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COMMISSION STAFF WORKING DOCUMENT

Annual Single Market Report 2021

Accompanying the

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery

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Executive Summary

The COVID-19 crisis has highlighted the importance of looking at the EU's industrial policy and the Single Market together, to better take into account the economic and social impact that disruptions to the free flow of goods, services and people - regardless of whether they are longstanding or crisis-related - have on our companies and to better understand the complex interlinkages among them across regions and sectors.

This report provides the analytical elements underpinning the Communication in its response to calls from the Competitiveness Council for the Commission to assess the resilience of the Single Market by drawing lessons from the COVID-19 crisis; define and report regularly on key performance indicators on industrial strategy and competitiveness; and take stock of implementation of the March 2020 Single Market Enforcement Action Plan (SMEAP). It is the first of a planned series of yearly reports.

The events of the past year have exposed the EU's economy to an unprecedented and sustained shock, with the EU economy contracting by 6.3%. Small and medium-sized enterprises (SMEs) were especially affected. This was also caused – and aggravated - by the unilateral introduction of a number of restrictions to the free movement of goods and people, which led to severe supply chain disruptions. These came on top of existing barriers identified in the March 2020 Single Market Barriers report and the SMEAP. The crisis also confirmed the interdependence of global value chains and demonstrated the importance of a globally integrated and well-functioning Single Market.

The impact of the crisis has been felt differently across the fourteen industrial ecosystems identified by Commission services. During the first three quarters of 2020, the "Tourism" ecosystem lost one fourth of its turnover while that of the "Digital" ecosystem was 5% higher.

Recovering fully and sustainably means implementing a large number of initiatives at EU, national, regional and local level. Many of these were already identified in the March 2020 Industrial Strategy package but their importance and the need to deliver on them fast has increased, as has the importance of an open, integrated, competitive and fully functioning Single Market.

There has been quick and substantial progress in addressing the impact of the crisis and in implementing the measures announced in the March 2020 Industry Package by deepening the Single Market; upholding a global level playing field; supporting companies and the economy in the transition towards climate-neutrality and a circular economy; helping the digital transition; supporting innovation; placing skills at the heart of the EU policy agenda; assisting investment and financing; reinforcing industrial and open strategic autonomy; and taking a new partnership approach to governance.

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1. Why this report is needed

The events of the past year have exposed the EU's economy to an unprecedented and sustained shock, with the EU economy contracting by 6.3%.

This shock was not only caused by national public health measures to limit social contact: it was also caused – and aggravated – by the unilateral introduction of a number of restrictions to the free movement of goods and workers by Member States, with intra-EU trade falling by 24% alone in May-June 2020.

This not only limited the ability of businesses to supply their goods and services, but also led to severe supply chain disruptions. Compounding the issue, the restrictions were adjusted frequently and unpredictably, triggering national stockpiling. And these restrictions came on top of existing barriers to businesses within the Single Market as detailed in the Commission's Staff Working Document of 10th March 2020 on addressing barriers to the Single Market[1].

All businesses suffered, but smaller ones most of all. Preliminary estimates show that the number of small and medium-sized enterprises (SMEs) fell by 1.3% with over 90% of SMEs reporting a fall in turnover.

The impact of the crisis varied across regions and Member States, and most of all across ecosystems, with tourism suffering the most.

Swift action was taken and is being taken by the EU – both the Commission and Member States – to address these negative socio-economic impacts and to put Europe's businesses and wider economy on a more stable and sustainable footing. Investments and reforms under the Recovery and Resilience Facility (RRF) and Next Generation EU will most notably provide key support for the recovery. The State Aid Temporary Framework has also helped.

Many of the reforms needed had already been identified in the March 2020 Single Market Enforcement Action Plan, Industrial Strategy and SME Strategy adopted before the full impact of the crisis was felt. Rather than being made redundant, their importance and the need for a twin transition to environmental sustainability including climate neutrality and digital leadership has been increased.

But more fundamentally, the crisis has underlined that the Single Market does not stand in isolation. It is the basis of all the EU's efforts to support the recovery of its industry, make it more resilient, and facilitate the green and digital transitions. It has underlined the importance of an open, competitive and fully functioning Single Market to enable businesses to grow to the scale needed to compete globally. This can only be achieved through effective implementation and enforcement. In this

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[1] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Identifying and addressing barriers to the Single Market {SWD(2020) 54 final}: https://ec.europa.eu/info/sites/info/files/communication-eu-single-market-barriers-march-2020_en.pdf

context, competition rules have an essential role to play. Competitive markets improve conditions for companies of all sizes to have a level playing field and unlock their full potential. This also contributes to a quicker, stronger and more sustainable recovery and increased resilience of Europe's industry.

This report therefore looks at these two dimensions – Single Market and industry – together.

Both the Council and the European Parliament have recognised that it is not enough to commit to a seamless Single Market and twin transition: it must be followed up with specific actions and actively monitored. This will allow the EU to identify and tackle remaining barriers and shortcomings.

Specifically, in September 2020, the Competitiveness Council called on the Commission to:

- *"take stock of the state of implementation of the 2020 Enforcement Action Plan and progress in addressing barriers in the Single Market, including through measures of the recovery plan, taking into account the work of [the Single Market Enforcement Taskforce] (SMET);*

- *assess the resilience of the Single Market, by first drawing lessons from the COVID-19 crisis and evaluating the robustness of existing procedures; and*

- *analyse on this basis the need for further regulatory and non-regulatory actions.*

Moreover, the Competitiveness Council conclusions from 16 November 2020 that:

- *call on the Commission to define key performance indicators for monitoring the industrial strategy and competitiveness by the end of March 2021 […] including taking into account investment trends, and comparing those to other world regions;*

- *Ask for a regular reporting on the key performance indicators in the form of a brief written report and a statement for discussion in the Competitiveness Council;*

- *Call also for the objectives of the EU's industrial policy to be reflected in sound indicators, in particular concerning industrial competitiveness, industry's contribution to the green and digital transition and the Union's resilience and strategic autonomy while preserving an open economy;"[2].*

This report provides the analytical elements underpinning the Commission response to these requests presented in the Communication "Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery" ("the Industrial Strategy Update Communication"[3].

Section 2 of this report assesses the impact of the crisis on the Single Market and on European companies, including as part of industrial ecosystems and SMEs. Together with the analysis of key persistent obstacles in the Single Market, it will allow lessons to be drawn from the crisis and assess the resilience of the Single Market

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[2] https://data.consilium.europa.eu/doc/document/ST-13004-2020-INIT/en/pdf
[3] COM(2021)350, "Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery."

Section 3 presents progress in the implementation of the 2020 Industrial Policy Package, including the Single Market Enforcement Action Plan, the Industrial Strategy, and the SME Strategy.

2. The impact of the crisis on the Single Market Economy

Key messages

*The impact on businesses and the economy of national public health measures to limit social contact was aggravated by new **unilateral restrictions on the Single Market**, often subject to frequent adjustments exacerbating legal uncertainty and triggering national stockpiling. These also affected the mobility of workers and service providers.*

*These restrictions caused **major disruptions** to the free flow of goods, services and people, profoundly affecting value chains, economic activity and employment. Despite the actions of the European Commission, the ability of industry to quickly introduce and scale up production in critical areas was seriously constrained.*

*As a result, the **EU economy contracted by 6.3%** in 2020, with major turnover losses and decline in employment, and investment. The economy is expected to start recovering in 2021 and grow by 3.7%.*

*The Commission services have further developed the **'industrial ecosystems approach'** set out in the 2020 Industrial Strategy as a lens to look at Europe's economy. This analysis shows that the impact of the crisis was uneven among ecosystems with tourism, cultural and creative industries, textiles and mobility-automotive all among the worst hit. Other ecosystems were less heavily hit, or even experienced a turnover increase during the crisis, such as the digital ecosystem.*

***SMEs** were especially affected with over 60% of SMEs reporting a fall in turnover and two thirds reporting that they have delayed investment decisions or downsized investments[4]. They were particularly affected by supply chain disruptions, employee absences and temporary shutdowns.*

*These new barriers came on top of a number of **existing barriers** to companies operating within the Single Market.*

The crisis has underlined not only the fundamental importance of the Single Market but also the need to make it more resilient and create appropriate tools to face future crises.

2.1. Impact of the COVID-19 crisis and restrictions to the Single Market

The containment measures applied by national authorities to limit social contact and the spread of the COVID-19 virus inevitably caused an economic contraction and hit a large number of businesses.

The measures led to physical constraints on economic activity and a sudden stop of production. First, the partial or full shut down of entire sectors severely disrupted domestic production in most

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[4] European Commission/European Central Bank (November 2020), "Survey on the access to finance of enterprises (SAFE)".

countries. Second, the propagation of such disruptions along global value chains weakened the functioning of the Single Market and of extra-EU supply chains.

As a result, during the second and third quarter of 2020, intra-EU trade fell by 24%, while GDP by 7% (see Figure 1).

Figure 1: GDP and intra-EU exports of goods and services
Q2 and Q3 2020 compared with 2019, unadjusted data at current prices. Data missing for ES.
Source: European Commission analysis based on Eurostat.
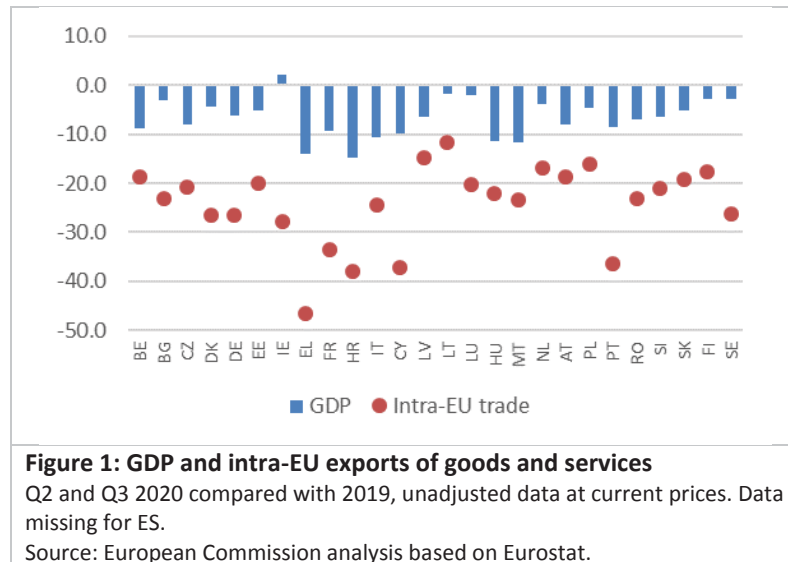
This contraction was aggravated by **new restrictions on the Single Market**.[5] Soon after the start of the outbreak in the EU, a number of Member States unilaterally introduced a number of restrictions that they justified by a need to protect public health. Whilst some of these have subsequently been relaxed or ended, a number of new restrictions have been introduced in some Member States.

Businesses, notably SMEs, have complained about a number of **practical problems,** notably the perceived lack of clarity regarding applicable national measures. Information was often hard to find, complex and only available in the national language of the Member State concerned. In addition, companies highlighted the large degree of divergence and fragmentation between national approaches even in cases of similar epidemiological situations. This is particularly difficult for those businesses being active or having to transit across several Member States.

Furthermore, the intra-EU export restrictions on products were subject to **frequent adjustments** exacerbating legal uncertainty and triggering national stockpiling responses with further negative effects. In the area of medicinal products, for example, economic operators had stocks close to expiry date, which were not in shortage nor in demand at national level but were still blocked on the national territory. In addition, many measures were not notified or only notified after they had been adopted, preventing the Commission and other authorities from raising potential concerns and weakening the ability of the EU to coordinate its response.

In addition, overly cumbersome border controls restricting the **free movement of persons** caused serious delays in freight traffic and even blocked the delivery of goods to other Member States,

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[5] Several Member States closed their borders or introduced coronavirus-related restrictions, for instance in the context of medical and medicinal devices.

leading to major disruptions to supply chains in many industrial ecosystems, including retail[6] and automotive[7].

The **free movement of services** was affected strongly, including by forced temporary closures of non-essential businesses, travel restrictions, and a lack of clarity on applicable rules on movement across borders.

Furthermore, border restrictions reduced the **mobility of workers and service providers**. The number of postings dropped dramatically in the second half of March and in April and May. Stakeholders repeatedly complained of[8] problems in construction (e.g. posting workers), retail (e.g. difficulties of frontier workers to reach the workplace), agri-food (e.g. lack of seasonal workers or difficulties in manning of fishing vessels), health (e.g. hospitals in border regions having staff from across the border) and energy-intensive (e.g. engineers unable to carry out urgent cross-border maintenance services on industrial equipment). Irrespective of the employment situation, this remains very difficult for some service providers and workers, mostly on short-term contracts, without decent accommodation at the place of work.

The accumulation of these restrictions caused **major disruptions** in many of the EU's industrial ecosystems, especially given the close links between activities within them. Some restrictions were particularly harmful to the functioning of the Single Market and even counter-productive. Bans or other restrictions on intra-EU exports of products raise serious doubts about their suitability and proportionality. They also undermine the principle of European solidarity and create a domino effect across the Single Market.

Businesses (mainly in the health ecosystem) underlined the negative impact on their supply chains of such new export restrictions, in particular during the first wave of the pandemic.

Commission services worked to lift around 30 export restrictions within the Single Market during the first wave[9], recommending instead a system of prior notification of exports allowing authorities to refuse these on a case-by-case basis and for a limited time, based on clearly identified risks of shortages.

Since then, Commission services have monitored national measures to prevent that new bans or other trade restrictive measures and has challenged unjustified or disproportionate measures using all available tools, including infringement procedures. The Single Market Task Force (SMET) set up following the adoption of the Long-term action plan for better implementation and enforcement, is proving an effective tool.

Guidelines on border management[10] allowed for improvements to the free flow of goods and essential services. The "Green lanes" system based on the principles set out in the "Green Lanes"

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[6] e.g. products not available in shops or for online purchase
[7] e.g. disrupted supply of components from other Member States
[8] Based on feedback obtained through SOLVIT, YourEurope Advice and information from business associations
[9] Introduced between March and May 2020 mainly on medicines, personal protective equipment (PPE), ventilators and disinfectants but also for food products
[10] Guidelines for border management measures to protect health and ensure the availability of goods and essential services (C(2020)1753)

Communication[11] has significantly alleviated the serious delays faced by freight traffic but remains voluntary. The recent reintroduction by some Member States of checks on transport workers, in particular at or behind the border is causing significant social and economic disruption and resulting in substantial challenges for freight and logistics, as well as for the movement of goods and people. This highlighted that the "Green Lanes" principles for freight transport must also continue to be applied in full in any circumstances when internal border controls are temporarily reintroduced as a measure of last resort[12].

Furthermore, in the last year, discriminatory practices have emerged in the **agri-food sector**, favouring national products over products originating from other Member States, and so fragmenting the Single Market. Measures such as calls on "**naming and shaming**" of firms importing goods, obligations on retailers to advertise or source a certain percentage of food products from national producers; giving preference to national food in public procurements; or promoting national food products with state or EU funds, may breach the Single Market.[13] The Commission has used infringement proceedings against such measures[14]. These issues are being discussed with Member States in the SMET together with alternative means to support farmers and short-supply chains in line with EU rules.

Public buyers had to deal with an immense increase of demand for similar goods and services. They had to ensure the availability of personal protective equipment such as face masks and protective gloves, medical devices, notably ventilators, other medical supplies, but also hospital and IT infrastructure, to name only a few. They were able benefit from the use of electronic procurement tools for their emergency purchases, facilitating the implementation and monitoring of the contracts.

In addition, the risk of shortages of essential products protected by **intellectual property rights** has also triggered debates in relation to compulsory licensing[15] of patents both at Member State and EU levels[16]. This mechanism based on the WTO TRIPS Agreement and implemented in the EU mainly at Member State level provides for a safety net, if voluntary solutions to make intellectual property available fail or are not available. Steps have been taken to facilitate the availability of results of publicly funded Research & Innovation programmes in the EU and its Member States to address shortages and ramp up production of critical materials.

Due to the commitment and close co-operation between public and private players to boost availability of essential products across the EU, the need to resort to compulsory licensing has been

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[11] C(2020) 1897 final on the implementation of the Green Lanes under the Guidelines for border management measures to protect health and ensure the availability of goods and essential services

[12] (COM(2020) 685 final Communication "upgrading the transport Green Lanes to keep the economy going during the COVID-19 pandemic resurgence"

[13] More than 10 such measures and/or export restrictions were identified in the area of food

[14] https://ec.europa.eu/commission/presscorner/detail/en/inf_20_859

[15] A compulsory license may be issued by a public authority under certain conditions, permitting the use of a patented invention without the consent of the patent owner.

[16] EP Resolution *'Shortage of medicines - how to address an emerging problem'* (2020/2071(INI)) of 17 September 2020 included a calls on the Commission '*to consider, in the context of its upcoming pharmaceutical strategy, the possibility for harmonised rules on granting compulsory licensing of medicinal products, such as vaccines, which would allow Member States to respond faster and more effectively to future European public health crises.*

largely mitigated. Unexpected and uncoordinated use of compulsory licensing by one Member State in an EU-wide emergency situation can distort trade, innovation, exacerbate product shortages in other Member States, and more generally weaken the collective bargaining power of the EU, e.g. in the context of joint procurement,[17] and also negatively affect ongoing negotiations with patent holders.

The result of all these restrictions and disruptions was that the ability of industry to quickly introduce and scale up **production in critical areas** was seriously constrained as certain products (e.g. cloth-face masks) lacked harmonised standards under the existing EU product *acquis.* In addition, testing facilities for essential products were closed in some Member States, putting further pressure on the ability of industry to quickly respond to emerging needs. Furthermore, market surveillance authorities faced a high number of non-compliant products shipped from third countries. As a result, shipments were blocked by customs in their transit to final destination in one Member State leading to further delays in the free movement of goods across the Single Market.

2.2. *The impact of the crisis on the economy* and the industrial ecosystems perspective

The pandemic has hit the European economy harder than any other economic shock in the history of the EU. The drop in economic activity has translated into significant reductions in the number of hours worked, while employment losses have so far been more contained in part because of the widespread use of short-time work schemes, supported at EU-level by the SURE instrument. Employment strongly declined in the second quarter 2020 before rebounding in the third quarter of 2020. The impact on young people has been particularly harsh, with the number of young people neither in employment nor in education and training (NEETs) on the rise, in particular in Mediterranean and Central European Member States[18].Despite important downside risks, economic recovery is within sight: according to the latest Commission Forecast, the EU economy is expected to grow by 3.7% in 2021 and 3.9% in 2022 (See Figure 2). Moreover, it is expected to reach the pre-crisis GDP level earlier than expected in the Autumn 2020 Economic Forecast.

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[18] Employment and Social Developments in Europe, Quarterly Review, December 2020

Figure 2: Evolution of GDP and employment, 2019=100
Source: European Commission analysis based on data by Eurostat.
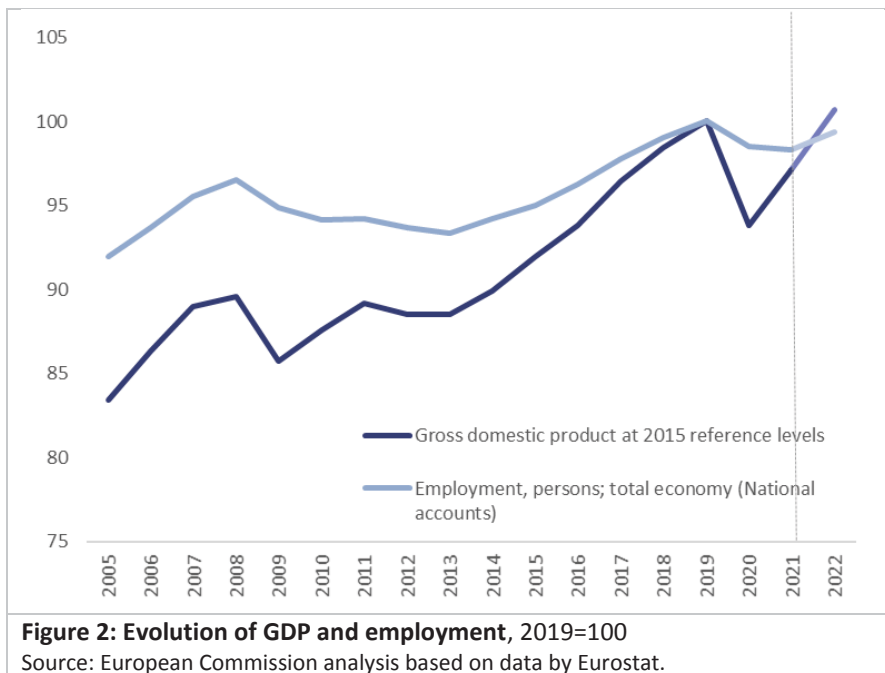
Economic activity can also be analysed through the lens of **industrial ecosystems**. This approach aims at capturing the interlinkages and interdependencies occurring between different economic actors.

The contraction of economic activity is uneven across economic activities, and the protracted nature of the pandemic tends to deepen these sectoral differences in impact. Contact-intensive services, which tend to be relatively insensitive to the economic cycle, have been affected the most. The sectoral variation in the containment measures largely explains differences in impact. Moreover, where contact is easier to avoid or teleworking is possible, economic activity has been more resilient. Similarly, in industries producing essential goods such as food, the reduction in turnover was rather modest. On the other hand, businesses relying on close physical interactions have experienced significant adverse shocks to turnover as they were forced to shut down or change the nature of their operations (e.g. tourism, food services, cultural and creative activities). Moreover, demand-sensitive sectors like the automotive industry experienced strong reductions in sales.

Nonetheless, **the lockdown has hit all ecosystems. Divergences started to emerge during summer,** due to the dynamics discussed above. In the second quarter of 2020, the lockdown triggered sizeable losses for all ecosystems, with the exception of "Digital". The figure below shows that "Tourism", "Textile" and "Automotive" have suffer the most in terms of turnover (See figure 3). The average losses reported in the figure hide significant heterogeneity within some ecosystems. For instance, travel agencies and tour operators faced turnover losses of roughly 80% in the last three quarters of 2020. In the same period, air transport also lost between 60% and 70% of their revenues. Moreover, the data significantly underestimate the impact for ecosystems as Cultural and Creative and Proximity, Social Economy and Civil Security, which are underrepresented in data.[19] In the third

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[19] Eurostat Short-term Business Statistics do not cover the whole economy. In particular, several activities related to culture, art, recreation, as well as public sector activities are not included. Hence the data used for the graph only represent a fraction of ecosystems depicted using dotted bars. Nonetheless, the sectors

quarter, most ecosystems returned close to 2019 levels, but divergences started to emerge. In the fourth quarter of 2020, such divergences became more apparent: Turnover in the "Tourism" ecosystem has further contracted significantly, pointing to a worrying situation, as this ecosystem did not recover even in the most favourable period of the year. The "Digital" and "Energy Intensive Industries" ecosystem, instead, increased their turnover, with respect to the previous year.

Figure 3: Change in Turnover by Ecosystem – by Quarters.
Source: European Commission analysis based on data by Eurostat Short-term business statistics.
Note: data show annualised y-o-y change in turnover for each quarter of 2020. For "Agrifood", "Health", "Social", and "Creative & Cultural" data available cover only partially that ecosystem. For this reason, they are depicted using dotted bars and the related values have to be interpreted with caution. Data for Cultural and Creative Industries and Proximity, Social Economy and Civil Security may underestimate the impact of the crisis, as data for some relevant sectors are not available.

To provide a better picture of the impact of the crisis for the ecosystems not fully covered by data on turnover, Commission services use quarterly data on Value Added.[20] The data show that in 2020, the arts, entertainment and recreation activities experienced the largest percentage drop compared to 2019 (see Figure 4). The impact was particularly strong in the second and fourth quarters, corresponding to the most relevant waves of the pandemic. A large share of these activities are part of the Cultural and Creative industries as well as of the Proximity, Social Economy and Civil Security ecosystem.

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included to calculate the turnover drop of CCI, represent approximatively 70% of the value added of the ecosystem.
[20] Quarterly data on value added is only available for aggregate sectors, hence it is not possible to produce figures by ecosystem.

Figure 4: Gross value added, 2020. Percentage change with respect to the same period in the previous year.

Source: Eurostat [namq_10_a10]
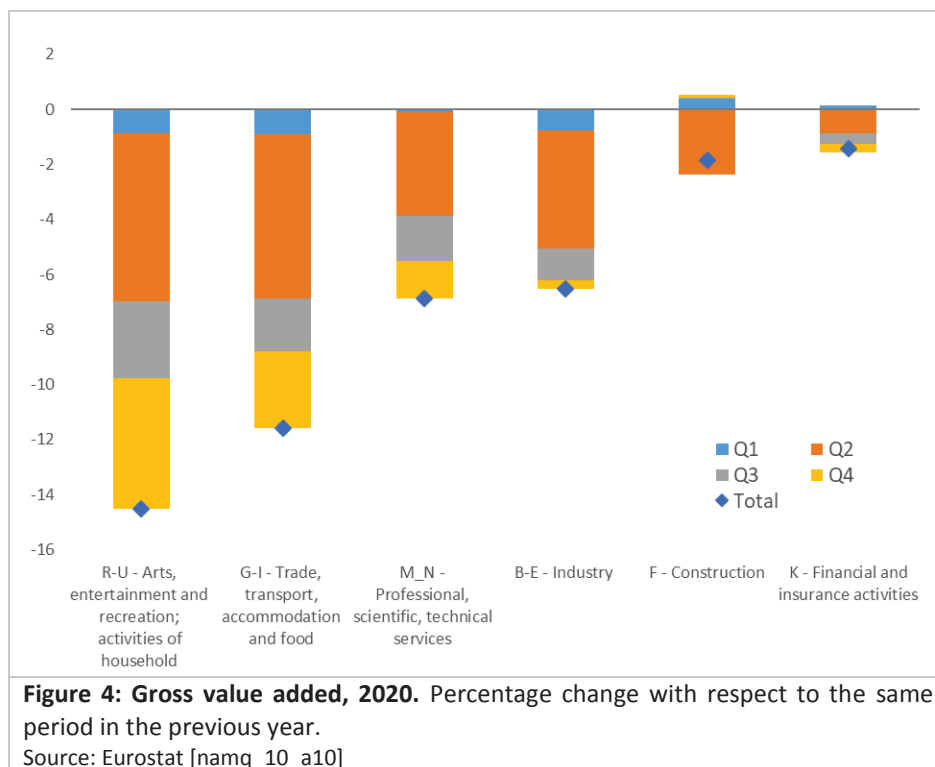
Studies on different components of the CCI ecosystem also show severe disruptions, potentially comparable to the Tourism sector. This is particularly the case for activities based on venues and visits: performing arts and 'heritage' sectors (e.g. live music, theatres, circus, festivals, cinema, museums and heritage sites). For example, cinema operators in the EU report a 70%[21] drop in box office sales in 2020, music venues report a 76% drop in attendance (64% in revenues)[22] and museums lost revenues up to 75-80% (in popular touristic regions). Outside of venue-based activities, news publishing saw its advertising revenues drop between 30% and 80%[23]. Revenues in the audiovisual sector (including remotely accessible services like broadcasting or streaming besides cinema), are estimated to have decreased by 15% in 2020[24]. TV advertising revenues are estimated to have dropped by 15-20% in 2020. The increase in the uptake of streaming and gaming services cannot alone compensate for the severe losses suffered elsewhere in the ecosystem.

The drop in turnover across ecosystems is mirrored by a drop in volume of hours worked. In some ecosystems, such as "Aerospace & Defence", "Retail", and "Digital", the drop in total hours worked is considerably larger than the drop in turnover: this signals important productivity gains in these ecosystems. In the "Energy-Renewables" ecosystem, instead, despite a relevant loss in turnover, the volume of hours worked and the level of employment have remained constant, leading to some fall in productivity (see Figure 5). As above, data for Cultural and Creative Industries and Proximity, Social Economy and Civil Security significantly underestimate the impact of the crisis, as data for some

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[21] www.unic-cinemas.org

[22] Source: Live DMA Network

[23] http://www.newsmediaeurope.eu/news/covid-19-and-the-news-media-journalism-always-comes-at-a-cost/

[24] Source: European Audiovisual Observatory https://rm.coe.int/modelling-audiovisual-sector-revenue-flows-in-the-eu-and-test-case-on-/16809fd5e7

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relevant sectors is not available. In particular, given the high share of self-employed and non-standard employment in these ecosystems, the impact has certainly been very severe.

CCI = Creative and Cultural Industries
EII = Energy Intensive Industries
MTA = Mobility-Transport-Automotive
ASD = Aerospace and Defence
P-SE-Sec= Proximity, Social Economy & Civil Security

Figure 5: Change in Turnover, Employment and Hours Worked in 2020
Source: European Commission analysis based on data by Eurostat. Note: For "Health" and "Proximity, Social Economy and Civil Security", data do not cover enough sectors to build a proxy, so they are not included. Data for "Cultural and Creative Industries" significantly underestimate the impact of the crisis, as data for some relevant sectors are not available.

Surveys data can be used to build an economic sentiment indicator for each ecosystem, which is a good proxy of the actual economic impact.[25] This complements the analysis for the most recent months, for which official data is not yet available, **and points to an improving, though heterogeneous, situation across the board** (see Figure 6).[26] Services sectors are clearly the most affected, as well as retail, while manufacturing and construction seem to have better absorbed the second round of containment measures. Consequently, in April 2021, t**he economic sentiment** turned positive for most ecosystems, but remains negative in Textiles and Tourism, despite a significant improvement.. As above, Data for Cultural and Creative Industries and Proximity, Social Economy and Civil Security may underestimate the impact of the crisis, as data for some relevant sectors is not available.
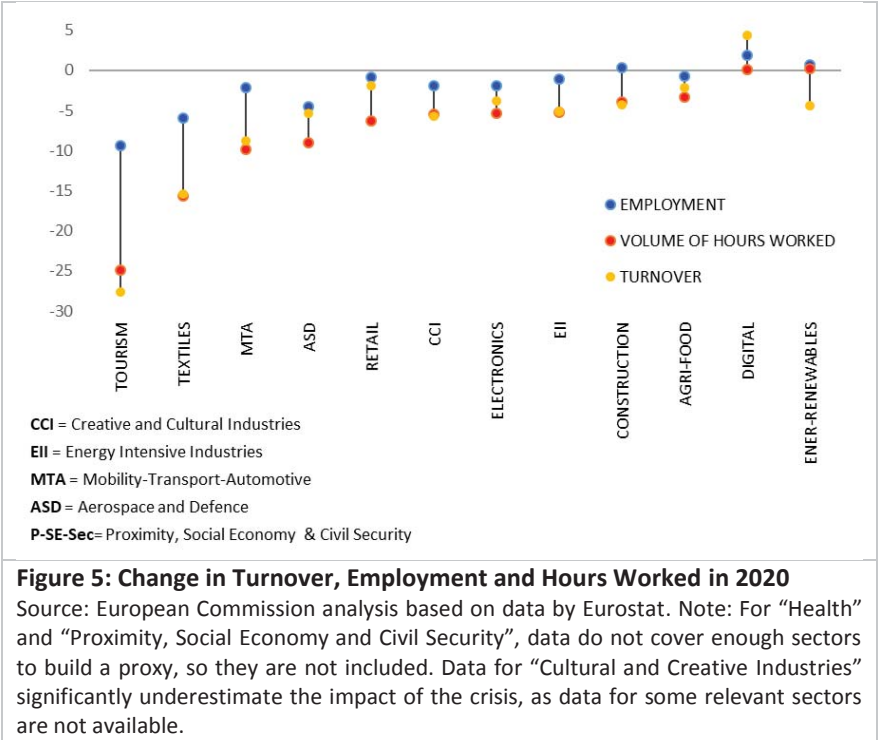
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[25] A profile of the economic sentiment for each ecosystem is created by aggregating data for different sectors, as explained in the methodological annex to this document. We calculate a weighted average of the values of the sectors included in the definition of each ecosystem; the weights are based on the share of value added that each sector has in the total value added of the ecosystem. This surveys-based indicator is highly correlated (80%) with the data on actual changes in turnover, for each ecosystems in each month. We can therefore use it to forecast the economic impact on each ecosystem in the most recent months.

[26] From the Joint Harmonised EU Programme of Business and Consumer Surveys.
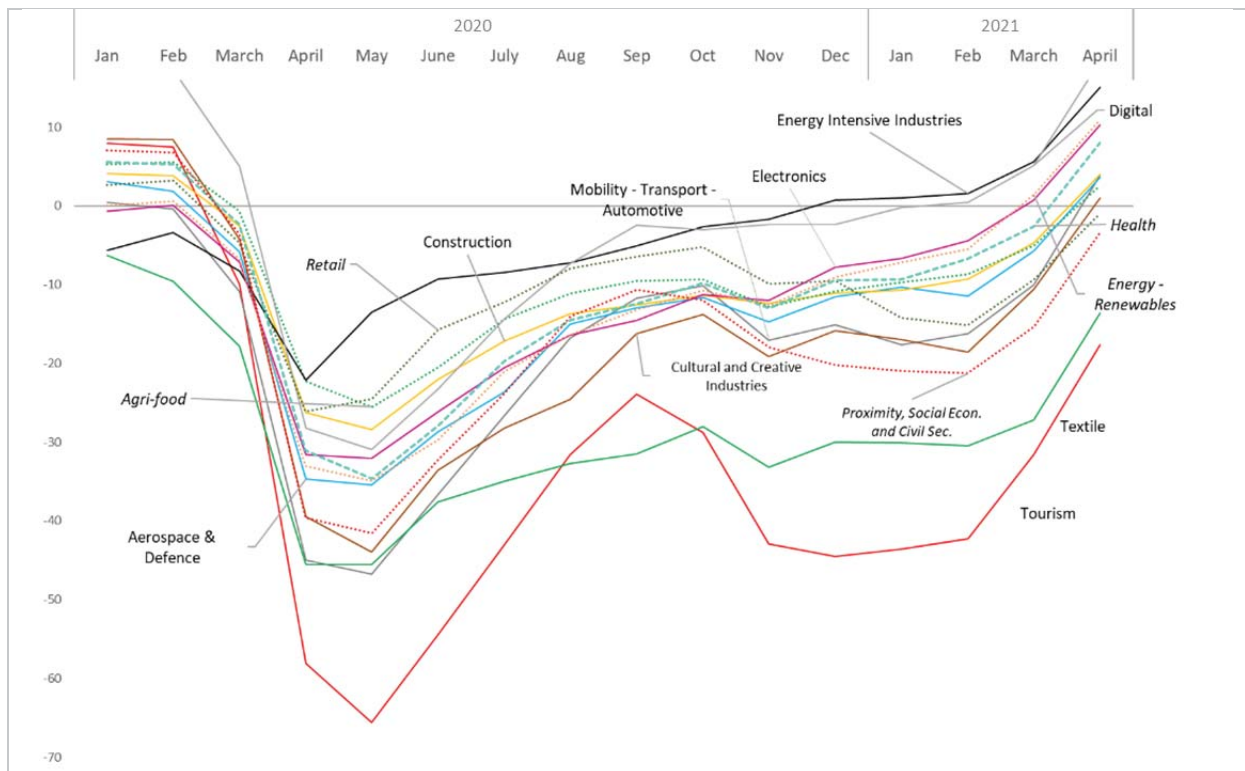
Figure 6: Evolution of the Confidence Indicator by Ecosystem

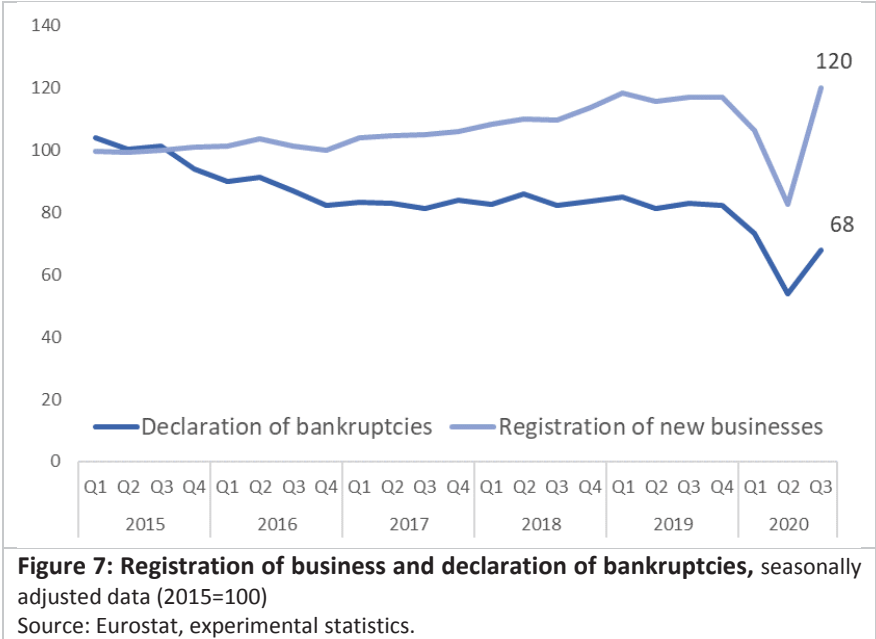Source: European Commission analysis based on data by the Joint Harmonised EU Programme of Business and Consumer Surveys. Note: For "Retail", "Agri-food", "Proximity, Social Economy and Civil Security", "Energy-Renewables", and "Health", data coverage is partial, so they are depicted using dotted lines and the related values have to be interpreted with caution. Data for Cultural and Creative Industries may underestimate the impact of the crisis, as data for some relevant sectors are not available.

Overall, this evidence suggests that the prospects for a quick and strong recovery differ across ecosystems. As seen in the third quarter of 2020, demand can quickly rebound if the health impact of the pandemic is contained. Nonetheless, the sheer size and the persistence of the shock are likely to spur business failures and a fall in employment in the future, leading to reallocation of resources both within and across ecosystems.

Swift and large-scale policy support programmes rolled out by governments in response to the unfolding of the pandemic cushioned the adverse effect on employment, bankruptcies and household income, and avoided the destruction of viable businesses. Beyond their macro-stabilisation effect, the measures will foster a faster recovery. In particular, a pandemic-driven surge in bankruptcies could have severe macroeconomic effects, as the exit of businesses would translate into losses of employment, higher unemployment benefit expenses and reduced private consumption, possibly resulting in a downward spiralling of aggregate demand. Moreover, the potential concentration of insolvencies in specific sectors could lead to more persistent unemployment if labour reallocation is made more difficult by the specificity of human capital and skills of the workers affected.

