EUROPEAN CLUSTER COLLABORATION PLATFORM

Report on the survey "Solutions to Supply Chain Disruptions in the EU"

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European hub for industry clusters. It contains data on the characteristics of different types of cluster actors that are currently able to profile themselves on the platform, alongside statistical data on sectors and industrial ecosystems for 201 regions.

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Executive summary

This report presents the results from the survey **„**A Solution-Oriented Approach to Supply Chain Disruptions" which was run between May and September 2022 by the European Cluster Collaboration Platform (ECCP). The following key takeaways are summarised:

Impact of supply chain disruptions

- **Disruptions in supply chains have a variety of impacts** on the respective industrial ecosystems. In this regard **company size also plays a role** in how badly the organisations are impacted. Nevertheless, respondents in a previous survey pertaining to **industrial ecosystems** of **Agri-food, Construction and Mobility – Transport – Automotive showcased the highest impact** in terms of input and market losses.
- The majority of organisations in the EU experienced negative effects of external shocks in recent years. These shocks have specifically manifested in **increased prices for supplies and services, as well as delivery delays.**
- Disruptions in the **inbound logistics, procurement and operations are the stages at which supply chain disruptions are most frequently experienced** by the majority of the survey participants.

Solutions to build supply chain resilience in the EU

- In the near term, the **diversification of the supplier base** as well as **building redundancies** (e.g., through safety stocks) are seen as the key measures for improving supply chain resilience. Cluster organisations as well as enterprises see this as the most relevant near term measure. Among the top near term measures are also the **regionalisation of the supplier base** followed by the acceleration of planned investments to enhance supply chain resilience.
- Among the currently adopted solutions for improving supply chain resilience, h**uman resources play a major role** (upskilling & hiring of employees) followed by **research & development**, and finally **smart production solutions**.
- Issues with suppliers are among the most frequent difficulties in improving supply chain resilience. Survey participants reported to **struggle with capacity shortages, identifying new suppliers** and also **insufficient competitiveness of (regional) suppliers**.
- The importance of **financial support both to implement new technologies and to build new production capacities** are highlighted as priority measures over the next five years at the EU level. Support for s**caling up of companies & technology in Europe, mapping of supply chains of European interest** and **increased funding of R&D projects** are as well regarded as high-priority measures.

Project proposals to build supply chain resilience

- Only a minority of survey participants are currently involved in publicly funded projects that address supply chain disruptions. Many of those projects that tackle supply chain disruptions in which survey participants are involved in are related to **recycling, energy & resource efficiency** as well as **data-driven, end-to-end monitoring of value streams**.
- A variety of suggestions for future projects/initiatives that focus on supply chain resilience are brought forward. Among these suggestions, projects/initiatives that **support supply chain governance, increase energy & resource independence as well as support innovation ecosystems** are highlighted by the majority of participants.

01

Introduction

1. Introduction: Supply chain disruptions in Europe and impact on EU-trade

This section provides a concise contextual background about the supply chain disruptions in our globalised economy. Thereby, a particular focus is placed on the current situation in relation to the supply chain disruptions in Europe, how these have impacted EU-trade and economies, as well as the role of clusters in these events.

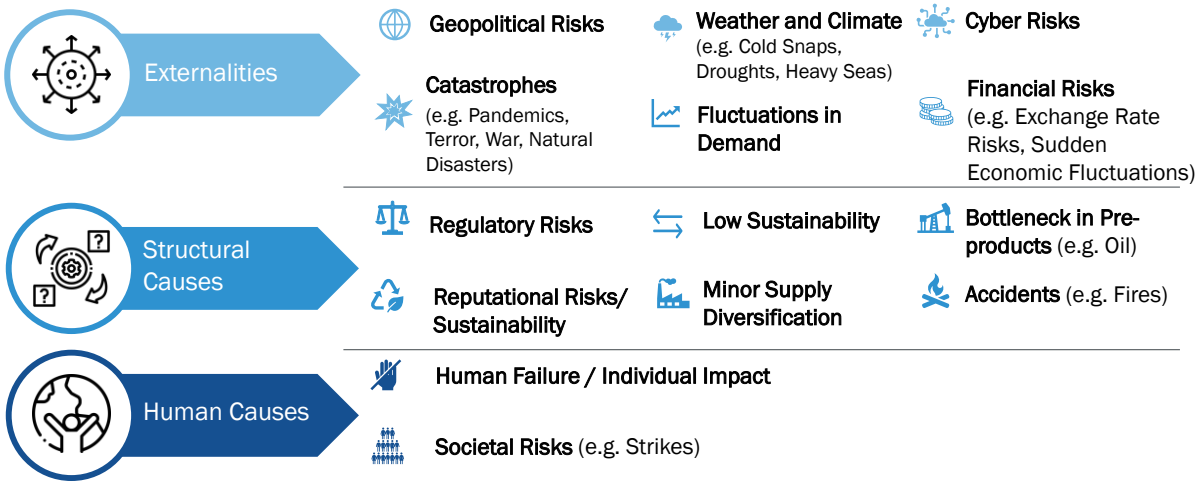
The nature of supply chain disruptions

Amid increasingly interconnected and global markets, economies have been able to expand their trade flow capacities to high levels, with global trade expected to grow by 70% to $30 trillion by 2030[1]. Drawing on a 2020 report by the World Bank, growth in supply chain takes place in specific sectors such as machinery, electronics, and transportation, with regions specifically focussing on these areas comprising Europe, North America, and east Asia[2]. Following the trajectory over the past 30 years, supply chain trade has been increasingly growing (excluding the 2008 global financial crisis that led to stagnation as well as a decline in global trade). Nevertheless, the EU stands out as a unique player in these trade flows, as its producers rely heavily on imported parts and components from third countries. Meanwhile, additional EU imports of intermediate goods account for 65% of total trade for all goods.

The deconstruction of rigid trade barriers, the widespread adoption of technological innovations and liberalising markets (especially in the region of Asia) constitute current-day complex trade structures. Although multinational enterprises have driven these changes, also small and medium-sized enterprises have integrated global supply chains into their businesses[3]. While the international outlook of supply chains has created a plethora of opportunities, it has also created its own challenges for contemporary economies. Economies have grown increasingly prone to disruptions in trade and supply chains, bringing multiple risks in different dimensions (see Figure 1). These typically occur through **externalities, structural causes or human causes**, as summarised below. This figure demonstrates how supply chain disruptions can be triggered through a variety of factors, where a series of unrelated events could effectively cause a shortage. The risks at display might appear distinct from one another on the surface but it is the culmination of different factors affecting different stages and aspects of a business' output that can constitute a "perfect storm" in disruption[4].

[1] Standard Chartered (2021). Global trade will grow by 70% to USD 30 trillion by 2030. Available under: Global trade will grow by 70% to USD30 trillion by 2030 | Standard Chartered (sc.com)
[2] The World Bank (2020). World Development Report 2020: Trading for Development in the Age of Global Value Chains. Available under: World Development Report 2020: Trading for Development in the Age of Global Value Chains (worldbank.org)
[3; 6] European Parliament (2021). Impacts of the COVID-19 pandemic on EU industries. Available under: Impacts of the COVID-19 pandemic on EU industries (europa.eu)
[4] Physog (2021). How a perfect storm of factors led to 'the mother of all supply chain disruptions'. Available under: How a perfect storm of factors led to 'the mother of all supply chain disruptions' (phys.org)

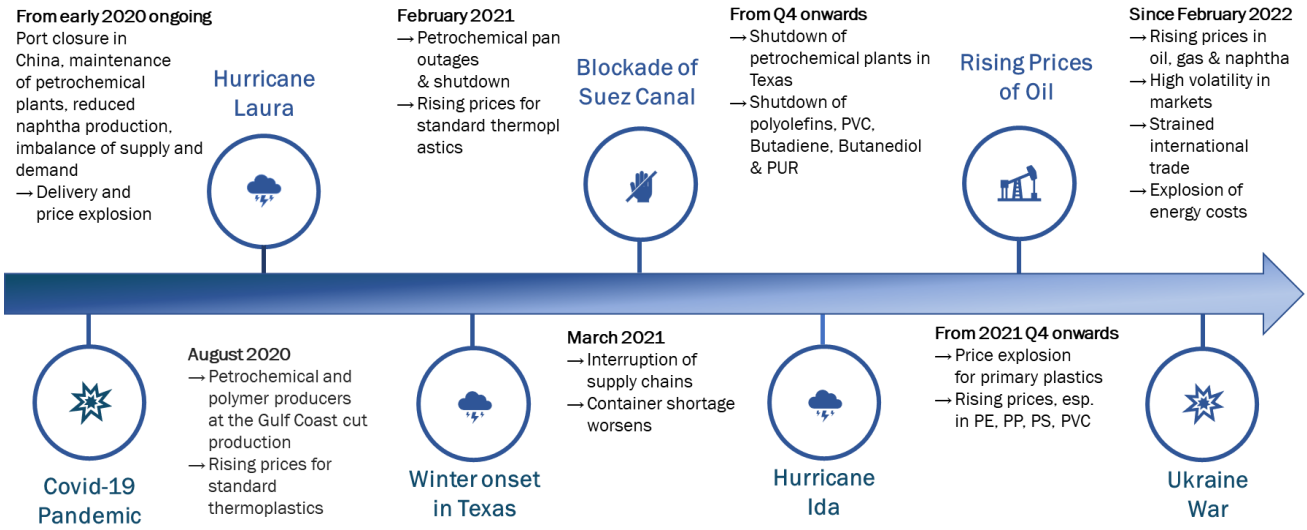
Figure 1: Dimensions of risks to supply chains



Source: ECCP (2022)

In parallel with the dimensions laid out in Figure 1, the events depicted in Figure 2 showcase a range of different scenarios in which disruptions in the supply chain occurred. Thus, to illustrate these dynamics with tangible examples, Figure 2 provides a chronological run-down of the most **significant events that have caused disruptions in the supply chain since 2020**.

Figure 2: Events impacting the supply chains since 2020



Source: ECCP (2022)

For example, events like the Covid-19 pandemic (since 2020) represent a natural **catastrophe** as well as **fluctuations in demand**, in which would port closures in China would cause delivery failures, price increases and disruptions in consumption patterns. On another note, **weather and climate risks** that were witnessed through Hurricane Laura (August 2020), Hurricane Ida (2021) and the Winter onset in Texas (2021), further illustrate the environmental risks that could effectively cause rising prices in thermoplastics, as well as in PE, PP, PS or PVC. The Russian invasion in Ukraine embodies the most recent and challenging event that has sent ripple effects across many stages of supply chains and has exposed risks in the realms of **geopolitical risks** as well as **minor supply diversification**. Against the backdrop of stand-out disruptions since early 2020, the Russian invasion in Ukraine has exacerbated said disruptions, with sanctions directed at Russia causing delivery delays or a lack of delivery entirely.

New insights: The ECCP survey on "Solutions to Supply Chain Disruptions in the EU"

In early June 2022, the ECCP published a first report on the impact of supply chain disruptions in the EU, which mapped out the criticality of the disruptions in all 14 industrial ecosystems.[5] Based on these findings, a second study was designed with the aim of deepening these insghts. Therefore, a second survey introduced questions on solutions to mitigate supply chain disruptions as well as roadmaps for joint projects that can increase supply chain resilience across the EU. The results of the survey present a fresh account of the challenges faced and measures applied by the business community in building supply chain resilience. On a further note, the results provide some insights about the future measures and specific project ideas that would address the identified difficulties. In the following a brief overview of the survey participants is provided.

Overall, this report draws from an entirely new source of data, collected through a survey that includes a **total of 336 participants** across the EU. The survey, which was translated in all relevant EU languages, was distributed through various channels between May and September 2022. These channels include social media channels, distribution through multiplier organisation as well as dedicated contact lists of EU enterprises. Through these distribution methods, participants from all over the EU were reached. On a national level, the survey completion from EU15 members is made up of 217 participants, whilst EU13 members amount to 118 participants. The analysis of the survey participants by their entity shows that most of the survey participants (54%) are small and medium enterprises (SMEs) followed by cluster organisations (21%). Large enterprises (15%) are the third biggest group of survey participants. The survey participants can also be linked to all 14 industrial ecosystems. The majority of survey participants are thereby active in the ecosystem Mobility – Transport – Automotive, Energy – Renewables and Health. Other ecosystems in which many survey participants are active are Agri-food, Digital, Construction and Electronics. A detailed analysis is provided in the Annex.

