU companies

(20/07/2020)

Evidence: Materials are fundamental in all sectors and represent the means to realize ideas of new products. Some material value chains are at risks in terms of availability, for example rare materials such as polymers from speciality chemicals, palladium, diodes and many others. Moreover, in several supply chains, there are technical/technological issues and loss of know-how (critical stages, lack of industrial tools, risk of failures, loss of suppliers, etc). The disappearance or absence of links in these value chains is a critical factor with significant risks for the downstream.

Another important point that has been highlighted and that has been part of several previous sessions, is the dependence of EU supply chains from Asian markets. The EU does not have all the sources of raw materials in Europe, which generates significant losses of autonomy for several sectors. Many specific raw materials which prices are very volatile and/or supplier are few and outside our borders make the EU particularly vulnerable.

Geographical impact: EU

Stage of value chain: procurement

Character of the disruption: raw materials supply difficulties

Time frame: medium/long term

EU actions needed:

- **Coordination:** launching a study for a shared analysis of the risks and critical points of the complete sectors to identify solutions to improve resilience and security in the medium/long term.

Recommendation:

The industrial material sectors have a strong impact on the consumer markets. Too often however, these markets do not take into account upstream issue due to a lack of knowledge.

14. Retail

Commerce disruption

(22/05/2020)

Evidence: Disruption of usual channels of selling products and services, generating a strong need of e-commerce technologies and knowledge, as well as stimulating new type of consumer relationship. There is a big number of SME's across Europe not ready for this new situation, losing market share in front of the big worldwide competitors.

The **closure of abroad market** lead to create **bigger local competitions** and **local markets saturated:** the big producers need to export. Local supermarkets have experienced a general **20% increase in purchases**, finding themselves unprepared. **Ecommerce** is needed for local producers /sellers to stay alive, to keep the supply chain open and to have the product reach the market and not to be cut away from the market. **Tourism disruption** has impacted the agrifood chain connected to touristic services (restaurant, bars, cafeterias...) and decrease in consumptions. **Consumption problems** for season's products because of limited capacity of certain locations. Chocolates and sweets have dropped (by 40/50%)

Geographical impact: SK, ES, PT, IT, LT

Stage of value chain: Outbound Logistics, Demand

Character of the disruption: Closure of borders and selling channels disruption

Time frame: short term

EU actions needed:

- **Coordination:**
 - Support local retailers to face demand increase
 - Digitalization for markets, products and buildings
 - Innovate on new products and business models

15. Textile

Shortage of critical supply of protection equipment & uniform certifications (27.05.2020)

Protective Equipment (PPE) shortage has created a bottleneck upstream in the supply chain, yet protective products have different authorizations in national markets: companies need to have common policies to EU Commission. It is difficult to **have a clear overview** regarding the specific situation involving different countries and regions across EU: someone need **different equipments** and someone **different solutions**. Find **balance** between providing protection **equipments** suitable for the specific application and common norms of certifications, in particular for protective masks. It's difficult to **map all specific issues** and needs in Europe, because the crisis has hit all countries but in different ways, creating **unbalance in geographical distribution**.

Geographical impact: ES, IT

Stage of value chain: certifications

Character of the disruption: lack of protection equipment in absence of common regulations

Time frame: short term

EU actions needed:

- **Coordination:**
 - Enhance Europe's capabilities on production of advanced materials for masks
- **Regulation:**
 - Improve regulation process for homologation of European innovation (homologations of tissue masks)

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