Government policies have effectively staved off the surge in bankruptcies so far. As the emergency support measures are gradually phased out, firms' ability to repay debt will be a function of firm characteristics pre-crisis, the magnitude and duration of the sectoral shock, as well as the sectoral recovery prospects. The share of Euro Area corporate non-performing loans (NPLs) stood at 5.2% of total loans in Q2-2020, marginally lower than in the previous quarter (5.3%) and down from 6.3% in

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Q2-2019. While it is clear that the debt-servicing capacity of the private sector has been adversely affected by the pandemic, government credit guarantees and loan repayment moratoria have prevented so far a rise in loan defaults. The most recent evidence shows that the characteristics of firms filing for bankruptcy in the course of 2020 is similar to pre-crisis patterns. These findings support the hypothesis that policies have been effective in avoiding a COVID-driven wave of bankruptcies. As illustrated in Figure 7 below, the number of bankruptcies in 2020 decreased compared to 2019, owing to administrative delays and, in some countries, loan repayment moratoria and the temporary relaxation of bankruptcy regulations. Thus, the headline NPL ratios – based on a rather stable NPL stock and the increasing loan denominator – do not yet reflect the underlying deterioration in the credit profile of borrowers. The stronger capital position of banks compared to the financial crisis should help them better absorb the shock.

Figure 7: Registration of business and declaration of bankruptcies, seasonally adjusted data (2015=100)
Source: Eurostat, experimental statistics.

While the policy response has prevented a wave of bankruptcies, it has not eliminated financial distress. Rather, the protracted nature of the pandemic has deepened the sectoral heterogeneity of its impact. Whether one uses the sectoral or the ecosystem grouping of economic activity, the stark finding is that firms which were perfectly healthy before the crisis have also been significantly affected by the crisis. Simulations based on the income statements and balance sheets of initially solvent firms show that the trajectories of firms operating in different sectors have gradually diverged. These simulations take into account a subset of government support measures such as short-term work schemes, loan moratoriums, and tax deferrals. As shown in Figure 8 below, corporate financial distress differs strongly across all sectors of the economy, with the largest share of distressed firms in the automotive and hospitality industries.[27]

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[27] For an overview of the methodology used for these simulations, please see the Commission Staff Working Document "Identifying Europe's recovery needs", SWD(2020) 98 final. The same methodology is illustrated in Connel Garcia, Ho (2021), "What Types of Firms Become Illiquid as a Result of COVID-19? A Firm-Level Perspective Using French Data", Discussion Paper 136, Economic and Financial Affairs, European Commission.

Figure 8: Share of EU firms likely to face financial distress at different points in time.

European Commission analysis based on ORBIS, Eurostat and Member State specific information collected by DG ECFIN
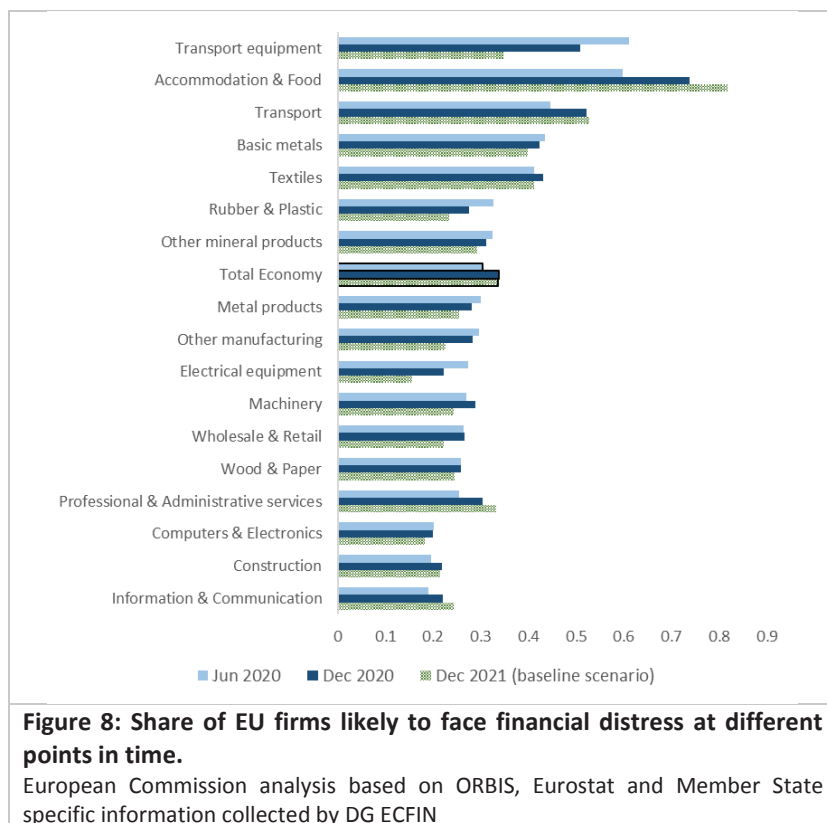
The same heterogeneity is visible when replicating the analysis by ecosystem. This complementary approach allows to better take into account the interlinkages across sectors. By the end of March 2021, the fraction of illiquid firms is estimated to range between 18% in the digital and 74% in the tourism ecosystem (see Figure 9). Data representing SMEs has been reweighted for this analysis in order to correct for the underrepresentation of SMEs and microenterprises in firm-level data. Nonetheless, results should be interpreted with caution for ecosystems as Cultural and Creative Industries and Proximity, Social Economy and Civil Security, characterised by the presence of many self-employed, associations and microenterprises, which may have suffered disproportionally from the lockdown measures.
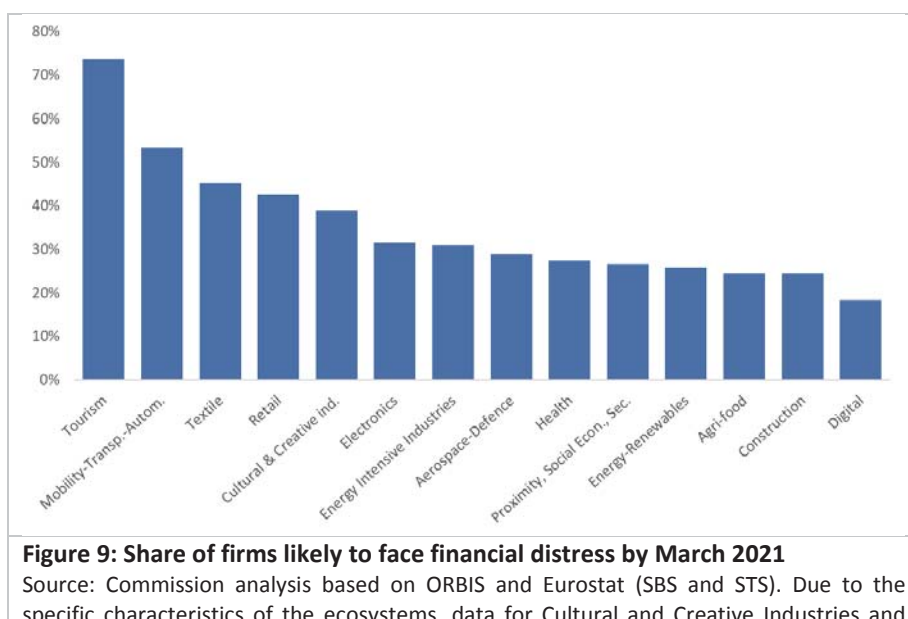
Figure 9: Share of firms likely to face financial distress by March 2021

Source: Commission analysis based on ORBIS and Eurostat (SBS and STS). Due to the specific characteristics of the ecosystems, data for Cultural and Creative Industries and

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Less performant firms in terms of economic characteristics as productivity are more likely to become illiquid within each sector or ecosystem. Yet, a significant fraction of the total liquidity shortfall is attributable to large and highly productive firms (see Figure 10). This finding indicates that financial distress may not be tightly connected with pre-COVID productivity.
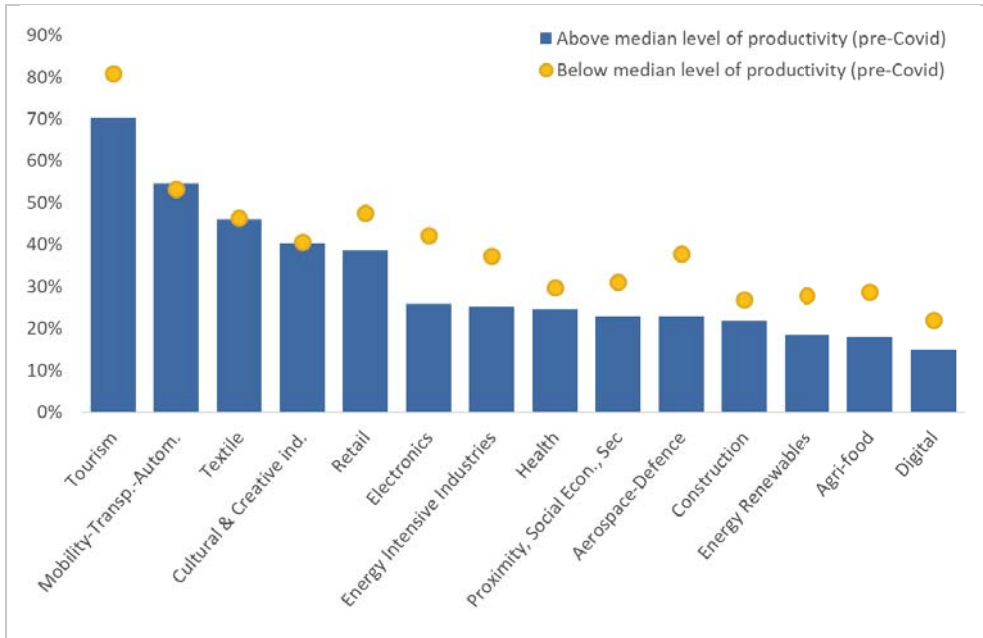
Figure 10: Share of firms (among top/bottom productive firms) likely to face financial distress by March 2021

Source: Commission analysis based on ORBIS and Eurostat (SBS and STS). Note: The graph shows the share of firms facing financial distress among the higher and lower half of firms in terms of labour productivity, measured prior to the COVID-19 pandemic. Due to the specific characteristics of the ecosystems, data for Cultural and Creative Industries and Proximity, Social Economy and Civil Security should be interpreted with caution.

In terms of financial characteristics, firms that were already financially vulnerable before the crisis are more likely to face financial distress. Some pre-crisis characteristics of firms can affect their ability to absorb repeated adverse shocks to revenue. In particular, less profitable and more leveraged firms tend to have smaller liquid asset buffers and face more difficulty in absorbing the adverse shock. Data shows that firms with relatively high ratio of equity to assets (solvency ratio) tend to become illiquid only as the crisis protracts. Specifically, among firms that became illiquid by the end of March 2020, 80% had a solvency ratio below the median level in pre-crisis times. However, just half of firms that become illiquid by the end of March 2021 (but were not illiquid previously) have a pre-crisis solvency ratio below the median (See Figure 11).
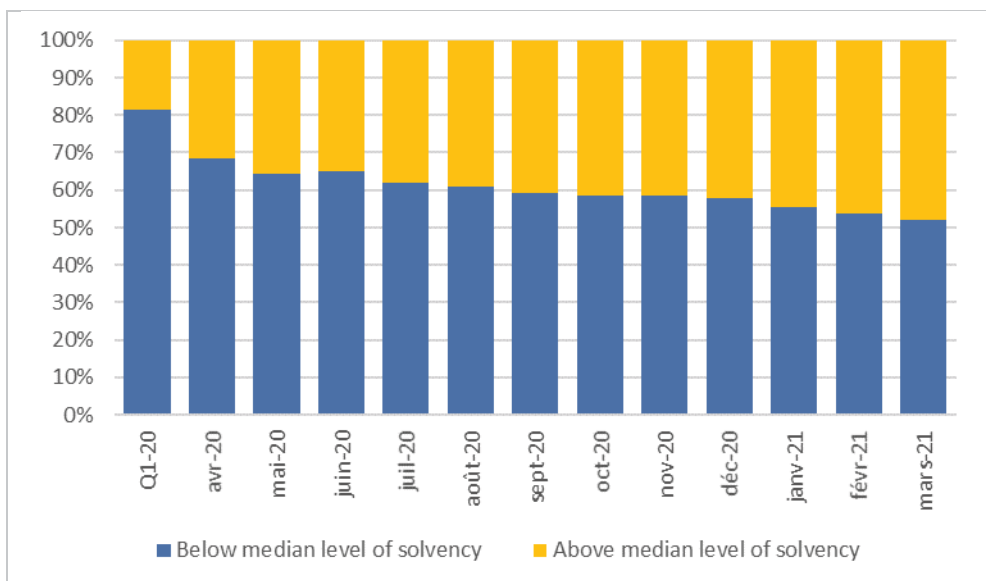
Figure 11: Financial profile (pre-COVID19) of new firms estimated to face financial distress in each month since March 2020

Source: Commission analysis based on ORBIS and Eurostat (SBS and STS).

Note: The Solvency Ratio is calculated as equity/assets and it is defined using the pre-COVID period. The firm level simulations use the most recent cross-section of financial statements covering millions of firms in the EU allows evaluating the capacity of these firms to overcome the COVID-19 shock on sales, including through previously accumulated cash reserves, operational flexibility as well as policy intervention. Due to the specific characteristics of the ecosystems, data for Cultural and Creative Industries and Proximity, Social Economy and Civil Security should be interpreted with caution.

Financial distress is more likely to translate into solvency concerns for firms that were already at a high risk of default at the onset of the crisis. The likelihood of default pre-crisis is assessed using firms' liquidity, leverage, and profitability characteristics. It is expected that firms at a high risk of default pre-crisis and illiquid in its aftermath may face greater difficulties in accessing credit. For the EU economy as a whole, about one third of all firms were estimated to be illiquid at the end of 2020. About one third of these illiquid firms were also at a high risk of default pre-crisis, implying that about 11.4% of all firms in the EU economy are likely to exit as support dries up, as they may fail to get access to fresh sources of credit. This share is estimated to increase to 12.3% by the end of 2021 in the scenario that incorporates the ongoing third wave of the pandemic. There is strong variation in expected exit depending on the economic activity. The percentage of firms expected to exit by the end of 2021 on the basis of this estimation varies between 7% in construction and 27% of in the accommodation and food services sector. This quantification is most likely a lower bound as it does not include viable firms pre-crisis that might become insolvent following the pandemic shock. This could have negative effects on employment in the coming months and bear negatively on the job-creation potential of the forecasted recovery.

2.3. The impact of the crisis on SMEs

SMEs are particularly vulnerable in the context of the pandemic. Preliminary estimates from the SME Performance Review suggest that across the EU, the number of SMEs fell by -1.3% in 2020, employment in SMEs by -1.7% in 2020 (representing 1.4 million jobs) and SME value added by -7.6%.

SME value added is unlikely to reach 2019 levels even by the end of 2021.[28] According to SME associations, more than 60% of SMEs have reported a fall in turnover and about two-thirds of SMEs report that they have delayed investment decisions or downsized investments. [29]

Seventy-two percent of respondents to a **recent SME survey**[30] indicated that the crisis affected them strongly or moderately because of supply chain disruptions, employee absences and temporary shutdowns. SMEs were not well prepared: almost two thirds of respondents had no plan in place to handle supply chain disruptions. One third created such a plan during the pandemic. The main reactions of companies to supply chain disruptions were looking for alternative suppliers and drawing up a plan to increase resilience to such disruptions (see Figure 12).

Figure 12: Response to the SME Survey
Source: EU Survey of SMEs carried out July-December 2020: multiple answers allowed

While bankruptcies among SMEs have so far not increased compared to 2019, within this group, this is also likely due to various government support measures and moratoria on insolvencies.

However, financial pressure is likely to increase in 2021 with insolvencies expected to rise as various forms of relief are phased out. As most Member States focus their support schemes on debt solutions, the risk of over-leverage and the need for recapitalisation will be severe for SMEs, especially smaller ones. According to an AFME report[31], there is a shortfall of between EUR 450 billion to EUR 600 billion in public and private sector equity at an EU-level over an assumed two-year period. Closing this gap will be a challenge that will have to be addressed at both EU and MS level.

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[28] Estimates for 2020 produced by DIW Econ, based on 2008-2018 figures from the Structural Business Statistics Database as well as provisional data for 2019-2020 from the National Accounts database and the Short-Term Business Statistics Database (EUROSTAT).

[29] European Commission/European Central Bank (November 2020), "Survey on the access to finance of enterprises (SAFE)"

[30] EU Survey carried out by European Commission July-December 2020.

[31]AFME/PwC, Recapitalising EU businesses post COVID-19, 2021

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As SMEs are deeply integrated into supply chains and comprise about 99% of companies in every industrial ecosystem, a rise in bankruptcies could significantly impact supply chains and jobs. In addition, late payments, which have long been an issue for SMEs, could exacerbate as since March 2020, payment delays have gone up rapidly knock-on effects throughout supply chains.

2.4. *Progress* on addressing key Single Market obstacles

The new Single Market restrictions detailed above came on top of a number of existing barriers to companies operating within the Single Market. These were detailed in the 2020 Staff Working Document of 10 March 2020 on addressing barriers to the Single Market referred to above.

These barriers are a mixture of **horizontal barriers** across all industrial ecosystems and **specific barriers** within individual ecosystems.

Horizontal barriers remain for example, for the **free movement of products**. To address these, Commission services are working in close cooperation with Member States to ensure the full implementation of the new EU Regulation 2019/515 on mutual recognition[32]. In addition, work is ongoing with interested Member States' representatives in the context of an "Accelerated Mutual Recognition" project. The aim is to come to an arrangement for specific sectors (e.g. precious metals, construction). The objective of this project for interested Member States is to facilitate a common understanding of their respective national rules to ensure that if a good is considered compliant in one participating Member State, it will automatically and without detailed assessment be recognized as compliant in another participating Member State. Such an arrangement would facilitate the work of national competent authorities and provide more certainty to economic operators when they decide to enter other Member States' markets.

In addition, **inadequate market surveillance** may also endanger a well-functioning Single Market for products that are safe and compliant with EU high standards and technical regulations, distorting competition and a level playing field for EU companies. Stepping up coordination, investment, resources and digitalisation of market surveillance authorities is therefore a high priority of the Commission and the EUPCN (EU Product compliance network), which has been recently set up as foreseen in the new Market Surveillance Regulation[33]. Moreover, resources are available under the Recovery and Resilience Fund for Member States to build or upgrade their market surveillance systems. For instance, the RRF could support the consolidation of national market surveillance authorities, the establishment of new accredited public laboratories, or the digitalisation of product inspections and data collection.

But such horizontal barriers are particularly prevalent for services, with a significant impact on the EU economy: the Services Directive alone covers service activities that account for 46.4% of EU GDP.[34] Full implementation of the Directive could potentially increase the level of EU GDP by 1.7%.[35] Indeed,

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[32] Regulation (EU) 2019/515 of the European Parliament and of the Council of 19 March 2019 on the mutual recognition of goods lawfully marketed in another Member State and repealing Regulation (EC) No 764/2008
[33] Regulation (EU) 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products and amending Directive 2004/42/EC and Regulations (EC) No 765/2008 and (EU) No 305/2011
[34] Commission calculations based on Eurostat data.
[35] See COM study from 2012, and its update in 2015.

the entry into force and implementation of the Services Directive brought clear economic benefits (see Figure 13 below).
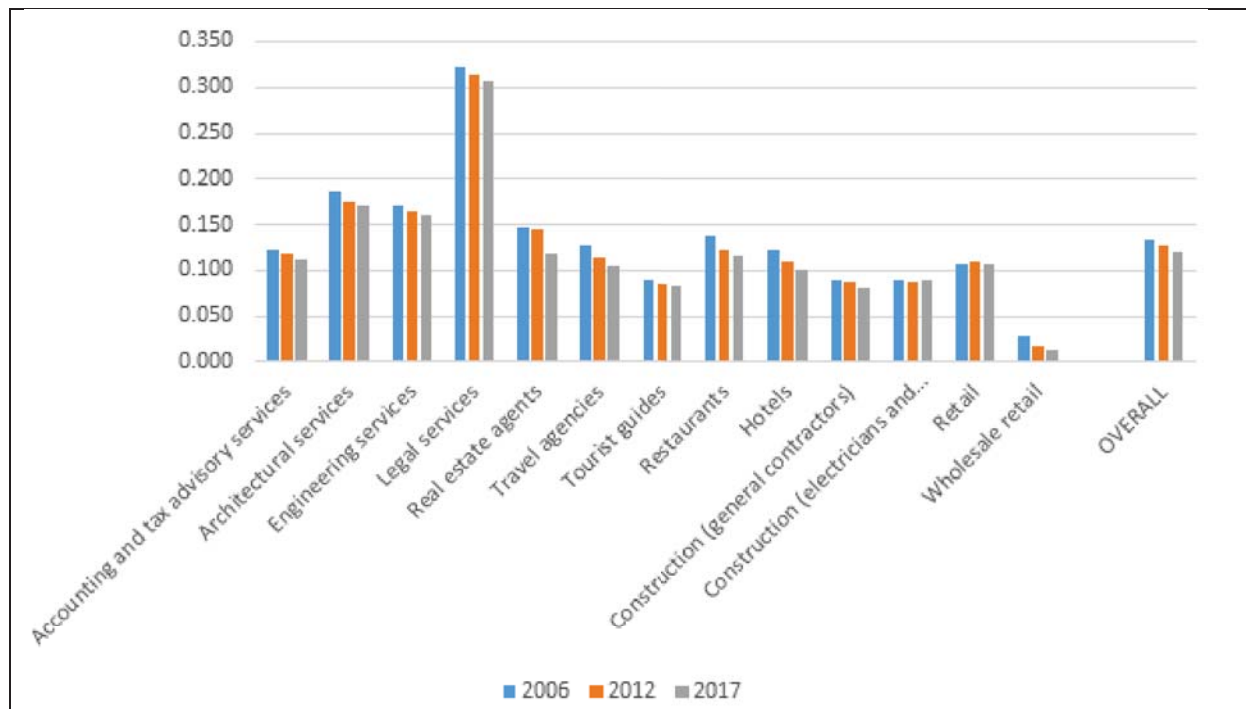
Figure 13: Overall barriers evolution in the EU
Source: Study on "Mapping and assessment of removal of legal and administrative barriers in the services sector", DG GROW. Note: The level of barriers measures the intensity of restrictions in services regulation in a specific sector, quantified on a scale from 0 to 1.

However reform progress has been slow and in some cases has been reversed. To address this, Commission services prepared a comprehensive review of its most pertinent rules in all Member States[36]. *Inter alia*, this shows that regulation of services markets remains complex and the Single Market in services remains fragmented. While, for example, most authorisation schemes applicable to service providers have remained in place, some of the key restrictions accompanying and underlying the authorisation schemes have been removed. In many cases, only a few Member States retain a certain type of restriction.

Making progress here is all the more important because of the increasingly strong interaction between goods and services, often referred to as '**servitisation**'.[37] In 2011, the value-added by services in EU manufacturing output and exports (at an aggregated level) already amounted to 40%;[38] an estimated 25-60% of employment in manufacturing firms relates to service.[39]

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[36] Study on "Mapping and assessment of removal of legal and administrative barriers in the services sector", DG GROW https://data.europa.eu/doi/10.2873/690757
[37] For example, in several Member States more than 50% of manufacturing SMEs provide product-service combinations
[38] Copenhagen Economics, 2018, Making EU trade in services work for all.
[39] Ibid.

Service activities in turn have much to gain from further **digitalisation**, which could contribute to lift the comparatively low productivity of the European services sector. Digitalisation is important for European companies' capacity to grow, innovate and go international, but requires significant investment. Nevertheless, this is held back by the existing regulatory set-up. For example, the **business services sector** is of crucial economic importance for the EU (representing 13% of total value added) and provides key inputs into many ecosystems, yet is held back by restrictive national rules such as strict requirements as regards who can hold equity of business service providers or manage them, which legal form they can take and how they can team up with other service providers to offer joint services.

Finally, **preventing new regulatory barriers** from being put into place is much more effective than seeking to address barriers once in place, particularly for services. Whilst regulation must keep up with developments in services markets, the Proportionality Test Directive and existing notification procedures provide a comprehensive framework for ensuring that measures made by Member States are justified and proportionate.

The ability of companies to send their workers temporarily to another Member State (i.e. posting of workers) is key for manufacturing and service activities. Complex and costly administrative formalities linked to the posting of workers are a leading obstacle across ecosystems,[40] in particular for SMEs. Recently revised EU rules regulating the posting of workers ensure the mobility of posted workers and must be implemented correctly by Member States. The European Labour Authority has been set up *inter alia* to assist Member States and the Commission in their effective application and enforcement of the relevant EU rules related to labour mobility across the EU.

Specific obstacles to the functioning of the Single Market persist across **all industrial ecosystems**. An analysis in Annex A3 shows that some ecosystems are characterised by particularly high levels of regulatory and administrative complexity that hinder their transformation.

Two examples are the construction ecosystem and retail ecosystem.

The transition to a greener European economy in no small part depends on the performance of the **construction ecosystem** and its ability to renovate Europe's existing building stock, accounting for approximately 40% of EU energy consumption and emissions. The efficiency of construction services is, however, held back by a number of Single Market barriers. They include compulsory certification schemes based on national standards and regulation without functioning mutual recognition schemes, as well as difficulties for companies to obtain the insurance coverage they need to offer their construction services in other Member States.

In addition, the environmental performance of the **retail ecosystem** (e.g. green transport and deliveries, low-emission stores, green product design) is essential for Europe's green transition. Nevertheless, national restrictions to establishment and operations deter innovation and affect the ability of retailers to invest in digital and green infrastructure and services.[41] Ongoing actions to eliminate barriers in the retail ecosystem include the identification of best practices that are tried and tested and could provide inspiration for reforms in other Member States.

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[40] SWD(2020)54 Identifying and addressing barriers to the Single Market
[41] Establishment restrictions are extensive regulatory requirements retailers face to open a shop (e.g. planning permits and authorisations). Operational restrictions are regulatory obstacles linked to the daily operations of shops.

Underpinning all this work on removing Single Market barriers is work on **standardisation.** For several years now, standardisation work has been supporting EU legislation on eco-design for a wide range of products. It is also crucial in implementing recent initiatives aimed at "greening" of critical sectors (such as the Plastics Strategy, sustainable fertilisers and "green" construction products). In the digital transition, standardisation will support the implementation of new technologies like Artificial Intelligence, whilst ensuring protection of citizens' rights in terms of privacy, personal data accessibility[42] and non-discrimination.

Administrative burden is often flagged as one of the key obstacles to doing business,[43] especially cross-border. Ensuring a smooth functioning and further implementation of the Single Digital Gateway will help overcome language barriers, introduce the once-only principle, increase transparency of rules and accelerate the digitalisation of procedures. In addition, the possibility to set up companies on-line and the cross-border co-operation and exchange of information between business registers (BRIS) will make the creation of new companies quicker and help overcome administrative barriers[44].

As a first step, in accordance with the Single Digital Gateway regulation, Member States are publishing online and making accessible through the gateway the national rules applying to citizens and businesses who want to make use of their Single Market rights. Thanks to the gateway, SMEs can be better informed about the applicable rules and they can more easily get relevant assistance. It also allows EU citizens and businesses to report any obstacle they still encounter in the Single Market.

2.5. Lessons learnt to increase the resilience of the Single Market

The crisis has underlined the fundamental importance of the Single Market. Particularly in the early days, businesses and citizens suffered from border closures, supply disruptions, lack of clarity and predictability, and fragmentation.

The Commission adopted a number of recommendations to provide swift and practical solutions to concrete obstacles on the ground:

- Guidelines on **border management**[45] allowed for improvements as regards the free flow of goods and essential services. The establishment of "green lanes"[46] in particular led to a quick and marked reduction of delays faced by freight transport at border crossings. Data from the green lanes reporting portal indicates that already in April 2020 there was a roughly 85% compliance rate with the green lanes recommendations.[47] In subsequent months, compliance rates further increased to around 95%. The Commission also issued Guidelines on

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[42] Directive 2019/882 European Accessibility Act
[43] SWD(2020)54final Identifying and addressing barriers to the Single Market
[44] Directive 1151/2019 as regards the use of digital tools and processes in company law.
[45] Guidelines for border management measures to protect health and ensure the availability of goods and essential services (C(2020)1753)
[46] Communication on the implementation of Green Lanes (C(2020)1897)
[47] Blockages of over one hour were experienced at roughly 5% of border crossings while wait times between 15 minutes and one hour were experienced at roughly 10% of border crossings.

air cargo[48] and **seafarer mobility**[49] to ensure uninterrupted cargo transport and taken several other measures[50].

- On the basis of a Commission proposal, Council Recommendation (EU) 2020/1475 fostered a coordinated approach to the **restriction of free movement** in response to the pandemic[51] basing restrictions such as quarantine and testing on the epidemiological situation in other Member States. The Council Recommendation was amended on 1 February 2021 to take into account the challenging epidemiological situation[52]. The Council Recommendation provides relevant exemptions for essential travellers such as transport workers.

- The Commission ensured the **mobility of workers and service providers** including through practical advice on the free movement of essential workers[53], urging Member States to establish specific burden free and fast procedures to ensure a smooth passage for critical cross-border workers, including proportionate health screening. In addition, specific guidance was provided in the area of professional qualifications to support the free movement of health professionals.[54] Furthermore, the Commission presented on 16 July 2020 Guidelines on Protecting Seasonal Workers in the context of the COVID-19 outbreak[55], to strengthen the protection of this particularly vulnerable group of workers;

- The Commission also adopted guidelines[56] presenting general principles for the safe and gradual restoration of **passenger transport** by air, rail, road and waterways. The guidelines put forth a series of recommendations, such as the need to limit contact between passengers and transport workers, and passengers themselves, reducing, where feasible, the density of passengers.

- **Commission guidelines** also boosted Europe's efforts to fight the pandemic. For example, recommendations to testing bodies and market surveillance authorities facilitated the supply of personal protective equipment and medical devices[57] and guidance to public authorities enabled purchasing urgently needed supplies and services under the EU's public procurement framework. In addition, guidance on national measures relating to medical

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[48] C(2020) 2010 final,

[49] C(2020) 3100 final

[50] These measures are described more in detail in SWD (2020) 331. Section 4.3.1.

51 Council Recommendation (EU) 2020/1475 of 13 October 2020 on a coordinated approach to the restriction of free movement in response to the COVID-19 pandemic. OJ L 337, 14.10.2020, p. 3–9.

52 Council Recommendation (EU) 2021/119 of 1 February 2021 amending Recommendation (EU) 2020/1475 on a coordinated approach to the restriction of free movement in response to the COVID-19 pandemic. OJ L 36I, 2.2.2021, p. 1–6.

[53] Guidance to ensure the free movement of critical workers (C(2020)2051)

[54] Communication from the Commission Guidance on free movement of health professionals and minimum harmonisation of training in relation to COVID-19 emergency measures – recommendations regarding Directive 2005/36/EC (2020/C 156/01)

[55] C(2020)4813 Guidelines on Seasonal Workers in the EU in the context of the COVID-19 outbreak file:///C:/Users/caspasi/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/C_2020_4813_Communication_Seasonal-workers%20(1).PDF

[56] C/2020/3139 Communication from the Commission Guidelines on the progressive restoration of transport services and connectivity.
The European Union Aviation Safety Agency (EASA) and European Centre for Disease Prevention and Control (ECDC) issued a joint document defining measures to assure the health safety of air travellers and aviation personnel once airlines resume regular flight schedules following the severe disruption caused by COVID-19.
For the safe resumption of railway operations in Europe, the European Union Agency's for Railways (ERA) and ECDC have developed operational guidelines with the COVID-19 railway protocol.

[57] Recommendation on conformity assessment and market surveillance (C(2020)1712)

products and devices and of personal protective equipment[58] aimed to address the proliferation of export restrictions.

In addition, different efforts made it possible to maximise the availability of medical supplies on the Single Market. The Commission coordinated a number of joint procurement actions, where Member States joined forces in negotiating purchases. In addition, the strategic rescEU stockpile and the COVID-19 Clearing House for medical equipment were established, the latter accelerating matchmaking for needed medical equipment. Furthermore, European standardisation bodies made 21 harmonised European standards for personal protective equipment and medical devices freely available, facilitating the conversion of production lines (and the creation of new ones) to respond to shortages. A specific European standardisation document for generic fabric facemasks was also developed and made freely available.

Secondly, existing Single Market tools and instruments have proven valuable:

- The **Single Market Transparency Directive** ensured transparency of measures restricting the free movement of goods. Altogether, Member States used the urgency procedure under that Directive 85 times during the first wave of the pandemic to notify COVID-19 related legislation to the Commission. The notifications of the draft technical regulations allowed the Commission to identify barriers to the free movement of goods, in particular concerning medicines and medical equipment most needed during the crisis, and address them in a timely and efficient manner. The measures most commonly notified during the first wave of the pandemic related to export restrictions for medicines as well as export bans on protective equipment, medical devices and *in vitro* medical devices needed in hospitals. Export bans for disinfectants and alcohols needed for their production were also frequently notified.

- Assistance tools such as **SOLVIT** and **YourEurope Advice** have received and dealt with a large number of enquiries and requests from businesses and workers to solve COVID-19 related problems. Business cases dealt with by SOLVIT include problems on free movement of goods (e.g. export restrictions on disinfectant and its ingredients, complaints about rules for CE labelling of masks) and on free movement of services (e.g. problems posting workers to another Member State, issues accessing COVID-19 crisis assistance for self-employed). In addition, SOLVIT received many cases involving mobile workers. In particular, certain enforcement models, like the Consumer Protection Cooperation (CPC) Network, proved to be very efficient in addressing the surge of online consumer scams linked to the pandemic. The EU Rapid Alert System for dangerous non-food products was a very efficient tool to speedily exchange information on unsafe COVID-19 related products.

- The Commission also facilitated and encouraged the action of **market surveillance authorities** against illicit and non-compliant personal protective equipment and medical devices and fake certificates.

- Member States also took action, **accelerating public purchases of goods and services** needed to fight the pandemic. For example, during the first wave, 11 Member States used the options provided in the EU public procurement directives to adopt temporary derogations to

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[58] Communication on a coordinated economic response COM(2020) 112 final

national public procurement rules in order to streamline the purchase of health products and services. Some Member States also addressed possible shortages in healthcare professionals by relaxing access requirements and enabling accelerated and less burdensome recognition procedures for professionals from other Member States.

Below are key observations based on the assessment presented in the subsections above[59], and informing the lessons learnt presented in the Communication[60]:

- Existing EU **crisis governance mechanisms** are not fully effective at coordinating national responses in times of emergency while protecting the Single Market;
- In several instances, better ***ex ante* assessment** by Member States on planned restrictions would have helped them to understand whether these measures would be effective and justifiable restrictions to Single Market freedoms[61];
- **Insufficient notification** by Member States at EU level for national measures that introduced restrictions both for goods and services created uncertainty;
- Member States could have made available more **clear, comprehensive and stable information** on applicable national restrictions for businesses;
- **The administrative capacity** to fully implement and apply Single Market rules including during crises times, including the notification of national measures, was often insufficient[62];
- Measures such as **"green lanes"** coupled with digital solutions were able to facilitate the free movement of goods, services providers and their workers during crises.
- **Faster and more effective purchases** of urgently needed goods and services through stronger cooperation among public buyers across the EU and the use of digital solutions, together with new mechanisms to ensure and speed up the availability of essential products in the EU and a common approach on stockpiling measures for products that are vital during crises would have helped[63].
- Manufacturers should have been granted better access to the necessary **product testing facilities** and market surveillance authorities should have had the means to control that products entering the Single Market met the necessary requirements.
- Building skills that increase workers resilience and digital competences would have contributed to maintaining production and service lines.

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[59] See Sections 2.1 Impact of the COVID-19 crisis and restrictions to the Single Market and 2.5 Progress on key Single Market obstacles

[60] Industrial Strategy Update Communication *idem*

[61] Bans or other restrictions on intra-EU exports of products raise serious doubts as regards their suitability and proportionality. The export restrictions were subject to frequent adjustments exacerbating legal uncertainty and they triggered national stockpiling responses with further negative effects. Many measures were not notified or only notified as adopted measures to the Commission and other Member States, preventing them from raising and addressing potential concerns beforehand. Commission services worked to lift around 30 such export restrictions during the first wave of the pandemic , instead recommending a more proportionate system of prior notification of exports allowing authorities to refuse these on a case-by-case basis and for a limited time, based on clearly identified risks of shortages. Some applies for border restrictions, which had a negative impact on the mobility of workers and service providers.

[62] See the SWD "Supporting public administrations in EU Member States to deliver reforms and prepare for the future" for further details on the topic

[63] The Commission coordinated a number of joint procurement actions, where Member States joined forces in negotiating purchases. The strategic rescEU stockpile and the COVID-19 Clearing House for medical equipment were established, the latter accelerating matchmaking for needed medical equipment.

Despite the usefulness of existing Single Market tools, the crisis showed that not all of them are suitable for emergency situations. The Commission was forced to take a large number of *ad hoc* actions[64] to safeguard the functioning of the Single Market.

Gaps in existing legislation and practices hindered industry and SMEs, highlighting the need for tools to meet the specific needs that arise in the context of a severe crisis, ensure the free movement of goods and services and support efforts to enable and speed up the availability of essential products. The Single Market needs to be better prepared to face a future crisis, based on forward looking and structural solutions that allow for predictability and legal certainty.

3. Delivering on the ground: the implementation of the 2020 Single Market Enforcement Action Plan, Industrial and SME Strategies

Key messages

Good progress was made in implementing the measures announced in the March 2020 Single Market Enforcement Action Plan, Industrial Strategy and SME Strategies.

*The implementation of the Single Market Enforcement Action Plan (SMEAP), the creation of the joint Single Market Enforcement Task-Force (SMET) will contribute to the **deepening of the Single Market**. A number of actions to help SMEs grow within the Single Market have been put in place and the review of the EU competition framework is ongoing.*

*A **global level playing field has been upheld**, by prioritizing WTO reform, following up on the White Paper on foreign subsidies, and thanks to actions aimed at improving SMEs' access to global markets, as well as the new Customs Union Action Plan.*

*Companies and the economy have been supported in the **transition towards environmental sustainability including climate-neutrality and a circular economy**, in particular through the New Circular Economy Action Plan. Good progress was made on energy with the Clean Energy and Hydrogen strategies, on mobility and construction with the Sustainable and Smart Mobility Strategy and Renovation Wave. The Commission is also paying special focus to products and their components, for example by publishing a Chemicals strategy and working for a Clean Steel partnership under Horizon Europe. It is moving to empower consumers under the Circular Economy Action Plan and New Consumer Agenda.*

*Action has helped the **digital transition**, by proposing the Digital Services Act (DSA) and the Digital Markets Act (DMA) as well as the Data Governance Act. The development and deployment of next generation cloud technologies as well as a high common level of cybersecurity have been promoted. **Innovation** is being supported through the Intellectual Property Action Plan and a communication on "A new ERA for Research and Innovation" as well as through a more strategic approach to partnerships.*

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[64] Cf. section 2.1 and the first part of this section

Skills are at the heart of the EU policy agenda and their development is being promoted thanks to initiatives like the European Skills Agenda and the Pact for Skills. The first European skills partnerships in key industrial ecosystems have been announced as well as a vision for achieving the European Education Area and a new Digital Education Action Plan (2021-2027). This will contribute to addressing the gender gap in STEM[65] as announced in the Gender Equality Strategy 2020-2025.