[5] ECCP (June 2022): Report on the survey Identification of disruptions in value and supply chains. Available under: https://clustercollaboration.eu/sites/default/files/news_attachment/Report%20on%20the%20survey%20Identification%20of%20disruptions%20in%20value%20and%20supply%20chains.pdf

02

Short recap: Impact of supply chain disruptions in the EU

2. Short recap: Impact of supply chain disruptions in the EU

Overview of key findings

1. Supply chain disruptions have a variety of impacts on the respective industrial ecosystems. In this regard company size also plays a role in how badly the organisations are impacted. Nevertheless, respondents in a previous survey pertaining to **industrial ecosystems** of Agri-food, Construction and Mobility – Transport – Automotive showcased the highest impact in terms of input and market losses.
2. The **majority of organisations in the EU experienced negative effects** of external shocks in recent years. These shocks have specifically manifested in increased prices for supplies and services, and delivery delays.
3. Disruptions in the inbound logistics, procurement and operations are the **stages at which supply chain disruptions are most frequently experienced** by the majority of the survey participants

This section focuses on investigating the most telling reasons for supply chain disruptions impacting different European organisations and how this has impacted EU-wide trade and its respective economies. Hereby it is also important to acknowledge how the sectoral focus, size and location can determine the extent to which supply chain disruptions can impact a company's input and output, further underlining the complexity and risks of current-day supply chains.

Overarching findings on impacts of supply chain disruptions

According to a S&P Global report from 2022, the most strongly affected industries on a global scale turn to be manufacturing of motor vehicles, trailers, and semi-trailers; electrical equipment; machinery and equipment; and computer, electronic, and optical products as a majority of companies operating in those sectors are facing high shortages[6]. This point is echoed in a report by the European Parliamentary Research Service, noting how nearly all manufacturing sectors have suffered delays in delivering parts, intermediate goods and products, where Asia, the EU and the US were most affected.

Similarly, a report from the European Central Bank acknowledges how disruptions can occur to a myriad of sectors as well as during multiple stages of the supply chain, causing problems in the logistics and transportation sector, specifically[7]. As mentioned in the previous sub-section, said increases to energy and other raw materials prices have added further pressure and limited the rebound of global trade. This has therefore impacted sectors with long global value chains, high dependency on energy and metals supply. A report from Accenture builds on these observations and maps out three distinct areas that were specifically impacted by the supply chain "shocks" and are due to be reinvented[8]:

1. Logistics breakdowns
2. Energy security
3. Lack of material supplies

[6] IHS Markit (2022). European supply shock: Sectors and countries at most risk. Available under: European supply shock: Sectors and countries at most risk | IHS Markit
[7] European Central Bank (2022) Economic, financial and monetary developments. Available under: Economic Bulletin Issue 8, 2021 (europa.eu)
[8] Accenture (2022). From disruption to reinvention: The future of supply chains in Europe. Available under: https://www.accenture.com/us-en/insights/strategy/ukraine-future-supply-chains-europe

In the first pillar, logistics breakdowns, the report outlines the key aspects that have caused transportation bottlenecks to exacerbate input shortages. In reference to the continued lockdown in China and the war in Ukraine, it is observed how port closures or a reduction in export can create bottlenecks and have a cascading effect through multiple stages of supply chains. The second pillar, energy security, represents the difficulty in safeguarding energy access in the context of sustainable energy sources as well as fossil fuel dependencies. All four issues combined constitute a risk in stake values and prospects of economic recovery. The third pillar, lack of material supplies, laments the limited number of suppliers of a good or service as well as the lack of intermediate inputs.

Altogether, the implications of sanctions directed to Russia and a lack of steady trade flow to and from Ukraine have forced European businesses to rethink their trade routes altogether. With global supply chain systems predominantly based on the "just-in-time" production system, operational efficiency and shareholder values are maximised for the shareholders. While this supply chain setup keeps the current costs low and profitability high, it does not put businesses in a well-equipped position to deal with sudden disruptions, regardless of whether it appears on the supply or demand side. On a further note, said structures tend to be built inflexibly and are difficult to reconfigure, impeding policy changes to initiate change. The private sector has been taking important steps in addressing current problems by utilising digital technologies or diversifying suppliers and manufacturing sites to enhance their resilience to supply chain shocks[9]. Hereby, networks could be reimaged in a way by focusing on supply and services security. In linkage with these efforts, it is crucial that stakeholder groups prioritised sustainable supply chains that engage in circular business models that are gaining traction and becoming a 'new normal'[10].

Before delving into the specific information regarding survey participants, it is important to mention the former survey, which was launched by the representatives of the European Cluster Collaboration Platform. On behalf of the European Commission, this survey ran from March to April 2022 and sought to understand the impact of the current geopolitical situation on companies and industrial ecosystems alike[11]. Published in June 2022, the report titled: **"Identification of disruptions in value and supply chains"**, analysed the particular impact on all 14 industrial ecosystems, whilst detailing the specific challenges that stakeholders across different sectors had to face. Stand-out findings on the report underlined the differential impact suffered by the respective industrial ecosystems and how company size also played a role in how badly they were impacted. Nevertheless, respondents pertaining to industrial ecosystems of Agri-food, Construction and Mobility – Transport – Automotive showcased the highest impact in terms of input and market losses.

Latest ECCP survey findings on the nature of impacts of supply chain disruptions in the EU

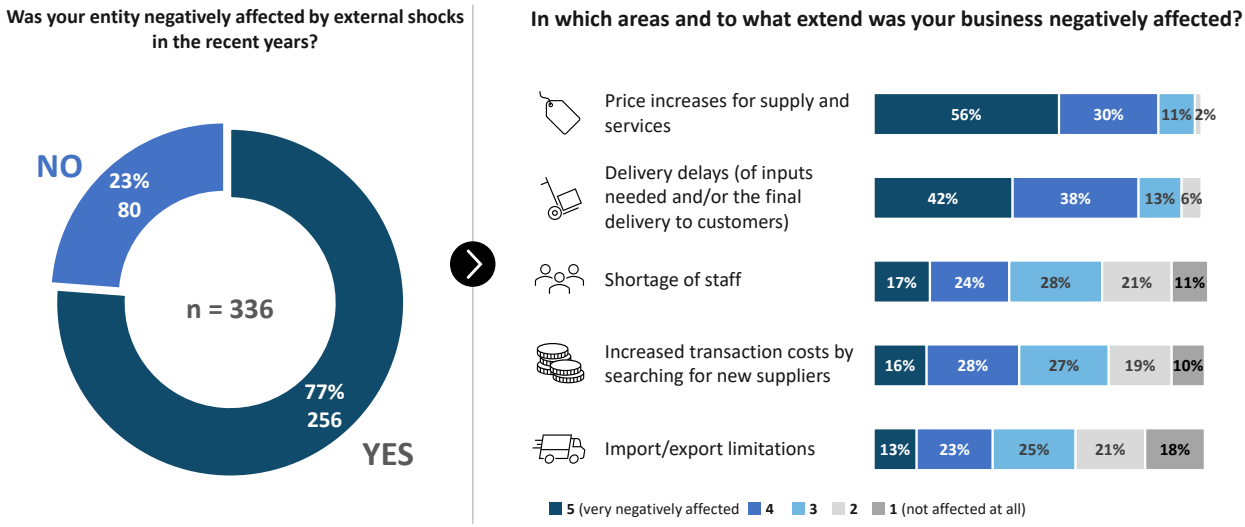
The first part of the survey "A Solution-Oriented Approach to Supply Chain Disruptions" investigated the impacts of supply chain disruptions as a starting point of the investigation and to complement the ECCP report of June 2022. The key findings are presented in the following section.

Figure 3 informs about the effects of external shock on businesses in the EU. Totalling 336 participants, the **majority (77%) has experienced negative effects** of external shocks in recent years. These negative effects caused by the shocks have specifically manifested in increased prices for supplies and services. Here, around 56% of the survey participants have been very negatively affected. Another area in which survey participants have been subjected to negative impact is delivery delays. More than 40% of the survey participants report negative effects in terms of increased transaction costs that originate in the search for new suppliers. Similarly, around 40% of the participants have been negatively affected by a shortage of staff. Import and/or export limitations are the areas where around

[9] GSDRC (2016). The role of the private sector. Available under: The role of the private sector - GSDRC
[10] Pwc (2020). Circular business models are very well possible. Available under: https://www.pwc.nl/en/insights-and-publications/themes/sustainability/circular-business-models-are-very-well-possible.html
[11] ECCP (2022): Report on the survey Identification of disruptions in value and supply chains. Available online: https://clustercollaboration.eu/sites/default/files/news_attachment/Report%20on%20the%20survey%20Identification%20of%20disruptions%20in%20value%20and%20supply%20chains.pdf (last access 24.10.2022)

40% of the survey participants report that they have not or only to a small extent have been negatively affected. Further scrutiny of the survey responses shows that large enterprises tend to be slightly stronger affected by price increases for supply and services (61% have been very negatively affected) and by delivery delays (47% have been very negatively affected). Cluster organisations also emphasise the negative effects of price increases for supply and services for the member firms (66% report that their members have been very negatively affected).

Figure 3: Negative effects of external shocks on EU supply chains

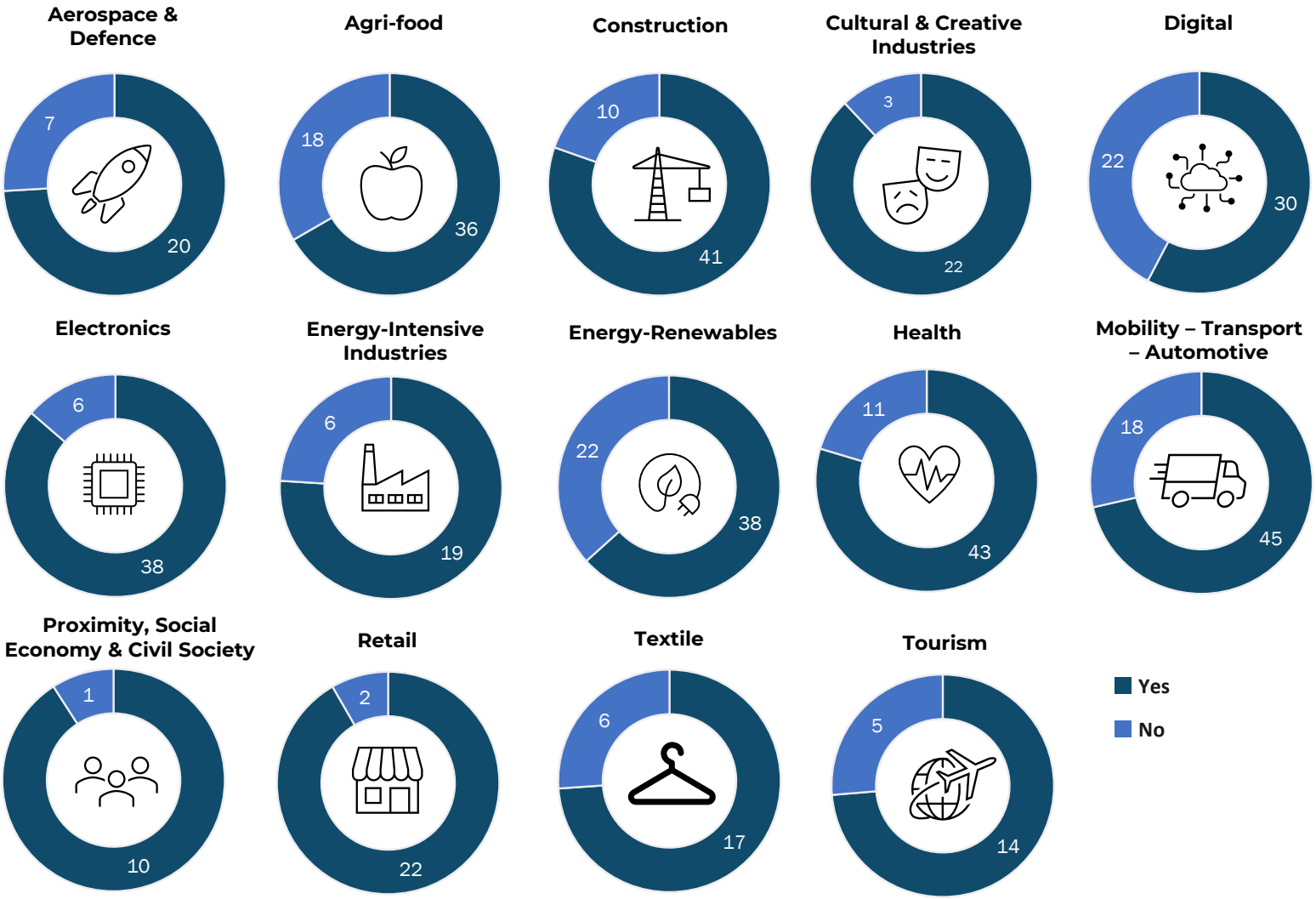


Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions

Figure 4 provides a differentiated analysis on the **negative effects of external shocks by industrial ecosystem**, with at least half of the respondents pertaining to each industrial ecosystem experiencing negative effects. Overall, from the 256 participants that experience such negative external shocks the majority (45 participants) are active in the ecosystem Mobility – Transport – Automotive followed by the ecosystem Health (43 participants) and Construction (41 participants). Moreover, from a relative perspective organisations involved in Retail (22 out of 24 participants), Cultural & Creative Industries (22 out of 25 participants), and Proximity, Social Economy & Civil Society (10 out of 11 participants) appear to have been overwhelmingly impacted by external shocks. Likewise, 38 out of 42 respondents in Electronics as well as 41 out of 51 participants in Construction revealed how their businesses were buffeted by the external shocks. On the other hand, some industrial ecosystems appear to have been more robust and/or resilient to external shocks, with respondents from Agri-food, Energy-Renewables and Digital reporting the lowest negative experience rates. The responses regarding the negatively affected areas by industrial ecosystem do not differ to a greater extent from the picture shown in the previous figure. However, it is noticeable how participants from the industrial ecosystem highlight the effects of price increases for supply and services (73% have been very negatively affected). This ecosystem has also been especially affected by price increases in the last couple of years.[12]