The agreement on the Multiannual Financial Framework and Next Generation EU **will support investment and financing** and private finance will be leveraged through the new Capital Market Union action plan as well as a number of actions to help Europe's SMEs. Member States can design Important Projects of Common European Interest (IPCEI) in line with State aid rules and new ones have been put in place.

The new Pharmaceutical Strategy, R&I partnership on pandemic preparedness, Action Plan on Critical Raw Materials, and Cybersecurity Strategy are reinforcing Europe's **industrial open strategic autonomy.**

Finally, a new partnership approach to governance has been promoted. In particular, the Commission has continued to promote the development of **industrial alliances** to bring stakeholders together to contribute to the delivery of EU policy objectives. Commission services have also moved to promote wider **partnership** in industry, most notably through the Industrial Forum.

In March 2020, just before the crisis fully hit all parts of the EU, the Commission adopted a package of measures including a new Industrial Strategy[66] and SME Strategy.[67] Over the past year, the Commission services have started to implement these measures, updating them as necessary in the light of the crisis. Adopting these measures, will help businesses and economy to recover from the crisis but also to move to a more stable and sustainable long-term footing.

In particular and as promised in the Industrial Strategy, good progress has been made towards:

- Moving to a deeper Single Market;
- Upholding a global level playing field;
- Supporting companies and the economy in the transition towards environmental sustainability;
- Boosting the digital transition and innovation;
- Promoting skilling and reskilling;
- Assisting investment and financing for the transition;
- Reinforcing Europe's strategic autonomy;
- Taking a new partnership approach to governance.

3.1. A deeper Single Market

To allow the Single Market to work for all, common rules must be implemented and enforced across the EU. Based on a renewed partnership between Member States and the Commission, the "Long

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[65] Science, Technology, Engineering and Mathematics.
[66] COM(2020) 102, A New Industrial Strategy for Europe
[67] COM(2020) 103, An SME Strategy for a sustainable and digital Europe

term action plan for better implementation and enforcement of the Single Market rules"[68] **(SMEAP)** sets out horizontal measures and 22 specific actions to maximise the effectiveness and efficiency of compliance and enforcement across the EU.[69]

The joint **Single Market Enforcement Task Force (SMET),** set up in April 2020, plays an essential facilitating role as a high-level forum where Commission services and Member States work together to assess the state of compliance of national law with single market rules, discuss the most pressing single market barriers needing to be addressed, as well as horizontal enforcement issues.[70] Barriers will also be addressed through the National Recovery Plans, currently under preparation by Member States as part of the Recovery and Resilience Facility.[71]

SMEs have the highest potential to benefit from the Single Market so the SME Strategy announced a number of measures including an EU Startup Nations Standard launched earlier this year[72]. Commission services are also setting up an EU Observatory on payment performance in commercial transactions to ensure a more regular monitoring for the payment behaviour by public authorities and businesses. The **Fit for Future (F4F) platform**[73] - a high-level expert group to help simplify existing EU laws will advise the Commission on how to step up the application of the Late Payment Directive to ensure results for small businesses.

The Commission also acted to review the EU **competition** framework. Between September 2020 and March 2021, three Staff Working Documents were published: one that summarises the findings of the evaluation of procedural and jurisdictional aspects of EU merger control, one summarising the results of the Fitness Check of the State Aid control system and one on the evaluation of the Vertical Block Exemption Regulation. In December 2020, the Commission proposed a Digital Markets Act that builds on the antitrust enforcement practice in the digital sector.

3.2. A global level playing field

The 2020 Industrial Strategy noted that while the openness of Europe's economy is at the source of its prosperity and competitiveness, the EU should not be naive about threats to fair competition and trade. The EU supported global efforts in the G20, the WTO and bilaterally to monitor critical supply chains and address disruptions throughout the crisis, and set the direction for an open, sustainable and assertive trade policy in the Trade Policy Review Communication adopted in February 2021.[74]

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[68] COM(2020) 94, Long term action plan for better implementation and enforcement of single market rules
[69] More details on the implementation of the SMEAP and work of the SMET are provided in Annex A1.
[70] Terms of Reference of the SMET Special Group, point 1 (1).
[71] The Annual Sustainable Growth Strategy (COM(2020) 575 final) identifies reforms as a key element of National Recovery Plans, notably when these reforms support the functioning of the Single Market
[72] This commits the Commission, Member States and stakeholders to high standards
[73] This builds on the REFIT platform and brings together Commission services, national authorities and stakeholders.
https://ec.europa.eu/info/law/law-making-process/evaluating-and-improving-existing-laws/refit-making-eu-law-simpler-less-costly-and-future-proof/fit-future-platform-f4f_en#:~:text=The%20Fit%20for%20Future%20Platform%20is%20a%20high-level,of%20the%20Regulatory%20fitness%20and%20performance%20%28REFIT%29%20programme
[74] COM(2021) 66

In June, the Commission therefore published a **White Paper on foreign subsidies**[75] and is currently working on a legislative proposal. Given its essential role for a stable trading environment, the EU is prioritising reform within the WTO later across its functions. Discussions in Council on the **International Procurement Instrument** are also progressing.

Attention is also being paid to improving **SMEs' access to global markets**, launching the information portal 'Access2Markets'[76] in October and including SME chapters or provisions in all new trade or partnership agreements. For entrepreneurs, the extended Erasmus for Young Entrepreneurs Global programme started in March 2021.

Beyond this, the new **Customs Union Action Plan**[77] sets out a series of measures to make EU customs smarter, more innovative and more efficient over the next four years. The proposal for the '**EU Single Window Environment for Customs**'[78] was also adopted to enhance cooperation and coordination between different authorities.

3.3. Climate neutrality and a circular economy

The Commission has adopted a number of measures to promote the transition towards increased environmental sustainability including social aspects in global supply chains. At the heart of these are the Green Deal and **New Circular Economy Action Plan** adopted in March 2020..

Within this, the Commission is paying special focus to sustainable production and consumption, in particular on designing greener **products and their components**, and harmonising rules for them, and has published a **Chemicals strategy for sustainability** to better protect citizens and the environment and boost innovation for safe and sustainable chemicals. Work on a **Sustainable Product Initiative** is underway together with sectoral initiatives on electronics, batteries, construction, textile, plastic and packaging. The Commission adopted a proposal for a new regulation on batteries and waste batteries[79] to modernise EU legislation on batteries to make them more sustainable throughout their lifecycle. In addition, to promote the circular economy transition across Europe, the Circular Economy Stakeholders Platform continues to gather industry, businesses, think thanks, non-governmental organisations, innovation communities and public authorities[80].

The **Clean Steel partnership** is advancing successfully to be approved as one of the proposed partnerships under Horizon Europe. The steel industry is responsible for about 20% to 25% of

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[75] COM(2020) 253, White Paper on levelling the playing field as regards foreign subsidies
[76] https://trade.ec.europa.eu/access-to-markets/en/content
[77] COM(2020) 581, Taking the Customs Union to the Next Level: a Plan for Action
[78] COM(2020) 673, Proposal for a Regulation Of The European Parliament And Of The Council establishing the European Union Single Window Environment for Customs and amending Regulation (EU) No 952/2013
[79] COM(2020) 798/3, Regulation Of The European Parliament And Of The Council concerning batteries and waste batteries, repealing Directive 2006/66/EC and amending Regulation (EU) No 2019/1020
[80] https://circulareconomy.europa.eu/platform/

industrial CO_2 emissions[81]. The partnership aims to align the public and private sector on alternative pathways[82] towards CO_2 reductions to of up to 95% by 2050 compared to 1990 levels.

Energy is a particular concern, so in July 2020, the Commission adopted the **Energy System Integration Strategy**[83] to achieve a cost-effective decarbonisation of the EU economy, involving technologies such as ICT and digitalisation, smart grids and meters and flexibility markets. Such a Strategy lays the foundation for the decarbonised European energy system of the future in synergy with the dedicated **Hydrogen strategy**[84] to support the production and use of clean hydrogen.

Energy is identified as one of the strategic areas for setting up a data space. Common European Energy data spaces are being put in place to exploit the potential of data to achieve the Green Deal Objectives, to support data exchange which helps the integration of renewables in the energy system. The enabling instruments will be the Delegated Acts on data sharing and Horizon Europe. The EU Strategy on Offshore Renewable Energy proposes to increase Europe's offshore wind capacity to at least 60 gigawatts (GW_ by 2030 and to 300 GW by 2050. Underpinning all this, the Just Transition Platform provides technical and advisory support towards the green transition for public and private stakeholders in coal and other carbon-intensive regions. The Emissions Trading System and the Energy Taxation Directive are being revised to better align them with the increased climate and environmental ambitions.

Mobility and construction are also central. In December 2020, the Commission adopted the Sustainable and Smart Mobility Strategy[85] to ensure that the EU transport sector is fit for a clean, digital and modern economy. In October, it launched the Renovation Wave.[86]

Consumers have a key role to play. Among the priorities of the Circular Economy Action Plan and the **New Consumer Agenda**[87] is to ensure that sustainable products are available to consumers on the EU market, that consumers have better information to be able to make an informed choice, and better information on the durability and reparability of products.

It also means **empowering SMEs and consumers** to drive the transition, so as part of an upgrade of the Enterprise Europe Network, Commission services are finalising the setting up of dedicated Sustainability Advisors to advise SMEs. In November, the Commission launched the New Consumer Agenda. The Commission services are considering the introduction, for selected sectors, of a **Carbon Border Adjustment Mechanism** (CBAM) should differences in levels of ambition worldwide persist.

3.4. *Digital transition and innovation*

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[81] For further details, please see: eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1.
[82] Non-traditional production processes based on breakthrough technologies and use of green electricity and optimised materials, gases and energy flows
[83] COM(2020) 299, EU Strategy for Energy System Integration
[84] COM(2020) 301, A hydrogen strategy for a climate-neutral Europe
[85] COM(2020) 789, Sustainable and Smart Mobility Strategy – putting European transport on track for the future
[86] COM(2020) 662, A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives
[87] COM(2020) 696, New Consumer Agenda

Digital technologies are profoundly changing our industry, business and societies. The Commission has already taken significant steps to invest in them, provide workers with new skills, reduce administrative burden for businesses, and set clear rules for their uptake.

In December, the Commission proposed the **Digital Services Act (DSA)[88] and the Digital Markets Act (DMA)**.[89] The new rules will better protect all users of digital services and their fundamental rights online, and will lead to fairer and more open digital markets for everyone. A modern rulebook across the Single Market will foster innovation, growth, and competitiveness and will provide users with new, better and reliable online services.

The efficient and ethical use of **data** will be central to Europe's future competitiveness. The European data strategy aims to create a single European data space where personal as well as non-personal data are secure and businesses also have easy access to high-quality industrial data. The recently adopted **Data Governance Act[90]** will improve access to data and increase trust in sharing personal and non-personal data and lower transaction costs linked to data sharing. And from this year on, the Commission will co-invest in a High Impact Project on European data spaces and next generation federated cloud infrastructures and services. [91] The development and deployment of next generation **cloud technologies** will be co-financed under the new long-term EU budget and complemented by private and national co-investment.

The Communication on the Digital Decade[92] will act as a compass to steer the digital advances to be reached by 2030, including the digital transformation of industry.

Underpinning the safety and security of all this, in December the Commission proposed a revised Directive on measures for a high common level of **cybersecurity** across the Union[93]. The proposal will increase information sharing and cooperation on cyber crisis management at national and EU level.

The **IP Action Plan[94]** adopted in November 2020 sets out key steps to improve the protection of Intellectual Property, boost its uptake by SMEs and facilitate the sharing of IP, so as to increase the technological uptake in the industry.

The Industrial Strategy noted that if the EU wanted to lead this transition and that to sustainability, its strategy needed to have an **industrial innovation strategy** at heart. The Commission therefore created the **Advanced Technologies for Industry (ATI)[95]** monitor, providing qualitative and

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[88] COM(2020) 825, Proposal for a Regulation Of The European Parliament And Of The Council on a Single Market For Digital Services (Digital Services Act) and amending Directive 2000/31/EC
[89] COM(2020) 842, Proposal for a Regulation Of The European Parliament And Of The Council on contestable and fair markets in the digital sector (Digital Markets Act)
[90] COM(2020) 767, Proposal for a Regulation Of The European Parliament And Of The Council on European data governance (Data Governance Act)
[91] COM(2020) 66 final A European Strategy for data, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0066&from=EN
[92] COM(2021) 118, 2030 Digital Compass: the European way for the Digital Decade
[93] Revised NIS Directive or NIS 2
[94] COM(2020) 760, Making the most of the EU's innovative potential: An intellectual property action plan to support the EU's recovery and resilience
[95] https://ati.ec.europa.eu/

quantitative data on technological development and trends. The communication on **A new ERA for Research and Innovation**[96] was adopted in September, proposing a revitalised **European Research Area (ERA)** with a forward-looking agenda.

Horizon Europe introduces a **more strategic approach to partnerships** and ensures that these partnerships are aligned with EU priorities and *inter alia* key drivers for industrial innovation and competitiveness[1]. In September, the Commission proposed a new regulation, providing a substantially larger budget for the **EuroHPC JU** (high performance computing Joint Undertaking). The recently formed Quantum Industry Consortium (QuIC) will be the voice of the quantum industry in Europe ensuring a sustainable and competitive business environment. In February 2021, the Commission proposed to set up another ten institutionalised partnerships under Horizon Europe[97], aiming to improve EU preparedness and response to infectious diseases, develop efficient low-carbon aircraft for clean aviation, support the use of renewable biological raw materials in energy production, or make rail transport more competitive. This list included the **Key Digital Technologies JU** will consolidate European companies present at different levels of the semiconductor value chain.

Administrative burden for businesses has been reduced with the implementation of the Single Digital Gateway Regulation.

3.5. Skilling and reskilling

The Commission is placing skills at the heart of the EU policy agenda, steering investment in people and their skills for a sustainable recovery. The **European Skills Agenda**[98] adopted in July 2020 sets ambitious objectives for upskilling and reskilling for the next 5 years including for skills needed for the green and digital transitions. This was followed by the Pact for Skills in November and building on the Blueprint for Sectoral Cooperation on Skills, the Digital Skills and Jobs Coalition, and the European Alliance for Apprentice-ships. The Pact supports the setting-up of large-scale partnerships in strategic industrial ecosystems and value chains and the priority areas identified in the European Green Deal to achieve ambitious commitments. The first **European skills partnerships** in key industrial ecosystems were announced.

The Commission also adopted two important initiatives in September. The vision for a **European Education Area** to be achieved by 2025,[99] sets out actions for quality, inclusion and gender equality, green and digital transitions, teachers, higher education, and a stronger Europe in the world. It also promotes quality investment in education and training as well as stronger cooperation among Member States. The new Digital Education Action Plan presents a plan for a high-performing digital education ecosystem with enhanced digital competences for the digital transformation. The Commission has also launched a pilot digital volunteers' programme promoting the transfer of knowledge between high-tech experts and SMEs. The renewed European Alliance for

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[96] COM(2020) 628, A new ERA for Research and Innovation
[97] https://ec.europa.eu/commission/presscorner/detail/en/ip_21_702
[98] COM(2020)274, European Skills Agenda for sustainable competitiveness, social fairness and resilience
[99] COM(2020) 625, Achieving the European Education Area by 2025

Apprenticeships[100] was launched in July, helping SMEs by providing a stable supply of quality and effective apprenticeships and mobilising local and regional authorities.

Gender equality must be a common principle of all our actions. The Gender Equality Strategy 2020-2025[101] delivers on a number of crucial issues to advance gender equality in the EU. One of them is promoting gender balance in ICT studies and careers.

3.6. Investment and financing

Investment and finance were already critical for Europe's companies. But the crisis has made this all the more critical. The EU has responded, most notably with agreement on the **Multiannual Financial Framework** (MFF) for 2021-2027 in December, providing a long-term EU budget of EUR1 074.3 billion. Together with the **Next Generation EU** recovery instrument[102] of EUR750 billion, it will allow the EU to provide an unprecedented EUR1.8 trillion of funding over the coming years to support recovery and the EU's long-term priorities across different policy areas. At the heart of Next Generation EU, the Recovery and Resilience Facility will help Member States address their structural challenges, as well as accelerate a just transition towards a greener, digital and more resilient economy.

To support the transitions to sustainability and digitalisation, the Commission is also putting forward a renewed Sustainable Finance action plan and is delivering on its Digital Finance strategy launched in September 2020. The **EU Taxonomy Regulation[103]** was published on 22 June 2020 and entered into force on 12 July 2020. The Taxonomy Regulation establishes six environmental objectives on which delegated acts will set out the criteria of significant contribution, do no significant harm and other requirements.[104]

At the same time, the new **Capital Market Union** action plan[105] proposed 16 legislative and non-legislative actions to make financing more accessible to European companies and create a true single market for capital.

Finance will be particularly important for **Europe's SMEs**. The Commission has advanced on the implementation of **ESCALAR**, a first of a kind risk/reward mechanism to boost the size of venture capital funds and crowd in private investments for scaling up. The Commission is also working on the products of the InvestEU's SME window including a single integrated guarantee facility and will support equity financing for SMEs and small midcaps. In this context, the Commission is working on establishing a public-private **SME IPO fund** to help SMEs grow and access further sources of financing through public listings, in order to complement the range of already-existing public support measures at earlier funding stages and strengthen SMEs' growth pipeline.

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[100] https://ec.europa.eu/social/main.jsp?catId=1147&intPageId=5234&langId=en
[101] COM(2020)152 A Union of Equality: Gender Equality Strategy 2020-2025 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0152
[102] https://ec.europa.eu/info/strategy/recovery-plan-europe_en#nextgenerationeu
[103] Regulation (EU) 2020/852 (Taxonomy) on the establishment of a framework to facilitate sustainable investment
[104] https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-taxonomy-sustainable-activities_en
[105] COM(2020) 590 A Capital Markets Union for people and businesses-new action plan

To support top-class innovators, entrepreneurs, small companies and researchers, the Commission has launched a European Innovation Council (EIC) to provide funding and opportunities for ideas that are radically different from existing products, services or business models, are highly risky and have the potential to scale up internationally. The budget is over EUR10 billion for 2021-27 of which over EUR 1.5 billion is available for breakthrough technologies and innovative start-ups in 2021 with targeted funding for Green Deal innovations and strategic digital and health technologies. The Innovation Fund under the EU Emissions Trading System was also launched in 2020, providing more than EUR 14 billion[106] by 2030 for low-carbon innovative clean-tech investments in energy intensive industries, renewable energy, energy storage and carbon capture, use and storage applications over this decade. The EU ETS Modernisation Fund with more than EUR 16 billion[107] is already available to support its ten beneficiary Member States to modernise their energy and industrial systems.

Pooling resources towards identified common priorities is equally essential. **Important Projects of Common European Interest (IPCEI)** provided for by Article 107(3)(b) TFEU help to catalyse investment in ground breaking innovation. Three IPCEIs have been put in place on batteries and microelectronics, the most recent one being the '**European Battery Innovation',[108]** the second IPCEI on innovations in the battery value chain which brings together 12 Member States that will provide up to EUR2.9 billion in funding in the coming years. This is expected to unlock an additional EUR9 billion in private investments.

22 Member States signed a manifesto to collaborate for the development of the **European hydrogen value chain, including with one or more possible IPCEIs.** In addition, in December, 19 Member States signed a declaration agreeing to work together towards a **forward-looking IPCEI on microelectronics** which also seeks to develop innovative and sustainable chips in Europe.

3.7. *Reinforcing Europe's industrial and strategic autonomy*

The Industrial Strategy committed the Commission to a reinforced industrial and open strategic autonomy. The Commission adopted a Pharmaceutical strategy for Europe[109]. The aim is to better identify the challenges and assess the need for measures and actions aimed at strengthening the resilience of pharmaceutical supply chains and ensure the security of supply of medicines[110].

The Commission has also launched an R&I partnership on Pandemic preparedness under Horizon Europe.

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[106] subject to the carbon prices
[107] subject to the carbon prices
[108] https://ec.europa.eu/commission/presscorner/detail/en/IP_21_226
[109] COM/2020/761 final
[110] See for more information https://ec.europa.eu/health/human-use/strategy/dialogue_medicines-supply_en

The **Action Plan on Critical Raw Materials**[111] and the **2020 List of Critical Raw Materials** were adopted in September, setting out the challenges for a secure and sustainable supply of critical raw materials and actions to increase EU resilience and open strategic autonomy. In July, the Commission published a Report on Member States' Progress in Implementing the **EU Toolbox on 5G Cybersecurity**. The Commission also addressed the status of implementation and next steps as part of the **Cybersecurity Strategy** adopted in December. An Action Plan on synergies between civil, defence and space industries was adopted in early 2021.

3.8. A new governance approach

Since the adoption of the Industrial Strategy, the Commission has reinforced its partnership approach to industrial policy. In particular, it has continued to promote the development of **industrial alliances** to bring stakeholders together to contribute to the delivery of the twin transitions and open strategic autonomy in an open, transparent, diverse and inclusive way. Stakeholder collaboration in targeted industrial alliances may be helpful to address strategic dependencies (e.g. batteries), build a value chain in future growth markets (e.g. clean hydrogen), jointly develop research and innovation or change business models from supply and demand perspective (e.g. circular plastics).

This experience builds notably on the success of the Batteries Alliance. The European Battery Alliance has helped to support manufacturing projects along the battery value chain at scale - some €100 billion in investment has been committed. It has also facilitated the design by several Member States of two Important Projects of Common European Interest (IPCEI) with in total EUR 6 billion approved State aid for research and innovation in the battery value chain, unlocking an additional EUR 14 billion in private investments. It has also led to a Blueprint Skills Programme for Batteries to develop a highly skilled workforce along the value chain and an interregional cooperation on advanced batteries materials involving 28 regions. Battery cell production in the EU is estimated to lead to 60 – 90,000 direct jobs and around 180,000 upstream jobs by 2030. If electric vehicles are taken into account as well, the most optimistic assessment estimates that the transition to electric mobility could create about 800,000 new jobs by 2025. In July, the Commission launched the European Clean Hydrogen Alliance, aiming at scaling up clean hydrogen production to 40 GW by 2030 and boosting demand for clean hydrogen in industry and mobility to achieve climate-neutrality. The European Clean Hydrogen Alliance has brought together more than 1,000 stakeholders along the value chain and is developing a pipeline of investment projects to deliver on the objectives of the hydrogen strategy for a climate-neutral economy.

In September, it launched the European Raw Materials Alliance in September 2020 to secure access to critical and strategic raw materials.

But the Commission has also moved to promote wider **partnership** in industry, most notably through the Industrial Forum established in December and composed by representatives from all Member States and a wide range of stakeholders to support the Commission in the systematic analysis of problems faced by industrial ecosystems and areas for cross-ecosystem and cross-border

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[111] COM(2020) 474 final Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability

collaboration. The EU Industry Days most recently held on 23-26 February 2021 as well as the reinforced SME envoy network[112]

4. Conclusion

The COVID-19 crisis has been an acid test of European businesses, European and national public authorities and above all, the commitment to the Single Market.

The unilateral restrictions put in place caused major disruptions, causing as yet unquantifiable damage to European businesses, and severely impaired the ability of the EU to respond. Individual 'industrial ecosystems' such as tourism and mobility were particularly badly affected. And this came on top of a number of existing barriers to companies operating within the Single Market.

The EU and the Member States must draw the lessons from the crisis. Despite extensive action to address its consequences, the crisis highlighted the importance of keeping a fully functioning Single Market and of European solidarity. This reminder would be expected to continue to guide the EU's actions in the coming years, be it to remove remaining obstacles to the Single Market or by working together at all levels to deliver on the EU's green and digital ambitions, ensure Europe's resilience and increase its long term competitiveness, as highlighted in the linked Communication "Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery" ("the Industrial Strategy Update Communication"[113].

The strategies set out in the March 2020 Single Market Enforcement Action Plan, Industrial Strategy and SME Strategy remain valid. Considerable progress was achieved in their implementation, but it is important to now build on the successes of the first year of implementation, support the recovery and accelerate the twin transition towards digitalisation and sustainability.

This Report is offers an analytical underpinning to those efforts as presented in the Industrial Strategy Update Communication. Commission services will therefore provide annual updates.

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[112] with a strong role in the Better Regulation Agenda, European Semester, Recovery and Resilience Plans and Single Market Enforcement Task Force
[113] COM(2021)xx, "Updating the 2020 New Industrial Strategy: Building a stronger Single Market for Europe's recovery."

Annexes

A1. State of play of the implementation of the Single Market Enforcement Action Plan

A2. Overview of the implementation of the Industrial Strategy and the SME Strategy

A3. Industrial ecosystems fiches

A4. Key Performance indicators – Methodology and Overview

Annex 1 State of play of the implementation of the Single Market Enforcement Action Plan

To allow the Single Market to work for all and to drive our industry forward, common rules must be implemented and enforced across the EU. Based on a renewed partnership between Member States and the Commission and taking into account the findings of the Communication on barriers to the single market[114,] the Single Market Enforcement Action Plan[115] presents some horizontal measures and 22 specific actions, with the objective to maximise the effectiveness and efficiency of compliance and enforcement across the EU. In the first year of implementation of the Action Plan, the Commission, in close collaboration with the Member States, completed a number of actions to strengthen joint efforts in this area.

Since the adoption of the Single Market Enforcement Action Plan on 10 March 2020, there has been progress on:

1. promoting increased knowledge and awareness of Single Market rules among national authorities, courts, citizens and businesses;

2. remedying incorrect transposition, implementation and application of EU rules;

3. preventing national measures in Member States from going against EU law;

4. preserving the smooth functioning of the Single Market by detecting non-compliance;

5. strengthening enforcement and

6. improving the handling of infringement cases.

The joint **Single Market Enforcement Task-Force (SMET),** set up by the Single Market Enforcement Action Plan, plays an essential facilitating role as a high-level forum where the Commission and Member States collaboratively seek solutions for addressing Single Market obstacles rooted in enforcement or implementation deficiencies[116]. SMET is an important new tool with a significant role to ensure that the Single Market works properly and to continue reducing regulatory burdens. In this context, SMET prioritises and addresses barriers that hamper the full functioning of the Single Market for all key ecosystems, notably when their root causes lie in incorrect or incomplete implementation and enforcement as identified in the Single Market Enforcement Action Plan and the Single Market Barriers Report. SMET can also be convened when needed to address single market

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[114] COM(2020)93; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Identifying and addressing barriers to the Single Market.

[115] COM(2020)94 ; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a " Long term action plan for better implementation and enforcement of single market rules".

[116] According to point 1 (1) of the Terms of Reference of the special group - Single Market Enforcement Task-Force (SMET), the Commission and Member States work together to assess the state of compliance of national law with single market rules, discuss the most pressing single market barriers needing to be addressed, as well as horizontal enforcement issues covered by the Long term action plan for better implementation and enforcement of single market rules.

issues that call for rapid action, as was, for instance, the case with the emergency SMET meeting[117], called to discuss and assess Member States' newly introduced controls of internal borders and measures on travel restrictions that restrict the free movement within the EU[118].

SMET's inaugural meeting took place on 7 April 2020 at the outbreak of the COVID-19 crisis to ensure the good functioning of the Single Market and allow the free flow of goods across EU borders. At this ad hoc meeting, SMET successfully addressed issues hampering the correct functioning of the Single Market due to COVID-19, such as intra-EU export restrictions of vital protective, medical and medicinal supplies, border controls and the need to increase production of essential equipment. The discussions in SMET showed a strong collective awareness that national intra-EU export bans or restrictions in one Member State risked creating shortages in other Member States. Since then, SMET had four formal meetings[119].

Member States started by identifying the five most pressing obstacles to the well-functioning of the Single Market and, with the Commission, discussed actions that can help tackling a number of the top barriers indicated in the Single Market Barriers Report, matching those that were raised by Member States.

To address such barriers, SMET set out a prioritised work plan in order to deliver clear results in a short time. The Task Force agreed to work on a three pillar work plan: 1) abolishing the remaining COVID-19 related barriers, notably in the agri-food sector; 2) addressing priority barriers identified by Member States and the Commission regarding national enforcement and implementation issues, such as insufficient information, complex administrative procedures, lack of digitalised procedures and barriers in professional services; and 3) reinforcing the Single Market to support the recovery.

According to the agreed work plan, SMET discussed five pilot projects with concrete actions addressing concrete barriers in the agri-food sector, the free movement of professionals, the construction sector and the posting of workers. More specifically, these proposed projects will address: 1) protectionist measures in the agri-food sector; 2) certification schemes in construction services and non-harmonised construction products; 3) cross-border restrictions for professionals; 4) elimination of document requirements in relation to the recognition of professional qualifications; and 5) administrative burdens associated to the Posting of Workers. The objective of these concrete projects is to deliver tangible results with quick effect. SMET concluded that the barriers presented and discussed are a priority and should be eliminated. SMET, therefore, mandated the 'SMET Sherpa Group' to put in place the necessary steps with the administrations of each Member State and to report to SMET on the progress of their work.

On 19 February 2021, an emergency SMET meeting took place to address a large number of travel restrictions and newly introduced controls of internal borders that Member States put in place in the context of increasingly tense situations and the new COVID-19 variants in most areas across Europe.

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[117] Fourth formal meeting of SMET on Friday 19 February 2021.
[118] Council Recommendation (EU) 2021/119 of 1 February 2021 amending Recommendation (EU) 2020/1475 on a coordinated approach to the restriction of free movement in response to the COVID-19 pandemic (OJ L 36I, 2.2.2021, p. 1).
[119] 9 June 2020, 21 September 2020, 29 January 2021 and 19 February 2021.

SMET agreed on the need to ensure the good functioning of the Single Market, especially as regards the transport of goods and the cross-border economic activities in coherence with the measures agreed in coherence with the COVID-19 related guidance and recommendations. Furthermore, SMET agreed on the importance to preserve the functioning of the "Green Lanes" and the close coordination among Member States and the Commission in line with the revised Council Recommendations 2020/1475.

Together with the **network of national SME envoys** and the EU SME Envoy, the SMET will also **address gold-plating in the transposition process** of EU directives to keep the regulatory burden on SMEs to a minimum. To promote the enforcement of a Single Market in a bottom-up approach, the Commission has launched a call for **pioneer partnerships among border regions** at the end of 2020, encouraging regional authorities to cooperate in addressing market barriers.

The SMET complements the **Cooperation network between national enforcement coordinators**. Making use of the existing Internal Market Advisory Committee (IMAC), the cooperation network held its first meeting on 24 November 2020. It allows the Commission and Member States to exchange information and best practices and explore possibilities to improve coordination and communication on specific enforcement matters amongst Member States' authorities. For general issues relating to the transposition and implementation of EU law by Member States and to the broader enforcement policy of the Commission, the services of the Member States and the Commission regularly meet in the EU Law Network, an expert group dedicated to sharing knowledge and exchanging best practices in this area.

To reflect better the needs of the end users in the Single Market and to support the European Semester, the **Single Market Scoreboard** is being upgraded. As to the content of this update, following the recommendations of the study published in May 2020[120], consultations were carried out with stakeholders and with Member States, focusing on the expansion of the scope and the selection of new policy areas and indicators. As to the IT system, a new system is being upgraded, which would address the policy and user needs. The database and data visualisation tool enables users, for their own research and policy needs, to access the wealth of data and to compare thematic datasets and performances across time and Member States[121].

1. **Increasing knowledge and awareness of Single Market rules**

A first series of actions of the Single Market Action Plan aims to increase knowledge and awareness of Single Market rules among national authorities and courts as well as citizens and businesses. Firstly, guidance helps to improve the application and enforcement of EU principles and rules. The Commission, therefore, adopted a number of guidance documents to increase knowledge of Single Market rules. In the area of goods, the **Guidance on the application of** Regulation (EU) 2019/515 of the European Parliament and of the Council of 19 March 2019 on the mutual recognition of goods

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[120] https://ec.europa.eu/internal_market/scoreboard/_docs/2020/survey/final-report_en.pdf
[121] https://ec.europa.eu/internal_market/scoreboard/

lawfully marketed in another Member State[122] is to help both, businesses and authorities in the application of Regulation (EU) 2019/515. The Commission presented and explained these rules to many business associations and maintained close contacts with the national competent authorities responsible for the application of this regulation.

The **Guidance document on Article 4 of the Market Surveillance Regulation[123]** sets out practical guidelines for the implementation of Article 4 of Regulation 2019/1020 that requires that an economic operator in the EU should provide for certain product categories information to and cooperate with the market surveillance authorities. This helps market surveillance authorities in checking compliance of products of manufacturers of third countries, particularly when addressing online sales.

Also, the **Guidance on the application of Articles 34-36 TFEU**[124] includes the most relevant jurisprudence of the EU Court of Justice on obstacles such as registrations, certifications, authorisations, and other product requirements including selling arrangements. The guidance covers identified obstacles in the main EU ecosystems and sectors e.g. pharma, veterinary and blood products, gas and electricity, construction, precious metals, automobiles and car registrations, agricultural products. The Commission launched a broad consultation of interested parties on the update of the **Blue Guide on the implementation of EU product rules**. The review of the updated Blue Guide is foreseen in 2021 and will also include guidance on the Product liability Directive 85/374/EEC that follows the work of the Expert Group on liability and new technologies. By absorbing the guidance for Directive 85/374/EEC, the Blue Guide will help enhancing legal clarity on liability claims for consumers and producers in the area of new, smart technologies.

In the area of audiovisual services, two new guidelines were issued by the Commission on the 7th of July 2020 under the revised **Audiovisual Media Services Directive:** one on video sharing platforms[125] clarifying to which extent social media actors will be covered by the new rules, paying due regard to the objectives of public interest to be achieved by the new rules and to the right to freedom of expression; and the other one on the promotion of European works[126], including a methodology for the calculation of the 30% share of European works in Video on Demand (VOD) catalogues and clarifying the definition of low audience and low turnover exemptions.

Secondly, to improve access to information on rules and requirements for users the '**Your Europe**' portal was upgraded in December 2020, hence meeting the requirements of the **single digital gateway** Regulation[1]. In line with this regulation , 'Your Europe' is now the hub to access

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[122] Commission notice- Guidance document for the application of Regulation (EU) 2019/515 of the European Parliament and of the Council of 19 March 2019 on the mutual recognition of goods lawfully marketed in another Member State and repealing Regulation (EC) No 764/2008 - C(2021) 1455 of 5 March 2021
[123] Commission notice- Guidelines for economic operators and market surveillance authorities on the practical implementation of Article 4 of Regulation (EU) 2019/1020 on market surveillance and compliance of products - C(2021) 1461 of 5 March 2021
[124] Commission notice – Guide on Articles 34-36 of the Treaty on the Functioning of the European Union (TFEU) - C(2021) 1457 of 5 March 2021
[125] Communication from the Commission 2020/C 223/03
[126] Communication from the Commission 2020/C 223/02
[1] Regulation (EU) 2018/1724.

information published on dozens of national websites, and can thus assist citizens and businesses in finding and understanding applicable Single Market-related rights and rules both at EU and national level, and in receiving assistance where needed. The assistance service finder has been designed to direct citizens and businesses to the most appropriate assistance and problem-solving service. As of December 2023, citizens and businesses will be able to access cross-border and complete online key administrative procedures and access other online procedures which are as yet accessible online for national users. Under Article 14 of the Single Digital Gateway Regulation, all Member States need to connect, by December 2023, to a European Once-Only-Principle Technical System for the automatic exchange of evidence between public authorities in Europe. This exchange of evidence will prevent businesses from having to provide the same documents repeatedly, thus reducing administrative burden on businesses. Member States have started a reflection with the Commission on how to connect their services to provide businesses with answers to questions on several areas (e.g. taxation, social security, sectoral requirements) through a **one-stop-shop.** Moreover, it is important for the Single Market for goods that businesses, in particular SMEs, can rely on the **Product Contact Points** to obtain reliable and specific information about the applicable law in a given Member State.

To counter systemic obstacles in the area of the free movement of goods related to a deficient application of the mutual recognition principle, the Commission services have engaged with the EU Product Contact Points in providing better and faster information to businesses about mutual recognition and the technical rules that apply at national level to non-harmonized products. Product Contact Points will also start informing businesses, at their request, on other EU rules on non-food products. The new module of the Information and Communication System on Market Surveillance (ICSMS) used for the purposes of mutual recognition has been deployed in stages since April 2020 and fully supports the enhanced role of the Product Contact Points. The Commission adopted a Commission implementing regulation specifying the details and functionalities of the ICSMS to be used for the purposes of Regulation (EU) 2019/515[127].

It is also foreseen that an updated technical environment would be provided for Member States to comply with the Professional Qualifications Directive and the Proportionality Test Directive by integrating the Regulated Professions Database to the Internal Market Information System.

Thirdly, product sellers on e-commerce platforms must be aware of EU product rules and ensure that no illegal and unsafe products are placed on the EU market. Since 2018, eleven major online marketplaces already signed voluntary commitments that go beyond the EU legislation, called '**Product Safety Pledges**', to improve the safety of non-food consumer products sold online.

The Commission has recently adopted a proposal for a Digital Services Act, which would set out general obligations for e-commerce platforms concerning illegal content, including unsafe products. The Commission is examining whether the revision of the General Product safety Directive planned for the second quarter of 2021 should further spell out the specific product safety obligations for online marketplaces.

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[127] Commission Implementing Regulation (EU) 2020/1668 of 10 November 2020 ELI: http://data.europa.eu/eli/reg_impl/2020/1668/oj

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The protection of rights of EU citizens and businesses is primarily the responsibility of national courts in the Member States. It is therefore important to strengthen the capacity of national judges and legal practitioners to enable citizens and businesses to assert their Single Market rights effectively. In this context, the Single Market dimension is reflected in the European judicial training strategy for 2021-2024 adopted on 2 December 2020[128].