[12] see https://www.hka.com/supply-chain-cost-increases-lead-to-proliferation-of-cost-escalation/ (last access 24.10.2022) and https://www.cbre.com/press-releases/construction-costs-expected-to-post-largest-increase-in-years (last access 24.10.2022)

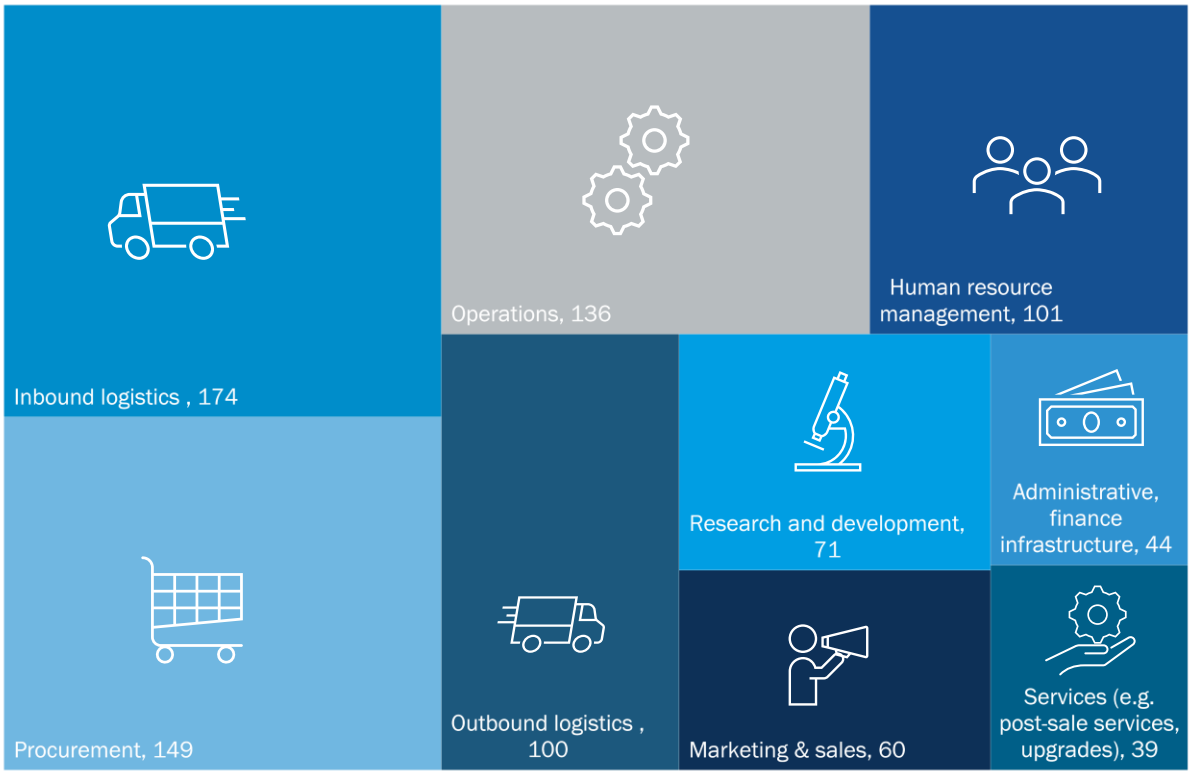
Figure 4: Negative effects of external shocks experienced by industrial ecosystem in the EU



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions

In regard to the **stages at which supply chain disruptions** are experienced (Figure 5), the majority of the survey participants report disruptions in their inbound logistics (e.g., raw materials, intermediate inputs, storage), their procurement (e.g., supplier management, funding, specification, standardisation) and their operations (e.g., manufacturing, processing, maintenance). Particularly logistics, as well as operations-stage disruptions reinforce reports from S&P Global, the ECB and Accenture. The stages at which participants report the least survey participants have experienced disruptions are services (e.g., post-sale services, upgrades) as well as the administrative, finance infrastructure (e.g., legal accounting, finance).

Figure 5: Stages of the supply chain in which disruptions are experienced by EU organisations



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 255. Note: Participants could select multiple disruptions.

In the following chapter solutions to increase the supply chain resilience in the EU will be discussed based on the results to the survey "A Solution-Oriented Approach to Supply Chain Disruptions".

03

Solutions to build supply chain resilience in the EU

3. Solutions to build supply chain resilience in the EU

Overview of key findings

1. In the **near team**, the diversification of the supplier base as well as building redundancies (e.g., through safety stocks) are seen as the key measures for improving supply chain resilience. Private enterprises as well as cluster organisations see this as the most relevant near term measure. Among the top near term measures are also the regionalisation of the supplier base followed by the acceleration of planned investments to enhance supply chain resilience..
2. Among the **currently adopted solutions** for improving supply chain resilience, human resource measures play a major role (upskilling & hiring of employees) followed by research and development and by smart production solutions. In terms of planned accelerated investments targeted at improving supply chain resilience, again R&D followed by smart production solutions are most relevant.
3. Issues with suppliers are among the most frequent **difficulties in improving supply chain resilience.** Survey participants reported to struggle with capacity shortages, identifying new suppliers and also insufficient competitiveness of (regional) suppliers. For large enterprises, regulations & tax incentives play a larger role whereas cluster organisations often reported lacking financial resources & too uncertain return on investment in new technology for supply chain resilience.
4. The importance of financial support both to implement new technologies and to build new production capacities are highlighted as **priority measures over the next five years at the EU level**. Support for scaling up of companies & technology in Europe, mapping of supply chains of European interest and increased funding of R&D projects are as well regarded as high-priority measures.

A central focus of the survey was on solutions and specific measures to build supply chain resilience. The key findings are presented in the following section. Thereby, a focus lies on solutions that improve supply chain resilience in the near term as well as difficulties faced in improving supply chain resilience. In addition, solutions for improving supply chain resilience in the future are discussed.

Solutions for improving supply chain resilience in the EU in the near team

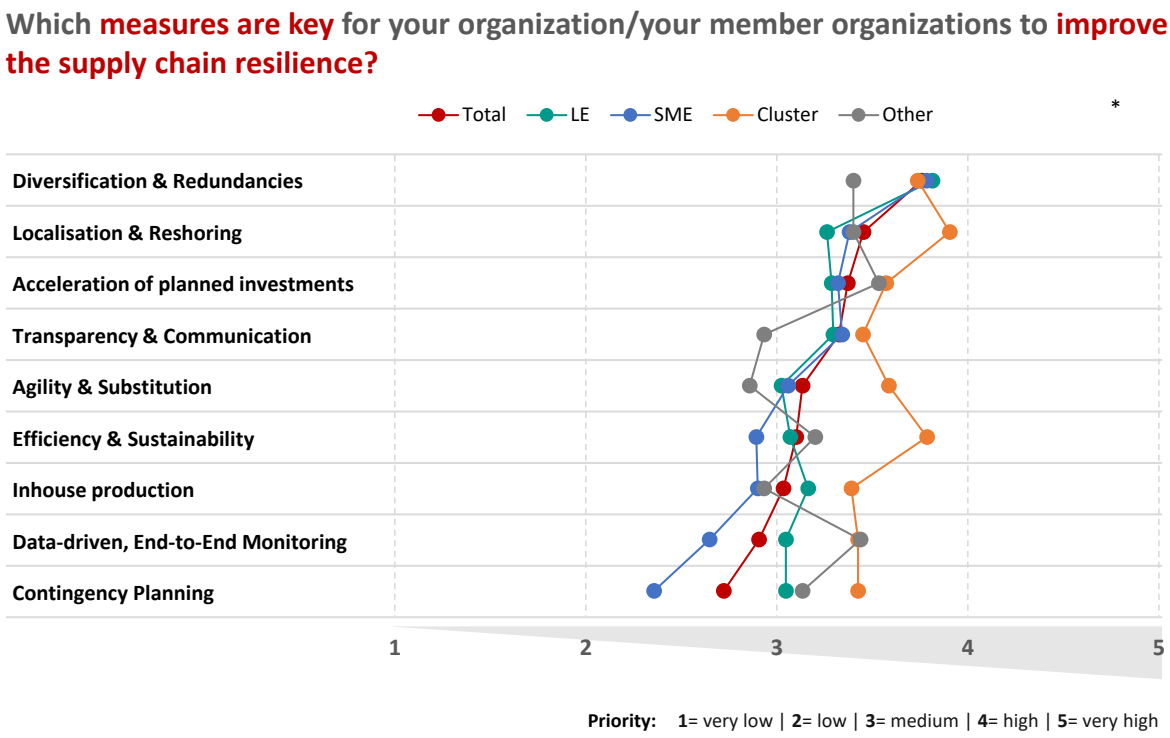
As for the measures that the respondents perceive as key for their organisation **to improve supply chain resilience in the near term**, Figure 6 below presents the key results by entity type. Here are the key learnings:

Overall, **diversifying the supplier base** (e.g., increasing the number of suppliers to reduce dependency) and building redundancies (e.g., by safety stocks) ranks as the top priority. This impression is shared by large enterprises, SMEs as well as cluster organisations alike. Unsurprisingly, universities, Research & Technology organisations and associations are rating this measure as less important since these entity types are usually not directly producing goods.

Among the top three measures for improving supply chain resilience are **localisation and reshoring**, i.e., regionalising the supplier base as well as moving parts of the supply chain inhouse, to reduce dependency (inhouse production) and **acceleration of planned investments** to enhance supply chain resilience. Here, cluster organisations rate these measures as more important compared to the other entity types. Moreover, cluster organisations rate almost all measures for improving supply chain resilience as more important compared to other entity types. This picture emerges especially for the measures **efficiency and sustainability** (collecting, recycling & reusing materials or increasing efficiency of energy/materials used) and **agility and substitution** (implementing shorter planning cycles for planning; Substituting materials). While the assessment of large enterprises is overall close to the total average, the ratings of SMEs are often slightly below the average, i.e. SMEs do overall

regard these measures as less important for improving supply chain resilience compared to the other entities – a somewhat surprising finding that deserves future attention. This emerges especially for two key measures that are overall regarded as least critical by SMEs for improving supply chain resilience: Data-driven, end-to-end monitoring (close monitoring of value streams to gather real-time information, e.g. using IoT or other tracking technology) and contingency planning (performing simulations and scenario planning, e.g. using digital twins or AI).

Figure 6: Key measures for improving supply chain resilience by entity type



Source: ECCP (2022): results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 230 - 243. *Other include Universities, Research & Technology Organisations and Associations

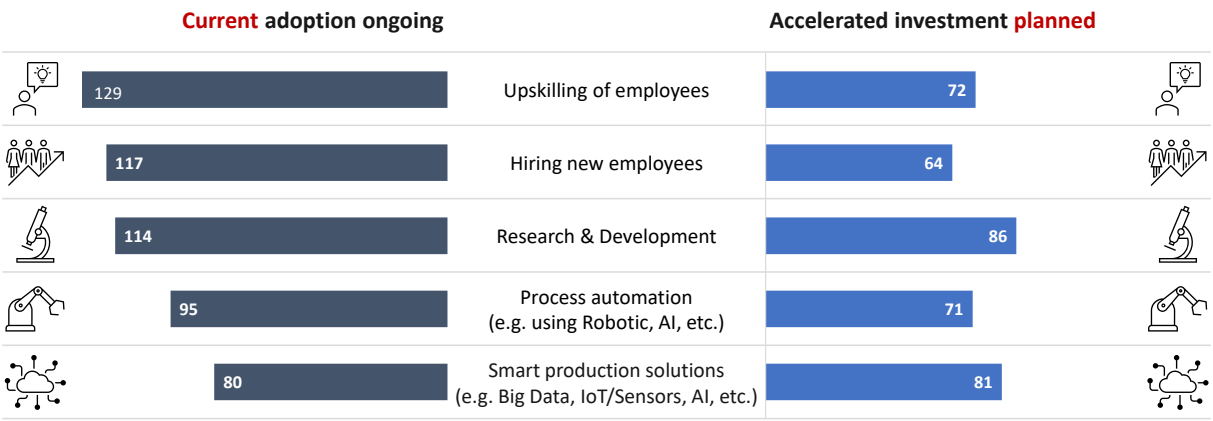
Considering these key measures for improving the supply chain resilience in the near term by **industrial ecosystem** some variations emerge. For instance, participants from the industrial ecosystem Agri-food and Electronics rate the measures of "Diversification & Redundancies" stronger than the average. This can partially be explained by the severe impact of the war in Ukraine on (global) food supply chains[13] and the lockdowns in China which affected the production and shipping of many electronics (such as semiconductors)[14]. Participants from these two industrial ecosystems regard most measures as more important compared to the average. These measures include "Localisation & Reshoring" as well as "Inhouse Production". The measures related to "Efficiency & Sustainability" (Collecting, recycling & reusing materials or increasing efficiency of energy/materials used) are especially important for participants from the ecosystems Agri-food and Energy-Renewables. For participants from the industrial ecosystem Digital, the measures related to Data-driven, End-to-End Monitoring as well as Contingency Planning play a more important role in improving supply chain resilience.

[13] see Jagtap, S. et al. (2022): The Russia-Ukraine Conflict: Its Implications for the Global Food Supply Chains. In Foods 2022, Accessible online https://mdpi-res.com/d_attachment/foods/foods-11-02098/article_deploy/foods-11-02098-v2.pdf?version=1657875112 (last access 20.10.2022)
[14] See https://www.emsnow.com/electronics-supply-chain-disruptions-the-saga-continues/

Additionally, the survey participants were inquired about the solutions they adopt in order to improve supply chain resilience as well as the planned investment in this regard. The figure below (Figure 7) displays that among the **currently adopted solutions**, human resources play a major role since the majority of respondents opt for upskilling employees and hiring new employees to improve the endogenous capacity to tackle supply chain risks. Another solution applied is linked to R&D. Process automation (e.g., using Robotics, AI) as well as smart production solutions (e.g. Big Data, IoT/Sensors, AI, etc.), are among the solutions to improve supply chain resilience adopted by the least participants. In terms of planned **accelerated investments** targeted at improving supply chain resilience this picture changes. Here, R&D (e.g., on robotics or clean technologies) followed by smart production solutions (e.g., Big Data, IoT/Sensors, AI, etc.) and upskilling of employees rank among the top three categories.

Regarding these current and planned adopted solutions to improve supply chain resilience, some differences in the replies among the **different entity types** can be observed. In this regard, research and development is the second most frequently adopted solution among members of cluster organisations. Among large enterprises are smart production solutions (e.g. Big Data, IoT/Sensors, AI, etc.) the solution for which most frequently accelerated investments are planned.

Figure 7: Adopted solutions to improve supply chain resilience



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 149 - 191. Note: Participants could select multiple items

Against the background of these solutions to improve supply chain resilience, survey participants were also asked about the **difficulties** they experienced in increasing supply chain resilience. Here, a number of issues emerge as shown in Figure 8 ("Faced difficulties in improving supply chain resilience by entity type"). Overall, the most prevalent difficulty that is faced by the survey participants are **capacity shortages of regional suppliers**. This can also be linked to Figure 5, where the inbound logistic (e.g., raw materials, intermediate inputs, storage) is identified as the most relevant stage in terms of disruptions. However, it needs to be highlighted that a variety of other difficulties are reported by the survey participants. This includes, for instance, the identification of new suppliers, insufficient competitiveness of regional suppliers as well as regulation and tax incentives. Lack of skills in the company's workforce is least often reported as a difficulty by the survey participant.

However, the figure below also demonstrates that the relative importance of the faced difficulties **varies among the different entity types**. Among cluster organisations and their members, the top 3 difficulties faced by this entity type cover the lack of financial resources / difficult access to capital and too uncertain return on investment in new technology for supply chain resilience followed by insufficient competitiveness of regional suppliers. The difficulty of lacking financial resources/difficulties in accessing capital are also highlighted by universities, Research & Technology

organisations and associations. Among the enterprises, both large enterprises and SMEs face most frequently capacity shortages of regional suppliers followed by difficulties in identifying new suppliers. For Larger enterprises, however, regulations and tax incentives (certification standards, environmental regulation, CO2 pricing, investment incentives, etc.) are among the top 3 faced difficulties in improving supply chain resilience by entity type.

Figure 8: Faced difficulties in improving supply chain resilience by entity type

Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 329. Note: Participants could select multiple items. *Other include Universities, Research & Technology Organisations and Associations.

Solutions for improving supply chain resilience in the EU in the next five years

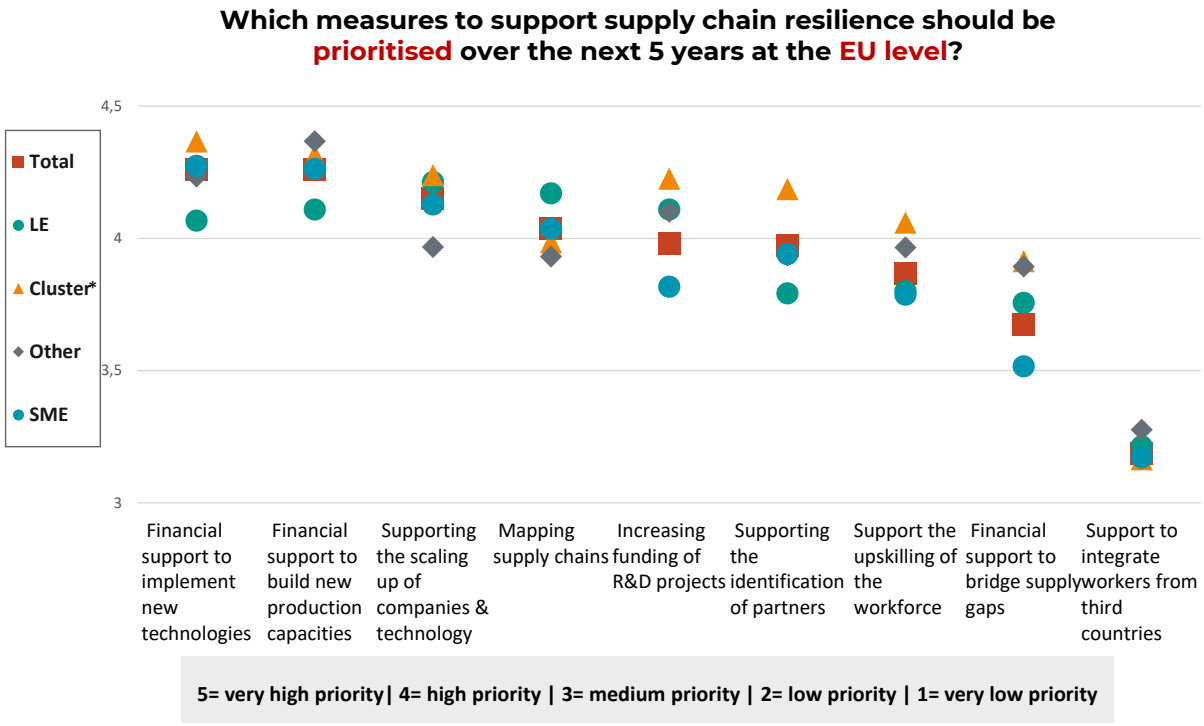
In addition to the key measures for improving supply chain resilience in the near term that have been discussed previously, Figure 9 displays the **measures to support supply chain resilience that should be prioritised over the next five years at the EU level**.

Overall, the survey participants underline the importance **of financial support** both to implement new technologies and to build new production capacities. Similarly, support for **scaling up** of companies and technology in the EU and the **mapping of supply chains** of European interest are regarded as high-priority measures. Regarding the mapping of supply chains the Supply Chain Resilience platform[15] which is powered by the Enterprise Europe Network can be listed as a relevant initiative in this regard. Further measures that are deemed as relevant in this regard are increased **funding of R&D projects** that contribute to supply chain resilience as well as the support in identifying partners across Europe. The support measure that according to the survey participants is the least relevant over the next five years is supported to integrate workers from third countries. The

[15] https://supply-chain-resilience-platform.b2match.io/ (last access 26.10.2022)

figure below also underlines that cluster organisations for their members prioritise most measures stronger than the other entity types. This concerns especially the increase of funding for R&D projects and the support for the identification of partners. For large enterprises, financial support is overall less important compared to the other entity types (except for financial support to bridge supply gaps. The mapping of supply chains is however stronger prioritised by large entities. SMEs prioritise less the increased funding of R&D projects and financial support to bridge supply gaps.

Figure 9: Priority measures to support supply chain resilience by entity type



Source: ECCP (2022): results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 301 - 316. *Other include Universities, Research & Technology Organisations and Associations

Figure 18 in the Annex displays the measures to support supply chain resilience that should be prioritised over the next five years at the EU level **by selected industrial ecosystems**[16]. Thereby, the overall rating of these measures does not deviate to a greater extent between those industrial ecosystems. Here, the participants also highlight the importance of financial support both to implement new technologies and to build new production capacities. The support to integrate workers from third countries is as well rated as the least important measure to support supply chain resilience. It can also be stated that among the selected industrial ecosystems participants from the ecosystem "Digital" regard most measures as more important compared to participants from other industrial ecosystems. Contrary to that rate participants from the industrial ecosystem "Mobility – Transport – Automotive" most measures as less important compared to other participants.

[16] The analysis only includes industrial ecosystems for which at least 40 participants have provided information for this question

04

Specific project proposals to build supply chain resilience

4. Specific project proposals to build supply chain resilience

Overview of key findings

1. Only a **minority of survey participants are currently involved in publicly funded projects** that address supply chain disruptions. Many of those projects that tackle supply chain disruptions and in which survey participants are involved in are related to recycling, energy & resource efficiency as well as data-driven, end-to-end monitoring of value streams.
2. A variety of **suggestions for future projects/initiatives** that focus on supply chain resilience are brought forward. Among these suggestions, projects/initiatives that support supply chain governance, increase energy & resource independence as well as support innovation ecosystems are highlighted by the majority of participants
3. The types of **skills and capabilities that matter for partnerships in future projects or public programmes** can be grouped under three topics: industrial capabilities, business support, and digital technology. Overall, many participants are looking for partners to rearrange their production processes and supply chains accordingly.

The survey "A Solution-Oriented Approach to Supply Chain Disruptions" also investigated current projects and future project ideas that can support building supply chain resilience. The respondents provided their accounts of the ongoing publicly funded projects that facilitate addressing the supply chain disruptions. Additionally, the survey collected suggestions about the needs for future projects and public funding programmes to improve supply chain resilience. Within this chapter, the analysis of these preliminary survey results will be presented.