Lastly, the **Network of the First Instance public procurement Review Bodies** provides a forum to share with Member States and the Commission best practices and contribute to the development of the public procurement review indicators, a set of data that helps Member States to measure the effectiveness of their review systems. The members of the Network also share their knowledge and questions through the online platform set up by the Commission's services. To improve the administrative capacity of staff working in Central Purchasing Bodies and facilitate SMEs' access to public procurement markets, the Commission funds a high level training programme. In addition **to the flexibility offered by the new EU's procurement framework**, a study on SMEs' participation in public procurement has been published[129]. The study aims at developing data for policy making and at analysing ways in which Member States may use such flexibility and put in place additional support for SMEs. Furthermore, in mid-2020 a call for proposals was launched to promote SME participation in public procurement outside the EU.

2. **Improving the transposition, implementation and application of EU rules**

The second pillar of the Single Market Action Plan aims to remedy incorrect transposition, implementation and application of EU rules that create barriers and obstacles to the Single Market. Therefore, to improve the overall timely and correct transposition of directives, a 'structured dialogue' with the Member States is in place during the transposition period. For instance, to ensure the correct implementation from the date of application, the Commission services have been monitoring the transposition process of the European Electronic Communication Code (EECC) and has been providing Member States with extensive technical guidance and legal assistance, including through the Communications Committee. On 4 February 2021 the Commission sent letters of formal notice under an empowerment procedure ('*mise en demeure par habilitation'*, MDH exercise) to the 24 Member States that failed to notify or partially notified national measures transposing the Directive. The Commission will then carry out its detailed assessment of the Member States' replies and decide on any further action in line with the Treaties.

In addition to issuing the guidances on video sharing platforms[130] and on European works[131] mentioned above, the Commission services supported Member States authorities in particular through bilateral exchanges and through discussions within the Contact Committee.

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[128] COM(2020) 713 final.

129 https://ec.europa.eu/growth/content/analysis-smes'-participation-public-procurement-and-measures-support-it_en

[130] Communication from the Commission 2020/C 223/02

[131] Communication from the Commission 2020/C 223/03

The implementation of the revised **AVMSD is** also addressed by the European Regulators Group for Audiovisual Media Services (ERGA), which is composed of the media regulators. As regards the Geo-blocking Regulation[132], the Commission services have published in 2018 an extensive Q&A document to facilitate implementation by traders and Member States, and regularly cooperate with the competent authorities in the context of the CPC network, while in November 2020 the Commission adopted its first short-term review of the Regulation, reporting also on the first year of implementation of the Regulation and its initial effects[133]. In a similar vein, a comprehensive Q&A document[134] was published at the time of the adoption of the platforms-to-business (P2B regulation)[135] containing the first-ever set of rules creating a fair, transparent and predictable business environment for smaller businesses and traders on online platforms. These Q&A were later updated, and guidelines for ranking transparency[136] have been published on 8 December 2020, which support the adequate and effective enforcement of the ranking transparency requirements in the P2B Regulation. The Commission services have supported Member State authorities, in particular through bilateral exchanges and discussions within the Contact Committee.

For the **copyright directives,** regular meetings of the Copyright Contact Committee ensured a coordinated exchange of views with Member States. The Commission completed extensive consultations to gather relevant stakeholders' views on the main topics related to the application of the new regime for the use of copyright-protected content on online content sharing platforms introduced by the **Directive on Copyright in the Digital Single Market[137]**. Regular workshops with Member States in the Company Law Expert Group supported the transposition of the 2019 Company Law package (Directive 2019/1151 on digital tools in company law and Directive 2019/2121 on cross-border conversions, mergers and divisions).

3. Making the best use of preventive mechanisms

To help to ensure a level playing field for citizens and businesses in the Single Market, under the third pillar of the Action Plan, there a number of actions designed to prevent national measures in Member States going against EU law. In the course of 2020, the Commission has moved ahead with streamlining the operation of the **Single Market Transparency directive** (SMTD)[138], and the

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31 Regulation (EU) 2018/302 of the European Parliament and of the Council of 28 February 2018 on addressing unjustified geo-blocking and other forms of discrimination based on customers' nationality, place of residence or place of establishment within the internal market and amending Regulations (EC) No 2006/2004 and (EU) 2017/2394 and Directive 2009/22/EC.*OJ L 60I, 2.3.2018, p. 1.*

133 COM(2020) 766 final and SWD(2020) 294 final, part 1/2.

134 https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=68300.

135 Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services (Text with EEA relevance), OJ L 186, 11.7.2019, p. 57–79.

136 Commission Notice Guidelines on ranking transparency pursuant to Regulation (EU) 2019/1150 of the European Parliament and of the Council 2020/C 424/01.

[137] Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC

[138] Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services.

development of its implementation. Steps have been taken to develop a methodology to identify areas susceptible of increased regulatory convergence, or harmonisation. Moreover, the strategic importance of the SMTD was evidenced during the COVID-19 crisis, when it constituted an entry point for urgent measures adopted by Member States to tackle the crisis aspects, which had an impact on the free movement of medical equipment, medicinal products and medical information society services. However, not all measures were systematically notified and some were only notified after their adoption. Also, to prevent unjustified barriers in the Single Market for services, the Commission has taken a number of measures to improve compliance with the existing **services notification procedure** established under the Services Directive and to improve the functioning of the existing notification system. It has offered, guidance and training to Member States, provided an annual report, improved the Internal Market Information system (IMI) module used for implementation of the existing notification mechanism and identified examples of newly introduced regulation that Member States failed to notify, thereby ensuring their notification.

4. Detecting non-compliance inside the Single Market and at the external borders

The fourth pillar of the Single Market Action Plan aims at preserving the smooth functioning of the Single Market by detecting non-compliance. To this end, national authorities and the Commission services need to have the appropriate tools such as up to date IT systems. In view of reinforcing and rationalising IT systems, the Commission services have launched preparatory work for the development of the digital interface between national customs systems and the **EU Information and Communication system for Market Surveillance (ICSMS)** via the EU Single Window Environment for Customs. This provides for a number of new functionalities and tasks for ICSMS, making it the digital backbone of the cooperation between market surveillance and customs authorities.

To ensure that the **Internal Market Information system** (**IMI)** becomes the default tool for administrative cooperation within the Single Market, the Commission services continue to identify legislation that may require administrative cooperation between Member States, which could be supported by IMI. Currently IMI supports 17 different Single Market related areas and continues to expand to new ones. In 2020, co-legislators adopted the Mobility Package, which foresees the use of IMI regarding posting declarations for road transport operators, and thereby ensuring better enforcement and a digitalised, green solution for cross border procedures. The Commission adopted an implementing act[139] to use IMI on a pilot basis in the context of the Regulation (EU) 2018/1807 on a framework for the free flow of non-personal data in the European Union.

To improve enforcement in relation to EU agri-food legislation, progress has been made to make full use of the **information management system for official controls** (**IMSOC**). To monitor Member States' official controls the **AROC** (**Annual Report Official Controls**) electronic version of the standard model form has been developed in IMSOC allowing the submission of Member States' annual reports. In **Multi-annual National Control Plans** (**MANCPs**) **Network meetings**, the Commission services engage with Member States in discussing, among others, the use of the pilot AROC, the

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[139] COMMISSION IMPLEMENTING DECISION (EU) 2020/1669 of 10 November 2020 on a pilot project to implement certain administrative cooperation provisions set out in Regulation (EU) 2018/1807 of the European Parliament and of the Council on a framework for the free flow of non-personal data in the European Union by means of the Internal Market Information System (OJ L 377, 11.11.2020, p. 10–12

submission of annual reports and the preparedness for the compulsory use of AROC by 31 August 2021. The Commission services provide trainings to Member States on how to use AROC (webinars, videos, guidance) and helpdesk support.

To improve enforcement in relation to EU agri-food legislation, the Commission and the Member States together made progress to make full use of the **information management system for official controls** (**IMSOC**). To monitor Member States' official controls, the electronic version of the standard model form for annual reports - **AROC (Annual Report Official Controls)** - has been developed in IMSOC for the submission of Member States' annual reports. In **Multi-annual National Control Plans** (**MANCPs) Network meetings**, the Commission engages with Member States in discussing, among others, the preparation of the MANCPs, the use of the pilot AROC, the submission of annual reports and the preparedness for the compulsory use of AROC by 31 August 2021. The Commission provides training to Member States on how to use AROC (webinars, videos, guidance) and helpdesk support.

To improve Member States and Commission controls in the area of fraud in the agri-food chain, a project has started in 2020 to collect information on the implementation of the new arrangements put in place by Member States concerning controls and other official activities aimed at identifying and following-up fraudulent or deceptive practices (as laid down by Article 9(2) of Regulation (EU) 2017/625[140]). A strong enforcement of EU law in the agri-food chain is essential to guarantee safe, sustainable food and its free movement in the Single Market. To verify that Member States address shortcomings in the application of EU law, a systematic follow-up of audit recommendations is ensured, mainly through general follow-up audits (GFAs) over a three-year cycle, with interim targeted reviews. This ensures that non-compliances are handled in a coherent manner across control areas and across Member States. It also provides an efficient means of identifying horizontal and systemic issues, and a platform for bilateral dialogue. The publication of the results in country profiles ensures transparency.[141]

In addition, in October 2020 work started on the Impact Assessment of the review of the geographical indications (GIs) policy, including enforcement measures, with the publication of the Inception Impact Assessment on 28 October 2020. The on-line Conference "Strengthening geographical indications" on 25-26 November 2020 served as the focal point for stakeholders to make their views known on the reform process. The 'GIview' database was launched on 25 November 2020 providing transparency to enforcement bodies and producer groups responsible for each GI. 'GIview', like its homologue 'TMView', will – when fully operational – give GI producer groups access to the IP Enforcement Portal allowing for confidential communication between GI producer groups and anti-fraud authorities, customs and police agencies.

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[140] Regulation (EU) 2017/625 of the European Parliament and of the Council of 15 March 2017 on official controls and other official activities performed to ensure the application of food and feed law, rules on animal health and welfare, plant health and plant protection products, amending Regulations (EC) No 999/2001, (EC) No 396/2005, (EC) No 1069/2009, (EC) No 1107/2009, (EU) No 1151/2012, (EU) No 652/2014, (EU) 2016/429 and (EU) 2016/2031 of the European Parliament and of the Council, Council Regulations (EC) No 1/2005 and (EC) No 1099/2009 and Council Directives 98/58/EC, 1999/74/EC, 2007/43/EC, 2008/119/EC and 2008/120/EC, and repealing Regulations (EC) No 854/2004 and (EC) No 882/2004 of the European Parliament and of the Council, Council Directives 89/608/EEC, 89/662/EEC, 90/425/EEC, 91/496/EEC, 96/23/EC, 96/93/EC and 97/78/EC and Council Decision 92/438/EEC (Official Controls Regulation) (OJ L 95, 7.4.2017, p. 1).
[141] The country profiles are published on the European Commission website: https://ec.europa.eu/food/audits-analysis/country_profiles/index.cfm

Since the adoption of the New Legislative Framework (NLF) for EU product legislation, industry and products have transformed radically, in particular due to the digital aspects. Hence, the Commission services have launched an **evaluation[142] of the NLF**[143] to reassess not only aspects related to labelling and traceability but also, more generally, whether the NLF continues to be fit for purpose in the current economic reality. Nowadays, products are increasingly digital and being frequently updated or upgraded after they have been put into service. The conformity assessment procedures must ensure that products placed on the Single Market are safe and compliant with the applicable legislation. In addition, the recent COVID-19 crisis has put to test the resilience of Union product legislation based on the provisions of the NLF, in particular as to whether they could adequately cope with a crisis. The evaluation is a first step towards ensuring that harmonised product legislation is fit, and can continue contributing to address possible obstacles while building a strong and resilient Single Market for goods.

Moreover, as announced in the new EU's Cybersecurity Strategy from December 2020, the Commission will consider a comprehensive approach, including possible new horizontal rules to improve the cybersecurity of all connected products and associated services placed on the Single Market. To that end, the Commission contracted an external study whose main objectives are to explore the current state of cybersecurity in broad categories of connected products and to identify the reasons for lack of sufficient security. The study will assist the Commission in analysing the current regulatory landscape with regard to cybersecurity requirements for connected products.

5. Strengthening enforcement on the ground

The fifth pillar of the Action Plan aims at strengthening enforcement. Effective enforcement of EU product rules, regardless of the origin of the product or the sales channel, requires a well-equipped, digitalised, efficient and well-coordinated market surveillance policy. As foreseen in Action 17 of the Enforcement Action Plan, the Commission services have worked in close coordination with Member States to launch, from January 2021, the **new EU Product Compliance Network**. In addition, as set out in Article 21 of the new Market Surveillance Regulation, the Commission could designate **European Union Testing Facilities (EUTFs)** to complement and expand market surveillance testing capacity in the EU. The Network will notably identify common priorities for market surveillance activities and testing. It will also propose their financing, based on the budget available from the Single Market Programme. In addition, as identified in the Guidelines to Member States on the recovery and resilience funds[144], market surveillance projects can be included as part of the national investment plans to reinforce the EU resilience and as cross-border projects financed by such recovery and resilience funds. This will help ensuring a level playing field in the EU and a dynamic and competitive EU Single Market with compliant products only.

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[142] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12654-Evaluation-of-the-New-Legislative-Framework-for-EU-legislation-on-industrial-products
[143] with the exception of the provisions of the Regulation (EC) No 765/2008 relating to market surveillance, which were already subject to an evaluation (SWD(2017) 469 final).
[144] 17.9.2020 SWD(2020) 205

The Commission launched a **study to assess the impacts of new technologies and digital supply chains on market surveillance**. In addition, the Commission continued its **financial support to joint actions between market surveillance authorities on compliance, safety and horizontal issues**. These types of actions foster cooperation, the sharing of best practices and the harmonisation of methodologies. The Commission also launched a call for proposals to finance horizontal actions and product testing activities. To cope with the impacts of new technologies, a **digitisation task force** was set up of volunteering authorities that will aim to upgrade current systems used for market surveillance and to anticipate and adapt to new technologies that affect market surveillance activities.

In parallel, the implementation of **joint activities to promote compliance** between market surveillance authorities and other relevant authorities or organisations representing economic operators or end users is being prepared. To further deepen the cooperation with Member States on the implementation of the new Market Surveillance regulation, the Commission hosted, together with the German Presidency, an online conference looking at how market surveillance will become more digital, cooperative and resilient.

To raise the profile of **SOLVIT** as an across-the board problem-solving tool for the Single Market, the Commission services and Member States authorities continue to strengthen the collaboration between SOLVIT and different bodies and networks at national and EU level, for example by being part of the assistance service finder of the single digital gateway and reinforcing cooperation with the Enterprise Europe Network and Product Contact Points. SOLVIT will continue to raise awareness of the new SOLVIT Mutual Recognition problem solving procedure, which is operational from the date of entry into application of Regulation 2019/515[145] on 19 April 2020. The Commission services will continue to explore the use of the SOLVIT model to meet the requirements of new initiatives.

6. Improving handling of infringement cases

In its last pillar, the Action Plan aims to better prioritise enforcement action. The "Single Market Economy Report 2021" integrates the single market Enforcement Strategic Report referred to in action 19 of the Action Plan. SMET identified, as work that it should focus on, the abolition of the remaining COVID-19 related barriers, a number of priority obstacles to national enforcement and implementation issues as well as the reinforcement of the Single Market to support the recovery.

Specific actions aim to improve the handling of infringement cases. As a rule, complaints addressed to the Commission that are better fit for SOLVIT will be referred to SOLVIT. Conversely, the Commission will continue to identify structural issues detected through the SOLVIT application, which could potentially be better addressed through infringement procedures through a streamlined process within the Commission.

In order to better target and structure the **EU Pilot** system as a rapid and effective tool supporting the solution-oriented dialogue with the Member States at the pre-infringement stage, the

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[145] Regulation (EU) 2019/515 of the European Parliament and of the Council of 19 March 2019 on the mutual recognition of goods lawfully marketed in another Member State and repealing Regulation (EC) No 764/2008

Commission issued new EU Pilot guidelines in July 2020.[146] The new guidelines are to ensure more clarity, consistency and flexibility in the dialogue between Commission services and Member States. The new EU Pilot guidelines were presented to the Member States' representatives in the EU Law Network in December 2020.

To complement the formal exchanges in infringement procedures with direct contacts, the Commission services have started in July 2020 to organise package meetings with individual Member States dedicated to specific policy areas. Package meetings on infringement cases and other horizontal enforcement issues, both at technical and political level, will continue to be scheduled with all Member States in 2021.

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[146] EU Pilot: Guidelines for the Commission services (July 2020).

Stocktaking of the implementation of the 2020 Single Market Enforcement Action Plan

Colour-coding

   	Implemented / launched before May 2021
   	In the Commission Work Programme 2021; implementation as of 2021
   	Scheduled for later implementation

Action	State of implementation
Establishment of the Single Market Programme	• Adopted by co-legislators in 2020
Single Market Barriers Report	• Adopted 10 March 2020
Single Market Enforcement Action Plan	• Adopted 10 March 2020
Action 1. Provide more specific guidance tools for national authorities	• Guidelines on the practical application of the essential functionality criterion of the definition of a 'video-sharing platform service' under the Audiovisual Media Services Directive 2020/C 223/02 • Guidelines pursuant to Article 13(7) of the Audiovisual Media Services Directive on the calculation of the share of European works in on-demand catalogues and on the definition of low audience and low turnover 2020/C 223/03
	• Guidance document on Article 4 of the Market Surveillance Regulation • Guidance on the Regulation on the principle of Mutual Recognition • Guidance on the application of Articles 34-36 TFEU • Blue Guide on the implementation of EU for harmonised product rules • Guidance on strategic (social, innovation, green) and other aspects (collusion) of public procurement and proposing a Recommendation on Review systems • Practical application of the new media literacy obligations of the AVMSD (media literacy toolbox and guidelines to Member States) • Guidance on Article 17 of the Copyright Directive
	• Support to the transposition of the European Accessibility Act • Setting up platforms for exchange with Member States such as the one used for Public Procurement

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	Directives
	• Setting up a central information point on practical questions that civil servants in Member States have in their daily work applying single market law
Action 2. Improving access to information on rules and requirements for users	• Your Europe Portal became the interface of the Single Digital Gateway on 12 December 2020 and now provides not only information on EU rules and requirements, but also on national ones, both in English and the relevant national language
	• New module of Information and Communication System on Market Surveillance (ICSMS) deployed since April 2020
	• The EU Product Contact Points are empowered by the "Goods Package" to provide better and faster information to businesses about the rules that apply to their products
Action 3. Online platforms facilitating compliance of products	• Horizontal measures to improve compliance of products sold via online platforms have been included in the Commission's proposal for the Digital Services Act
	• Revision of the General Product Safety Directive scheduled for Q2 2021 aims to improve product safety, including in online sales.
	• New EU database on medical devices (EUDAMED) currently under development
Action 4. Training and exchange of practices for national judges and practitioners	• European judicial training strategy for 2021-2024 adopted and European Training Platform[147] launched in December 2020. Other actions ongoing.
	• Conference of stakeholders on European judicial training due for May 2021
Action 5. Capacity building for national public administrations	• Ongoing.
	• EU Product Compliance Network will propose the financing of the activities set out in Article 36 of the Market Surveillance Regulation 2019/1020 later in 2021
Action 6. Building capacity of public procurement professionals and strengthening the cooperation between national bodies	• Regular meetings of the Network of First Instance Review Bodies on Public Procurement
	• High-level training programme in 2021 to improve administrative capacity of Central Purchasing Bodies
Action 7. Structured dialogue for better transposition of Single Market Directives	• Ongoing monitoring of transposition of the European Electronic Communication Code (EECC) through the Communications Committee

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[147] https://e-justice.europa.eu/content_european_training_platform-37158-en.do

	• Regular meetings of the Contact Committee on the Audio-Visual Media Services Directive • Ongoing cooperation of media regulators within the Regulators Group for Audiovisual Media Services with voluntary cooperation mechanism put in place at the end of 2020 • Regular meetings of the Copyright Contact Committee • In 2020, the Commission revamped its IT monitoring system on transposition. • Regular workshops with national authorities in the Company Law Expert Group (CLEG) to support the transposition of the Directive on digital tools in company law (2019/1151) and of the Directive on cross-border conversions, mergers and divisions (2019/2121), Capital Requirements Directive (CRD V) (2019/878/EU), Bank Recovery and Resolution Directive (BRRD II) (2019/879/EU), Investment Firms Directive (2019/2034/EU) and Covered Bonds Directive (2019/2162/EU)
	• Workshop on the implementation of the EECC due later in 2021
Action 8. Implementation partnership for Single Market Regulations	Ongoing
Action 9. Improving ex-ante assessment of restrictive regulation under the Proportionality Test Directive	Guidance document on Proportionality Test Directive to be adopted later in 2021
Action 10. Streamlining the operation of the Single Market Transparency Directive (SMTD)	Ongoing
Action 11. Preventing new barriers to providing services in the Single Market	Ongoing including upgrade of the IMI module used for services notifications, guidance and training provided to Member States, a detailed annual report on the implementation of the procedure and awareness raising
Action 12. Unlocking the full potential of the notification mechanism under the e-commerce Directive	Ongoing
Action 13. Rationalising Single Market IT systems and setting-up a platform for online enforcement (e-enforcement lab)	Ongoing

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	• New interface for submission of posting declarations in Road Transport sector & information exchange to enforce posting rules in 2022 • Interconnection of ICSMS and Safety Gate/RAPEX to become operational by 2025
	• Integration of the Regulated Professions Database in IMI in 2021 • Development of the "Annual Report Official Controls" (AROC) and an electronic version of the standard model form in IMSOC for the submission of MS annual reports with compulsory use of AROC from 31 August 2021. • Commission Notice on a guidance document on how to fill in the standard model form in the Annex to Commission Implementing Regulation (EU) 2019/723 published on 1 March 2021 (2021/C 71/01) • EU E-Lab project to establish a platform with common e-tools that authorities can use to carry out online investigations in relation to consumer rights and to product safety by end 2021.
Action 14. Strengthening the fight against counterfeit and illegal products	• Contribution to the EU Toolbox against counterfeiting • Cases against imports of illicit medical equipment • Pilot cases against food fraud
	• Project to verify the implementation of the new arrangements by Member States on controls and other official activities aimed at identifying and following-up fraudulent or deceptive practices ongoing. Two pilot missions and eight audits have been planned for the period 2020-2022.
Action 15. Strengthening enforcement in the agri-food chain	• Systematic follow-up of audit recommendations to ensure that Member States implement the actions necessary to correct identified shortcomings by the competent services (continuous) General Follow-up Audits (GFAs) on 8 Member States carried out in 2020 and further GFAs are planned for 2021. • Continuation of "Better Training for Safer Food" training programme • Ongoing work on monitoring implementation of Multi-Annual National Control Plan (MANCP) and the review of obligations on Member States and new requirements for MS annual reports • Commission Notice on a guidance document on the implementation of the requirements for the multi-annual national control plans issued 2021. • Regular meetings of the National Audit Systems (NAS) network. • Inception Impact Assessment on the review of the Geographical Indications (GIs) published on 28 October 2020. GIview database launched on 25 November 2020
Action 16. Development of labelling and traceability systems	• Evaluation of the need to update the digital labelling and traceability requirements started in 2020 • New customs equipment capable of reading and checking the encoded information will be developed

	as part of the Integrated Border Management Fund 2021-2027
	• The Commission will seek the digital submission of compliance information for industrial and consumer products
	• External study on cybersecurity of connected products in the Single Market launched in August 2020
	• Dedicated module for the identification and traceability of medical devices via Unique Device Identification (UDI) to be released for voluntary use in 2021
Action 17. EU Product Compliance Network	• Operational in January 2021
Action 18. Making SOLVIT the default tool for Single Market dispute resolution	• SOLVIT will provide training to ELA staff
	• The Mutual Recognition problem solving procedure became operational on 19 April 2020
	• SOLVIT will consider future cooperation arrangements with the European Labour Authority (ELA) on practical aspects of its work and consideration will be given to a specific MoU on mediation
	• SOLVIT will be considered as part of a problem solving initiative in the area of protection of investment
	• SOLVIT will continue cooperation with the VAT Forum in addressing problems in the area of VAT double taxation
Action 19. Better prioritisation of enforcement action	• Addressed by this report.
	• Continued quarterly reports about structural issues detected through the SOLVIT application.
	• The system for submitting complaints is being revised to better integrate it with SOLVIT
Action 20. Clarity and consistency in case handling	• The Commission's complaint handling system was adjusted to reflect the new requirements on preliminary assessment of complaints, and internal guidance was issued in January 2021.
Action 21. Better use of the EU Pilot system	• In order to better target and structure the EU Pilot system as a rapid and effective tool, the Commission issued new EU Pilot guidelines on 30 July 2020.
Action 22. Systematic periodic package meetings	• Started in July 2020 and to continue in 2021.
Setting up a Single Market Enforcement Task-Force (SMET), composed of Member States and the Commission. (GROW/SMP)	• Ongoing: Inaugural meeting took place on 7 April 2020
Cooperation network between national enforcement coordinators	• First meeting took place on 24 November 2020.
Single Market Scoreboard	• Being updated to better reflect the needs of end users in the Single Market and to support the EU

	Semester

Annex 2
Overview of the implementation of the 2020 Industrial Policy Package

Stocktaking of the implementation of the 2020 Industrial Strategy

Colour-coding

   	Implemented / launched until May 2021
   	In the Commission Work Programme 2021; implementation as of 2021
   	Scheduled for later implementation

Creating certainty for industry: A deeper and more digital single market	
Single Market Enforcement Action Plan and Single Market Barriers Report	
Setting up a Single Market Enforcement Task-Force, composed of Member States and the Commission.	
SME Strategy for a sustainable and digital Europe	
Ongoing review of competition rules, including the evaluation of merger control and the fitness check of State aid guidelines.	State aid fitness check completed Evaluation of merger control published Review of competition rules ongoing, including the evaluation of State aid guidelines, the evaluation of the market definition notice, the review of the Horizontal and Vertical Block Exemption Regulations and their guidelines and the simplification of merger procedures
Intellectual Property Action Plan to assess the need to upgrade the legal framework, ensure a smart use of IP, better fight IP theft.	
Follow-up to the European Data Strategy to develop an EU data economy, including the launch of common European data spaces in specific sectors and value chains.	Regulation on European Data Governance
	Specific data spaces have different timelines. Most of them are scheduled to be launched in 2021 (e.g. manufacturing and health data

	spaces)
Digital Services Act to update and strengthen the legal framework for a single market in digital services.	
Initiative on improving the working conditions for platform workers	
Upholding a global level playing field	
White paper on an instrument on foreign subsidies by mid-2020, also looking at foreign access to public procurement and EU funding.	
	Follow-up to the white paper in 2021
Action plan on the Customs Union in 2020 to reinforce customs controls, including a legislative proposal for an EU Single Window Environment for Customs to allow for fully digital clearance processes at the border.	Action Plan published Proposal for an EU Single Window Environment for Customs adopted
Swift adoption of the International Procurement Instrument.	Pending[148]
Strengthening the global rules on industrial subsidies in the World Trade Organization.	Annex to the Trade Policy Review Communication on reforming the WTO
Supporting industry towards climate neutrality	
Strategy for smart sector integration.	
A Common European Energy data space will exploit the potential of data to enhance the innovative capacity of the energy sector.	Ongoing
Launch the Just Transition Platform to offer technical and advisory support for carbon-intensive regions and industries.	

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[148] Pending adoption by EP and Council

Chemicals Strategy for Sustainability	
Review of the Trans-European Network Energy regulation.	
EU Strategy on Offshore Renewable Energy.	
EU Strategy on Clean Steel	Funding proposal for Clean Steel Partnership presented in the context of Horizon Europe
Comprehensive Strategy for Sustainable and Smart Mobility.	
'Renovation Wave' Initiative and Strategy on the built environment.	
Carbon Border Adjustment Mechanism to reduce carbon leakage, in full compatibility with WTO rules	
Building a more circular economy	
Circular Economy Action Plan adopted in parallel with this strategy, including a new sustainable product policy framework.	Sustainable product policy framework to be adopted in 2021 including: • Empowering consumers for the green transition • Substantiation of green claims • Sustainable Products Initiative • Circular electronics initiative (non-legislative) • New design requirements and consumer rights for electronics
New Regulatory Framework for Sustainable Batteries	
EU Strategy for Textiles.	
Embedding a spirit of industrial innovation	
Communication on the Future of Research and Innovation and the European Research Area to map out a new approach to innovation and ensure the EU budget is used with maximum impact.	
Launch Public Private Partnerships in the Horizon Europe programme)	Single Basic Act for proposed institutionalised partnerships (Joint undertakings) and art 185 (public-public partnerships) adopted

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|	Non-institutionalised partnerships to be launched
Skilling and reskilling	
The Commission will update the Skills Agenda for Europe, including a Pact for Skills, and will propose a Council Recommendation aimed at modernising vocational education and training	
Launch of a European Pact for Skills.	
Communication on achieving a European Education Area by 2025.	
New Digital Education Action Plan (2021-2027).	
Implementation of the EU Gender Equality Strategy 2020-2025, adopted in March 2020.	Ongoing
Investing and financing the transition	
Work with Parliament and Council to ensure rapid adoption and implementation of the next long-term budget.	
Consider scope for coordinated investment by Member States and industry in the form of new IPCEIs and on the possible follow-up to the first IPCEIs on batteries and microelectronics.	Ongoing for microelectronics. Second IPCEI for batteries launched
Review State aid rules for IPCEIs.	Review ongoing - Communication on Important Projects of Common European Interest
Action Plan on the Capital Markets Union in 2020, including measures in support of integrated capital markets and more funding opportunities for citizens and businesses.	
A renewed sustainable finance strategy.	
A new Digital Finance Strategy.	
Reinforcing Europe's industrial and strategic autonomy	
A new EU pharmaceutical strategy in 2020, including actions to secure supplies and ensure innovation for patients.	

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An Action Plan on Critical Raw Materials, including efforts to broaden international partnerships on access to raw materials.	
Follow-up to the 5G Communication and the Recommendation on cybersecurity of 5G networks.	Ongoing Report on Member States' Progress in Implementing the EU Toolbox on 5G Cybersecurity Report on the impact of the Commission Recommendation of 26 March 2019 on the Cybersecurity of 5G Networks published The Cybersecurity Strategy for the Digital Decade of December 2020 contains an appendix with a list of actions and objectives for the next steps in the EU coordinated approach on 5G cybersecurity
Action Plan on synergies between civil, defence and space industries, including at the level of programmes, technologies, innovation and start-ups.	
A partnership approach to governance	
Building on the successful template of industrial alliances, a new European Clean Hydrogen Alliance will be launched.	
Alliance on low-carbon industries	
Alliance on raw materials	European Raw Materials Alliance
Industrial European Alliance for Industrial Data, Edge and Cloud	
The Commission will undertake a thorough screening and analysis of industrial needs and identify ecosystems needing a tailor-made approach.	
An inclusive and open Industrial Forum will be setup by September 2020 to support this work	
The Commission's annual Industry Days will continue to be an important event to bring all players together.	

Stocktaking of the implementation of the 2020 SME Strategy

Colour-coding

	Implemented / launched before May 2021

	In the Commission Work Programme 2021; implementation as of 2021

	Scheduled for later implementation

Action	State of implementation
Capacity building and support for the transition to sustainability and digitalisation	
The Commission will enhance and upgrade the Enterprise Europe Network including with dedicated Sustainability Advisors and other sustainability services	Ongoing
The Commission will develop Digital Crash Courses for SME employees to become proficient in areas like AI, cybersecurity or blockchain	Work being finalised
The Commission will launch a "digital volunteers" programme to allow young skilled people and experienced seniors to share their digital competence with traditional businesses .	
The Commission will update the Skills Agenda for Europe, including a Pact for Skills with a dedicated component for SMEs, and will propose a Council Recommendation aimed at modernising vocational education and training.	
The Commission will expand Digital Innovation Hubs in connection with Startup Europe and the EEN and provide a	First grants to be signed in 2021.

seamless service within local and regional ecosystems.	
The Commission will allocate at least EUR 300 million to encourage breakthrough Green Deal innovations under the EIC.	
For the SMEs which focus their activities on short-term accommodation rental services, the Commission will continue to explore a possible collaborative economy initiative.	On course for implementation in 2021.
Reducing regulatory burden and improving market access	
The EU SME Envoy and the network of national SME Envoys will contribute to the work of the Commission's Single Market Enforcement Task Force, to address among others gold-plating in the transposition process with a view to keep the regulatory burden on SMEs to a minimum.	SMET has started its work and the SME Envoy network is involved.
The Commission will encourage Member States to implement the Single Digital Gateway in a business friendly way. Member States should link their services in a one-stop-shop.	Ongoing
The EU SME Envoy will filter EU initiatives to signal to the Commission those that merit close attention from an SME perspective and have a specific role in the new Fit for Future Platform.	Ongoing
The EU will launch an EU Start-up Nations Standard to share and adopt best policy practices for the growth of European start-ups.	The European Startup Nations Standard was launched through a joint declaration in March 2021.
The Commission calls on Member States and their contracting authorities to use the flexibility offered by the EU's new procurement framework to enhance opportunities for SMEs including through the use of digital tools and platforms to step	Ongoing. Ongoing

up cross-border procurement. The Commission will issue guidance and support to contracting authorities.	
The Commission will encourage Member States to develop proposals for regulatory sandboxes by launching a pilot.	Pilot to be set up later in 2021.
The Commission will launch a call for pioneer partnerships among border regions to enhance regional cooperation in enforcing the Single Market and removal of administrative barriers.	Assessment of proposals ongoing
The Commission will support the Member States in enforcing the Late Payment Directive by setting up monitoring and better enforcement tools and exploring the feasibility of alternative resolution/mediation mechanisms for SMEs.	Ongoing
The Commission will facilitate cross border cooperation with and among SMEs under the European Defence Fund and map strengths in its research and innovation eco-system.	European Defence Fund-related actions will be deployed over 2021-2027.
The Commission will launch a Space Entrepreneurship Initiative 'CASSINI'.	To be launched in 2021.
The Commission will support Member States in transposing the recently adopted Directive on preventive restructuring frameworks and second chance, by helping them set up early warning mechanisms for companies in financial difficulties to avoid bankruptcy.	Ongoing.
The Commission will explore with Member States measures to create a supportive environment for transfer of SMEs.	Commission project on improving the evidence base and data collection methods on business transfers across the EU completed in December 2020. Further work ongoing.

The Commission will continue to enhance SME access to third country markets including through dedicated SME chapters, use of dialogues to exchange good practices with trade partners and a new information portal (GROW). The Commission will facilitate SME access to trade defence instruments.	Free Trade Agreement (FTA) negotiations including SME chapters are ongoing with several third countries. The new 'Access2Markets' (A2M) information portal was launched in 2020
EU Delegations will provide support by addressing queries of SMEs linked to the FTAs.	Ongoing.
The Commission will extend the Erasmus for Young Entrepreneurs Global scheme.	Preparatory Action started in March 2021.
Improving access to financing	
The Commission will support Initial Public Offerings (IPOs) of SMEs with investments channelled through a new private-public fund, to be developed under the InvestEU programme starting 2021 under the Capital Markets Union.	2021
The Commission will introduce a first of a kind risk/reward mechanism to boost the size of venture capital funds and crowd in private investments for scaling up through the ESCALAR initiative.	Call with financial intermediaries published in April 2020. Projects are in the process of being signed.
The Commission will launch a gender-smart finance initiative to stimulate funding for women-led companies and funds and to empower female entrepreneurship.	2021
The Commission will launch a green tech investment initiative to pool funding from the EU, Member States and the private sector to increase the access to equity finance for innovative SMEs and start-ups that develop and adopt green tech	A market assessment is being launched.

solutions.	
The Commission will launch a blockchain-based initiative enabling issuance and trading of SME bonds across Europe, using the European Blockchain Services Infrastructure.	Initiative launched in Q4 2020.
The Commission will co-fund tech due diligence services under an EU pilot project to enable more precise valuations high tech start-ups and prepare their investment readiness.	2021.
The Commission will further simplify the existing state aid rules on combinations of national funds with InvestEU and Horizon funds, making it easier for SMEs to benefit from pooled resources to help them with the twin transitions. The Commission will also revise state aid rules for risk finance and the IPCEI communication, to further support SME involvement, ensure crowding-in of private investment while avoiding distortions of the level playing field.	Ongoing with view to completion by end 2021
Governance: an EU-Member State partnership for delivery	
The Commission will appoint a high level EU SME Envoy.	The nomination process of the EU SME Envoy is ongoing.
The Commission will reinforce the SME Envoys Network to strengthen the link between the EU and national level on SME policy.	Ongoing.
The Commission will launch a group of Strategic Entrepreneurship Ambassadors (GROW).	Progressively from 2021.
The EU SME Envoy will raise awareness on SME-related aspects in a regular dialogue with the Regulatory Scrutiny Board.	Ongoing.

Annex 3: 14 industrial ecosystem fiches

Industrial ecosystems encompass all players involved in the achievement of a certain socio-economic goal: from the smallest start-ups and the largest companies cooperating to satisfy a new market need, the research activities supporting industrial innovation, the regulators steering economic activity through conducive policies, to the services providers and suppliers.

As presented in the March 2020 Industrial Strategy[149], this approach incorporates the systemic importance of all the horizontal and vertical links among economic actors. It recognises the importance of those activities often considered as ancillary to industry, such as supply of raw material, research and innovation, the provision of business services, or access to distribution networks. While each ecosystem has its own characteristics, they all evolve against the same background: an integrated Single Market. The ecosystem lens enables a bottom-up analysis of, and exchange on, the opportunities and challenges in the EU economy as the EU embarks on the twin green and digital transition, as well as on boosting its resilience.

The diverging impact of the COVID-19 crisis across the European economy, and the disruptions experienced in spring 2020, confirmed the need for an ecosystem approach[150]. Further, it is also the approach followed to implement the Pact for Skills.

So far, **14 industrial ecosystems spanning across the EU have been identified** based on their economic and technological relevance, and for their expected contribution to the decarbonisation, digitalisation and resilience of the EU economy. They represent approximately 70% of the EU economy and 80% of the business economy (as a share of value added).

These 14 industrial ecosystems are:

1. Aerospace and Defence
2. Agri-food
3. Construction
4. Cultural and Creative Industries
5. Digital
6. Electronics
7. Energy Intensive Industries
8. Energy-Renewables
9. Health
10. Mobility-Transport-Automotive
11. Proximity, Social Economy and Civil Security
12. Retail
13. Textiles
14. Tourism

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[149] A New Industrial Strategy for Europe, COM/2020/102 final
[150] Europe's moment: Repair and Prepare for the Next Generation, COM(2020) 456 final and accompanying SWD(2020) 98 final

The boundaries and scope of the ecosystems are dynamic. For each ecosystem, the Commission has identified core activities, i.e. those that more than the others characterise each ecosystem[151]. These activities have been mapped into a widely used statistical classification (NACE). While the match between the sectors as per NACE classification and the concept of ecosystem is not perfect and requires some approximation, the mapping allows for a good representation of the ecosystems.