Supply chain resilience issues tackled by projects

In relation to chapter 2, it is apparent how **company-specific aspects** regarding their size, sector specialisation and area can all predetermine their ability to cope with supply chain disruptions. In regard to companies also delivering goods on an output stage, the substitutability of said goods amid sudden price increases can vary based on:

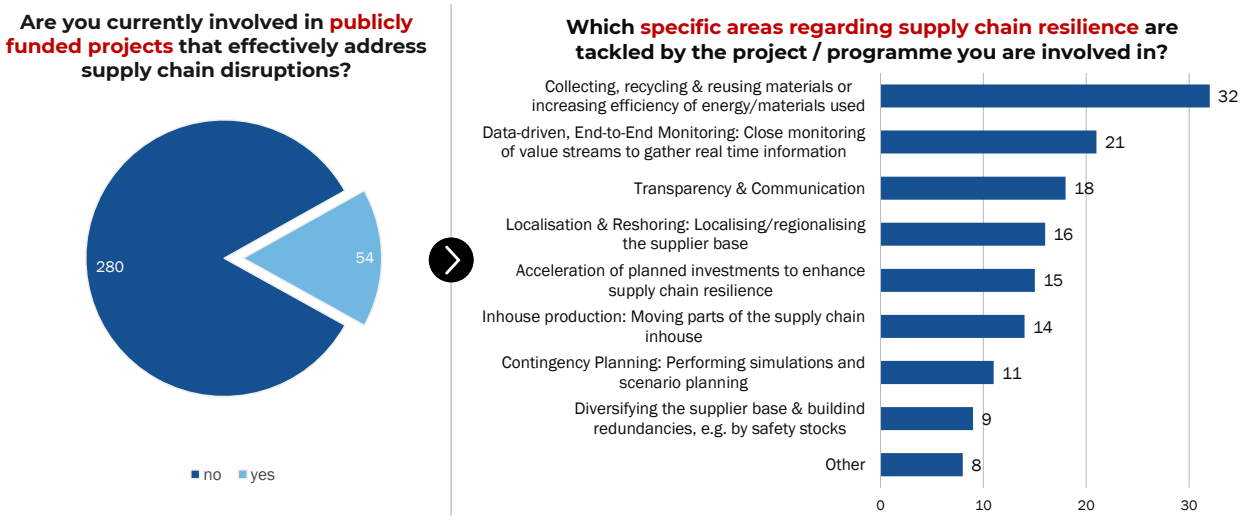
1. Overall substitutability
2. Extent of own warehousing
3. Importance of derivatives
4. Cost share of the total costs
5. Possibility to pass on price increases in the market'[17]

Given that disruptions in the production process are company-specific, delivery bottlenecks are also company-specific. This is further illustrated in Figure 10, in which an array of different areas regarding supply chain resilience are tackled by **ongoing projects**. However, this figure shows also that only a minority of survey participants are currently involved in publicly funded projects that effectively address supply chain disruptions. For participants that are involved in such projects, the survey aimed to collect responses about their involvement in projects that effectively address supply chain disruptions. The results indicate that projects in the area of **'recycling & reusing materials and increasing efficiency of energy & materials used'** are of great importance followed by areas related to **data-driven, end-to-end monitoring** and **transparency & communication** (e.g., showing a clear picture and building a positive narrative about better resilience towards customers). Other specific

[17] Ma, P. et al. (2018): Pricing decisions for substitutable products with green manufacturing in a competitive supply chain. In Journal of Cleaner Production, available under: https://doi.org/10.1016/j.jclepro.2018.02.152 (last access 21.10.2022)

areas regarding supply chain resilience, such as localisation & reshoring or acceleration of planned investments to enhance supply chain resilience although not typically handled at the project level, yet were mentioned as important measures taken by companies at the strategic level (see previous section, Figure 6).

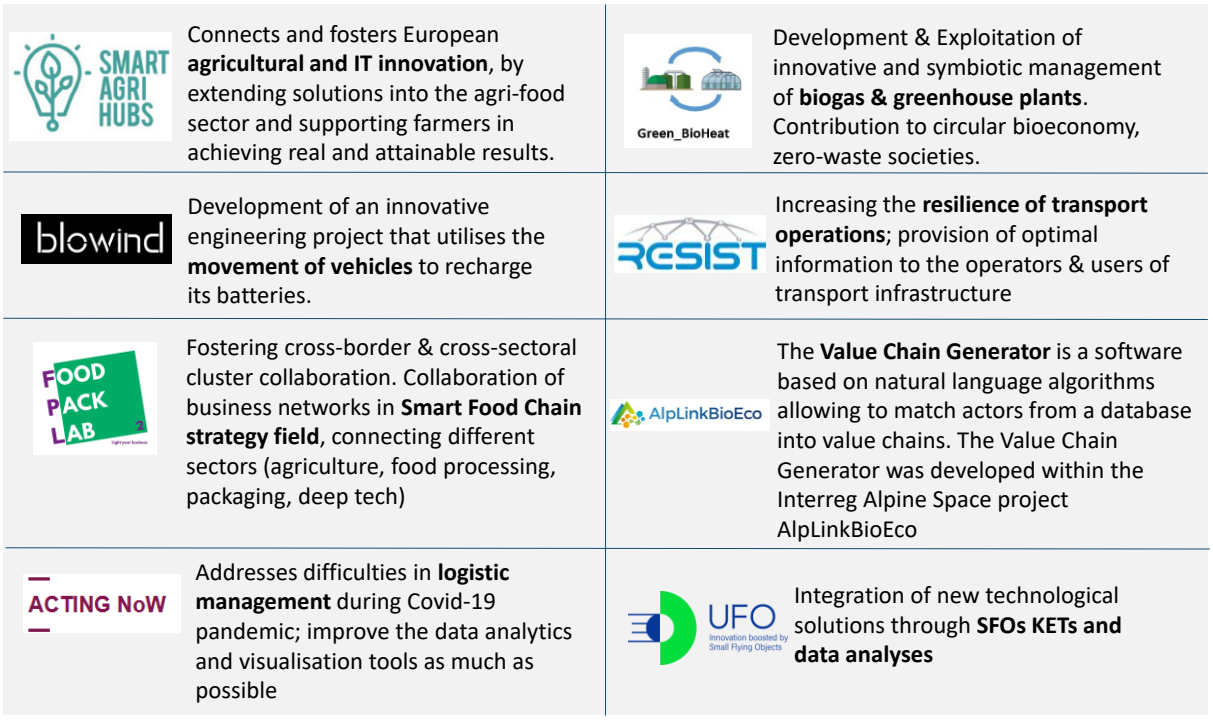
Figure 10: Areas regarding supply chain resilience tackled by current projects



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 54. Note: Participants could select multiple items.

With the survey also asking respondents to voice already established projects that are aimed at building greater resilience in their supply chains, there were notable answers that stood out. The following Figure 11 shows an **overview of selected project examples aiming at building supply chain resilience** (see also Table 1 in the Annex for a more detailed overview). These projects cover various industrial ecosystems, including Agri-food, Mobility – Transport – Automotive, and Digital, and provide numerous advanced solutions that can help to increase supply chain resilience and the transition to a greener and more digital economy.

Figure 11: Overview of eight interesting project examples aiming at supply chain resilience



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. For assessing the project websites please click on the following: SmartAgriHubs, Green_BioHeat, blowind, RESIST, FoodPackLab 2.0, AlpLinkBioEco, ACTING NoW, UFO. See also Table 1 in the Annex for an overview

Suggestions for future projects focusing on supply chain resilience

Having discussed throughout this paper the key areas of disruptions in the supply chain, main ecosystems affected as well as ongoing and measures used by stakeholders in the EU as well as their needs, this section aims to provide a **brief overview of the specific suggestions** for projects and public funding initiatives to table these issues. In the following, the responses that were provided through qualitative input are investigated. Regarding the question in which respondents were asked to briefly elaborate on European-level measures in the context of supply chain disruptions, multiple relevant approaches are found.

To understand and categorise the disruptions in supply chains, the ECCP team identified a set of tags to describe the measures to deal with the current disruptions, that respondents proposed in the free text fields of the survey. Altogether, 82 tags were created in an inductive way from the survey results. Figure 12 visualises a subset of the 46 tags that were identified at least three times. The size of the tag corresponds with its frequency. To be able to better process the information for the analysis these tags were then grouped in a second step into 8 overarching topics (see Figure 16 below). The findings at both levels of analysis will be described in the following paragraphs.

To start with, Figure 13 shows an overview of **overarching suggestions for future projects/public funding initiatives** to improve supply chain resilience mentioned by the survey participants. To derive these overarching suggestions the qualitative input from the survey participants was screened and different tags were identified to describe the explained suggestions. In the next steps, these tags were grouped and aggregated to identify the overarching suggestions that are shown below.

Figure 12: Overview of the proposals for future projects/public funding initiatives to improve supply chain resilience

Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 209. Note: respondents can mention several suggestions. The figure shows a subset of the 46 tags that were identified at least three times. The size of the tag corresponds with its frequency.

The figure shows that the majority of the suggestions for future projects/public funding initiatives to improve supply chain resilience are related to support for **supply chain governance**. The suggestions of this overarching topic centre around projects that for instance deal with supply chain mapping, reshoring or supply chain platforms. As also displayed in the previous word cloud many participants suggest the development of supply chain platforms that provides information on different supply chains and also allows to detect relevant suppliers. The following specific suggestions were articulated:

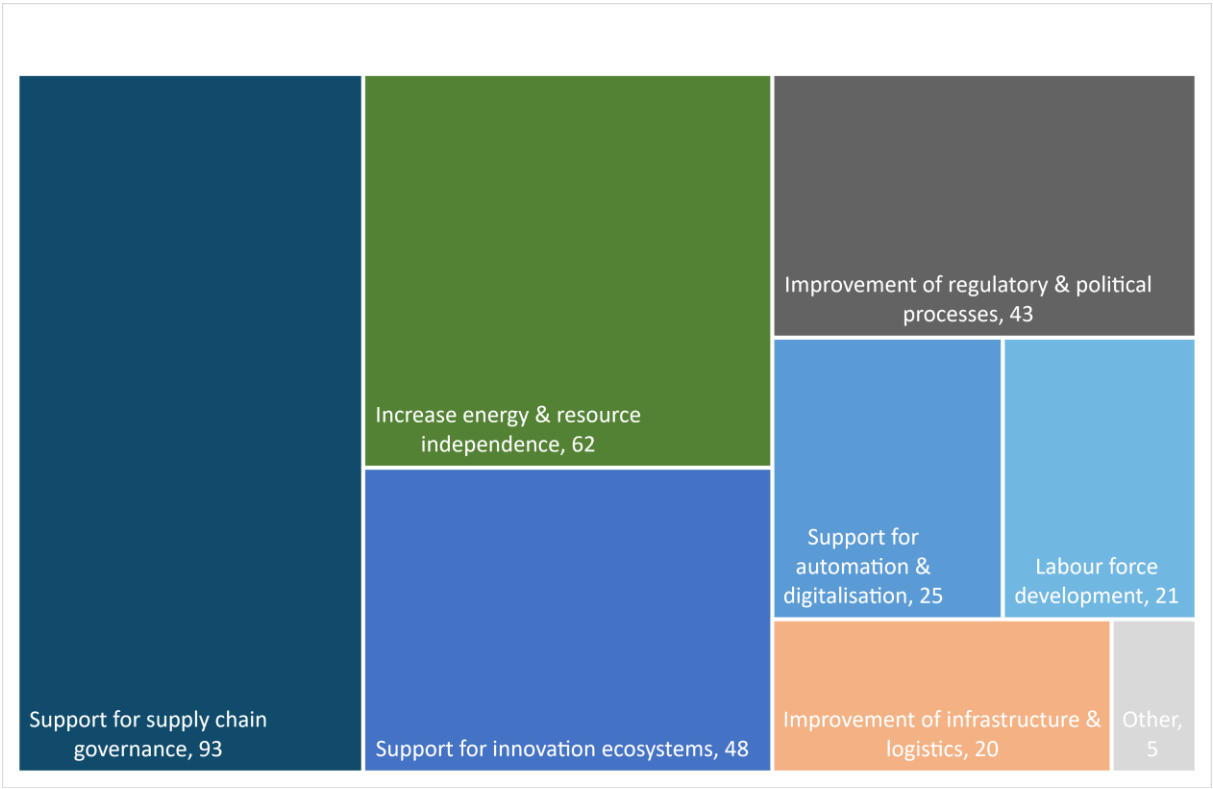
- ***Supply chain platform & mapping***: One of the top responses was the call for a platform-based solution to find suppliers across the European Union, especially in volatile times with frequent supply chain disruptions.[18] Transparent supply chain mapping would also enable businesses to control governance issues along their supply chains and detect disruptions early on. Relatedly, many respondents are willing to team up with partners to organise common procurement. These efforts should be accompanied with further networking support such as events. Beyond transparency, efforts should be made to counter the excessive power of large players along supply chains.
- ***Reshoring & reindustrialisation***: Another remarkable finding was the widespread call for the reshoring of production on European soil. Specifically, respondents suggested targeted investment support to close critical supply chain gaps within the Single Market. Local content

[18] Such a supply chain platform was indeed launched in March 2022 by the European Enterprise Network (EEN) in collaboration with the European Cluster Collaboration Platform (ECCP), with the support of the European Commission and EISMEA. As a large part of the respondents does not seem to be aware of its existence, promotion efforts should be intensified. Available under: https://supply-chain-resilience-platform.b2match.io/ (last accessed 27.10.2022).

requirements and import tariffs could support a "Made-in-Europe" approach in order to guarantee the upkeep of capacities all along the supply chain and foster resilience. Where reshoring is not feasible, the focus should lie on supplier diversification and strategic redundancies.