Ecosystems are also linked to each other. For instance, the Retail ecosystem provides (downstream) services to virtually all other ecosystems. Similarly, the Energy Intensive Industry ecosystem supplies inputs to many other ecosystems. Moreover, ecosystems overlap with each other, as some activities are relevant for more than one. For instance, several professional services are used by all ecosystems. In other cases, e.g. for industries providing products and services for a safer and more secure society, these are captured in more than one ecosystem. Similarly, activities related to waste management, which are so important for the circular economy, are instrumental for the green transition of all ecosystems. A share of these 'horizontal' activities is attributed to all ecosystems based on their specific contribution to the core activities of the ecosystems (see Annex 4 for detailed methodology).

This annex presents, for each ecosystem, an assessment of the relevance and contribution of the industrial policy toolkit from the perspective of the different ecosystems. **The individual Ecosystem Fiches zoom into the specificities of each industrial ecosystem**. The fiches are structured as follows:

- **Transformative initiatives**: these are the main areas for action expected to have a major impact on the sustainability, digitalisation and resilience of the ecosystem. Ongoing or announced actions in the accompanying Communication or in recent Commission Communications are highlighted.
- **Towards an EU policy toolbox fit for purpose**: a short description of 3-5 of the most relevant ecosystem-specific actions/tools which complement the transformative initiatives above.
- **The ecosystem at a glance**: this section describes the ecosystem and its main components, the cyclical and structural trends affecting the performance of each ecosystem, its position in the global context, and provides a forward-looking assessment of the key opportunities and challenges faced by the ecosystem.
- **Mapping policy tools in more detail**. The last section provides a synthetic description of how policy tools contribute to the objectives of the ecosystem, highlighting examples of good practice and opportunities offered by these tools. The overview of the tools and instruments highlighted in each ecosystem fiche is not exhaustive, but focuses on the most important levers for change.

The Single Market is the common background of all ecosystems, thanks to which research, engineering, production, assembly and service activities can support and integrate each other across borders in a flexible and dynamic manner. An open, integrated and undistorted Single Market is a driver for improving the competitiveness of EU businesses. EU competition policy has an important role to play, given its main objective of preventing and removing distortions of competition by ensuring a strict enforcement of antitrust, mergers and State aid rules. Competition policy is horizontal in nature, cutting across economic sectors and industrial ecosystems. It is therefore relevant in all markets and for all businesses. Competition policy can contribute in many ways to

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[151] The identification is based on literature review (including studies supported by the Commission) and expert judgement.

creating conditions for achieving existing and/or future development goals. In a business environment where competition is preserved and promoted, businesses are incentivised to enhance their efficiency, innovate, seize new opportunities and allocate their resources in a more efficient way, boosting thus the economy and increasing Europe's competitiveness on global markets. Finally, competition also brings benefits to downstream users and consumers, in terms of lower prices, better quality and more choice. The ongoing review of EU competition rules will ensure that they are fit for purpose for an economy that is changing fast, increasingly digital and must become greener and more circular.

Similarly, trade policy also drives the EU's growth and competitiveness across all ecosystems. The EU is an open economy benefiting from vibrant trade and investment links that enhance resilience and support the recovery and the green and digital transformation of the EU economy. Trade policy benefits EU industry, workers and citizens by providing a stable rules-based environment, creating opportunities, safeguarding a level playing field and protecting EU industry from unfair trade by means of existing rules (as well as new tools now being elaborated), promoting EU standards and developing frameworks for cooperation and dialogue. The Commission set out the direction for an open, sustainable and assertive trade policy in the Trade Policy Review Communication adopted in February 2021.

As such, **the industrial policy toolkit highlighted in each fiche is not exhaustive, but focuses on the most important levers for change.** In cases where certain tools featured in the table below do not directly contribute to the main challenges of each ecosystem, they have not been included in the specific fiche. For example, the Proximity, Social Economy and Civil Security; Construction; Cultural and Creative Industries ecosystems do not feature an assessment of the tools relating to 'international partnerships and dialogue'.

The overview of the tools considered for each ecosystem is summarised in the table below.

Table 1: List of industrial policy tools assessed and other specific tools per ecosystem

Funding and budgetary programmes	Supportive regulatory environment	International partnerships and dialogue	Networks and governance
Recovery and Resilience Facility (RRF)	Single Market Surveillance	Strategic Partnerships (e.g. Critical Raw Materials input)	Industrial Networks
IPCEIs (where relevant)	Main Single Market barriers within the ecosystem	Regulatory dialogue/cooperation	Clusters cooperation
CRII+/ERDF/ESF/CEF	Standardisation		Enterprise Europe Network
Horizon Europe (including European Partnerships)	Digital transformation		Pact for Skills
Digital Europe Programme	eGovernment		Digital Innovation Hubs
InvestEU	Green Transformation		Thematic Smart Specialisation Interregional Partnerships
Access to finance	Strategic Public		

	Procurement		
Space Programme and European Defence Fund	Intellectual Property		

The **Ecosystem Fiches provide a basis for informed and structured dialogue with public institutions and stakeholders**, to generate a more granular understanding of the complex and interdependent economic fabric of the EU. Through a joint effort of evidence-gathering, these fiches can enrich our understanding of the current and future determinants of the performance of ecosystems, and of the policy levers which can affect it. As such, the ecosystem fiches could contribute to transition pathways to be co-created for relevant ecosystems.

1. Aerospace and Defence Ecosystem

**3.92 million people employed
(direct employment)** [152]

**1.99% of EU value added
(EUR 241 billion)**

**3.2 million firms
99% of SMEs**

Transformative initiatives

Strategic dependency risk monitoring

A systematic monitoring of risks associated with strategic dependencies in **products, services, critical technologies, actors and skills** in order to take targeted measures to deliver on reinforcing open strategic autonomy in the ecosystem.

Secure space connectivity

An EU space flagship[153] providing secure space-based connectivity for governmental and commercial sector services, including better connecting key infrastructure, support for crisis management and external actions, surveillance and mass market.

Cassini space entrepreneurship initiative

To promote opportunities for start-ups via business acceleration, incubation, seed-funding and for SMEs with finance for growth and pre-commercial/innovative procurement.

Towards an EU policy toolbox fit for purpose

European Space Programme and European Defence Fund These provide opportunities to support resilience, open strategic autonomy and connectivity, as well as climate action, using space infrastructure and services built and operated by EU industry. They include R&D actions with defence applications to foster competitiveness, (disruptive) innovation, and efficiency of the European defence industrial base including SME's and start-ups. **A stronger European defence industrial base and EU as a global space power will contribute to an EU with a global impact.**

Horizon Europe (including European Partnerships) Provides opportunities to accelerate the development of climate-neutral aviation technologies and reduce EU strategic dependencies in space value chains; enhance the competitiveness of the EU space sector in fostering innovation and new technologies (New Space, quantum, zero emission aircraft), and support start-ups (Cassini). **R&D partnerships proposed under Horizon Europe in the domains of space, clean aviation and integrated Air Traffic Management will play a key role.**

Pact for Skills The skills partnership under the Pact is an opportunity to upskill and reskill EU workers for the high-tech Aerospace and Defence industry of the future. It supports **high skilled jobs in a high-tech industrial ecosystem.**

Strategic Public Procurement It provides opportunities for first contracts, EU as anchor customer, and procurement of innovative solutions. It supports a **stronger home market for space and defence industry.**

Industrial Networks A possible **Alliance on Zero Emission Aviation** would aim to ensure market readiness for disruptive aircraft configurations (hydrogen, electric, etc.) developed by the European industry to green air transport and contribute to Europe's 2050 climate neutrality objective, bringing together all actors necessary to solve the bottlenecks and promote the necessary investments. A possible **Alliance on Space Launchers** would aim to ensure a globally competitive, cost-effective and autonomous EU access to space, by establishing a shared roadmap for the next generation of European launchers, bringing together the European Space Agency, Member States and industry, addressing supply and demand.

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[152] Figures for employment and value added are based on Eurostat National Accounts and SME shares on Eurostat Structural Business Statistics.
[153] See recent Action Plan on Synergies between Civil, Defence and Space Industries, COM(2021) 70 final

The ecosystem at a glance

Sectors included in the ecosystem	**The Aerospace and Defence ecosystem covers manufacturing companies in aeronautics, space and defence; space operators and data and service providers; research institutes.**
	This ecosystem's core manufacturers generate a turnover of EUR 250 billion (125 for aeronautics, 12 for space and 110 for defence)[154], with globally competitive companies. Its complex supply chains are composed of large system operators and integrators down to high-tech specialised SMEs. In defence, and partly space, EU Member States define the needs and act as the primary customers for a wide-range of products. European technology institutes and academia play a particularly important role in this ecosystem due to its high-tech nature, and act as knowledge transfer channels.
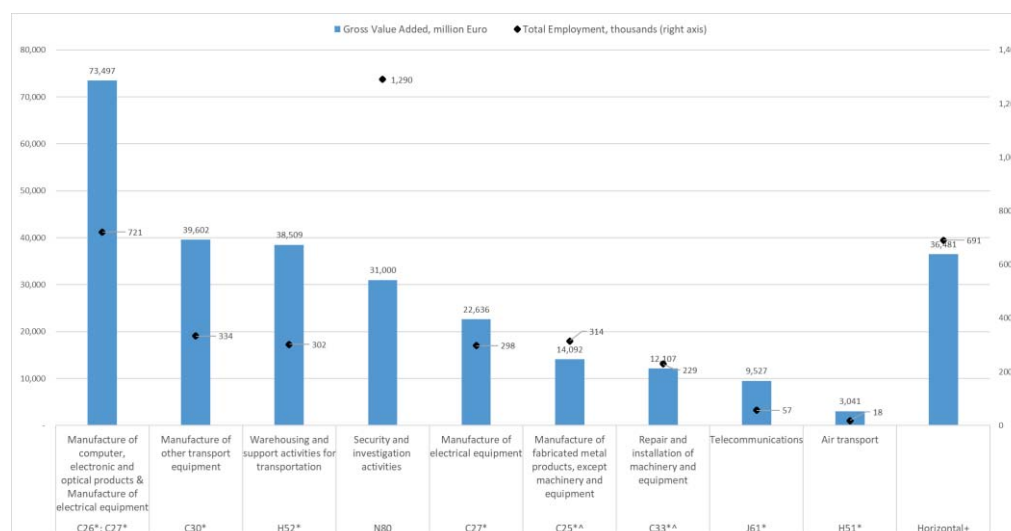
Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem; ^Includes additional share added on top of horizontal component; +Excludes contribution of C25 and C33.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	**SMEs and start-ups represent an important part of the Aerospace and Defence ecosystem since they perform many niche, complex and innovative tasks in the manufacturing supply chain.** In civil aeronautics, they represent more than 80% of all companies, providing, amongst others, high-tech material processing and engineering services. In addition, SMEs are strongly represented in the downstream space sector and New Space start-up companies are developing at a fast pace, where innovative applications are developed. Defence-related SMEs are also key enablers of innovation and growth of the defence sector as a whole. More than 2,500 SMEs play a central role in the complex defence supply chains across Europe.
Current challenges	The ecosystem faces an unprecedented crisis due to COVID-19, with turnover reduction up to EUR 50 billion for aeronautics (40%), EUR 28 billion for defence (25%) and EUR 3 billion for space (25%)[155]. Massive job cuts are ongoing (e.g. in civil aeronautics) and will continue if no investment perspective is provided. Some companies critical to the supply chains may become targets for non-EU takeovers. Air travel may not recover 2019 levels before 2024[156]. This may oblige industry to maintain reduced production rates of new aircraft in the next decade. This will impact the entire ecosystem, since civil aeronautics

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[154] Passenger air transport is not included in this ecosystem, but in Tourism
[155] https://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/ITRE/DV/2021/04-13/IPOL_STU2021662903_EN.pdf
[156] International Air Transport Association

represents 50% of its turnover. Space and defence will be particularly affected by public sector spending cuts. Companies involved in defence face an increasing problem of access to financing. **The full impact of the crisis is expected by industry to come with 2-4 years delay**, due to a combination of long lead times in this industry, and the dependence on public procurements. In addition, demand from export markets is dramatically reduced (among others due to the oil price fluctuations and to increasing technology-related disputes between the US and China).

Forward-looking assessment	**The EU aerospace and defence industry is currently highly competitive on the global market, but needs a stronger investment capacity to continue the development of the disruptive technologies necessary to deliver on the green deal (in particular the greening of aviation) and address digital challenges of Europe. It also requires a less fragmented home market in defence and space.** This industry supplies the EU with crucial capacities for open strategic autonomy: border surveillance, secure diplomatic communication, law enforcement, fisheries control, climate variable monitoring, smart mobility and crisis management all depend on aerospace and defence technologies. Although global markets for aeronautics are expected to grow on the longer term[157], it is uncertain if the EU aerospace and defence industry can maintain the competitive and technological edge in the next five years. This is exacerbated by the expected loss of skills due to lay-off of personnel in the coming years.
Global context	**Competing industry on other continents benefit from a massive, stable and predictable home markets of public procurement, and sponsoring of their national industry.** This has a distorting effect on the global level playing field. Many foreign markets are largely captive markets favouring home industries (e.g. launchers).

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[157] www.iata.org/pax-forecast

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF Depending on national priorities, the RRF can be an important tool for enhancing the resilience of EU strategic industrial value chains, as well as their digitalisation. National Recovery and Resilience Plans can support the investments required to develop green aircraft technologies. Member States could include investments in their Recovery and Resilience Plans commensurate with their country recommendations and challenge.

CRII+/ERDF/ESF/CEF There is a need to **communicate on funding and investments opportunities** into aerospace and defence industry, for example for smart specialisation. The **Connecting Europe Facility** can finance (i) the **uptake of space services** and applications relevant for energy, transport, smart cities, protecting climate and environment; and (ii) the initial phase of the **EuroQCI** (Quantum Communication Infrastructure) system, contributing to the development of the secure connectivity initiative.

The existing synergies between border management and civil protection and the Aerospace and Defence Ecosystem will continue to increase. Those are EU-level procurements of assets and services (see also section on Strategic Procurement). There is a need to **ensure that for security-related aspects a capability–pull relationship is developed with EU industry, so that EU standards can be set and maintained**.

Horizon Europe (including European Partnerships) Under Cluster 4 'Digital, Industry and Space', topics on space can contribute to **reducing strategic dependencies** for strategic value chains; **enhance the competitiveness** of the EU space sector in **fostering innovation and new technologies (New Space)**, and **support start-ups (Cassini)**. The **climate-neutral aviation objectives in** Cluster 5 'Climate, Energy and Mobility' will support the development of a next generation of clean aircraft (ultra-high efficient, hybrid-electric or hydrogen-powered aircraft). This will enable the European aeronautics industry to significantly contribute not only to achievement of the European Green Deal objectives but also to the greening of air transport worldwide. Institutionalised European Partnerships (e.g. in Clean Aviation, Integrated Air Traffic Management and Clean Hydrogen) will play a prominent role, supporting the integration and demonstration of disruptive technological innovations. In particular, the Clean Aviation partnership will ensure technological and industrial readiness of innovations to support the launch of disruptive new products by 2035.

Digital Europe Programme The Digital Europe Programme will support the **testing of the interface between the EuroQCI space and terrestrial components**, including support for the validation of systems and components, and test the technology in ground and lower-altitude experiments. This action will also benefit the secure connectivity initiative as it should also feature the innovative quantum technology built through the EuroQCI initiative[158], and improve quality control. It will support European Digital Innovation Hubs to stimulate SMEs and a broad, EU-wide uptake of space services and applications.

InvestEU CASSINI Space Entrepreneurship Initiative[159] will set up a dedicated space investment facility under InvestEU to **increase the number of space companies raising VC significantly over** the next seven years. It will channel investment guarantees via EIF to Europe-based Venture Capital Funds focusing on

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[158] https://ec.europa.eu/digital-single-market/en/news/future-quantum-eu-countries-plan-ultra-secure-communication-network
[159] First announced in the EU SME Strategy, see: https://ec.europa.eu/defence-industry-space/eu-space-policy/space-research-and-innovation/cassini_fr

space-related investments. The EIB's lending policy currently largely precludes the financing of defence-related and carbon-intensive industries, including aeronautics. **Aviation-related activities, defence/dual-use and space services, data and applications could benefit from inclusion under the Taxonomy Regulation**. Adaptation of the EIB lending criteria would be needed to be inclusive for the defence sector within the limits of the Treaties. A joint SME/RID equity product implemented by the EIF will support equity funds investing in strategic technologies in the area of space and defence.

Access to Finance **Aerospace and defence industries face increasing difficulty to access public and commercial loans as well as venture capital investment, hindering their potential for innovation, scaling-up and integration in supply chains.** The main problem is a reputational issue for investors, though there is an increasing requirement to the transition towards carbon-neutrality. At the same time, several funding schemes already exist at the EU level that can fund dual-use (e.g. ESIF) and defence applications (e.g. EDF). The **CASSINI Space Entrepreneurship Initiative will improve access to venture and growth capital** through a dedicated space investment facility under InvestEU, and in addition launch matchmaking activities with potential customers and VC investors. The possible inclusion of economic activities related to aviation and space – including the construction and entry into service of new generation aircraft and space services, data and applications – in the EU Taxonomy could benefit the ecosystem.

EU Space Programme and European Defence Fund The EU space programme will implement its different space components (Galileo, EGNOS, Copernicus, SSA and GOVSATCOM) to **provide secure space-related data, information and services without interruption**. It will reinforce the EU supply chain autonomy and resilience for the space sector. A **new EU flagship for Secure Space Based Connectivity**[160] will be developed to strengthen EU's open strategic autonomy, resilience and technological non-dependence by (i) providing ubiquitous high speed broadband coverage in Europe, and (ii) secure, cost-effective, reliable connectivity for governmental and commercial services to address identified market failures. **The European Defence Fund will support collaborative defence R&D projects** between legal entities to foster the competitiveness, innovative capacity and efficiency of the defence industrial base; will open up national defence supply chains and ensure greater involvement of SMEs and start-ups; and will fund disruptive technologies.

Supportive regulatory environment

Single Market Surveillance The revised market surveillance regulation (EU) 2019/1020 will enable a considerable improvement in efficiency of the market surveillance of **online sales and imports of consumer drones**. It will contribute to ensure the compliance of consumer drones with the requirements of the existing legislation[161], while ensuring that the EU drone sector remains competitive on the global market.

Main Single Market barriers within the ecosystem In support of reducing the main Single Market barriers within the ecosystem, the Directives on Defence and Sensitive Security Procurement (Directive 2009/81/EC) and on intra-EU transfers of defence-related products (Directive 2009/43/EC) have not yet reached their full potential to open up defence supply chains that remain fragmented along national borders. Enhanced efforts by all actors to be made to enforce the Defence Procurement Directive and to

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[160] Recently announced in the Action Plan on Synergies between Civil, Defence and Space Industries, COM(2021) 70 final
[161] Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems, Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft.

ensure a stronger and more harmonised uptake of the Directive on intra-EU transfers and facilitate the transfers of defence-related products within the EU.

Standardisation The **development of hybrid civilian-military standards** are important to reduce cost-burden for European industry. Relevant European standardisation bodies may need to **assess and prepare for the standardisation requirements of future aircraft towards carbon-neutrality** as standards on new technologies and products such as for LH2 tanks and distribution systems do not exist yet. Improvement of aircraft connectivity should also be supported. At the international level, EU engagement in the development of **standards for a number of emerging key technologies** (such as quantum communication) and policies (Space Traffic Management)[162] will be important. Key applications like Galileo, as well as Copernicus's passive sensors, require protection from interference. This includes minimising interference from other radio services, which could be aided by harmonising spectrum use and applying appropriate specifications for radio receivers and transmitters.

Digital transformation The ecosystem is a **major contributor to digital solutions and technologies**, for example through satellite communications and services provided by the EU space programme and through the European Defence Fund priorities on **digital transformation in defence**.

Green transformation Space is a major contributor to the green transformation, for example through **monitoring of greenhouse-gasses, and by services provided by the EU space programme that enable greener transport** (e.g. shorter routing in marine transport) and support to greener agricultural production. As set out in the Commission's Sustainable and Smart Mobility Strategy[163], for aeronautics, the transition to carbon-free aviation will proceed along multiple paths, including the introduction of sustainable aviation fuels, efficiency gains, more flexible routing and the introduction of new propulsion technologies (notably electric, hydrogen or emerging new sources of energy). These measures require the mobilisation of large amounts of capital and a high degree of cross-sectoral coordination (aeronautics, airlines, airports, energy producers and distributors, certifying agencies, regulators, etc.). Strategic engagement of key actors in the ecosystem can increase awareness and knowledge-base, while also facilitating the implementation of green and circular practices, two of the aims of the new 'incubation forum on circular Economy in European defence'[164], launched and managed by the European Defence Agency and co-funded by the Commission's managed LIFE Programme.

Strategic Public Procurement Public procurements from EU aerospace and defence industry are key industrial policy tools at EU and Member State level. Contrary to other major global industrial actors, the **EU industry lacks a reliable and predictable home market for space and defence, in the form of large demanding anchor customers**.

Intellectual Property The **cost of patenting in EU is much higher than in USA**, which may limit, especially by SMEs, the use of this protecting tool and/or their capability to monetise their know-how. The fragmented legal framework hampers the exploitation of industrial/commercial potential.

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) To ensure a global level playing field in space, Europe needs to engage in the debate on setting international rules and standards for using

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[162] See recent Action Plan on Synergies between Civil, Defence and Space Industries, COM(2021) 70 final
[163] COM(2020) 789 final
[164] https://eda.europa.eu/what-we-do/eu-policies

space.**Establishing strategic partnerships** will be an ongoing effort, including in areas such as raw materials in order to address dependencies on raw materials and to reinforce the resilience of the space value chains.

Regulatory dialogue / cooperation Many companies in this ecosystem can only survive if they have access to global markets. **Economic diplomacy efforts** can support making the most of the potential of the EU Space programmes (Galileo, EGNOS, Copernicus) as market openers to facilitate EU companies' access to markets and procurements in third countries.

Networks and governance

Industrial Networks The aerospace and defence industry is represented in the recently launched European Raw Materials Alliance and it could benefit from the Industrial Alliance on Microelectronics[165]. Ensuring market readiness for disruptive zero emission aircraft (e.g. hydrogen-powered aircraft) will require a high degree of cross-sectoral coordination (aeronautics, airlines, airports, energy producers and distributors, certifying agencies, regulators, etc.). Coordination with Member States and industry will be important to support this transition[166]. In addition, working on the next generation of EU launchers and technologies would require a shared approach between the European Space Agency, EU Member States/Space Agencies, and industry (traditional and new space).

Clusters cooperation **There is an active aerospace and defence cluster** where work is ongoing with uneven progress so far. The European Aerospace Cluster Partnership gathering 42 aerospace clusters in 17 countries has strongly contributed to the competitiveness of the aeronautics supply chain by promoting collaboration between regions and industries. Moreover, the **European Network of Defence-related Regions** brings together various EU defence-related clusters and regional organisations to exchange best practices and information, in particular to the benefit of their client SMEs. **Cooperation between research and development actors and the aerospace and defence industry** would need to improve in order to produce innovative products and technologies. Clusters can play a key role by promoting collaboration between these main actors. Industry cooperation should neither result in delaying the introduction of new technologies nor in the crowding out of other innovative market players.

Pact for skills **Aerospace and defence entered the Pact for Skills as pioneers in November 2020**. A partnership between all stakeholders was formed to upskill 200,000 employees and reskill 300,000 people to enter the supply chain, a public and private investment of EUR 1 billion in the next 10 years[167]. Industry efforts to implement the ecosystem's skill's agenda should continue to be encouraged and supported, including through funding from the RRF, REACT-EU and EU programmes such as ERDF or ESF+.

Enterprise Europe Network Intensified efforts to **rely on the EEN to disseminate awareness-raising materials on funding for defence SMEs** as well as to facilitate matchmaking/B2B at defence-related events.

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[165] On 7 December 2020, 20 Member States signed a declaration expressing their interest to work together in order to bolster Europe's electronics and embedded systems value chain with a strong focus on processors and semiconductor chips, see:
https://ec.europa.eu/digital-single-market/en/news/joint-declaration-processors-and-semiconductor-technologies
[166] see Sustainable and Smart Mobility Strategy, COM(2020) 789 final, p. 5
[167] file:///C:/Users/subirnu/AppData/Local/Temp/1/ASD-1.pdf and More on the Pact for Skills on
https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

2. Agri-Food Ecosystem

16.3 million people employed[168]

**4.84% of EU value added
(EUR 585 billion)**

**599,000 firms
99.4% of SMES**

Transformative initiatives

Ensuring the sustainability transition of the ecosystem

InvestEU will address the financing gap faced by SMEs and mid-cap companies in the agri-food ecosystem. This will **stimulate capital expenditure in green and digital technologies** to decarbonise and accelerate the sustainability transition of the ecosystem.

Boosting agri-food SMEs digital uptake

Achieving the Commission's aim of 100% broadband internet access in rural areas by 2025[169] will allow **SMEs to access online marketplaces boosting recovery**. Adequate support for SMEs is key to help them address the lack of digital infrastructure and to achieve the digital transition of the agri-food ecosystem.

Promoting global sustainability of the food system

It can provide new opportunities for the agri-food ecosystem. The implementation of the Farm to Fork Strategy, of the Chemical Strategy and the ongoing review of the EU agri-food promotion policy will address the need to **increase safety and sustainability of the food system** and will support its global competitiveness.

Towards an EU policy toolbox fit for purpose

Digital Europe Programme The **Digital Europe Programme will offer further support for SMEs to grasp the opportunities offered by new technologies.** It can especially boost the digital transformation of the sector through strategic initiatives to build capacity in skills, data infrastructure and technologies, and innovation support.

Pact for skills Actions under the Pact can be beneficial for **upskilling and reskilling workforce in the ecosystem.** The Pact represents an opportunity to address for example the shortage of first line supervisors and managers experienced by agri-food companies.

RRF **Ensuring sufficient support for food service will allow operators to re-open, recover and adapt their model to the 'next normal'.** The RRF will offer the necessary support for companies, in the agri-food ecosystem, including SMEs, to invest in sustainable practices and achieve their green recovery.

Green transformation The Farm to Fork strategy[170] presents an excellent opportunity for the green recovery of the agri-food ecosystem. One of the first deliverables is the **development of a**

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[168] Figures for employment and value added are based on Eurostat National Accounts and SME shares on Eurostat Structural Business Statistics.
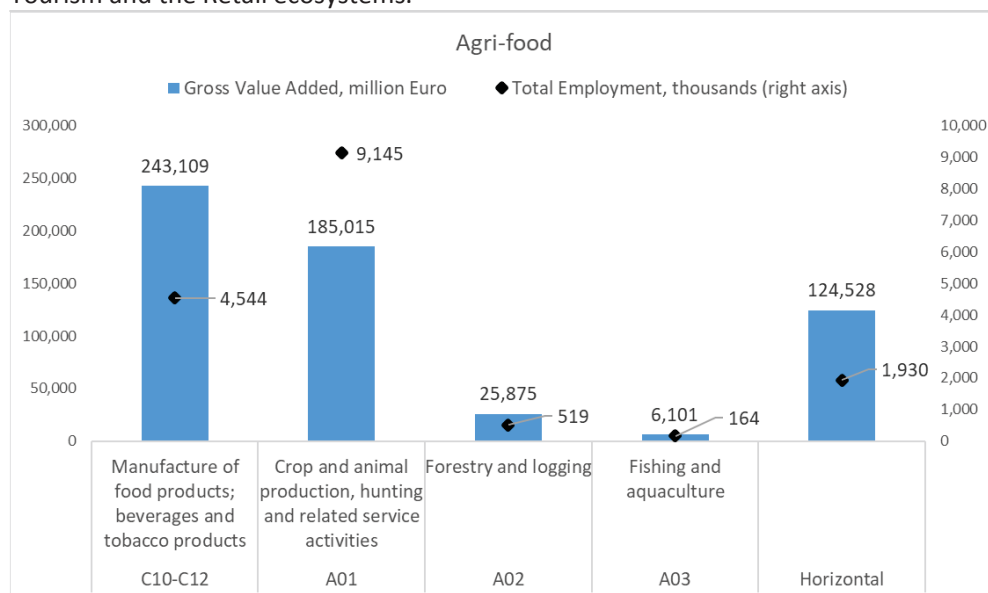[169] Communication - A Farm to Fork strategy for a fair, healthy and environmentally-friendly food system, COM/2020/381
[170] COM/2020/381 final

The ecosystem at a glance

Sectors included in the ecosystem

The agri-food ecosystem covers **all operators in the food supply chain** (farmers, food industry, food retail and wholesale, and food service) **and their suppliers of inputs and services** (seeds, pesticides, fertiliser, machinery, packaging, repair, transport, finance, advice and logistics). The ecosystem hence has a very long border – and overlaps – with the Tourism and the Retail ecosystems.

Agri-food

■ Gross Value Added, million Euro   ◆ Total Employment, thousands (right axis)

Sector	GVA (million Euro)	Employment (thousands)
Manufacture of food products; beverages and tobacco products (C10-C12)	243,109	4,544
Crop and animal production, hunting and related service activities (A01)	185,015	9,145
Forestry and logging (A02)	25,875	519
Fishing and aquaculture (A03)	6,101	164
Horizontal	124,528	1,930

Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex of the SWD on Monitoring the Implementation of Industrial Policy.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension

SMEs are the backbone of the agri-food ecosystem. 99% of food and drink enterprises are SMEs, representing 60% of employment and 47.5% of turnover. 78% of SMEs in the food and drink sector are micro enterprises (1-9 employees), representing 14.5% of employment and 5.7% of turnover. Only 1% of food and drink companies are leading large enterprises; they however employ 40% of the workforce and generate 52.5% of turnover of the sector. On average, food retailers are predominantly SMEs, but with important differences across Member States. Regarding the agricultural sector, farms are not classified as SMEs in business statistics, however an extremely small number of holdings may not fall within the SME criteria, as only 1.0% of the EU farm holdings have a turnover of over EUR500 000 per year.

Current challenges

While trusted for providing high quality and safe products, the agri-food ecosystem has longstanding vulnerabilities. Large food companies are globally competitive (yet in need of skilled workforce and innovation). Innovation research is often dispersed, R&D investment comparatively low[171]. Digitalisation is increasing, but still insufficient. Farmers have lower incomes compared to other economic actors[172] and face uncertainty, linked to weather, price variation or income volatility. Food retail needs to restructure and adapt to new consumer trends. Overall, the ecosystem can be considered as relatively stable, with many small producers, processors and retailers alongside large companies with more capacity to invest in technological innovation. **The ecosystem showed resilience during the COVID-19**

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[171] The EU food and Drink industry has a lower R&D investment intensity compared to several global competitors
[172] Farmers' income is around 40% lower compared to non-agricultural income

crisis (no food shortages) but suffered from sudden changes in demand patterns, disappearance of key outlets, disruption to cross-border trade and shortage of workers[173]. In Q2 2020 food industry output decreased by 9.6% (but some producers, dependant on hospitality, faced higher losses). The need to adapt working conditions and logistics has increased costs. Food service operators face high uncertainty and many may not recover.

Many workers in the ecosystem are part-time or self-employed (especially in the agricultural sector). The ecosystem also often relies on temporary contracts and precarious employment[174] in particular due to seasonality of much of agricultural production (e.g. agricultural seasonal workers). **The ecosystem faces challenges linked to an ageing workforce and to attracting staff with high-level skills**, but also a long-term trend towards automation and other productivity raising measures.

Another challenge faced by the agri-food ecosystem is the degradation of natural capital, on which it is based, resulting in spillovers affecting biodiversity and environmental quality at large. **Some protectionist national measures may also introduce obstacles in the Single Market negatively affecting the agri-food ecosystem**. For example, by providing more advantageous and competitive marketing conditions for domestic food products, discriminating against similar imported products, and restricting the freedom of retailers to decide on their assortment, on the lay out of their sales surface, and on their supply chain.

Forward-looking assessment	The pandemic has accelerated the up-take of innovative food business models and digital solutions and fostered solidarity schemes among ecosystem actors. **New consumer trends** (higher demand for healthier and more sustainable fair transition is essential and all food, food e-commerce and meal delivery services) **can present opportunities**. More innovation and upskilling of the workforce will boost performance. **The ecosystem reports an ageing workforce, particularly in production activities, and the need for up-skilling and attracting new talent[175].** Given its significant economic, environmental, social and health impact, the food system needs to accelerate its inclusive sustainability transition. **The EU Farm to Fork strategy (F2F)[176] sets ambitious targets for producers** that will require significant investments (and potentially disinvestments in certain sectors), as well as measures to support producers' position in the food supply chain. A fair transition is essential and all food actors need to adapt to consumer demand for healthier, more sustainable, and yet affordable food. The actions under F2F can contribute to EU food becoming a global sustainability benchmark if investments and level playing field are assured. The resilience of the ecosystem will be strengthened by the development of a contingency plan for ensuring food supply and food security in the EU and by a legislative framework for sustainable food systems, both under F2F.
Global context	**The EU is the number one food and drink exporter in the world** (EUR 138 billion annual exports in 2018). The EU food industry, while internationally competitive (with reputable, high value, quality products[177]), is somewhat lagging behind certain competitors (such as Brazil) when it comes to labour productivity and innovation. However, EU agricultural productivity has increased overtime albeit at a slower rate in recent years. Stricter requirements for environmentally, socially and economically sustainable food production will place the EU as a leader and will make stronger international cooperation even more valuable, as we face global challenges such as climate change and biodiversity loss.

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[173] FoodDrinkEurope Economic Bulletin Q2 2020

[174] Precarious employment can be defined at the intersection between insecure employment, unsupportive entitlements and vulnerable employees. EurWORK – European Observatory of Working Life

[175] FoodDrinkEurope-EFFAT Toolbox: Good practices and tools from the food and drink industry in Europe, 2016

[176] Communication - A Farm to Fork strategy for a fair, healthy and environmentally-friendly food system, COM/2020/381

[177] Including EU geographical indications

Mapping of policy tools in more detail

Funding and Budgetary programmes[178]

RRF Ensuring support for a green recovery through the RRF is essential to make sure both food service and production do not derail from sustainability plans and commitments and ensure that funds go to projects directly benefitting operators. The following flagship areas for investments are particularly relevant for the agri-food ecosystem: 'Power up' (foster clean technologies and renewables) and 'Reskill and upskill' (urgent for food workers). **Support for food service could be envisaged as a priority to allow operators to re-open, recover and adapt their model to the 'next normal'.** Investment is needed in green technologies and equipment, digitalisation (smart farming and food factories), public services in rural areas etc. Key areas of interventions for agriculture cover digitalising agriculture and rural areas, carbon sinks, bio-economy and renewable energy, organic sector etc.

CRII+/ERDF/ESF/CEF/EAFRD[179] **& EAGF**[180] The ERDF is an important source of funding for agri-food, which is a priority in three in four EU regions (strong link to territory). The Common Agricultural Policy's EAFRD and, for certain sectoral interventions, the EAGF, also provide crucial investment funding to agri-food, with a specific focus on rural development and COVID-19 crisis recovery. The European Maritime and Fisheries Fund is the main supporting instrument to the new Common Fisheries Policy, which will seek to support the fisheries and aquaculture sectors. The Agri-Food Smart Specialisation Platform supports joint investment projects on technology and digital. ESF is important for food workers (ageing workforce, need for new skills) and for vulnerable, food-insecure people. CRII+ offered some support for farmers and fishers. **It shows potential to be further deployed for crisis-related measures and projects for food service operators and their suppliers** (possibly support schemes via vouchers, promotion campaigns etc.).

Horizon Europe (including European Partnerships) **Research and innovation (R&I) are key drivers in accelerating the transition to sustainable, healthy and inclusive food systems from primary production to consumption**. R&I can help develop and test solutions, overcome barriers and uncover new market opportunities. Yet, innovation levels in food manufacturing and processing are uneven and often lower than in other sectors[181]. The Commission has already invested under Horizon 2020 into R&I projects to boost innovation in the agri-food ecosystem, including through EIT Food[182]. Under Horizon Europe Cluster 6 'Food, Bioeconomy, Natural Resources, Agriculture and Environment'[183] further EUR 9 billion will be invested in R&I on food, bio-economy, natural resources, agriculture, fisheries, aquaculture and the environment, including the use of digital technologies and nature-based solutions for the agri-food ecosystem. Under the European Innovation Council, EUR 300 million have been allocated to

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[178] For all the funding programmes, awareness among food system actors (including in remote areas) can be improved (even sector associations find difficulties in identifying the best instrument and delivering targeted info to stakeholders). There is a need to make sure 'the right funds arrive in the right place' (directly to vulnerable producers, scalable projects on sustainability transformation etc.), design a form of more efficient governance and ensure the emphasis is not only on primary production.

[179] EU Rural Development Fund

[180] European agricultural guarantee fund

[181] The agro-food industry's share of total output attributable to R&D is around 0.27% (compared to 13% in pharma), but is heterogeneous. [182] European Institute for Innovation and Technology

[182] European Institute for Innovation and Technology

[183] Horizon Europe Strategic Plan

encourage breakthrough innovations[184] delivering Green Deal objectives to high potential start-ups and SMEs. In the agri-food sector, for example, these innovations can answer the need to upgrade the production methods.

Digital Europe Programme **A testing and experimentation facility on agri-food will allow the ecosystem to test** advanced AI-based and robotics technologies for precision farming, food processing, wholesale, retail, hospitality and food services. The programme also proposes to develop a Common European Agriculture Data Space, which will facilitate trustworthy sharing of agricultural data, thus enabling an increased and more effective use of data and digital technologies, and subsequently increasing the environmental and economic performance of the ecosystem. The programme complements actions under the Connecting Europe Facility, ERDF and EAFRD towards rural broadband and digitalisation.

InvestEU Under the SME window, debt financing will be available not only to sustain general agri-food SMEs competitiveness, but also to help them digitalise, innovate and become more sustainable.

EU Space Programme and European Defence Fund Copernicus helps assess agricultural land use and trends, crop conditions and yield forecasts. It supports input management, farm management recording, irrigation and precision farming. Smart agriculture has a long-term positive impact on the entire ecosystem.

Supportive regulatory environment

Single Market Surveillance **Measures (presented as COVID-19-related) by Member States (a minimum share of national food products in stores, reserved space for local producers and national calls to buy domestic) or agreements by domestic firms excluding EU competitors need to be closely monitored to avoid negative impacts on the Single Market.** Measures need to be proportionate to their legitimate objectives (and not merely protectionist). Existing tools such as infringement proceedings, competition law enforcement, the Single Market Transparency Directive and Single Market Enforcement Task Force continue to play an important role for the ecosystem.

Main Single Market barriers within the ecosystem Although the majority of EU food regulation is harmonised, **national measures have been on the increase in particular on labelling** (e.g. several Member States introduced national rules for mandatory origin labelling of certain food products and diverging schemes of front-of-pack nutritional labelling - FOP). As part of the Farm to Fork strategy (F2F), the Commission is set to propose harmonised mandatory FOP requirements and consider the extension of mandatory origin indications to additional products. These initiatives need to fully take into account impacts on the Single Market**. Removing obstacles for retailers and suppliers to enter in mutually beneficial contractual practices beyond a pure selling and purchasing relationship** would be beneficial for the ecosystem (e.g. collaborative product launches). Agri-food enterprises are amongst those experiencing the longest payment durations, especially SMEs. A closer monitoring and reporting of payment behaviours, accompanied by potential sanctions, seem to be an effective mechanism to tackle late payments and **ensure enforcement of the EU Late Payment Directive**. The provisions of the Directive on Unfair Trading Practices in the agricultural and food supply chain will enter into force this year (on 1 November 2021) and will also contribute to afford protection along the entire agri-food supply chain.

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[184]European Innovation Council Fund: First Equity Investments of EUR 178 million in Breakthrough Innovations, 06/01/21, IP/20/2530[185] Communication - An SME Strategy for a sustainable and digital Europe, March 2020

Standardisation EU marketing standards for agricultural and fishery and aquaculture products are important to guarantee uniform quality to consumers and common criteria in the SM. As part of F2F, review is underway for 2022, among others to reinforce the role of sustainability criteria and leverage impact on food loss and waste and healthier diets. Standards will also underpin future food sustainability and animal welfare labels. The food industry sees further EU level standardisation as a constructive opportunity for the ecosystem.

Digital transformation **Advanced technologies** such as AI, robotics, block chain, high performance computing or the Internet of Things **have potential to make farming and food processing more efficient and sustainable**. More clarity on data ownership and governance would support the digital transformation of the ecosystem. The lack of **digital skills of the workforce** is also one of the main barriers for digitalisations of the agri-food ecosystem. To this regard, two programmes proposed by the SME strategy[185] are also relevant to support SMEs in the digital transition, the 'digital volunteers' programme will promote the transfer of expertise from high-tech businesses to more traditional SMEs, and the Digital Crash Courses will help SME employees to become proficient in areas like AI, cybersecurity or blockchain.

Green transformation The F2F strategy foresees the adoption of a Legislative Framework for sustainable food systems by 2023, sets sustainability targets for primary producers and outlines related legislative initiatives[186]. Higher ambition on climate/environment is part of the EU agri-food promotion policy[187] and of the new CAP proposal and reflected in Member State specific recommendations adopted by the Commission concerning future CAP strategic plans[188]. The food industry and retail are covered by horizontal environmental legislation and the Circular Economy Action Plan and will be concerned by new labelling requirements under F2F. **The Commission is developing with stakeholders a Code of Conduct[189] to foster sustainable practices by food business operators[190]** . The Commission is also working on a proposal for a legislative initiative on **sustainable corporate governance** for Q2 2021, to foster long-term sustainable and responsible corporate behaviour, including requirements to include sustainability into corporate strategies. **Future measures will continue to guarantee the integrity of the Single Market, avoiding disproportionate SME burden and the erosion of the level playing field.**

Strategic Public Procurement Food procurement can make a major contribution to a healthier and more sustainable (yet affordable) food offer, especially to vulnerable groups (children, patients and the elderly). The F2F foresees finding the best modalities to set minimum mandatory criteria for sustainable food procurement in Q3 2021.

Intellectual Property Geographical Indications (GIs - PDOs, PGIs[191]) create important value, especially for small producers (overall GI sales value est. EUR 74.76 billion). GI products can have sales value that are twice as high compared to similar non-protected products. Many are internationally competitive exports and require protection internationally. As announced in the F2F, **the European Commission has launched a GI reform, for better enforcement and sustainability[192].** F2F will help the scaling of EU action

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[185] Communication - An SME Strategy for a sustainable and digital Europe, March 2020
[186] E.g. revision of pesticide, feed additives, animal welfare legislation etc.
[187] The ongoing review of the EU agri-food promotion policy will address the need to increase sustainability of the food system and will support the ecosystem's global competitiveness.
[188] CAP Strategic Plans
[189] See section on Networks and Governance
[190] COM may consider further legislation following evaluation of its impact
[191] Protected Denominations of Origin and Protected Geographical Indications are schemes to protect names of foods and drinks against copying/fraud and certify that they were made to high standards in a specific country or region. E.g. Feta Cheese, Champagne
[192] COM may consider further legislation following evaluation of its impact

against food fraud, e.g. by improving import controls (for protecting EU food and drink geographical indications e.g. spirits from counterfeited goods).

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) **The EU imports significant quantities of agricultural raw materials from third countries,** when EU production is insufficient or inexistent such as in the case of vegetable oils, soya beans, rice, maize or fish. The EU is also dependant on imports of tropical products (e.g. coffee, cocoa, palm oil) and soya for feed, where sustainability can be an issue. The Commission is now developing in the meantime a contingency plan under F2F to ensure food supply and security in the EU in times of crises, and is developing a legislative proposal to minimise the risk of deforestation and forest degradation associated with products placed on the EU market. In the same vein, free trade agreements negotiated by the EU contain a trade and sustainable development chapter and sustainable food system requirements covering animal welfare, limited use of pesticides and antimicrobial resistance. Where possible organic equivalence arrangements have been negotiated e.g.: USA, Canada, Japan, etc.

Regulatory dialogue / cooperation The EU has pre-existing regulatory dialogues under Free Trade Agreements (FTA) (e.g. Canada, Japan, UK) and outside FTA frameworks (e.g. China, Korea, Ukraine, Taiwan). Regulatory cooperation is particularly useful in the areas of Technical Barriers to Trade, labelling and market surveillance and are therefore beneficial for EU exports of food products.

Networks and governance

Clusters cooperation EU agri-food clusters have a key role in supporting food SMEs in innovation and digitalisation[193], as they capture important linkages in uptake of technologies, skills, infrastructure, business development and research. The co-operation with the EU Clusters Alliance has been very beneficial in providing real-time information on developments, opportunities and needs of agro-food companies.

Pact for skills The agri-food ecosystem faces a challenge in attracting staff with high-level skills not typical in the food area (digital skills, behavioural science, genetics, etc.), and in transferring skills as existing workers move to retirement. Food companies experience shortage of first line supervisors and managers. Hence, action under the Pact can be beneficial for food workers and overall performance. The ecosystem is characterised by part-time and self-employment (especially in SMEs/agricultural sector)[194].)[195]. A Roundtable for skills for the agri-food ecosystem took place on 18 February 2021[196]. It is expected to lead to the creation of a partnership for skills for the sectors concerned with participation of frontrunners who will have an impact on reskilling or upskilling needs in the ecosystem. Work is also ongoing under the 'Blueprint on sectoral cooperation on skills for bio-economy, new technologies and innovation in agriculture'.

Enterprise Europe Network As 99% of food producers are SMEs (78% micro enterprises) the EEN can benefit even more the ecosystem (including via its agri-food group) to provide advisory services

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[193] There are more than 200 clusters active in areas such as agricultural services, food processing, forestry, livestock processing and wood products registered on the European Cluster Collaboration Platform
[194] The ecosystem also relies on temporary contracts and precarious employment (e.g. agricultural seasonal workers)
[195] The ecosystem also relies on temporary contracts and precarious employment (e.g. agricultural seasonal workers)
[196] Roundtable report

for the sustainability/digital transition and specifically to enable food companies to adhere to the new requirements foreseen under the Farm to Fork strategy. Targeted information on access to finance and to the (new and existing) financial instruments with a focus on green funding can be helpful in this respect.

Digital innovation Hubs Several of the Digital Innovation Hubs support agri-food companies in their digital transformation, and are also involved in the Agricultural Innovation Partnership (EIP AGRI), or based on an existing Food innovation pole. Digital Innovation Hubs in agri-food will speed up the uptake of innovative digital solutions.

Thematic Smart Specialisation Interregional Partnerships The Smart Specialisation (S3) Interregional Partnerships on high tech farming, consumer involvement, nutritional ingredients, traceability and big data, and smart sensors for agri-food can play a key role in this ecosystem[197].

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[197] EU regions have joined forces to exploit complementary strengths across Europe, build synergies and enhance the development of and investments in EU value chains.

3. Construction Ecosystem

24.9 million people employed[198]

9.6 % of EU value added (EUR 1,158 billion)

5.3 million firms 99.9% of SMEs

Transformative initiatives

Boosting confidence of property owners and investors to accelerate renovation and build efficient buildings[199]

The Renovation Wave[200] aims to **renovate 35 million inefficient buildings by 2030 and to fuel a switch away from fossil to renewables and waste heat** through a mix of policy instruments, funding and technical assistance. This is an opportunity to modernise the operation, human capital and technological basis of construction ecosystem, as it will need to deliver these renovations.

An updated and functioning EU regulatory framework for a Single Market of sustainable construction products

The **revision of the Construction Products Regulation**[201] will facilitate the harmonisation of technical rules and trade of safe and sustainable construction products across the EU.

Tapping into the large potential of new data driven business models in construction

The digitalisation of data along the value chain will allow the development of **new business based on data,** improve the productivity and environmental performance of the construction ecosystem and of the built environment as well as boost novel services.

Towards an EU policy toolbox fit for purpose

Access to Finance As buildings represent more than 50% of the total investment needs to achieve climate targets, the EU's **Sustainable Finance Taxonomy** is expected to strengthen criteria in financial incentives for more ambitious renovation and decarbonisation of the building stock.

Industrial Networks The industry-lead Construction 2050 'alliance' and the European Cluster Collaboration Platform **enhance opportunities** for collaboration with market operators at all levels. The **New European Bauhaus** initiative will support creative and interdisciplinary collaborations to (re)design the built environment and future ways of living.

RRF The **flagship 'Renovate'** strongly encourages Member States to put forward **investment and reform plans to renovate and decarbonise existing buildings**. It could also support the implementation of the **Affordable Housing Initiative** to promote efficient and circular processes, boost social engagement models to empower residents and stimulate cultural innovation at district level.

Standardisation Standards being proposed by the European Standardisation Organisations have the potential to better support the implementation of EU policies and legislation. In particular, **standards will need to include information about environmental performance, climate resilience and accessibility for persons with disabilities**.

Digital Innovation Hubs DIHs under the Digital Europe Programme are **key to support the digital transformation of construction SMEs in order to improve their processes, products and services[202]**.

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[198] Figures for employment and value added are based on Eurostat National Accounts and SME shares on Eurostat Structural Business Statistics. Data from 2018.

[199] Improved energy and resource efficiency of public and private buildings will contribute to the doubling of the renovation rate and the fostering of deep renovation (COM(2020) 575 final)

[200] 'A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives', COM(2020) 662 final
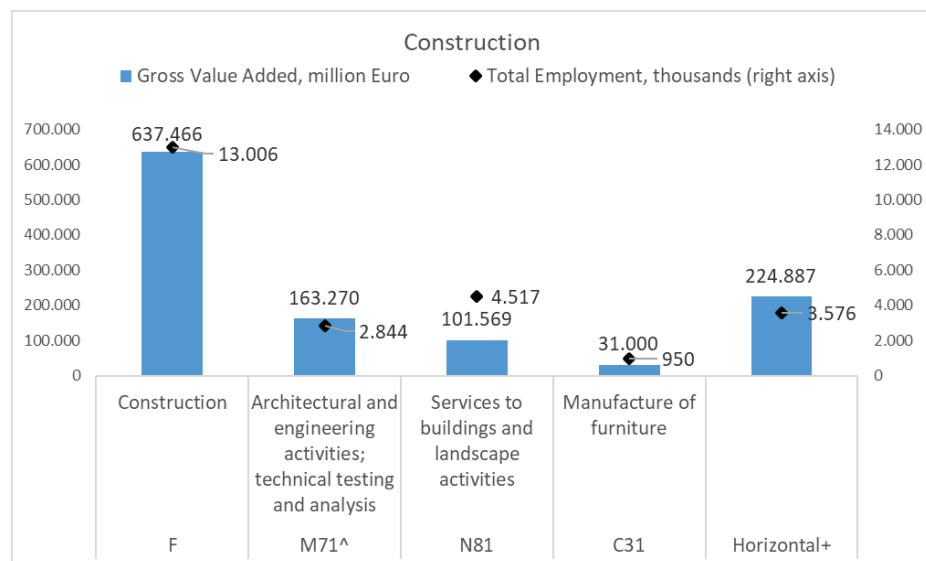
[201] Ibid, page 6.

[202] Digital Transformation Scoreboard 2018: In the Digital Intensity Index construction is below 10%, meaning that the sector has a very slow absorption rate of digital technologies.

The ecosystem at a glance

Sectors included in the ecosystem	**The construction ecosystem covers contractors for building and infrastructure projects, some construction product manufacturers[203], engineering and architectural services as well as a range of other economic activities (e.g. rental and leasing of machinery and equipment, employment agencies).** About 24.9 million people are employed in the ecosystem. Declared migration and mobility movements across the EU accounted for an inflow between 2 and 4.5 million individuals per year (including both extra and intra community movements). According to CEDEFOP[204], about 1 million new and replacement workers will be needed by 2025. Additionally, the skills needed in construction are likely to change to meet the demands for 'green' and energy-efficient buildings.

Construction

■ Gross Value Added, million Euro ◆ Total Employment, thousands (right axis)

	Construction	Architectural and engineering activities; technical testing and analysis	Services to buildings and landscape activities	Manufacture of furniture	Horizontal+
	F	M71^	N81	C31	

Construction: GVA 637.466, Employment 13.006
Architectural and engineering: GVA 163.270, Employment 2.844
Services to buildings and landscape: GVA 101.569, Employment 4.517
Manufacture of furniture: GVA 31.000, Employment 950
Horizontal+: GVA 224.887, Employment 3.576

Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. Includes additional share added on top of horizontal component; +Excludes contribution of M71.

Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	The level of concentration of the activity is very low, i.e. the production structure is dominated by micro and small enterprises. **99.9% companies of the ecosystem are SMEs, which represent 90% of employment and 83% of the total added value.** The fragmentation of the ecosystem is accentuated by the fact, that around 90% of the companies are microenterprises, representing 45% of employment and 32% of the total added value. The value chain can be better described as a 'network of competence' rather than a set of vertical relations.
Current challenges	The **main challenge is to boost property owners, including public authorities, and investors' confidence to invest in the green and digital transition of the built environment.** Contractors estimated that their activity in Europe fell by 6% in 2020, with Ireland, Spain and France being the countries most affected. Energy efficiency investments seem also to have dropped by 12%. [205] National recovery measures should help to reinvigorate demand for buildings' renovation and revitalise the ecosystem, while applying high health, safety and environmental standards. Being a highly labour intensive industry, **coordination of national approaches regarding sanitary measures and recognition of qualifications**

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[203] Some categories of products which are essential to construction, such as cement, glass, ceramics and tiles, plastic pipes are covered under the EII ecosystem.
[204] European Centre for the Development of Vocational Training, skills forecast, 2016
[205] COM(2020) 662 final, page 2

	would facilitate the availability and mobility of workforce across borders. **Liquidity remains a primary concern** in particular for SMEs contractors, considering their low margins of profit and uncertainties about the prospects of new projects in the year to come. Late payment delays are also increasing, which puts additional burden on SMEs. Shortage of skilled labour force in innovative green solutions and digital tools must also be addressed.
Forward-looking assessment	EUR 275 billion per year until 2030 is needed to renovate and decarbonise the existing building stock[206]. This could create 160,000 new jobs. **But the construction ecosystem needs to modernise. It needs to embrace new technologies[207] to improve productivity, reduce emissions and environmental impacts along the life-cycle of buildings, take up circular approaches and new business models**[208]. This requires the development of new high quality job profiles. In parallel, regulatory and administrative processes such as permitting and procurement need to evolve. The better collection, organisation and use of information and data from construction is key to modernise the ecosystem and increase transparency. Circular techniques such as design for deconstruction and reuse of components require different approaches than the traditional linear model and require further development of the European sustainability indicators (e.g. Level(s)[209]). This has **important implications for construction permits, liabilities, procurement, insurance, certification of innovative products, building codes, and compliance checks.**
Global context	**Except for some Member States such as Denmark, the Netherlands, Belgium and Estonia, imports do not play a significant role.** The outlook for extra-EU trade of services is moderate, with an annual forecasted average growth of 1.5% until 2025. The Chinese Belt and Road Initiative could raise new competitive challenges on the internal market contributing to an increased presence of Chinese State-Owned construction enterprises in public works contracts.
	Looking at geographic patterns in the internationalisation of construction, **proximity is a key factor in determining trade in construction products**. The exports value of construction products across non-EU27 trading partners is heavily concentrated on deals with the US, Switzerland, Norway, and Russia, with total exports above EUR 1 billion.

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[206] See 'Identifying Europe's recovery needs', SWD(2020) 98 final and 'Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people', SWD(2020) 176 final.

[207] Such as automation, prefabrication, robotics, and artificial intelligence. Technologies such as Building Information Modelling (BIM) and augmented reality bring new possibilities for collaborative working to design and carry out construction works.

[208] For example predictive maintenance, automated checks.

[209] https://ec.europa.eu/environment/topics/circular-economy/levels_en

Mapping of policy tools in more detail

Funding and Budgetary Programmes

RRF The **flagship 'Renovate'** provides a unique opportunity for Member States to use their national recovery and resilience plans to boost renovation efforts, as proposed by the Renovation Wave. It could also help to improve the green and digital capacity of the construction ecosystem to increase its competitiveness and resilience. . Note that a significant portion of RRF funding will be also going towards infrastructure projects.

CRII+/ERDF/ESF/CEF **ERDF and ESF can support investment in digital technologies, adapting skills and recycling infrastructure platform for construction and demolition waste.** CEF is very important for Trans-European Transport infrastructure projects and the construction of sustainable transport infrastructure. The ongoing negotiation of the Operational Programmes of the European Structural and Investment Funds is expected to secure adequate budget allocation to the green and digital transition of construction and the built environment.

Horizon Europe (including European Partnerships) **Horizon Europe could cover different R&I needs of the ecosystem to address the twin transition.** Under Pillar II 'Global Challenges and European Industrial Competitiveness', cluster 4 "Digital, industry and space" could accelerate the digitalisation of the sector, such as the broader use of robotics, industrial data platforms and AI as well as the development of digital permits and digital building logbooks. At the same time, R&I partnerships developing circular industrial technologies can provide a basis for increased circularity in construction processes. The **Built4People Partnership** under Cluster 5 "Climate, Energy and Mobility focuses on R&I needs to improve the carbon emissions along the whole life-cycle of buildings (including the embodied carbon of construction materials), and activities funded under Cluster 6 "Food, Bioeconomy, Natural Resources, Agriculture and Environment" focus on integrated solutions for circularity in the construction and buildings sector.

Just Transition Fund Potential areas of interest for construction are: (a) **energy and transport infrastructure**; (b) **decarbonisation projects**, economic diversification of the regions and social infrastructure; (c) **circular economy** and (d) **re-skilling, upskilling of workers**.

Digital Europe Programme In Digital Europe programme the support to industrial data spaces will allow the construction sector to **tap into the large potential of new data driven business models.** Under the Digital Europe Programme, the Commission is supporting the reskilling and upskilling of workers through short-term courses in advanced digital skills.

InvestEU **Financing under the SME window will be available** not only to sustain generally construction SMEs competitiveness, but also to help them to digitalise and contribute to the construction of more sustainable buildings. InvestEU will support energy and resource efficiency investments.

Access to Finance The **Sustainable Finance EU Taxonomy** is expected to foster the finance of sustainable activities in companies themselves and of individual construction projects (construction of transport infrastructure; water projects; new buildings; renovation of existing buildings; individual renovation measures, installation of renewables on-site and professional, scientific and technical activities, acquisition of buildings).

Supportive regulatory environment

Main Single Market barriers within the ecosystem **Obstacles** to the internal market of construction products remain **in the form of national marks and certification, in conjunction with insufficient and uneven market surveillance**. **The revision of the Construction Product Regulation will address these deficiencies.** Regarding restrictions for construction services with market access and exercise requirements (e.g. insurance requirements and professional qualifications), infringement action and where appropriate 'softer' solutions based on guidance / recommendations towards Member States could be made. Regarding the posting of workers, a more active enforcement policy may be applied where Member States are in clear violation of applicable EU law to ensure that there are no unnecessary administrative barriers to cross-border provision of construction services. **The European Labour Authority could also possibly look at ways to assist the Commission and the Member States regarding the promotion of cross-border service provision in relation to better enforcement of the rules in place for posting of workers.**

Member States often add additional national requirements for CE-marked construction products, mostly in conflict with the current Construction Products Regulation (CPR). In addition, there is an uneven application of the CPR by the different authorities, magnified by unequal and generally too weak market surveillance. The EU acquis is incomplete and partly obsolete with regard to harmonised standards.

Construction enterprises are amongst those experiencing the longest payment durations, especially SMEs.[210] A closer monitoring and reporting of payment behaviour in the construction sector, accompanied by potential sanctions, seem to be an effective mechanism to tackle late payments and ensure enforcement of the EU Late Payment Directive. As announced in the SME Strategy[211], this could include a virtual observatory for monitoring payment delays, clarifying unfair payment practices, and exploring the feasibility of alternative resolution/mediation mechanisms for SMEs for a fast resolution of payment disputes in commercial transactions.

Standardisation There are concerns about the slow delivery and non-compliance of the candidate standards proposed for harmonisation for construction products with the legal requirements, whereas these are at the core of the system and of mandatory use under the Construction Products Regulation. This prevents the system from meeting Member States and industry's needs. The ongoing revision will address environmental impacts, circularity, safety of construction products and adaptation to innovation and digitisation. It will also consider harmonised rules for new areas such as 3D printing, prefabricated construction elements or houses, and building integrated PV products. Second generation of Eurocodes[212], to be published in 2026, will enhance safety, sustainability and climate resilience of built environment. As mentioned in the circular economy action plan, **the revision of harmonised standards could consider, where appropriate, circularity requirements.**

eGovernment Online information on applicable formalities or building permit rules and procedures is often scarce, hard-to-find and predominantly in the local language. **Only nine Member States have a fully digital buildings permit system in place.** E-procedures are only available to a very limited extent. The Single Digital Gateway should improve this situation. Further transition to business models based on digital technologies is needed.

Green transformation Proposed revisions of energy legislation (Energy Efficiency, Energy Performance of Buildings and Renewable Energy Directives) would support the implementation of the Renovation

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[210] In the EU-28, 47% of all SMEs reported problems linked to late payments in 2018. Source: European Construction sector observatory.
[211] COM(2020) 103 final, see p. 11
[212] https://eurocodes.jrc.ec.europa.eu/showpage.php?id=63

wave and will offer new opportunities to the construction ecosystem. Modality for an **extension of ETS to buildings is under scrutiny**[213]. Targeted financial support would help to accelerate the deployment of low carbon solutions, especially for households at risk of energy poverty. Action supporting skills development (e.g. training, certification) in the construction sector would be important to support renovation efforts and the availably of skilled labour professionals in the construction sector. An EU roadmap to reduce the whole life carbon of buildings[214] would provide a common understanding of the issue and inspire additional actions toward net-zero emissions in the construction sector and national authorities to design their own roadmap.

Digital transformation More harmonisation on data standardisation and rules regarding permitting and logbooks would further support the digital transformation of the ecosystem. The **Data Governance Act** sets out a new legal framework to foster the availability of data for use by increasing trust in data intermediaries and by strengthening data-sharing mechanisms across the EU, which is a foundation for the development of data spaces for the sector. **Technologies** such as AI, robotics, high performance computing, the Internet of Things, Digital Twins and 3D mapping of built environments **have potential to make construction more efficient and sustainable**.

Strategic Public Procurement Need to boost green procurement and shift to life-cycle costing approach. Further development of the green public procurement criteria would help to uptake a more life cycle approach and circularity principles[215]. The Big Buyers for Climate and Environment initiative helps to drive market demand for innovative and sustainable products and services[216]. **Guidance on how to procure 'green' from the definition of the project to the implementation will help public investors[217]. There has been significant progress in the use of digital tools (Building Information Modelling) in the public procurement for construction,** but still only 11 Member States have made its use obligatory and further guidance is needed**.**

Networks and governance

Industrial Networks The Renovation Wave provides opportunities for continued dialogue with the High Level Construction Forum. An important component of this Forum would be the **Construction 2050 'alliance',** which is a spontaneous initiative of 47 EU associations, from construction products, to contractors, SMEs, building owners, machinery producers, social housing operators, engineers, promoters and many more. The purpose of the industry initiative is to have a dialogue on how to work together to advance the needs and priorities of the wider construction and built-environment sector at EU level, including issues related to the EU raw material dependencies and resilience of supply chains.

Clusters cooperation The European Cluster Collaboration Platform is the EU hub for industrial clusters, of which **83 clusters are working directly on construction**. Many other clusters like digital or renewables are also important for the construction ecosystem. Their mobilisation is very important to ensure the transition of the ecosystem as a whole.

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[213] 'Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people', SWD(2020) 176 final.
[214] 'A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives', COM(2020) 662 final, page 6
[215] Ibid, page 23.
[216] For example, to promote the use of zero-emission construction machinery and the use of circular construction materials in the procurement of public demolition, construction and renovation projects.
[217] 'A Renovation Wave for Europe - greening our buildings, creating jobs, improving lives', COM(2020) 662 final, page 23, Section 4.2. Par 3.

Pact for skills[218] **As construction is a highly labour intensive industry, the human capital is a critical factor in the green and digital transition of the construction ecosystem.** Companies are reporting a lack of workers and skills mismatches, therefore attracting new workforce and providing it with appropriate skills is crucial. The **Blueprint for Sectoral Cooperation on Skills** project addresses short and medium-term skills needs. The construction industry and the unions are also willing to be part of the **Pact for Skills** initiative, to foster further the sectoral collaborative approach in the skills development. A roundtable took place between stakeholders and the Commission on November 2020. Discussion is ongoing to formalise commitments. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Enterprise Europe Network   The EEN has a '**Sustainable Construction Sector Group'** which will need to continue to evolve to help relevant SMEs address the triple transition to sustainability, digitalisation and resilience, in particular using the forthcoming EEN Sustainability Advisors.

Digital Innovation Hubs **Several European Digital Innovation Hubs (EDIHs) are specialised in construction across Member States.** Together with the EEN and the EU hub for industrial clusters, the network of European Digital Innovation Hubs (EDIHs) offers with a seamless service to every company to take advantage of digital opportunities to optimise their production processes and to innovate their products and business models.

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[218] More on the Pact for Skills: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

4. Cultural and Creative Industries Ecosystem

8.02 million people employed [219]

3.95% of EU value added (EUR 477 billion)

1.2 million firms 99.9% of SMEs

Transformative Initiatives

Scale up

Cultural and Creative Industries (CCI) companies need to make the EU their native market to overcome fragmentation and be competitive globally. Different tools support the companies in CCIs to scale up and access markets beyond national borders. For example **Europe's Media in the Digital Decade: an action plan to support recovery and transformation (MAAP)** envisages several measures to achieve that, including engaging digital tools and new business models (e.g. collaborative platforms and leveraging private investment).

Digital, entrepreneurship and managerial skills

CCI are made up of creative, administrative and technical workers, as well as entrepreneurs. It is of crucial importance to equip and continuously upskill all of them in digital, entrepreneurial and managerial skills to ensure innovative content and business models. A comprehensive approach to these issues is proposed in the **2020 Skills Agenda for Europe (Pact for Skills) and the MAAP.**

Immersive content

By 2030, immersive content has the potential to add about EUR 1.3 trillion to the global economy[220] and Europe has an advantage thanks to its large cultural diversity and heritage as well as its highly skilled professionals. The activities envisaged under the **MAAP aim to ensure that European market players can reap their benefit**s.

Towards an EU policy toolbox fit for purpose

Horizon Europe is the key tool to advance in innovation, in particular creativity-driven innovation (e.g. **Cluster 2**) and in digitisation, e.g. through a **Media Data Space** to support advanced solutions for the creation, distribution and consumption of new media products; a **VR Media Lab** to foster innovation in the VR/AR Media field; greater support for **XR technologies;** better protecting, restoring and promoting European **cultural heritage.**

RRF The **Member State Recovery Plans** offer an opportunity to support CCIs recovery and growth by addressing the twin (green and digital) transitions. In particular, measures to boost the production and distribution of creative digital content and services can contribute to the goal of allocating 20% of the RRF expenditure on digital transition.

InvestEU InvestEU will support access to finance of the CCIs in particular through the Guarantee Facility for loans and MediaInvest, a new dedicated equity platform. This support will aim to increase the capacity of the CCIs, in particular independent SMEs, to operate beyond national borders and scale up.

Main Single Market barriers within the ecosystem As regards the revised **Audiovisual and Media Services Directive**, Member States must ensure full implementation, while media regulators must implement and monitor the correct application of the new rules in practice, and enforce them where necessary.

Intellectual Property Full and timely implementation by the Member States of the **2019 Copyright Directive and the update of the EU design protection legislation** is essential, together with an effective enforcement of rights.

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[219] Figures for value added are based on Eurostat National Accounts and estimates from DG CNECT. Figures for employment are based on Eurostat National Accounts. Number of firms and SME shares based on Eurostat Structural Business Statistics.

[220] PWC, Seeing is believing, 2019, https://www.pwc.com/seeingisbelieving

The ecosystem at a glance

Sectors included in the ecosystem	**The CCIs are a varied group[221]. The biggest industries are audiovisual (TV, videogames, VOD, cinema, VR/AR), music, books and press publishing, advertising, cultural heritage (museums, historical sites), performance (theatre, dance) and visual arts.** In Europe, culture and creativity are regarded as a public good and may receive public support (eg. public funds play an important role in the AV industry or the heritage sector) while many creative entrepreneurs are driving the creative economy (e.g. music, publishing and media, architecture, design). Cultural education is considered part of the ecosystem.
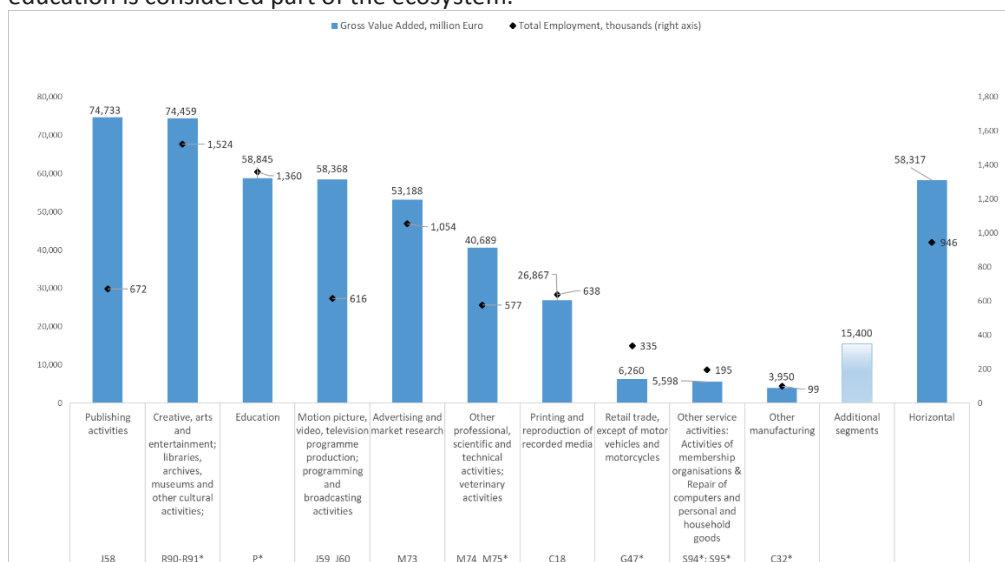
Notes: The category 'Additional segments' includes additional value added from digital services not well (only partially) captured by other categories: SVOD, digital game sales, ebooks, music steaming and platform advertising; estimates from DG CNECT. No employment data available. The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem.

Source: Eurostat, National Accounts. 'Additional segments' based on various data sources (DG CNECT). Data from 2018 (or latest year available).

The employment in CCIs was growing at a rate of 1% annually 2008-2016, with e.g. 3% in the AV industry[222] and before COVID the outlook was good. Workers in CCIs face very high level of job insecurity (very high shares of self-employment[223], working part-time and on non-permanent contracts). They are better educated than average (59% have tertiary education, compared to 34% EU27 average). Both creative and technical professionals need to strengthen digital skills.

SME dimension	Apart from some big market players, like broadcasters and several media conglomerates, the CCIs are composed of a high number of small, independent companies. **SMEs in CCI are smaller than the market average[224], due to a high share of freelancers and micro-enterprises**. The CCI market is fragmented along national/linguistic territories. SMEs (mostly micro) employ over 90% of workforce in such sectors as visual arts and design (and contribute to over 80% of the

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[221] There are several descriptive definitions in use, including *UNESCO Framework for Cultural Statistics*, 2009, the European Commission Green Paper *Unlocking the potential of cultural and creative industries*, 2010. The new 2021 Creative Europe Programme Regulation Art 2) defines the cultural and creative sectors as including architecture, archives, libraries and museums, artistic crafts, audiovisual (including film, television, video games and multimedia), tangible and intangible cultural heritage, design (including fashion design), festivals, music, literature, performing arts, (including theatre and dance), books and publishing, radio, and visual arts.

[222] KEA for EIF, Market Analysis of the Cultural and Creative Sectors in Europe, 2018, p. 12-15.

[223] EU27 self-employment average was 14% in 2019, in CCS 33%. Eurostat Cultural Statistics, https://ec.europa.eu/eurostat/statistics-explained/index.php/Culture_statistics_-_cultural_employment. Eurostat Cultural Statistics does not have the exact same remit as the CCS ecosystem, but covers most of the same sectors

[224] Average number of employees in 2016 was 2.7. Source: KEA for EIF, Market Analysis of the Cultural and Creative Sectors in Europe, 2018, p.11. www.eif.org/what_we_do/guarantees/cultural_creative_sectors_guarantee_facility/ccs-market-analysis-europe.pdf

	value added of these sectors) and almost 85% in audiovisual production and music publishing (78% of value added)[225.]
Current challenges	The COVID crisis has accelerated major trends in digital, and the CCIs need to increase efforts to develop **new content and new business models**. Technological developments such as AI, AR, IoT and 3D printing are a field full of potential for CCIs in terms of content creation, services, distribution and relation to end-users. In parallel, the crisis has exacerbated the underlying **fragmentation, underinvestment, and lack of skills.** European enterprises are vulnerable to acquisitions by extra-EU actors with a risk for European cultural diversity. For example, global online platforms have grown[226] while revenues of traditional venues have dropped e.g. cinemas by - 64%. Also, the internet has become the primary advertising medium, with a market share of 40% in 2017, at the expense of printed media and TV. Meanwhile only 22% of the heritage collections have been, on average, digitally reproduced. Europe also needs to compete in emerging markets, such as **virtual reality** which is estimated to add EUR 1.3 trillion to the global economy by 2030. The most urgent need is **access to finance** to mitigate bankruptcies and unemployment. Digital **skills** also need to be upgraded to enable take up of digital more widely. The same is true for entrepreneurial and managerial skills to strengthen professionalization and scaling up. Furthermore, it is essential to establish a true **level playing field** for all CCIs players and a fair environment for creators and those investing in creative content and services, as well as creative entrepreneurs.
Forward-looking assessment	Without a strong policy response to overcome the industry's fragmentation the global platforms' massive investments in content risks relegating European independent players to mere service providers. **Harnessing the benefits of digitisation will be key for future competitiveness. The CCIs are key to the single market because they have great spill-over effects** in terms of innovation across the economy and promote European exports by enhancing the image of Europe across the world. The Commission adopted the **European Media in the Digital Decade: an action plan for recovery and transformation[227]**, supporting recovery and enhancing competitiveness of news media and audiovisual[228] entertainment through **10 actions** around three areas: to help the media sector **recover** in particular by investing in content production and distribution to ensure diversity in the context of dominant global players; to support **transformation** through innovation harnessing data and exploiting the potential of the emerging AR/VR/XR market; to enable companies, for example by scouting media start-ups, and **empower European citizens** by increasing access to content and strengthening media literacy. Future measures could ensure inclusion and gender equality.
Global context	**North America leads the AV market** (turnover of EUR 10.4 billion), while the EU is the third biggest market (EUR 5.3 billion)[229]. The traditional sectors of AV market are dominated by US media conglomerates and the VOD sector by US-based Netflix and Amazon. The EU could set the technical standards to avoid having to comply with standards which are not relevant for European content (e.g. visual effects on VOD platforms), while keeping on attracting foreign investments in AV. The **music market is also led by the USA**, but among the top ten music markets, three are European: Germany, France (and UK) and Spotify is a globally successful EU player. The Asia-Pacific region has the biggest video game market followed by North America and the EU (17.4% of global revenues). In newspaper **publishing, the biggest turnover is in the EU** followed by the Asia-Pacific region and the US. In the book sector Europe counts five among the top ten largest publishers (mostly part of larger European conglomerates like Vivendi, Bertelsmann), however the 'foreign books' market is dominated by translations of Anglo-American titles.

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[225] Eurostat Cultural Statistics, 2017 results, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Table_4_-_Main_indicators_for_selected_cultural_activities,_by_enterprise_size_class,_EU-27,_2017.png

[226] E.g. Netflix registered a record 16 M new subscribers in Q2 2020. Source: https://variety.com/2020/digital/news/netflix-stock-record-high-q2-forecast-1234703262. Tik-Tok became the most downloaded app in 2020. Source: https://www.forbes.com/sites/rebeccabellan/2020/02/14/tiktok-is-the-most-downloaded-app-worldwide-and-india-is-leading-the-charge

[227] COM(2020)784

[228] Digital Decade: Commission launches Action Plan to support recovery and transformation of the media and audiovisual sectors, https://ec.europa.eu/commission/presscorner/detail/en/IP_20_2239

[229] comparison of all sectors by region in this paragraph: Media Mapping Study, KEA &Deloitte for EC, p. x-xv.

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF Significant investment is needed for the ecosystem's recovery. **Strengthening skills and capacity building** is essential to face and drive the green and digital transitions, across Europe. In particular, the **production and distribution of digital content is included within the 20% digital target. The Member States can decide to co-fund the pan-EU projects like the audiovisual equity platform**. Under the flagship initiative 'Renovate' targeted investments could **make cultural infrastructure more sustainable**, accessible to broader audiences and adapted/adaptable to the evolving needs of contemporary society. In line with the **New European Bauhaus** quality architecture and participatory design principles will need to be applied to adapt and upgrade infrastructure in/for the cultural sector in a sustainable way. **Engagement with Member States on the CCIs** needs to be pursued to ensure that the Recovery Plans address the CCIs, as they are amongst the worst affected ecosystems.