- ***Standardisation & certification***: A complementary proposal is to provide incentives for further standardisation of equipment, stock materials and components within the EU and, by extension, also for non-EU suppliers. This would enable producers to find reliable replacements more quickly and easily in case of disruptions. Appropriate certification schemes should be supported by dedicated EU-wide programmes.

Figure 13: Overview of overarching suggestions for future projects/initiatives to improve supply chain resilience



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 209. Note: respondents can mention several suggestions. The suggestions were tagged and grouped into overarching topics in a second step. The figure shows the analysis of these overarching topics

The importance of focusing on increasing **energy and resource independence** in future projects and public funding programmes is as well underlined by many respondents. Here, the survey participants for instance suggest support for raw material independence in the EU as well as projects related to circular economies, renewable energy, and energy efficiency. The following specific suggestions were articulated:

- ***Circular economy & clean technologies***: The top priority, according to the respondents, to achieve more independence in energy and resources, is to produce less waste. One way is conceptualised as the "circular economy", the other – complementary – is to rely on clean technologies. Business models, product design, and production techniques must be adjusted to rely on sustainable processes and upcycling as far as possible and produce less irretrievable waste. Recycling should be comprehensive and occur within the European Union in order to reduce geoeconomic dependencies on other world regions. EU-wide recycling networks

should be created. Furthermore, a "right to repair" in business-to-business transactions has been suggested.

- ***Renewable energy, energy prices & energy efficiency***: Energy is one of the most critical supply chain disruptions at the moment. Renewable energy sources are broadly seen as the solution to the current problems and to achieve energy independence in the long run. Specifically, respondents suggest investment support in the form of grants and tax reductions for renewable energy plants as well as for shifting industrial processes towards electricity and hydrogen. Further attention should be directed at reducing regulatory hurdles for renewable energy plants and creating a truly interconnected European energy grit with sufficient storage capacity. Also, energy communities should be supported to increase energy self-reliance. To reduce harmful volatility, there should be some form of energy price controls. At the same time, energy efficiency should be promoted across sectors.
- ***Raw materials from the EU & substitutes***: Shortages in critical raw materials are bothering European businesses. To alleviate the problem, respondents suggested supporting increased extraction and refinement within the European Union. As a complementary measure, the substitution of scarce materials should be intensified.

Among the top three overarching suggestions for future projects/public funding programmes to improve supply chain resilience are also suggestions related to **support for innovation ecosystems**. These suggestions often centre around support for clusters and start-ups, cross-regional or research-industry collaboration as well as technology diffusion. The following specific suggestions were articulated:

- ***Innovation & technology diffusion***: Innovation as the translation of research and development results into new marketable products is seen as crucial by respondents to overcome current disruptions. Beyond the technological frontrunners, however, it is also important to assure the widespread application of new production techniques and process innovation across the economy. In order to tackle supply chain problems, the focus should lie especially on process innovation and there should be a close collaboration with actors from the industries to find out where barriers exist and how to overcome them. Furthermore, to achieve comprehensive technology diffusion, support programmes should be low-threshold and not dependent on collaboration with research institutes in order to reach also small enterprises. Another proposal is to foster cross-sectoral collaboration through workshops with experts.
- ***Regional innovation & production***: Regions are the usual geographical unit for innovation and production ecosystems and respondents frequently suggest more support for the regional level. Specifically, regional innovation ecosystems should be further strengthened by focusing on the company level, on adopting technologies recently developed and on scaling up existing specialist industries in European regions. Regional industrial ecosystems can also be supported by relaxing public procurement rules as to allow more local sourcing.
- ***Cluster support & cross-regional collaboration***: Respondents also frequently called for strengthening institutional structures around innovation ecosystems like cluster organisations and business platforms. An important aspect is to support SMEs to engage in cross-regional and international collaboration. Clusters can also help to develop circular approaches in specific industrial ecosystems and support the broad adoption of new innovations. To expand their operations in these tasks, respondents suggested facilitating the access of cluster organisations to funding both from public programmes and commercial banks.

Suggestions related to **regulatory and political processes** are as well frequently mentioned by respondents. In this regard survey participants outline for instance more flexible funding options and more flexible requirements for funding programmes, reducing bureaucracy or simplifying regulations for imports and exports. The following specific ideas were articulated:

- ***Financial & regulatory incentives:*** *R*espondents frequently point to difficulties regarding regulatory hurdles and complex funding rules. To relocate technology and production to Europe and to build production capacities for new technology developments in the EU,

regulatory processes should be slimmed down and accelerated and access to funding simplified. This includes a significant reduction in bureaucratic burdens and better and more efficient regulatory system for the approval and change of critical suppliers in certified product categories with specific quality requirements like medical components. Moreover, harmonizing European tax systems would facilitate collaboration and tax incentives could be provided for European production.

- ***Policy platform & inclusive decision-making***: Local capacities for policy development vary across Europe. Respondents therefore proposed a type of policy platform or knowledge base where best practices, academic research findings and think tank material should be gathered and made available. Exchange programmes for civil servants across could further foster knowledge exchange. Others suggested more inclusive policy-making processes in issue-specific working groups bringing together private and public actors and relying on the distributed knowledge of all relevant actors to produce better policy results.

Another relevant overarching topic for suggestions is support for **automation and digitalisation**. Here, respondents mention the importance of digital technologies for resilient supply chains or point out the need for interoperability of data across the EU and the relevance of (open source) software. Furthermore, automation is seen as crucial to expand production capacities to ameliorate crucial supply bottlenecks. Furthermore, the following specific ideas were mentioned:

- ***Forecasting & prediction***: Artificial intelligence and machine learning can significantly improve the identification of shortages in the distribution of goods across industries based on already existing data. Such projects could predict product shortages, delivery times and provide supply and demand forecasts. They would improve the efficiency, resilience, and adaptability of European supply chains. The EU should support startups and other initiatives working on open-source solutions and guarantee the standardised integration of information systems.
- ***Broad digitalisation***: According to respondents, it is important to attain digitalisation in a broad sense. The more processes and actors are integrated, the more network benefits the whole system brings. To pave the way, the physical infrastructure must be expanded and updated, overly tight regulations on data gathering and usage should be relaxed, and data standardisation established and enforced. There should be special programmes to support the digital integration of small, established enterprises to reach the most comprehensive digitalisation of the economy, not just of large companies and startups.
- ***Automation & robotics***: Automation and the increased deployment of robotics is seen as an inevitable step to overcome the labour supply shortages caused by demographic change. The automation of some activities should allow for the relocation of scarce labour into others. Solutions which integrate automation and digitalisation along the supply chain should be promoted.

Suggestions related to the development of the labour force as well as the improvement of infrastructure and logistics are least frequently brought forward by the respondents. For the **development of the labour force** participants mention support for improving skills of workers or improving the attractivity of certain jobs. Specific suggestions include the following:

- ***Upskilling***: possessing relevant skills is seen as an important point for supply chain resilience. Respondents suggest that EU support for closing skill gaps in the labour force and in certain sectors is needed. For instance, grants and tax benefits for companies who organise labour force trainings are mentioned and the collaboration between institutions of higher education and industry should be intensified.
- ***Non-academic professions***: Respondents diagnose an acute shortage of skilled workers in non-academic and technical professions (e.g., heating installers, truck drivers, farmers) and propose to better incentivise occupational schools compared to colleges and universities.
- ***Labour immigration***: Another solution suggested to deal with labour shortages is immigration and an easier access to European labour markets from third countries. Foreign workers should receive special language, education, and reskilling programmes.

Regarding the **improvement of infrastructure and logistics** participants mention among other things the further development of road networks, railways and support to European ports. Specific suggestions include the following:

- ***Upgrade transport infrastructure***: Respondents highlight the relevance of railways and ports for logistics and the functioning of supply chains. It is suggested to further strengthen the railway infrastructure across the EU, to increase cross-border connections and to unite the European and Ukrainian railway systems. Furthermore, respondents suggest to enhance the port infrastructure of more peripheral regions to improve their supply chain integration.
- ***Logistics platform***: To resolve the logistical side of supply chain disruptions, respondents suggest further digitalised system integration, optimally in a centralised platform structure. This would allow for efficient end-to-end connection between suppliers and carriers, improving utilisation, ensuring fair competition, and the early detection of anomalies and disruptions.

In addition to future projects or public programmes, respondents were also asked to comment on the types of **skills and capabilities** they are looking for in **prospective partnerships**. One of the stand-out findings here is, that respondents focused on the green and digital transformation and are looking for partners to rearrange their production processes and supply chains accordingly. Most responses, indeed, were directed at enhancing production capacities or finding suppliers, financing or public and cluster support to do so. Less emphasis was on partnerships for research, development, and innovation. While innovation will have to play a crucial role in the ongoing transformations, these findings point to the conclusion that a policy focus should be to support adaptability to technological trends and other disruptions, i.e., to enable technology diffusion and transfer and to provide institutional support for the necessary reorganisation of economic structures and business models.

The codified findings of the survey can be grouped under three topics: industrial capabilities, business support, and digital technology. All listed tags have been mentioned by at least three respondents and are shown according to their frequency from most to least.

Industrial capabilities
- manufacturing/production
- circular economy
- materials
- technical skills
- automation & robotics
- construction
- specialised production
- R&D&I

Business support
- financing
- public & cluster support
- logistics
- training
- supply chain expertise
- procurement
- sustainability

Digital technology
- digitalisation
- IT expertise & cloud-based solutions
- IoT & edge computing
- data analysis & AI

05

Outlook

5. Outlook

As pointed out in the EC report (2021): Evaluation study of and potential follow-up to cluster initiatives under COSME, H202 and FPI[19] among overarching strategies for building supply chain resilience is supporting businesses and cluster organisations in their transformation of EU industrial ecosystems towards more regional supply chains, also known as **'glocalisation'**[20]. Cluster organisations can be key in supporting this transformation, given that they connect and tap into the expertise of different stakeholders in the value chain: from SMEs, multinationals to start-ups. Another interesting strategy refers to performing regular mapping of cluster skills and SMEs' needs to build stronger linkages across value chains.

Additionally, as pointed out by Stiftung Wissenschaft und Politik (2022)[21] comprehensible **transparency rules** and **extensive risk assessments** can reduce the vulnerability of supply chains. This can be linked to building a strategic supply chain policy, by for instance reducing one-sided dependencies e.g., on Chinese raw materials and producing closer to the demand, through the option of nearshoring.

Having discussed throughout this report the key areas of disruptions in supply chains and measures applied by stakeholders in the EU another focal point was on future priority areas and projects that improve supply chain resilience. In the face of supply chain disruptions, this report illustrated a variety of approaches and strategies to lessen the impact of said external shocks and improve supply chain resilience. To complement these findings, Table 2 and Table 3 in the Annex outline existing and upcoming EU funding possibilities from private and public sources that cluster organisations and businesses can benefit from in relation to building supply chain resilience. The programmes presented there constitute a real opportunity for stakeholders to participate in the open calls for proposals and benefit from the EU funding for their projects related to the discussed supply chain solutions development and implementation. These existing and upcoming EU funding opportunities demonstrate that there is a **variety of funding possibilities** initiatives[22] that can be used to implement the suggestions for future projects focusing on supply chain resilience. In this regard, the considerations for a European Sovereignty Fund[23] do play as well a major role for increasing supply chain resilience in the European Union.