CRII+/ERDF/ESF/CEF These funds support **adaptation of skills, creation of new jobs and uptake of advanced technologies**. CCIs can also directly and indirectly contribute to five proposed Policy Objectives of the future Cohesion Policy 2021-2027. **Regional/ local development strategies could promote cultural assets and creative businesses**, support investment in infrastructure and in human capital. However, more take up is necessary, including in countries with low audiovisual capacity.

Creative Europe This Programme is dedicated specifically to the European CCIs and will be crucial for supporting recovery. The Programme has the general objectives of strengthening competitiveness and protecting and promoting cultural diversity. It aims at helping European organisations from of the cultural and creative sectors to scale-up, collaborate across borders, produce high quality content and reach European-wide audiences. The budget for 2021-2027 was increased 80% on an EU27 basis and encompasses audiovisual, cultural and cross-sectoral strands.

Horizon Europe (including European Partnerships) Under Cluster 2, R&I funding will be dedicated to cultural heritage and CCIs, focusing on **deepening knowledge of CCIs and their role as driver for innovation, the interactions and spill-overs to other sectors, on how to devise efficient ways to strengthen the industries**, as well as deeper research into specific sectors such as filmmaking and music. Furthermore, several R&I topics will require a deep involvement from the sector, such as for instance the New European Bauhaus. Under Cluster 4, support will be given to applications of a **Media Data Space and a Virtual Reality (VR) Media Lab and Extended Reality (XR) technologies and applications**. The European Institute of Innovation and Technology (EIT) plans to establish a **new Knowledge and Innovation Community (KIC) for the CCSIs.** A European-wide support structure will be created, with the mission to boost innovation and competitiveness of Europe's CCIs.

Digital Europe Programme The ecosystem needs to accelerate digitisation. In line with the MAAP support will be given to (i) **deployment of a media data space infrastructure** and (ii) a European Digital Media Observatory – to **tackle disinformation**. The programme will also **support SME to reskill and upskill employees to strengthen their digital skills e.g. through digital crash courses,** and the deployment of a **cultural heritage data space.** The Dataspace for Cultural Heritage will aim at creating a common data Space to support to the digital transformation of Europe's cultural heritage sector. It will build on the current Europeana platform and will vastly expand the current functionalities, in particular in relation to 3D digitisation, re-use of digitised cultural resources by different sectors.

InvestEU The ecosystem needs market instruments to **tap into private investors and avoid dependence on public subsidies**. Building on the successful CCIs Guarantee Facility 2014-2020 (over EUR 2 billion in lending mobilised), InvestEU will fund specific products: continue **loan guarantees to CCIs; establish an audiovisual equity platform; support pilot equity for news media**. More broadly, CCIs are eligible for general products under four windows of InvestEU. However, funding levels remains a challenge because of severe budget cuts to InvestEU.

Supportive regulatory environment

Single Market Surveillance The Commission monitors **implementation of the Copyright and Audiovisual Media Services (AVMS) Directives, as well as the EU legislation on Design**. Stakeholder dialogue and further studies are conducted where necessary. The MAAP foresees that the cooperation of the European Group of Audiovisual Regulators (ERGA) will be strengthened to better implement AVMSD. A voluntary cooperation mechanism (Memorandum of Understanding) was put in place at the end of 2020 by ERGA. The Commission will monitor its performance and propose improvements if necessary.

Main Single Market barriers within the ecosystem Establishing a **true level playing field for all audiovisual media players and a fair environment for creators** and those investing in content have been the central goals of the revised AVMSD and the modernised copyright framework (which is relevant also for other CCIs). The effective and consistent implementation of the revised AVMSD and copyright rules at national level will be key in order to make sure that they deliver. As regards the revised AVMSD, Member States must ensure **full transposition** while their media regulators must implement the new rules in practice, and enforce them where necessary. Access to and exercise of certain cultural and creative professional activities in a Member State are made conditional upon possession of qualifications and/or other national requirements (e.g. restorer of fine arts, dance teacher, archivist, etc.) These can lead to unjustified barriers to the free movement of persons and workers and can hamper the single market.

Standardisation Standard setting by the EU, i.e. instead of the Motion Picture Association from US, can contribute to avoiding **dependence on non-EU technology**. The **interoperability of data will be tackled as part of the Media Data Space** project in the MAAP. In addition, as a follow up to the IP Action Plan, work will be undertaken as regards **rights metadata**. The issue of standards for archives could also be considered. Also, many hardware platform suppliers signed the Open XR standard, but there is still a need to set frameworks on a global level. The same applies to **eBook and digitisation of cultural assets** for which standardisation and interoperability would facilitate growth.

Digital transformation The most pressing issues arising in the digital transition, such as **the level playing field with platforms and the remuneration of creators,** have been addressed in the new **AVMSD and Copyright Directives**. **The Digital Markets Act and the Digital Services Act** will complement the Copyright Reform and the revision of the AVMSD to ensure a fair online environment for the creative sectors and promote a level playing field that is crucial to strengthen European content and support essential values such as cultural diversity and media pluralism in the digital context. More broadly, the majority of internet traffic is around video and creative content, so that cultural and creative industries are key to generating user profiles and economic value of online players. In order to become more innovative and competitive, European media companies could be empowered to make better decisions and deploy more advanced solutions based on insights gleaned from data. The Commission proposes to bring this about by fostering the creation of a European 'media data space', building on the European Data Strategy (see sections on Horizon Europe/Digital Europe).

Green transformation In line with the MAAP, the Commission will collaborate closely with the industry and Member States on **sharing existing best practices and agree on common tools and green standards**. The Commission will also be working on a best practice guide for green production and provision of services[230]. These actions will complement the Digital Strategy **on making infrastructure such as data centres climate neutral**. In addition, the Commission is collaborating closely with EU Member States on the adaptation of cultural heritage to climate change impacts. The **New European Bauhaus initiative** is also relevant for green design and architecture.

Intellectual Property The full transposition and effective implementation by Member States of the 2019 Directive on Copyright in the Digital Single Market and the AVMSD can ensure copyright rules fit for the digital age. Once implemented, the new rules will **facilitate licencing** and ensure a **fairer market place for rights holders** when negotiating with online platforms and remuneration of authors and performers. As outlined in the IP Action Plan and the Media Action Plan, more effective enforcement of IP rights in the digital environment is key to support the competitiveness of CCIs. The Commission will reinforce cooperation with all involved players to ensure existing remedies to **fight against piracy** are more efficient. Particular attention could be paid to fostering the cooperation amongst national enforcement authorities and cross-border enforcement.

Networks and governance

Industrial Networks The promotion of collaboration is being pursued in the ecosystem. The Media and Audiovisual Action Plan foresees the creation of a European **News Media Forum** to develop an innovation agenda as well as a **European Virtual Reality/Augmented Reality industrial coalition** to stimulate cooperation across industry sectors. The Coalition will be based on a broad, cross-sectorial approach involving industries, technology providers and creatives. The Coalition would present, by end 2021, a strategic paper setting out a) the extent to which VR/AR/XR are deployed in the media sector; b) objectives for optimum deployment of VR/AR/XR in the media sector to be reached by 2026; c) concrete commitments on how the industry will contribute to meet these objectives.

Pact for skills **Digital skills** need to be developed in the CCIs, both for creative and for technical workers. Entrepreneurial and managerial skills are also key for professionalisation. The component dedicated to SMEs makes a contribution to boosting the skills of professionals in the CCIs ecosystem. Particular activities are also being carried out on cultural heritage skills by the Commission under the **Blueprint for Sectoral Cooperation on Skills**[231]. Sector-specific skills challenges are addressed by the **Creative Europe Programme** (training, mobility and experience-exchange schemes), including in synergy with Erasmus+. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Enterprise Europe Network The Enterprise Europe Network (EEN) sector group on cultural and creative industries helps creative businesses innovate and grow on an international scale. It could also use the forthcoming Sustainability Advisors to ensure that SMEs in this ecosystem are able to make the transition to sustainability. The MAAP builds on the experience of EEN to develop a **tailor-made online tool guiding media companies through the relevant EU support instruments**.

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[230] As announced in COM(2020) 784 final, p. 13 'Action 6: A structured exchange of best practice with the industry and (sub)national film and audiovisual funds'
[231] More on the Pact for Skills: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

Digital innovation hubs Several of the European digital innovation hubs are specialised in media. They will be complemented by the Creative Europe support for Creative Innovation Labs focusing on content and cross-sectoral collaboration.   The ecosystem is encouraged to make the most of the network of EDIHs, which offer a seamless service with the EEN and Clusters.

5. Digital Ecosystem

6.8 million people employed[232]

5.17% of EU value added (EUR 625 billion)

1.2 million firms 99.8% of SMEs

Transformative initiatives

Develop and deploy EU strategic digital technologies, capacities and infrastructures	**Boost the adoption and diffusion of digital technologies across the EU's businesses**	**Enhance digital skills and tackle the shortage of ICT specialists in Europe**

On the supply side, scaled-up, coordinated and targeted investments in the digital ecosystem are needed to enhance digital capabilities and support the **development of key sustainable, secure and trustworthy general purpose digital technologies and infrastructures**[233] needed by businesses across all industrial ecosystems and by public administrations. **By 2030, all European households will be covered by a Gigabit network, with all populated areas covered by 5G**[234].

The network of European Digital Innovation Hubs, along with the AI-on-demand platform, the AI Testing and Experimentation Facilities and the EU-wide Data Spaces create unique synergies that help both less digital-savvy SMEs and disruptive innovators capture the real value of the data economy and deploy AI-based tools and services by providing them with innovation services and access to technical expertise. **The aim is that by 2030, 75% of European enterprises have taken up cloud computing services, big data and Artificial Intelligence**[235].

Funding programmes, **dedicated reforms and investments** and **existing initiatives** (e.g. the Pact for Skills, the Digital Skills and Jobs Coalition) play a key role in promoting joint action for training, reskilling and upskilling, to enable workers to meet the needs of a labour market in transition and increase the pool of digital specialists. **By 2030 there will be 20 million employed ICT specialists in the EU, with convergence in the relative proportions of women and men**[236].

Towards an EU policy toolbox fit for purpose

RRF **At least 20% of RRF funding** will be invested in digital. It is an unprecedented opportunity to boost the digital transition across the EU, through a number of high-impact multi-country projects combined with EU funding programmes to build **pan-European advanced digital capacities and infrastructures.**

Digital transformation Through current and upcoming legislative initiatives[237] the Commission aims at building a **robust regulatory framework based on fundamental EU values and rights and on robust safety requirements** in order build confidence for all to embrace digital solutions, a level-playing field for businesses and to foster the full potential of the data economy.

InvestEU It bring financial instruments to support the development of sustainable digital infrastructures and the digitalisation of businesses through dedicated **InvestEU**

Digital Europe Programme The Programme enhances the **deployment** of **advanced digital technologies and infrastructures** in key areas, as well of advanced digital skills. It will also support the broad adoption of digital technologies by SMEs and public administrations. Synergies with other programmes, e.g. Horizon Europe and Connecting Europe Facility, will cement this effort.

Industrial Networks An Industrial alliance on **Industrial Data**, **Edge and Cloud** would strengthen Europe's presence in the next generation cloud supply. Member States agreed to cooperate and engage in efforts to co-invest in semiconductor technologies across the full value chain to this end[238]. An **Industrial Alliance on Microelectronics & Processors**[239] would mobilise industrial partners to establish strategic roadmaps, and research and investment plans to develop capacities for processor design, deployment and fabrication.

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[232] Figures for employment and value added based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics.

[233] Including AI, cloud and edge computing, supercomputer and quantum computer, cybersecurity and blockchain.

[234] 2030 Digital Compass: the European way for the Digital Decade, COM(2021) 118 final, p.6.

[235] 2030 Digital Compass: the European way for the Digital Decade, COM(2021) 118 final, p.10.

[236] 2030 Digital Compass: the European way for the Digital Decade, P.5

[237] e.g. Digital Services Act, Digital Markets Act, upcoming regulatory framework for AI following the 2020 White Paper

[238] See Member State Declaration "Building the next generation cloud for businesses and the public sector in the EU" https://ec.europa.eu/digital-single-market/en/news/towards-next-generation-cloud-europe

[239] See Member State Declaration 'A European Initiative on Processors and semiconductor technologies' https://ec.europa.eu/digital-single-market/en/news/joint-declaration-processors-and-semiconductor-technologies

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windows.

Sectors included in the ecosystem	**The digital ecosystem covers ICT Manufacturing, Services (excluding telecommunications), Telecommunications. ICT Services account for the 95% of the total ICT value added.** Within the ICT Services subsector, telecommunications play an important role: they make up around 35% of the value added of the services sub-sector and 16% of its employment.
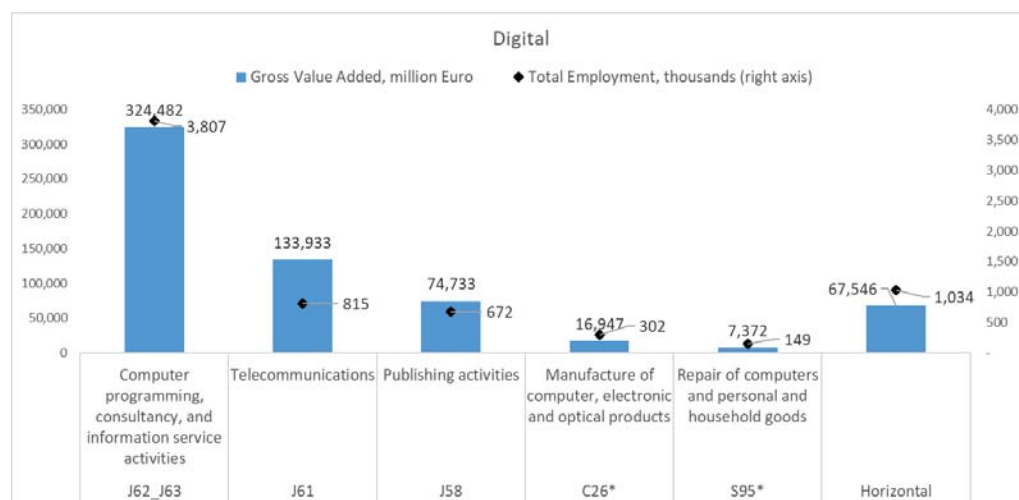
Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	Networking and lock-in effects of digital technologies play in favour of companies with established dominant position in this ecosystem at the expense of smaller competitors. Many SMEs however are involved in niche solutions tailored to specific needs. Some of the start-ups are even very successful in introducing new products, as examples of unicorns show.
Current challenges	Although the digital ecosystem has not been among the most hardly hit[240], the current crisis and the negative impact on investments still risk undermining the development and deployment of strategic digital capabilities, such as 5G, cybersecurity, HPC, AI. At the same time, the COVID-19 pandemic has highlighted the crucial role played by digital technologies in all sectors, and triggered an unprecedented demand for digital technologies and infrastructures. Connectivity in the EU is steadily improving, businesses are increasingly taking up digital solutions, and citizens are using more digital tools[241]. However, significant variations still exist across sectors, Member States and regions, large businesses and SMEs[242]. Significant gaps also remain when it comes to digital skills, which are a key enabler of digitalisation[243]. Digital transformation of sectors like construction and transportation is crucial to achieve more circularity and further energy efficiency, and meet the EU target of carbon neutrality by 2050.
Forward-	**Digital infrastructures and capabilities are essential assets to recover from the crisis, ,**

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[240] The digital ecosystem is heterogeneous; the magnitude and nature of the economic impact of COVID-19 vary depending on the market area. Some technology segments (such as PCs, tablets, and PC monitors) and infrastructure as a service (IaaS) are expected to experience continued growth. However, mid-term, a general decline in ICT spending, as companies put non-mission-critical investments on hold, might be expected (IDC, August 2020).

[241] Data from DESI 2020

[242] As an example, only 17% of European SMEs use advanced cloud services and only 12% big data. Among large companies these figures are respectively 38.5% and 32.7% (Digital Economy and Society Index 2020).

[243] 42% of the EU population still lacks basic digital skills. In parallel, there remains a shortage of ICT specialists on the labour market: 64% of large enterprises and 56% of SMEs that recruited ICT specialists during 2018, reported that vacancies for ICT specialists are hard to fill (Digital Economy and Society Index 2020).

looking assessment	**to strengthen the vital and digitally-enabled functions of our society and to build a more competitive and resilient economy across all industrial ecosystems**. The EU suffers from significant underinvestment and dependency from other regions for critical parts of the supply chain. The Commission services estimate[244] an annual investment gap of about EUR 125 billion for digital. In the next years, it is **crucial to support reforms and investments in key areas** such as: • *Connectivity*, with the aim of reaching the goals of the Gigabit Society Strategy (Towards a Gigabit Society) restated in the 'Shaping Europe's Digital Future' Communication, the '5G Action Plan for Europe', and expanded in the Commission Communication 2030 Digital Compass: the European way for the Digital Decade. • *Development and deployment of advanced digital technologies*, such as AI, blockchain, cloud and edge infrastructure and services, HPC, quantum. • *Human capital*, focusing on digital skills at all levels, to boost social inclusion, help workers meet the needs of a labour market in transition and increase the pool of digital specialists. • *Digitalisation of businesses*, by accelerating the sustainable take-up of digital solutions and a cyber-resilient digital transformation across all sectors. • *E-government*, to modernise the public administration, increase its efficiency and infrastructure security and resilience, and stimulate the online interaction between administrations and citizens and businesses.
Global context	Based on DESI 2020, in 2017 the value added of the ICT sector in the EU (4.1%) was lower than that of the US (5.9%), Japan (5.8%) and China (4.8%). In 2018, public funding of ICT R&D represented 7.1% of EU government budget allocations for R&D. This figure has continuously lagged behind the US and Japan where ICT represent 8.1% and 10% of government budget allocations for R&D[245]. Finally, the **EU is dependent on other regions for key digital capacities** (Asia and the US), whether hardware (e.g. fibre, electronic components, raw materials), computing power or software (data processing, cloud and edge computing). The top four leaders on the public cloud infrastructure market will account for over 80% of global revenues in 2021[246]. The market of edge computing features enormous growth potential (global market value expected to reach over EUR 200 billion by 2024)[247]. To reap the benefits of this potential, it is important to **leverage on the existing strengths of the EU industry and support the development and deployment of a European cloud-to-edge ecosystem, building up the European data infrastructure and data spaces.** This will enable European industrial sectors to create value from industrial data sharing and to innovate, notably thanks to broader use of AI and Digital Twin technologies.

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[244] SWD(2020) 98 final; backed-up by studies of the European Investment Bank and McKinsey ("Shaping the Digital Transformation in Europe", available here).
[245] Digital Economy and Society Index 2020, "The EU ICT Sector and its R&D Performance".
[246] https://www.gartner.com/en/newsroom/press-releases/2020-08-10-gartner-says-worldwide-iaas-public-cloud-services-market-grew-37-point-3-percent-in-2019.
[247] Forecast by IDC's Worldwide Edge Spending Guide, 2020, (https://www.idc.com/getdoc.jsp?containerId=prUS46878020#:~:text=According%20to%20the%20new%20Worldwide,the%202019%E2%80%932024%20forecast%20period)

Mapping of policy tools in more detail

Funding and budgetary Programmes

RRF **20% of RRF funding** (up to EUR 134 billion in 2018 prices) will be invested in digital, which may **significantly strengthen the European digital ecosystem and the ICT sector.** In particular, **investments in high-impact multi-country projects** in critical technological areas will enable the deployment of large digital infrastructures, capabilities and production capacities that will enhance European digital sovereignty and underpin the digital transformation of all sectors, with important spill-overs for the EU economy It is important to ensure that national Recovery Plans have a strategic approach towards the digital transition, combining both reforms and investments with a lasting positive impact on the future of Member States, and timely and effective implementation.

CRII+/ERDF/ESF/CEF These programmes **provide resources for the deployment of connectivity networks, the digitalisation of businesses and the public sector and digital re- and upskilling**. Communication infrastructure, including very high-capacity networks are **crucial for the development of the whole economy**. Additionally, ESF supports more and better digital skills training to make the labour force ready for the digital transition.

Horizon Europe (including European Partnerships) The second pillar in Horizon Europe will support R&D in ICT technologies mainly in the Cluster 4: Digital, Industry and Space. The following public-private partnerships in preparation. (i) The **EuroHPC Joint Undertaking (JU)** aims to support R&D&I in high performance computing (HPC), including **quantum computing resources**, and seeks to provide computing solutions, improving cooperation in advanced scientific research, boosting industrial competitiveness, and ensuring European technological and digital autonomy. (ii) The **JU on Smart Networks and Services**, which aims to strengthen the position of the European towards next generation '6G' network systems, devices and associated service infrastructures is being prepared. (iii) The **JU on Key Digital Technologies (KDT)** will reinforce Europe's technology sovereignty in electronic components and systems to support future needs of vertical industries and the economy at large. Furthermore **breakthrough innovation**, market deployment and innovative solutions will be supported in the third pillar of Horizon Europe, including by EIT DIGITAL[248].

Just Transition Fund To invest in **digitalisation and in digital connectivity** in regions facing particular challenges deriving from the green transition.

Digital Europe Programme Deployment of **advanced technologies such as supercomputing and artificial intelligence and quantum computing presents unparalleled opportunities for growth, competitiveness and technological autonomy of the European economy**. The effect of deployment of these technologies will affect virtually all sectors of the economy. Challenges related to **cybersecurity** and threats arising from an increasingly digitalised economy as well as lack of **advanced digital skills** needed to develop and deploy these technologies will be addressed by the programme. The programme will also support the deployment of **European Data Spaces** in nine sectors (as announced in the European Data Strategy), AI Testing and Experimentation Facilities, and the Cybersecurity Competence Centre and Network, enhancing the EU's open strategic autonomy.

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[248] https://www.eitdigital.eu/

InvestEU Three **InvestEU windows** (out of total four): **sustainable infrastructure** (including very-high capacity connectivity and cloud computing); **research, innovation and digital**; and social investment and **skills** (including digital skills and capabilities) are closely linked with the development of the digital ecosystem. In addition, the SME window will stimulate debt and equity financing for digitalisation projects of SMEs and small mid-caps.

Access to Finance **SMEs and start-ups face a major finance gap in Europe** of EUR 20-35 billion despite substantial support programmes at EU and national level, and in some Member States, access to finance remains one of the key problems they face. **There is a need to diversify sources of finance, enhance venture capital invested in European SMEs, start-ups, and address geographical imbalances** within the EU (with Central and South-Eastern Europe facing particular challenges). The Commission is working closely with Member States, notably through the Digital Innovation and Scale-up Initiative.

EU Space Programme and European Defence Fund Space Programme will implement an autonomous civil global navigation satellite system (Galileo), a civil regional satellite navigation system (EGNOS), an autonomous civil Earth observation system (Copernicus), space situational awareness (SSA) and a satellite communications service (GOVSATCOM). Uninterrupted, up-to-data and secure space-related data, information and services delivered by the EU space programme are enablers for developing new applications. Additionally, space technologies in relation to **geolocalisation, quantum communications and imaging** are enablers for new ICT services, start-ups and innovative products and services.

Supportive regulatory environment

Main Single Market barriers within the ecosystem A substantial body of legislation has been put forward or was reviewed over the last years (e.g. electronic communications regulation, copyright, data protection, digital public services, cybersecurity) and its transposition, implementation and **enforcement are closely monitored**. Where gaps have been identified, the Commission has tabled relevant proposals or is in the process of doing so (please see the point below on 'Digital transformation'). Some important barriers were identified such as: **Inefficiencies in the deployments** of electronic communications networks, mainly due to legal and administrative burdens (burdensome permit granting, high fees, problems to access to physical infrastructure, lack of information on existing infrastructure, etc.). **Inconsistent regulatory approaches by national authorities** which might create disincentives for investments into new very high capacity networks (VHCN). **Fragmented approach to spectrum assignments**, which does not promote wireless connectivity investment, in a coordinated fashion, for the benefit of internal market, (in particular market shaping license conditions, or setting asides spectrum for new entrants, as well as different types of authorisation types regimes applicable in to a specific band). **Lack of reliable, energy-efficient, trusted, secure, interoperable and decentralised cloud and edge infrastructure and service providers** (dominance of non-EU players with limited European presence). **Lack of genuine single market for data**, lack of data sharing within/across sectoral and national borders, lack of high-quality and high-volume data processing capacities. **Digital divide and insufficient sustainable take-up of advanced technologies** (in particular by SMEs and public entities).

Standardisation In the digital area, there is a **need for global standards providing for interoperability. Europe needs to mobilise resources and reinforce the European players with coordinated positions with Member States and industry in global standard organisations to drive technology leadership, values and ethics**.

Digital transformation **Regulatory obstacles remain in several areas**, e.g. diverging national rules in the area of online platforms; risk of inconsistent regulatory frameworks among the Member States on advanced technologies (e.g. AI); data sharing across the Member States and across businesses etc. A **number of legislative revisions to improve the current framework are already ongoing or planned** (e.g. proposal for review of Directive on security of network and information systems (NIS Directive); Data governance Act, Data Act (proposal planned for Q3 2021); review of the Broadband Cost Reduction Directive, review of the Roaming Regulation; review of the eIDAS Regulation; follow-up to the White Paper on Artificial Intelligence, including on safety, liability, fundamental rights and data). Moreover, the Commission adopted in September 2020 a Connectivity Toolbox Recommendation, and recently proposed for two legislative initiatives - the Digital Services Act (DSA) and the Digital Markets Act (DMA) – with the objective of creating a a level playing field for digital businesses, as well as a safer digital space for users of digital services.

eGovernment There is **significant gap between frontrunners and laggards** – for example, while 94% of Finnish internet users use the digital public services, whereas only 32% of Italians do.[249] The performance across Member States has converged in the last years, but there is still room for improvement. European countries could improve the implementation of digital enablers in eGovernment service delivery. In particular, **some areas require attention: promotion of cross-border and interoperable public services** (EU e-identification, the Once Only Principle, Blockchain), inclusiveness and accessibility, and strengthen **cybersecurity**[250].

Green transformation The green and digital transitions are complementary goals. Digital solutions have a critical role to play in supporting Europe's transition to a more sustainable economy and society. The green transformation can boost the future of digital technologies, with reduced resource usage, waste and greenhouse gas emissions. In parallel, **the digital ecosystem itself** (networks, data centres, and connected objects) **will need to become more energy and resource efficient**, **reuse waste energy, and use more renewable energy sources**. Numerous EU initiatives will address this – including **climate neutral data centres and electronic communications networks by 2030, the Circular Economy Action Plan and the Circular electronics initiative**[251]. These will be supported by specific data spaces enabling the needed data collection and data sharing.

Strategic Public Procurement Innovation procurement (public procurement that buy the development and/or adoption of new innovative solutions) supports reinforcing industrial competitiveness and increases private sector investments in strategic digital and green technologies. It is an underused instrument in Europe **in key digital areas** (e.g. AI, robotics, Blockchain, advanced computing etc.) and compared to other parts of the world[252].Sustainable public procurement (green and socially responsible) can speed up the transition of ICT towards contributing to the Green Deal climate and environmental objectives. The integration of environmental requirement in public procurement is essential to reduce the impact of public authorities and to promote eco-innovation. It promotes fully circular and fair ICT infrastructure and products, maximising their lifetime, closing material chains where possible, minimising

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[249] Digital Economy and Society Index, 2020.
[250] To give an example, only 20% of all URLs assessed by eGovernment Benchmark 2020 meet half of the 14 basic security criteria evaluated.
[251]See also the Codes of Conduct for Energy Efficiency in ICT and in particular for data centres (https://ec.europa.eu/jrc/en/energy-efficiency/products/coc).
[252] Innovation procurement investments in Europe are only half (9.9%) of those in the US (20% of total public procurement) and even less than in South Korea (25% of total public procurement). Two areas especially need a boost in investments in Europe: innovation procurements of digital solutions (Europe is underinvesting with a factor 3) and R&D procurements (Europe is underinvesting with a factor 5 compared to e.g. the US).

carbon emissions and the impact on the environment, and minimizing any impact on human rights and labour rights.

Intellectual Property Regarding Standards Essential Patents (SEPs), the IPR framework can be improved to ensure a balanced, smooth and predictable environment that supports a sustainable and efficient standardisation ecosystem and SEP licensing environment so that contributors to the standards are fairly rewarded whilst implementers can access the patented technologies on reasonable terms. This is crucial for the rapid take up of IoT in Europe.

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) **Implementation of the Critical Raw Materials Action Plan** is key to secure access to primary and secondary raw materials necessary for the development of digital technologies. Strengthening cooperation with like-minded third countries, including on trade, to support safe global supply chains with interdependencies complement the strategic partnerships.

Networks and governance

Industrial Networks Raw materials are a critical input to digital technologies. The **Industrial Alliance on Raw Materials** will address the raw material dependencies and reinforce resilience of supply chains. The **Alliance on Data, Edge and Cloud–**would aim to foster joint development and deployment of next generation European cloud and edge technologies for businesses and the public sector in the EU. **Several declarations relevant to the digital ecosystem have been signed by Member States.** While such declarations in themselves do not amount the creation or a launch of industrial alliances, such declarations **state the intention to join forces and collaborate on common projects and priorities**, e.g. on: **Processors and semiconductor technologies**[253]; **Quantum Communication Infrastructure**[254]; Cooperation on **Artificial Intelligence**[255]; Access to at least 1 million sequenced **genomes** in the European Union by 2022, e.g. European **Blockchain** Partnership[256]; Letter of intent on the testing and large scale demonstrations of **Connected and Automated Driving**[257].

Clusters cooperation There are **1,214 clusters registered on the European Cluster Collaboration Platform out of which 274 contribute to Digital**. As part of the European recovery plan, **clusters could help industrial ecosystems to develop a robust digital industry and facilitate the deployment of new technological solutions**, particularly in businesses with a low degree of digital technology uptake such as SMEs.

Pact for skills European skills partnerships[258] in key industrial ecosystems, involving a wide range of actors, that will promote joint actions for reskilling and upskilling and investment in training. In this

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[253] Joint declaration on processors and semiconductor technologies, December 2020 see https://ec.europa.eu/digital-single-market/en/news/joint-declaration-processors-and-semiconductor-technologies
[254] December 2019, see https://ec.europa.eu/digital-single-market/en/news/nine-more-countries-join-initiative-explore-quantum-communication-europe
[255] April 2018, EU Member States sign up to cooperation on Artificial Intelligence, see https://ec.europa.eu/digital-single-market/en/news/eu-member-states-sign-cooperate-artificial-intelligence#:~:text=On%2010%20April%2025%20European,European%20approach%20to%20deal%20therewith.
[256] April 2018, European countries join Blockchain Partnership https://ec.europa.eu/digital-single-market/en/news/european-countries-join-blockchain-partnership
[257] March 2017, https://ec.europa.eu/digital-single-market/en/news/eu-and-eea-member-states-sign-cross-border-experiments-cooperative-connected-and-automated
[258] More on the Pact for Skills: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

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context, the existing Digital Skills and Jobs Coalition will canvass pledges related to the development of digital skills in different sectors. Activities will be showcased and disseminated through the European Digital Skills and Jobs Platform.

Enterprise Europe Network The Enterprise Europe Network (EEN) has an **'ICT Industry and Service Sector Group', which will help SMEs with their digital transformation**, adapting their business processes and improving their IT readiness. **EEN will help the SMEs make use of the EU Digital Innovation Hubs (EDIH) services and carry out basic digital assessments for SMEs**. It needs to continue to evolve to help relevant SMEs become more resilient and ensure that digitalisation and sustainability go hand in hand.

Digital Innovation Hubs **Acceleration of the uptake of digital technologies** (such as robotics, Artificial Intelligence and data platforms) by SMEs will improve the capabilities of the ecosystem. The network of Digital Innovation Hubs (DIHs) will help ensure that every company, small or large, high-tech or not, can take advantage of digital opportunities to optimise their production processes, and to innovate their products and business models. The geographical spread of the network covering all regions of Europe is key to offer services at working distance to all companies and public administrations. DIHs will offer a seamless service with the EEN and Clusters.

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6. Electronics Ecosystem

1.79 million people employed[259]

1.06% of EU value added (EUR 128 billion)

104,000 firms 98.9% of SMEs[260]

Transformative initiatives

Underpinning technology for a secure, trusted, powerful data ecosystem and the new applications of AI

Reinforce processors and semiconductor technologies for data processing, communications and related data infrastructures, and new applications for AI to capitalise further on a digital transition of all sectors and ensure a secure and trusted data ecosystem.

New chips to drastically improve the energy performance of data-processing in digital systems, including electric mobility

Driven by AI and the shift towards edge-computing, digital applications will require high computational power together with reduced energy consumption. Developing powerful and energy-efficient processors and semiconductor components is both a challenge and an opportunity for EU industry.

Mobilisation of the European electronics industry to take action in specific areas, notably in processor technologies

Mobilise Europe industry on emerging critical processor and semiconductor technologies, and consolidate innovation-driven leadership in areas of proven expertise, such as automotive, as well as in new innovative digital areas via a joint European strategy and investment in key infrastructures and capabilities.

Towards an EU policy toolbox fit for purpose

Horizon Europe (including European Partnerships) Reinforcing potential to innovate across the value chain and lay the ground to transfer innovation to future industrial deployment.

Industrial Networks Mobilising a wide range of public and private sector actors to join forces to achieve key industrial policy objectives on processors and semiconductor technologies for digital applications across key sectors. A large number of Member States[261] have signed a declaration expressing their interest to work together in order to bolster Europe's electronics and embedded systems value chain with a strong focus on processors and semiconductor chips.

RRF Offering Member States unprecedented opportunities to invest in specific areas, namely digital components (processor and semiconductor technologies). The RRF's stated ambition is to double, by 2025, the production of cutting-edge semi-conductors in Europe and to produce 10 times more energy efficient processors.

Pact for Skills Addressing critical skill gaps in existing and emerging digital technologies, requiring an overall public and private investment of EUR 2 billion providing upskilling and reskilling opportunities for 250,000 people (2021-2025) in Europe's electronics clusters[262].

IPCEI A potential new IPCEI would help drive innovation to the stage of first industrial deployment in processor and semiconductor technologies (design ecosystem, supply chain capabilities, first industrial deployment of advanced semiconductor technologies,

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[259] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics. Data from 2018.

[260] This figure is only based on the number of firms, distribution of turnover or value added will result in a different picture

[261] Joint declaration on processors and semiconductor technologies, https://ec.europa.eu/digital-single-market/en/news/joint-declaration-processors-and-semiconductor-technologies

[262] See: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

including scaling towards leading edge process innovation) crucial for energy-efficiency, uptake of digitalisation and development of trusted digital infrastructure.

The ecosystem at a glance

Sectors included in the ecosystem	**The electronics ecosystem covers design and manufacturing of electronic components; includes raw materials (semiconductor wafers) and manufacturing tools. The value chain stretches from design to semiconductor manufacturing to 'assembly-test-packaging' facilities, before reaching end-user companies, which integrate the chips into their product solution. Materials, equipment and related services and tools, including specific design tools and so-called functional blocks, enable design and manufacturing (see fig. 2).**

The European ecosystem is characterised by vertically integrated design and manufacturing companies, design companies, pure-play foundries, manufacturing equipment and material suppliers, among others. It also includes 3 world-leading Research and Development (R&D) Centres of excellence (IMEC, CEA-Leti, Fraunhofer Mikroelectronik) in microelectronics and digital technologies. The major EU producers of semiconductor chips operate globally, serving OEMs in automotive, industrial manufacturing, security and healthcare as well as aeronautics, energy production and telecom. Their leadership positions in the afore-mentioned market segments derive from strengths in secure hardware, power electronics, sensors and MEMS technologies. Furthermore, manufacturers of chips at leading-edge nodes rely for their technology development on EUV photolithography machines produced by a unique global supplier, which belongs to the European electronics ecosystem. Packaging, assembly and test is located mostly in Asia, as is manufacturing of chips at nodes with feature sizes below 20nm – used in microprocessors and memory chips for high-end computing and communications, PCs, smartphones and consumer products.
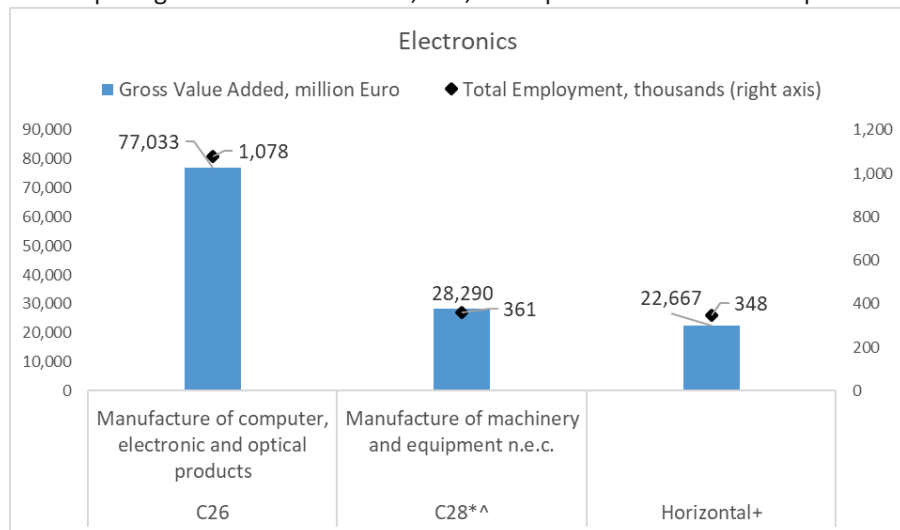
Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem; ^Includes additional share added on top of horizontal component; +Excludes contribution of C28.