[19] European Commission (2021), Evaluation study of and potential follow-up to cluster initiatives under COSME, H2020 and FPI. Available under: https://op.europa.eu/en/publication-detail/-/publication/a2c3e9e1-3deb-11ec-89db-01aa75ed71a1 (last access 27.10.2022).
[20] Glocalisation' is a conceptual synthesis of globalisation and localisation. It describes the relationship between the global orientation of enterprises (procurement, sales) and the regionally limited location of industrial production. Glocalisation becomes clear in the form of local production complexes as nodes in global networks and locally adapted production strategies of multinational enterprises.
[21] Stiftung Wissenschaft und Politik (2022), Supply Chain Instability Threatens Security of Supplies. Available at: https://www.swp-berlin.org/10.18449/2021C60/ (last access 27.10.2022).
[22] see for instance the Supply Chain Resilience platform by the EEN: https://supply-chain-resilience-platform.b2match.io/ (last access 27.10.2022).
[23] see https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_5543 (last access 21.10.2022).

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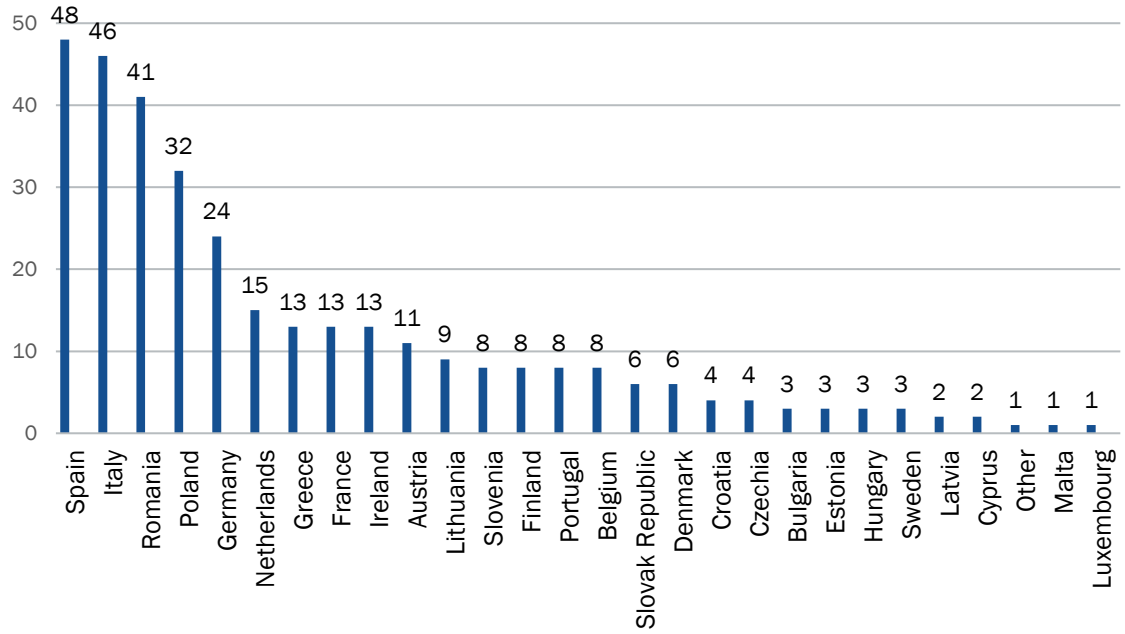
Annex

Survey participants by region

On a national level, the survey completion from EU15 members is made up of 217 participants, whilst EU13 members amount to 118 participants. The higher concentration in survey participants from the EU15 indicates how countries that have been integrated in the EU for a longer time, were higher represented among all survey participants. The distribution of survey participants by specific Member States (see Figure 14) also makes for an interesting analysis, with six Western European Member States in 10 highest represented (Spain, Italy, Germany, Netherlands, France & Ireland).

Figure 14: Distribution of Survey Participants by Member States



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 336

Survey participants by entity type

In the following, the survey participants will be presented by entity type. In the survey, the following entity categories could be selected:

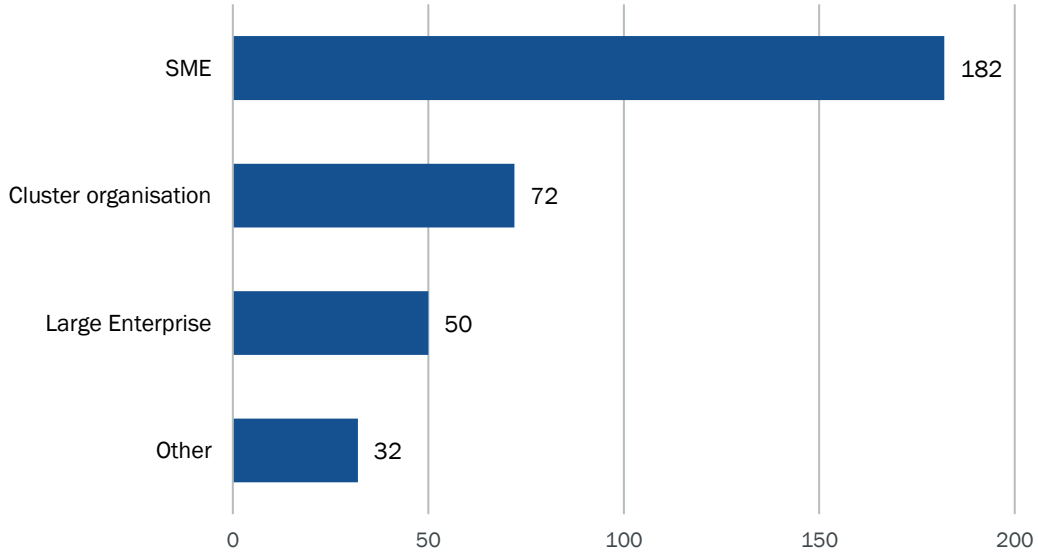
- Micro Enterprises
- Small Enterprises
- Medium Enterprises
- Large Enterprises
- Cluster Organisations
- Universities
- Research & Technology Organisations
- Associations

To facilitate the analysis, the former classifications were reconceptualised and aggregated some of the entities, which resulted in the following categories:

1. SMEs
   - ➢ aggregation of **Micro, Small, Medium-sized Enterprises**
2. Large Enterprises
3. Cluster Organisations
4. Other
   - ➢ aggregation of **Universities, Research & Technology Organisations, Associations**

In Figure 15, one can see the survey respondent distribution on the basis of entity type, with 'SMEs' making up the majority of respondents with 182 (54%), followed by 'Cluster Organisations' with 72 (21%), 'Large Enterprises' with 50 (15%), and finally, 'Other' with 32 (10%). Figure 17 provides a detailed overview by disaggregated entity type.

Figure 15: Distribution of Survey Participants by entity type



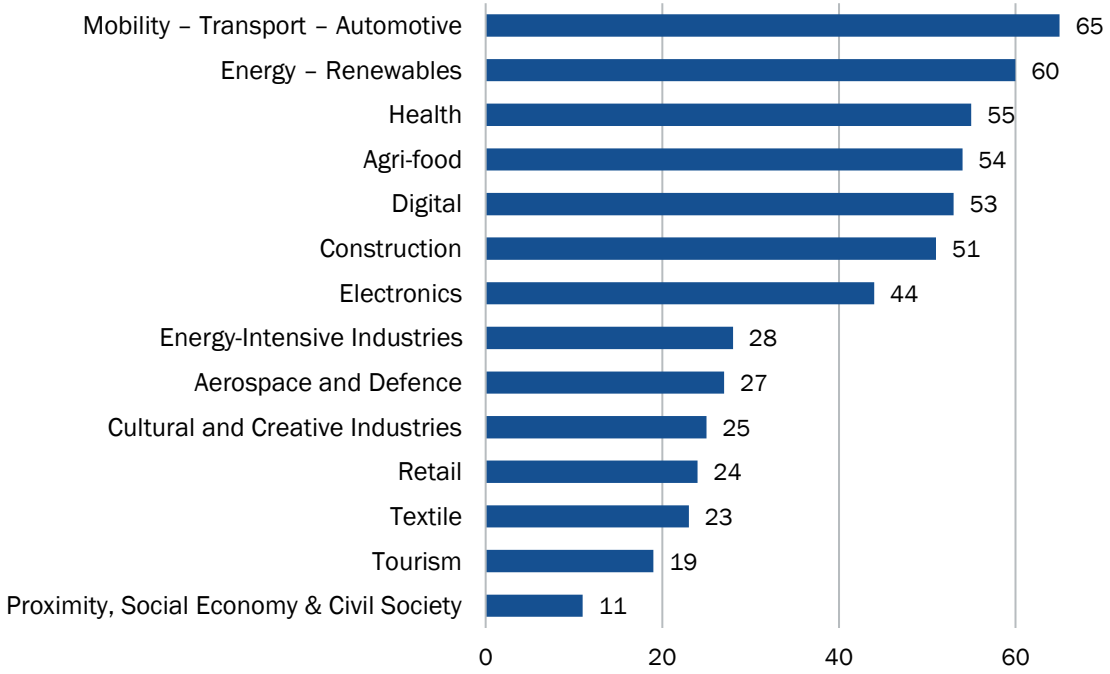
Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 336. See Figure 17 in the Annex for a more detailed overview

It is remarkable how SMEs make up more than half of survey respondents overall, but also among the total of respondents representing businesses ('SME' & 'Large Enterprise'), they accounted for 78% of all respondents. The higher concentration in survey participants from businesses with lower personnel is generally in line with the tendency of SMEs outnumbering large companies as well as employing a large total of people. On a further note, respondents representing Cluster Organisations made up roughly a fifth of all respondents, showcasing a considerable representation of entities reporting on behalf of cluster-based initiatives.

Survey participants by industrial ecosystem

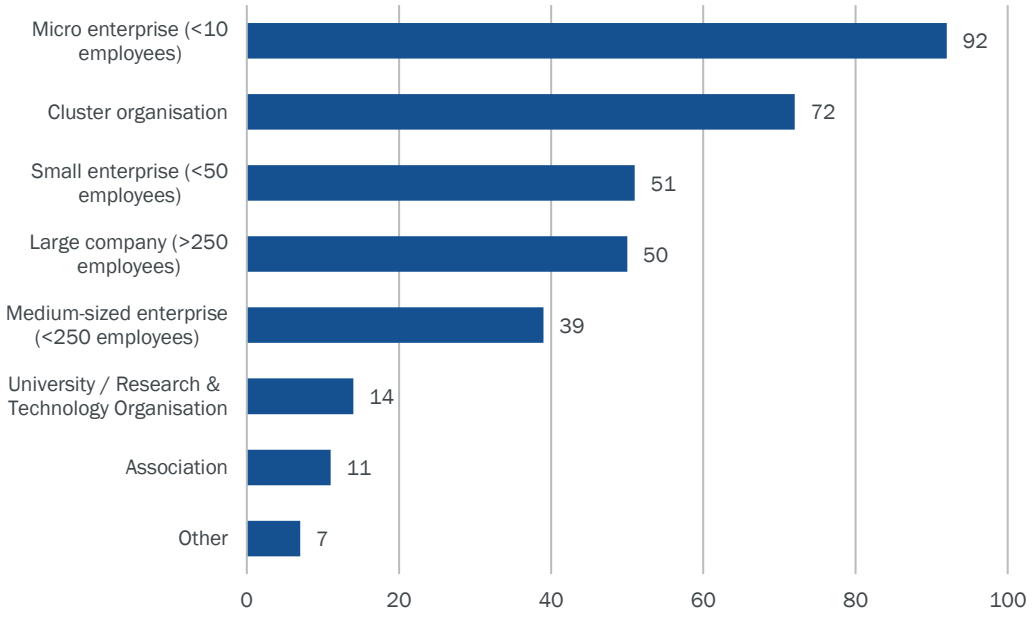
Figure 16 displays the distribution of survey participants by industrial ecosystem. The figure shows that survey participants are linked to all 14 EU industrial ecosystems. Thereby, the most prevalent ecosystems are Mobility – Transport – Automotive (65 participants), Energy – Renewables (60 participants) and Health (54 participants). Other frequent ecosystems include Agri-food (54 participants), Digital (53 participants), Construction (51 participants) and Electronics (44 participants). Industrial ecosystems in which the least participants are active in are Textile (23 participants), Tourism (19 participants) and Proximity, Social Economy & Civil Society (11 participants).

Figure 16: Distribution of Survey Participants by industrial ecosystem



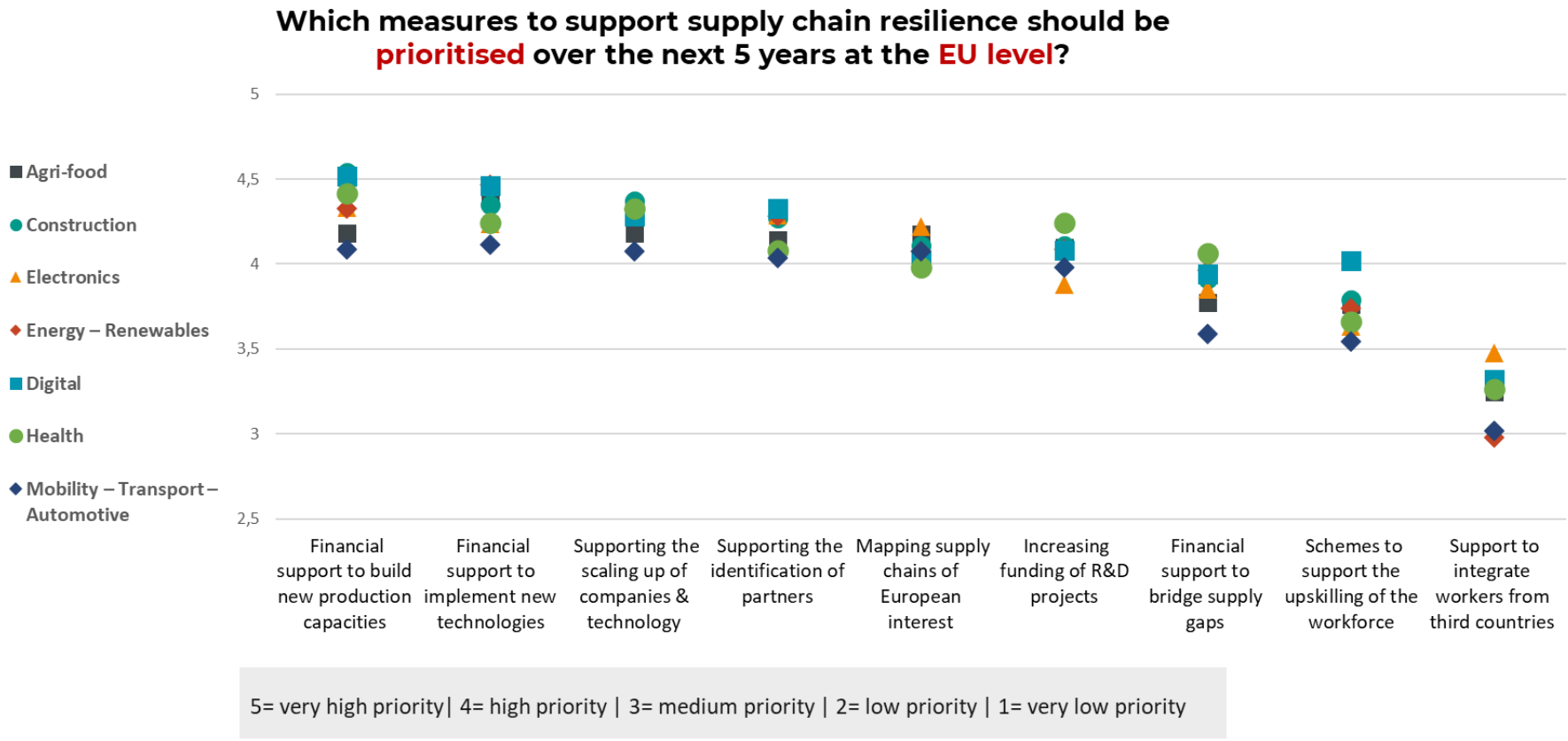
Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 336. Note: Participants can be active in multiple industrial ecosystems

Figure 17: Distribution of Survey Participants by entity type (detailed)



Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 336

Figure 18: Priority measures to support supply chain resilience by selected industrial ecosystems



Source: ECCP (2022): results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions. n= 40 - 61. Only industrial ecosystems for which at least 40 participants have provided information are selected.

Examples of projects aimed at building supply chain resilience and funding/financing sources

Table 1: Examples of projects aimed at building supply chain resilience

Project	Year	Short description	Link
Horizon 2020, UFO	2021-2022	Integration of new technological solutions through SFOs KETs and data analyses	https://www.ufoproject.eu/ https://eic.ec.europa.eu/news/ufo-emerging-industries-new-value-chains-boosted-small-flying-objects-2022-02-22_en
Horizon 2020, SME Instrument (Phase 1 and 2)	2018-2020	Supporting SMEs to develop and bring new products, services and business models to the market, to drive economic growth	https://clustercollaboration.eu/open-calls/h2020-call-proposals-sme-instrument
Horizon Europe, Cluster 6: Food, Bioeconomy, Natural Resources, Agriculture and Environment	2021-ongoing	Enable ecological transition, developing European agricultural R&I, support European Green Deal priorities	https://rea.ec.europa.eu/funding-and-grants/horizon-europe-cluster-6-food-bioeconomy-natural-resources-agriculture-and-environment_en https://ec.europa.eu/info/research-and-innovation/events/upcoming-events/horizon-europe-info-days/cluster-6_en
Green_BioHeat	2020-2023	Development & Exploitation of innovative and symbiotic management of biogas & greenhouse plants. Contribution to circular bioeconomy, zero-waste societies.	Project Green_BioHeat :: Scient Act SA
France 2030	2020	Develop green hydrogen, improve mobility, support rail sector, reshoring industrial sector, investing in future technologies, strengthen skills & vocational training	France Relance recovery plan: building the France of 2030 - Ministry for Europe and Foreign Affairs (diplomatie.gouv.fr)
AlpLinkBioEco	2018 - 2021	The **Value Chain Generator** (VCG) is a software based on natural language algorithms allowing to match actors from a database into value chains. The Value Chain Generator was developed within the Interreg Alpine Space project AlpLinkBioEco in the context of the development of bio-based solutions for current environmental and societal challenges.	https://www.alpine-space.eu/project/alplinkbioeco/

blowind	not disclosed	Development of an innovative engineering project that utilises the movement of vehicles to recharge its batteries.	https://blowind.es/en/our-project/
ACTING NoW	Not disclosed	Addresses difficulties in logistic management during Covid-19 pandemic; improve the data analytics and visualisation tools as much as possible	Université du Luxembourg - ACTING NoW
RESIST	2018-2022	Increase the resilience of transport operations; provision of optimal information to the operators & users of transport infrastructure	https://cordis.europa.eu/project/id/769066
European Tourism Going Green 2030	2017-	Research in the field of travel and tourism, to support efforts in reaching / meeting UN 2030 Sustainable Development Goals	https://destinet.eu/who-who/civil-society-ngos/etgg2030/
RFCS	2021 - 2027	Supporting research in coal & steel sectors: - optimisation - health & safety - environmental protection - technology & transition - optimisation & conservation of resources	https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/research-fund-coal-and-steel-rfcs_en
FoodPackLab 2.0	2020-2022	Fostering cross-border & cross-sectoral cluster collaboration. Collaboration of business networks in Smart Food Chain strategy field, connecting different sectors (agriculture, food processing, packaging, deep tech)	https://clustercollaboration.eu/eu-cluster-partnerships/escp4i/foodpacklab-20
SmartAgriHUBS	2014-2020 (under Horizon 2020)	Connects and fosters European agricultural and IT innovation, by extending solutions into the agri-food sector and supporting farmers in achieving real and attainable results.	https://www.smartagrihubs.eu/

Source: ECCP (2022), results based on an online survey (May-September 2022): A Solution-Oriented Approach to Supply Chain Disruptions

Table 2: EU-wide public funding possibilities for projects aimed at building supply chain resilience.

Funding programme	Year	Short description	Budget & co-financing rate	Target group	Link
Euroclusters	2021 -	Supporting implementation of industrial strategy	Available budget: €42 million	- Cluster Organisations - Cluster Networks - Companies	https://eismea.ec.europa.eu/funding-opportunities/calls-proposals/joint-cluster-initiatives-euroclusters-europes-recovery_en
I3 Instrument	2021 -	Supporting interregional innovation projects in commercialisation and scale-up phases. Hereby tools are provided to help overcome barriers (e.g.: regulation) and move firm to investment-level	Available budget: Strand 1: €72,8 million Strand 2: €77,3 million	- SMEs	https://eismea.ec.europa.eu/programmes/interregional-innovation-investments-i3-instrument_en
Connecting Europe Facility (CEF) **Connecting Europe Facility CEF-2 programme: Digital strand**	2014-2021 2021 – 2027	Promotion of growth, jobs & competitiveness through European-level infrastructure investment Supporting EU Green Deal through effective and efficient implementation of delegated programmes	Available budget: €28,7 billion Available budget: €2,065 billion	- SMEs - Large Enterprises - Government - Cities - Communities & NGOs - Knowledge Centres	https://ec.europa.eu/inea/en/connecting-europe-facility European Climate, Infrastructure and Environment Executive Agency (europa.eu)
EU-Singapore Matchmaking Event – Call for Expressions of Interest for SMEs & Clusters	2022	Promotion of information exchange and networking opportunities for European cluster organisations and members with Singapore-based counterparts.		- SMEs - other companies - Clusters	EU-Singapore Matchmaking Event - Call for Expressions of Interest for SMEs | European Cluster Collaboration Platform

AMULET (by H2020-INNOSUP-1)	2022	Creation of new value chains through projects which foster the penetration of advanced lightweight materials in the following sectors: • Automotive • Aerospace & Aeronautics • Energy • Building	Available budget: €1,277 million	- SMEs	AMULET 1st Open Call | European Cluster Collaboration Platform
Call for Expression of Interest: **Clusters meet Regions**	2022	Coming together of clusters and policymakers for knowledge transfers in the realms of clusters, creation of new partnerships. Specific ideas: • Strengthen industrial ecosystems • Address supply chain disruptions • Drive digital & green transition • Build Resilience in regions		- Clusters (regional & national) - Policymakers	Call for Expression of Interest - Clusters meet Regions | European Cluster Collaboration Platform
HERA open call for Design and Prototype for a Mapping Platform on COVID-19 Therapeutics in the EU	2022	Mapping the production capacity and supply of COVID-19 Therapeutics in the EU, including products in research and development phases. This encompasses: • ICU medicines • Heparin • Dexamethasone & Antibiotics • Diagnostics Devices	Available budget: €5 million	- SMEs	HERA open call for Design and Prototype for a Mapping Platform on COVID-19 Therapeutics in the EU (clustercollaboration.eu)
GALATEA (Under Horizon 2020)	2022	Supporting Blue Growth-driven SMEs, focussing on: • Smart Ships • Smart Ports	Available budget: €3,6 million	- SMEs	Apply to GALATEA's open call for services (clustercollaboration.eu)

		• Smart Shipyards • Maritime Surveillance			

Table 3: EU-wide private financing possibilities for projects aimed at building supply chain resilience.

Funding programme	Year	Short description	Budget & co-financing rate	Target group	Link
InvestEU Programme / InvestEU Fund	2021-2027	The InvestEU Programme supports sustainable investment, innovation and job creation in Europe.	Available budgets: €26,2 billion	- Investors - Project Promoters - SMEs	https://investeu.europa.eu/what-investeu-programme/investeu-fund_en https://investeu.europa.eu/about-investeu_en
Santander EGF Pan-European Supply Chain Finance / EIB financing	2021	Reverse factoring operation under the European Guarantee Fund (EGF) of trade payables of corporates and mid-caps located outside Spain in EGF-participating Member States, improving access to finance of their (mainly small and medium-sized enterprise (SME)) suppliers.	EIB finance: EUR 500 million	- SMEs	https://www.eib.org/en/projects/all/20200772
EIB financial instruments	2007-2021	Foster engagement in innovative financial instruments. Combine funds with other sources of financing, as well as providing advisory support through Fi-compass platform. Considering that the funding period is finished there is a follow-up expected from the EIB.	Available budget: €5,6 billion	- Cluster Organisations - Cluster Networks	https://eismea.ec.europa.eu/funding-opportunities/calls-proposals/joint-cluster-initiatives-euroclusters-europes-recovery_en

Funding Options (Supply Chain Finance)	2011 -	Provision of cash funds to enable matchmaking business from different sectors to mitigate operational barriers (incl. supply chain disruptions & delays)	Available budget to specific fund recipient: £10 million	- SMEs	https://www.fundingoptions.com/blog/covid-19/funding-for-businesses-experiencing-supply-chain-problems-and-delays
Flow /Trade Financing)	2018 -	Solves complexity of fund infrastructure	Available budget: undisclosed	- SMEs	https://flow.db.com/trade-finance/dealing-with-supply-chain-disruptions