Source: Eurostat, National Accounts. Data from 2018 (or latest year available).
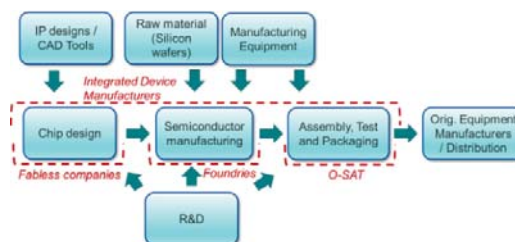
Figure 2-The Semiconductor Value Chain

SME dimension	SMEs play a strong role in value chains, for electronics board design and integration, photonics, and equipment manufacturing, often strongly associated to value chains of specific big companies, but are as well active in chip design. The EU SME landscape contrasts with an Asian landscape rather dominated by conglomerates and megafactories. Highly innovative SMEs at the forefront of new technology development face major hurdles in assessing adequate source of finance necessary to upscale their technology development, which is high capital intensive and entails high financial risks due to inherent long learning cycles.
Current Challenges	The electronics ecosystem has coped well with the challenging situation caused by the COVID pandemic. Companies addressing the digital market (servers/data-centres/telecom/Internet/IoT) have in general benefitted from increased digitisation through the increasing volume of data traffic and use of mobile communications. Energy performance of a system is highly dependent on the energy efficiency of the individual components. Europe's ability to couple the digital transition with a green transition hangs on its ability to produce energy-efficient chips. European chip producers also need however to build on and expand their current strengths[263] to data processing and communications where they have very limited market presence. This includes the design and production of processors, which are of ever-growing importance in data processing for data and communications infrastructures, high-end and general purpose computing, and future trends like highly automated driving and AI applications at the edge of the network. For manufacturing of the fastest and most efficient processors, Europe currently relies on external foundries located in non-EU regions offering advanced manufacturing of components with feature sizes down to 7 and 5nm[264]. This is of concern now more than ever as data-processing represents a critical capability to further capitalise on opportunities in the digital sector that are essential for digital transition, and hence puts pressure on European industry to act to reduce strategic dependencies. The EU semiconductor sector will require a resilient, diverse, and secure supply chain to prosper. The mapping of the electronics ecosystem for strategic dependencies provides an opportunity to conduct an in depth assessment of the risks associated with the different stages of the supply chain, including on the origins and sources of supplies and the extent to which such commercial relationships results in vulnerabilities of the EU economy.
Forward-looking assessment	Business performance and future outlook remain highly dependent on how the pandemic continues to unfold at a global level, on the impact of the economic stimulus packages that will be implemented and on a variety of geopolitical factors (ref. 3. Global Context). A concerted effort to capitalise on further digital and green transformation of industry and services would be beneficial for Europe at large. Independently, the market for AI chips is considered the largest opportunity in semiconductors and will drive future growth for the whole industry.
Global Context	Europe's semiconductor footprint is relatively small compared to other regions[265]. Therefore it will be an important area for Europe to focus on in order to avoid excessive dependencies now and in the future, and harness the potential of new trends such as edge AI. US and Chinese semiconductors companies are accelerating their efforts on R&D up to high volume production. Cooperation with likeminded partners to ensure a diversified and resilient semiconductor supply chain will be essential. The EU strongly supports global efforts in the G20, the WTO

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[263] Among European stakeholders, there are two global market leaders in specific segments of power management and sensors (Infineon, Bosch). NXP and Infineon are leading in automotive semiconductor worldwide, ST is in the top 5 (Market share, Statista, 2019).
[264] In 2020, only 2 companies, TSMC (Taiwan) and Samsung (S. Korea) offer chips at 7-5nm. Intel (US) announced that its 7nm technology has been delayed until 2022.
[265] Ref. Footnote 84

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and in the context of EU's bilateral relations, to monitor critical supply chains, keep them open and undisrupted, and ensure fair and equitable access to critical goods. Enhancing the resilience and sustainability of supply chains is a pillar of the European Union's drive towards open strategic autonomy.

Mapping of policy tools in more detail

Funding and budgetary Programmes

RRF In the Annual Sustainable Growth Strategy 2021, the Commission encourages Member States to invest in specific areas, among these the **Scale Up flagship** focusing on digital processors and cloud. Several Member States already plan reforms and investments for microelectronics to be supported by RRF. Part of these national investments can contribute to a multi-country project on processors and semiconductor chips, which has the potential to boost highly innovative design and fundamentally innovative process technology production capabilities in Europe.

IPCEIs The first IPCEI on Microelectronics approved in December 2018 under State aid rules allows France, Italy, Germany, the UK and Austria[266] to jointly advance innovation in microelectronics up to the first industrial deployment through transnational cooperation projects with major synergies across industry. The total national funding of EUR 1.9 billion unlocks EUR 6.53 billion investment from 30 companies and 2 research organisations, including three SMEs. A large number of Member States[267] have signed a declaration expressing their interest to work together in order to bolster Europe's electronics and embedded systems value chain with a strong focus on processors and semiconductor chips, through development of a proposal for a possible new IPCEI.

Horizon Europe (including European Partnerships) **The Key Digital Technologies (KDT) Joint Undertaking (JU)** under Horizon Europe aims at **reinforcing Europe's potential to innovate** through robust electronics value chains providing secure and trusted technologies tailored to the needs of user industries. It will contribute to boosting the EU's competitiveness and technological sovereignty through support for R&D into essential electronic components and related manufacturing equipment. The R&I Programme also fosters the use of advanced electronics in other digital and non-digital priorities, often in partnership with industry and academia, such as R&I in Artificial Intelligence, High-Performance Computing and mobility.

Digital Europe Programme Testing and Experimentation Facilities for Edge AI under Digital Europe will support market development of Edge AI, of high strategic relevance for Europe. The proposed platform is meant to provide the opportunity for EU enterprises, large and small, to test prototypes with the most advanced AI computing technologies.

InvestEU The InvestEU programme identifies processors design, edge AI and semiconductor manufacturing among the areas of strategic relevance for investments particularly in the Research, Innovation and Digitalisation Window.

Access to Finance As the electronics ecosystem is highly capital intensive, SMEs and Start-ups face major hurdles in accessing adequate source of finance to upscale their technology developments. In addition, technology development entails high financial risks due to inherent long learning cycles. Sources of finance need to be diversified, to significantly complement funding of European programmes

EU Space Programme and European Defence Fund Synergies with the space programme and the European Defence Fund could be further explored to tackle specific secure critical dependencies on

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[266] The participation of Austria was approved on 23 March 2021: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1343
[267] Joint declaration on processors and semiconductor technologies, https://ec.europa.eu/digital-single-market/en/news/joint-declaration-processors-and-semiconductor-technologies

sourcing electronic components from outside the EU, and demand for state-of-the-art technology, which is more prevalent than in the past.

Supportive regulatory environment

Standardisation Standardisation needs and opportunities are in emerging markets and applications enabled by semiconductor technologies, namely autonomous driving, future connectivity for 6G, edge AI and security. On automotive, as the technology for highly automated vehicles and electric vehicles continues to develop at global level, in addition to EU legislation, setting and /or updating safety standards for electronics in vehicles, and connectivity with the infrastructure, other vehicles and humans would be crucial for Europe to maintain industrial competeiveness in the field. On connectivity and 6G, setting specification standards on next generation 6G core technology early ahead would be important in order to re-build a position in a strategic field interlinked with automotive, in particular highly automated driving, and with interoperability and security of critical infrastructure.

Green transformation **Energy-efficient electronics are at the heart of the green and digital transformation contributing to optimisation of resource usage, reduction of greenhouse gas emissions, environmental monitoring and protection**, etc. Numerous EU initiatives address this – including the target on climate neutral data centres by 2030 and the Circular Economy Action Plan. The Circular Electronics Initiative will contribute to the green transformation of electronics and the reduction of emissions by making the life of devices longer, tackling waste, increasing the circularity of value chains and encouraging and enabling users to use their devices for longer (right to repair). Significant research efforts will be devoted to designing and developing highly efficient processor chips.

Strategic Public Procurement There is scope to exploit European industry's strengths in secure and low-power technologies. Development of standards for green and/or circular electronics and cybersecurity, and eventual certification schemes could facilitate strategic public procurement, which in turn would stimulate standardisation activities.

Intellectual Property Intellectual Property and patents are a key ingredient of the electronics ecosystem. An additional element in the electronics ecosystem are de-facto standards established by market leaders or ad-hoc cross-industry collaborations. A significant number of EU companies with relevant intellectual property (IP) have been acquired by foreign groups, which has created critical dependencies for the ecosystem. Moreover, as in most other ecosystems, the transfer of IP developed in academic R&D to the market remains a weakness in Europe compared to other areas of the world. Regarding foreign acquisitions, the recent EU foreign direct investment (FDI) screening regulation that became operational on 11th October 2020 will provide the Commission the possibility to assess the risks of foreign investments for companies active in the semi-conductor sector, among others, in terms of impact on security and public order from a European perspective.

Networks and governance

Industrial Networks On 7 December 2020, a large number of Member States[268] signed a declaration expressing their interest to work together in order to bolster Europe's electronics and

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[268] Joint declaration on processors and semiconductor technologies, https://ec.europa.eu/digital-single-market/en/news/joint-declaration-processors-and-semiconductor-technologies

embedded systems value chain with a strong focus on processors and semiconductor chips. In this joint declaration, Member States put forwards a possible industrial alliance on microelectronics and processors, which could mobilise industrial partners, as well as possibly designing a proposal for a new IPCEI.

Pact for skills **Microelectronics is one of the sectors included in the launch of the Pact for Skills**. The shared engagement and approach to skills development, pooling efforts from public and private stakeholders, are the right ingredients to address the critical skills gap in the field of electronics components and systems. The implementation, supported by networking, knowledge and resource hubs, also requires an active collaboration of MSs to achieve the common objectives. Skills partnership for microelectronics requiring overall public and private investment of EUR 2 billion providing upskilling and reskilling opportunities for 250,000 people (2021-2025) in Europe's electronics clusters[269].

Enterprise Europe Network **The Enterprise Europe Networks (EEN) has a well-functioning Sector Group on the ICT Industry & Services.** The Group and EEN as a whole could look to cooperate more closely with the Digital Innovation Hubs and cluster organisations to promote the sector. It could also use the forthcoming Sustainability Advisors to ensure that SMEs in this ecosystem are able to make the transition to sustainability.

Digital Innovation Hubs **Several of the European Digital Innovation Hubs are specialised in electronics and are well-placed to support SMEs to include advanced chips in their products and services**. The network of European Digital Innovation Hubs (EDIHs) can help ensure that every company, small or large, high-tech or not, can take advantage of digital opportunities to optimise their production processes, and to innovate their products and business models. The geographical spread of the network covering all regions of Europe is key to offer services at working distance to all companies and public administrations.

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[269] More on the Pact for Skills https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

7. Energy-Intensive Industries Ecosystem

7.8 million people employed [270]

4.55% of EU value added (EUR 549 billion)

**548,000 firms
99.4% of SMEs**

Transformative initiatives

The EIIs will need a substantial amount of decarbonised energy at an internationally competitive price

The transition of EIIs to climate neutrality requires access to substantial amounts of decarbonised energy across the EU. The cost of decarbonised energy will be crucial for international competitiveness of the EU's EIIs.

Creating markets and stimulating demand for green and circular products is key for accelerating the twin transition

The markets for green products are still underdeveloped both within the EU and globally. Creating markets for green and circular products is **the key step for large-scale green transition of the EIIs Ecosystem.** Actions under the Circular Economy Action Plan and the Sustainable Product Initiative[271] will be important in this regard. Public buyers can play a role in creating demand.

Full scale transition of EIIs to climate neutrality will require to address unprecedented investment challenge

The EII ecosystem needs to accelerate investments into research and innovation, demonstration, and the rollout of breakthrough technologies. It is a **precondition for the full scale green transition of the EIIs**. Actions under Horizon Europe, Recovery and Resilience Facility will be important for some aspects of this.

Towards an EU policy toolbox fit for purpose

Green transformation A combination of all relevant policy tools could be used to create lead markets for green and circular products and support the business case for private investments. No single tool will be sufficient, but **availability of large amounts of decarbonised energy at a globally competitive prices** is at the top of the list.

Digital transformation **Digitalisation of EIIs requires major changes** in (1) collection and use of industrial data and (2) development of digital product passports to increase traceability of material flows and (3) Artificial Intelligence and High-Performance Computing based simulation and prediction to enable better integration of renewable energy sources into EIIs and improve the quality, efficiency and speed of safety and sustainability assessments.

Access to Finance Needs to reflect industry's needs during the transition to climate neutrality. **De-risking of initial investments through tools like Contracts for Difference** need to be explored.

Industrial Networks Important for **enabling transition, pooling resources and sharing risks**.

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[270] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics.
[271] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12567-Sustainable-products-initiative

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The ecosystem at a glance

Sectors included in the ecosystem	The Energy-Intensive Industries (EIIs) Ecosystem covers chemicals, Steel, Paper, Plastics, Mining, extraction and quarrying, Refineries, Cement, Wood, Rubber, Non-ferrous metals, Glass, Ceramics. **They supply intermediate products to each other and to many downstream sectors** of the economy, are **closely integrated with energy providers as well as with the waste and recycling industries** due to their need for secondary raw materials.
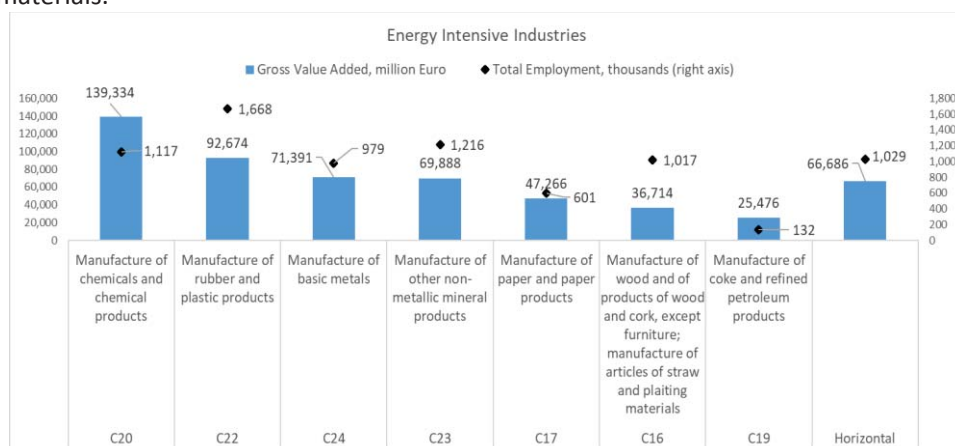
Note: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex of the SWD on Monitoring the Implementation of Industrial Policy.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	SMEs represent 99.4% of companies active in the EIIs ecosystem and have 51.25% share of employees working in this ecosystem. SMEs also represent 31.3% of the EII ecosystem turnover and 36.9% of value added. All parts of the ecosystem have a mix of large companies and SMEs. At one extreme, the refineries sector accounts for 40 large companies, at the other, the manufacture of wood products has around 100,000 SMEs.
Current challenges	Annual **production dropped significantly in 2020** (ranging from around 22% for the steel sector, 10-16% for cement, 10-15% for flat glass and 1-11% for non-ferrous metals, amongst surveyed companies). This is largely **driven by major drops in demand in downstream industries, notably in automotive and construction**, starting in March 2020. Although most industries showed a strong recovery since the first wave of the pandemic, the growing uncertainty deteriorated the overall business sentiment and resulted in massive temporary layoffs. Uncertainty about global economic recovery looms over investment decisions needed to support ongoing activities of Energy-Intensive Industries (EIIs) in the EU.
Forward-looking assessment	The EIIs ecosystem can be **an enabler for greening both upstream and downstream value chains**. Building on the current global leadership of European EIIs in terms of their environmental footprint, **the twin transition further creates new opportunities for growth and innovation**, notably through the creation of new markets for green and circular products. EIIs require significant investments into research and innovation, demonstration, and roll-out of new technologies, such as hydrogen-based steelmaking, carbon capture, utilisation and storage, and system integration for circularity. At the same time, the EIIs ecosystem includes sectors that are among the most ambitiously regulated in the EU, which in turn makes them particularly **vulnerable to carbon leakage and loss of competitiveness** in case of differences in level of ambition between the EU and other global players persist.
Steel, non-ferrous metals, chemicals and the majority of other EIIs operate in global markets where their products are traded globally at international prices with very limited possibility for passing additional costs related to higher regulatory requirements to downstream customers.
EIIs will have to go through unprecedented challenges requiring significant investment to

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	achieve the green and digital transition while remaining globally competitive.
Global context	**The EU needs to address the resilience of EIIs and other related ecosystems** as currently China is controlling production of some of the critical raw materials that are needed for EU's green transition and is actively securing future access to many other raw materials. A number of countries have **built major production capacities in EIIs' products through aggressive support policies**, including China (in all EIIs), Gulf countries (aluminium), Indonesia (nickel/stainless steel), resulting in **major overcapacities (steel, aluminium) threatening and putting pressure to operators worldwide**. This has led to proliferation of trade defence measures (e.g. anti-dumping, US section 232 measures). Specifically, China considers steel, aluminium sectors as strategic and built major capacities during the last decades. Currently China represents more than 50% of global production in a number of these products and is on a path to increase its global market share further (estimated to represent 50% of global sales of chemicals by 2030). The EU **trade defence measures – applied in compliance with our international commitments -will remain crucial to correct distortions and for a level playing field** and survival of EIIs in the EU. The share of the **EU EIIs in the global output is likely to decrease due to the higher growth in other regions**. Loss of a global market share raises a concern for EIIs competitiveness, given the enabling role EIIs play in providing critical and strategic inputs for most of other industrial ecosystems, for the green and digital transition, as well as the resilience of the EU.

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF The RRF provides an unprecedented opportunity for cooperation between Member States to coordinate investment efforts on common challenges including the green transition of EIIs and industry and national recovery and resilient plans need to reflect this appropriately. Projects related to **demonstration and first deployment of new technologies**, such as hydrogen-based steelmaking, carbon capture, utilisation and storage, sustainable chemical recycling technologies for plastic waste and system integration for circularity, **development of infrastructure relevant for twin transition** (hydrogen, CO2 transport) as well as **projects in line with the EU's Action Plan on Critical Raw Materials [272] could be prioritised**. The Member States are encouraged to invest in common flagship areas like 'Power Up' which stated ambition is to support the building and sector integration of almost 40% of the 500 GW of renewable power generation needed by 2030, support the instalment of 6 GW of electrolyser capacity and the production and transportation of 1 million tonnes of renewable hydrogen across the EU by 2025.

CRII+/ERDF/ESF/CEF **The twin transition of EIIs calls for up-skilling and re-skilling.** ERDF and ESF supports the adaptation of skills, creation of new jobs as well as smart specialisation, the uptake of advanced technologies and industrial transition. Building cross-border infrastructure links (CEF) is important for the industry's transition to climate-neutrality and circularity (Hydrogen infrastructure, CO2 transport). Ongoing efforts will be needed to direct investments into the priority areas based on pathways or sectoral roadmaps that are being implemented by the EIIs and to secure adequate budget allocation.

Horizon Europe (including European Partnerships) New technological solutions and their uptake are at the **core of Processes4Planet[273], Clean Steel[274] and Clean Hydrogen[275] partnerships in Horizon Europe**. Some of the destinations under Clusters 4, 5 and 6 are highly relevant for further development and demonstration at industrial scale, including hydrogen-based steelmaking, carbon capture, utilisation and storage, safe and sustainable by design chemicals, decontamination of waste streams, and system integration for circularity as well as innovation for safety, sustainability and circularity of plastics, including bio-based and biodegradable plastics. The Research Fund for Coal and Steel Modernisation Package revising the legal bases of the RFCS Research Programme aligns the research objectives in Steel to the Green Deal objectives. It will also allow for the use of ECSC assets to fund breakthrough technologies under the Clean Steel partnership in combination with Horizon Europe funding.

EU ETS Innovation Fund It supports low-carbon innovation in energy intensive industries. The Fund supports both the decarbonisation of industrial processes and substitute products which deliver low-carbon alternatives to the carbon-intensive ones. The support also includes carbon capture, use and storage in the sectors covered by Annex 1 to the EU ETS Directive[276].

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[272] The EU's Action Plan on Critical Raw Materials published in September 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1542
[273] Processes4Planet is a new public-private Horizon Europe partnership will aim to transform energy-intensive process industries and help the EU reach 2050 climate goals. Processes4Planets is a successor to the Horizon 2020 public-private partnership Sustainable Process Industry through Resource and Energy Efficiency (SPIRE).
[274] 'Clean Steel - Low Carbon Steelmaking' is a co-programmed Horizon Europe partnership proposed in the context of the European Union's goal to achieve climate neutrality by 2050.
[275] The Clean Hydrogen partnership aims at accelerating development and deployment of European clean hydrogen technologies, contributing to a sustainable, decarbonised and fully integrated energy system.
[276] https://ec.europa.eu/clima/policies/ets_en

EU ETS Modernisation Fund The Modernisation Fund supports the decarbonisation of energy and industrial sectors in its ten beneficiary Member States. Energy efficiency investment or renewable electricity generation in energy intensive industries are among its priority areas.

Digital Europe Programme It will support the setup of Manufacturing Data Spaces, which integrates material and semi-finished products data into the supply chain of the Manufacturing sector. Data and material flows will also be relevant for the Green Deal Data Spaces that can contribute qualified information to product passports and support the reuse of material and energy. The Digital Europe Programme, will fund the design and delivery of specialised programmes in key capacity areas like data and AI, cybersecurity, quantum and HPC and support the reskilling and upskilling of workers through short-term courses in advanced digital skills.

Just Transition Fund EIIs are interlinked between themselves and often operate in a form of EIIs' clusters, **the Just Transition Fund will address the needs of carbon-dependent regions related to the transition**. Eligibility criteria for projects in areas covered by the Emission Trading System (like EIIs) could allow investments in sectors with great investment needs but insufficient supply of robust clean solutions available on the market, provided that they lead to sufficient levels of greenhouse gas emission reduction[277].

InvestEU The SME window will provide enhanced condition to implementing partners/financial intermediaries in order to stimulate them to finance SMEs in transition towards sustainability and climate-neutrality. I**nvestments in Raw Materials and EIIs under the Sustainable Infrastructure Window, in particular in view of the need for resilient EU value chains**, are envisaged. InvestEU will contribute to the Just Transition Mechanism by deploying an InvestEU Just Transition Scheme, aiming to support economically viable investments by private and public sector entities aligned to Just Transition objectives. Actual investments will be followed in the course of the InvestEU implementation.

Access to Finance **De-risking of initial investments into industrial scale demonstrators of green technologies and launch of markets for green and circular products is needed.** EU ETS Innovation Fund and EU ETS Modernisation Fund support respectively low-carbon innovation and decarbonisation in the EIIs. Further analysis on de-risking measures (e.g. carbon contracts-for-difference, insurance schemes and special purpose vehicles for off balance sheet financing) is needed to support the uptake of new low carbon technologies at industrial scale. The **Green Tech Investment Initiative,** as mentioned in the SME strategy, is also relevant to increase the access to equity finance for innovative SMEs and start-ups that develop and adopt green tech solutions. Green tech investment could encourage the development of innovative solutions that will help the energy intensive industries to achieve the green transition.

The sustainable finance taxonomy will be essential to achieve the goals of the European Green Deal. Taxonomy criteria reflect best performance levels in terms of greenhouse gas emissions and will be regularly reviewed to ensure they chart a credible pathway toward decarbonisation.

Supportive regulatory environment

Main Single Market barriers within the ecosystem A truly Single Market for goods and movement of workers **provides the scale and business environment needed for EIIs' global competitiveness and transition to climate-neutrality**. **Enhanced use of the SMTD** (Directive (EU) 2015/1535 addressing the

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[277] They must lead to a substantial reduction in greenhouse-gas emissions going substantially below the relevant benchmarks established for free allocation under the ETS Directive).

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prevention of technical barriers in the internal market) and **enforcing Single Market rules**, can support the removal of barriers in this ecosystem. A disparity between Member State regulation can be observed, for instance in how some of them transpose EU chemical legislation, air and water quality rules and the consequences for basic industries or mining and extractive activities. National gold plating regulation hinders cross border activities and creates fragmentation in the Single Market. **Fragmented definition and regulation of these industries** can be addressed by means of **encouraging cooperation and best practice exchange among the regulators**.

Standardisation **Standardisation is instrumental for creation of markets for green and circular products** within the EU and internationally. They facilitate the uptake and consolidation of mature green solutions. This work needs to advance and EU could aim to keep leadership in green standard setting as new players intensify their activity in global fora.

Green transformation For green transformation at a largescale, **the policy framework could further support the business case for private investments**. Breakthrough technologies for deep decarbonisation require substantial upfront investments and higher operational costs to produce green products in the business environment where prices are set internationally and differentiation between green and conventional products is currently lacking. The EU ETS and many environmental regulations, e.g. Extractive Waste Directive, Industrial Emissions Directive and Environmental Impact Assessment Directive, are crucial in defining the operating environment for EIIs. While markets for climate-neutral and circular products are scarce, different levels of environmental regulation can affect the competitiveness of energy-intensive industries. A level playing field, an effective carbon leakage prevention framework and measures to create markets for sustainable products (including through the EU's Sustainable Products Initiative) are required to address these concerns. **All relevant policy tools could be used to create lead markets for green and circular products**. In most of cases there is still no business case for transformative investments, all available tools could be used to adjust policy framework, including **(1) Sustainable Product Policy**, allowing to distinguish clean and circular products on the market; **(2) competition policy and public procurement**, allowing necessary cooperation between market players and launch of the new markets for green and circular products[278]; **(3) availability of financial instruments allowing to de-risk initial investments** that are too risky for individual companies; **(4) development of relevant infrastructures and supply of large quantities of renewable energy and internationally competitive prices**. Furthermore, the regulatory framework has the potential to encourage the use of energy management systems and better process controls to reduce energy use, support industry to make cost-effective energy efficiency investments, invest in cogeneration, favour industrial symbiosis, encourage sharing of information about waste heat and finding economically attractive uses for it.

Digital transformation **Digital technologies and better use of data will act as crosscutting enablers for industrial transformation.** The Commission's proposal for a Data Governance Act[279] aims to respond to the lack of clear rules/mechanisms for secure data sharing.

Strategic Public Procurement Public procurement is an important tool for creating markets for green and circular products. There is a need to boost green procurement and shift to life-cycle costing approach, including trade-offs between production and use-phase emissions. The importance of public

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[278] The competition framework sets out criteria for assessing adverse effects on competition and pro-competitive effects of cooperation projects.
[279] COM/2020/767 final, p.5

procurement is not fully reflected in public policies, and low-carbon and circular products public procurement strategies are insufficiently implemented in practice. **Development of Sustainable Product Policy and its reflection in public procurement strategies will allow to use public procurement as an effective tool to launch and develop the markets for green and circular products.** Guidance on how to procure 'green' from the definition of the project to the implementation would help public investors.

Intellectual Property Intellectual Property will remain very important for maintaining and strengthening the leadership in green and digital economy and to prevent innovation leakage.

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) Raw materials are at the core of the green and digital transition. **Securing supply of raw materials is particularly relevant for all sectors in the EIIs ecosystem.** The EU needs to boost extraction and/or production of key raw materials in the EU and complement it with undistorted and sustainable supply of raw materials from global markets. The **implementation of the Critical Raw Materials Action Plan is a key task for the coming years.** Continued efforts to diversify supplies, establishing strategic partnerships and securing of adequate financial tools for their implementation will be an ongoing work.

Networks and governance

Industrial Networks **These are very important for enabling transition, pooling resources and sharing risks.** The already launched alliances (on Batteries, Plastics, Clean Hydrogen and Raw Materials) are relevant for EIIs. Reflections whether to launch a Renewable and Low-Carbon Fuels Value Chain Alliance have been announced in the sustainable and smart mobility strategy[280].

Clusters cooperation The European Cluster Collaboration Platform (EU hub for industry clusters) has validated 42 clusters on plastics, 7 in iron and steel, 21 clusters on paper and packaging, 8 in mining and quarrying (with a European Cluster Partnerships on Geo-Energy[281] with clusters from 5 Member States + Turkey), 2 on non-ferrous metals, 2 on ceramic materials and powders. **Their mobilisation would be very important to ensure the transition of the ecosystem as a whole.**

Pact for skills **Development of skills is needed to support green transition** in line with EU Skills Blueprints and other European programmes[282]. The green transition will require major and quick transition. It is unclear whether activities related to the Pact for skills will be fully solve the skill mismatch fast enough. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Digital Innovation Hubs They support the introduction of data-driven business models based on new technologies such as blockchain, Artificial Intelligence (AI) and High Performance Computing, to substantially increase the competitiveness of SMEs in the Energy-Intensive Industries with process optimisations and new instruments for circularity. They will offer a seamless service with the Enterprise Europe Network partners and the cluster organisations.

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[280] COM/2020/789 final
[281] https://www.clustercollaboration.eu/escp-profiles/geo-energy-europe
[282] More on the Pact for Skills: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

8. Energy – Renewables Ecosystem

1.2 million people employed[283]

1 % of EU value added (EUR 122 billion)

111,000 firms 99.4% of SMEs

Transformative initiatives

Scaling up investments in renewables to achieve the 2030 climate targets

The **renewables market needs to double** and at least an **estimated EUR 50 billion per year is needed in both production of and infrastructure for renewables to achieve the increased climate ambitions for 2030**. Significant growth in the use of renewables in transport, industry and buildings is needed, as well as increases in public and private investments in R&I[284] and public procurement. The Recovery and Resilience Facility includes a 'Power Up' flagship to direct investments towards renewables.

Transforming towards an integrated energy system

The **decentralised nature of renewables** will require seamless data exchange between producers, infrastructure, aggregators and storage providers, together with consumers and their appliances all through an **energy data space.** Better data-driven energy services to consumers, interoperable appliances, services, platforms and management systems will be crucial for an integrated energy ecosystem. A Digitalisation of Energy Action Plan is scheduled for 2022.

Strengthen the European renewables ecosystem as global leader in technology development

The European supply chain will need to be strengthened to facilitate access to rapid growing markets within the EU and globally, including activities to **support the supply and end-of-life options for the critical raw materials for renewables production, digitalisation, and for the production of batteries and electrolysers**. The Clean Energy Industrial Forum has been re-launched to support the competitiveness of the industry.

Towards an EU policy toolbox fit for purpose

InvestEU Catalysing private investment is key to **increase the financing needed** for accelerating renewables supply and uptake in industry, buildings, and transport to achieve the greenhouse emission reduction targets for 2030.

Main Single Market barriers within the ecosystem Creating a **common European market for renewables** is key to ensure investor certainty and cost-effective deployment. **Permit procedures** in Member States are perceived as one of the biggest obstacles to this growth potential, as they are lengthy and complex (particularly the ones also involving environmental impact assessments).

Strategic Public Procurement The **uptake of renewables in buildings and transport applications can be facilitated through public procurement**, especially by triggering additional investments in renewables and the development of integrated energy systems.

Green transformation The current EU target of at 32% renewables by 2030 will need to be increased under the revision of the renewable energy directive. The introduction of **new certification schemes for all renewable and low-carbon fuels**[285], including renewable hydrogen, will allow more transparency to the end-consumers, and can entice the rapid penetration of renewables in end-use sectors like industry, buildings and transport.

Digital Europe Programme Digitalisation of the energy sector is critical for delivering an integrated energy system, provide a cost-effective transformation towards a decarbonised energy system, and maintain European leadership in renewable energy technologies and integrated energy systems. This requires the rapid development of **energy data spaces**, **interoperable smart energy solutions, platforms, management systems**, and tools to provide **better data-driven energy services as well as facilitate energy infrastructure planning**.

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[283] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics. Data from 2018.
[284] (COM (2020) 953)
[285] EU strategy on energy system integration, COM(2020) 299 final

The ecosystem at a glance

Sectors included in the ecosystem	**Renewables include wind energy, solar energy (photovoltaics, thermal and concentrated solar power), hydropower, bioenergy (including sustainable biofuels), geothermal energy, ocean energy, and heat pumps. Furthermore, sustainable energy storage solutions, smart infrastructure technologies and energy conversion technologies, including electrolysers, are an important part of a clean energy ecosystem.**

Energy-Renewables

■ Gross Value Added, million Euro   ◆ Total Employment, thousands (right axis)

	Electricity, gas, steam and air conditioning supply	Manufacture of electrical equipment	Horizontal
Gross Value Added, million Euro	65,815	37,398	18,989
Total Employment, thousands	309	565	293
	D35*	C27*	
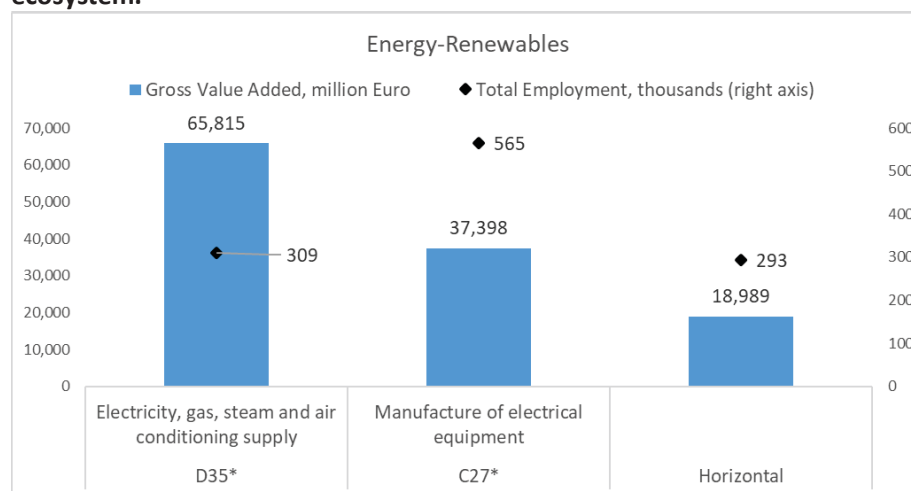
Notes: Data relative to the sector D35 refers to a share of 29% of the total, and is used as a proxy for the renewable share of energy generation. This coefficient is based on the renewable share of energy generation in each sub-sector: 32% of 35.1 (electricity); 4% of 35.2 (gas); 20% of 35.3 (steam). Applying these coefficients to VA and employment is of course an approximation, and should be taken with caution. The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem. Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	In the electricity sector alone, more than 50000 SMEs are active in the production of renewable electricity as well as 560 companies with a turnover of >50 million. The renewable heating and cooling sector is very diverse with many SMEs, and distinct supply chains for different biomass options, solar heating, geothermal heating, and heat pumps. The sector has a high turnover/job compared to other sectors (800k/job), and every million of investments in renewables and flexibility creates 25 jobs[286].
Current challenges	**The backlog of application procedures due to long permitting processes and complex environmental and spatial planning needs to be reduced[287].** Due to the COVID-19 crisis, data show that there were 10% fewer final investment decisions for total utility-scale renewable projects (excluding large hydropower) in the first half of 2020 than in the same period in 2019[288], although early estimates suggest that overall investments in renewables in the European market increased compared to 2019[289]. For wind, a 30% disruption is expected in 2020 compared to 2019 forecasts, and 20% disruption is expected for solar and heat pumps. This is estimated to result in an investment gap of EUR 14 billion for 2020. **The wind and solar PV industry – the largest markets in the EU[290] – also encountered supply chain bottlenecks due to manufacturing plants that were closed, namely in Italy and Spain in April 2020, and in China**. With the required market scale up, additional provisions are needed to strengthen the supply chains and create industrial-based cooperative platforms, including for raw material supply. Biomass and solar thermal projects encountered difficulties in intra-EU travel for employees,

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[286] IRENA (2020) The Post-Covid Recovery; IEA (2020) Sustainable Recovery
[287] https://ec.europa.eu/energy/sites/ener/files/renewable_energy_progress_report_com_2020_952.pdf
[288] IEA (2020) Renewables 2020
[289] BNEF (2021) Energy Transition Investment Trend 2021, data includes the UK.
[290] EUROSTAT, December 2020.

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	whilst rooftop solar PV and heat pumps encountered issues with installers unable to access residential homes. **Yet, the renewables industry, except for biofuels, has been relatively resilient** in the wake of the recovery, with a slight growth of solar PV compared to 2019.
Forward-looking assessment	**To reach the EU climate ambitions for 55% greenhouse gas emission reductions for 2030, the share of renewables needs to grow from 20% today, to approximately 38-40% in the energy mix.** This means the current investment gap is set to increase beyond the EUR 30 billion per year as estimated based on the current target of at least 32% renewables by 2030, and EUR 49 billion per year for the increased climate ambitions[291]. **The renewables sector is therefore a major growth market with significant opportunities for net job growth opportunities, whilst reflecting planetary boundaries.** For 2050, the jobs in the renewables sector are expected to double to 2.7 million in Europe[292]. With the share of renewables expected to double in the decade, there are also new opportunities to expand manufacturing of renewable energy technologies for the European market. Principles of the circular economy will have to be integrated through policies on eco-design and sustainable products. EU instruments will be needed to **catalyse private investments,** including through higher targets for renewables deployment. Increased annual investments are needed to enable energy system integration, including through electrification of end-use sectors, including heat pumps, better use of organic waste resources and heat, and additional production of renewable fuels and gases, including renewable hydrogen. Furthermore, significant investments are needed to **ensure that infrastructure is available** to bring renewable energy sources to the end-consumers, including strengthening local electricity and heat networks, the strengthening of the grid and repurposing existing gas infrastructure to support the transport of renewable hydrogen, including support for e-mobility and ports. **Investments to make the end-use sectors ready for renewables supply are also needed**, including building renovations, new industrial processes and e-mobility solutions.
Global context	**The European renewables industry is a global leader in certain technologies, with significant exports** – especially in the wind energy sector and enabling technologies for the integration of renewables, such as batteries and smart grid technologies. In cumulative terms, the European renewables market accounts for 25% of the global market. The EU is also expected to remain the largest market for renewable heat, with significant growth expected from renewable electricity. The renewables market remained relatively strong in 2020, is expected to rebound in 2021, with the EU being the second largest market after China[293].
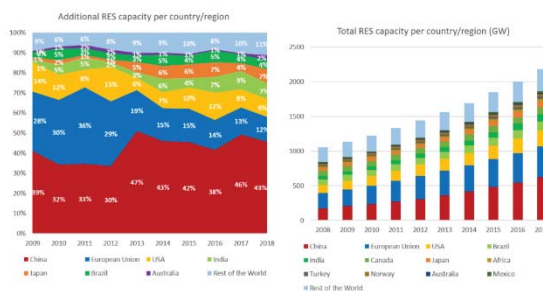
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[291] SWD (2020) 98
[292] IRENA (2020) Global renewables outlook
[293] IEA (2020) Renewables 2020
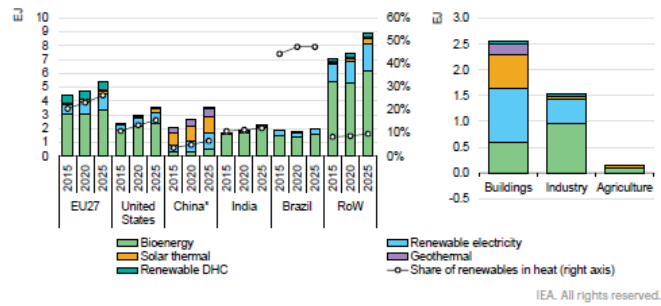
*Although China does not currently report bioenergy use in industry in its statistics, some bioenergy is consumed.
Note: RoW = rest of the world
Sources: IEA (2020), World Energy Statistics and Balances 2020 (database); IEA (2020), World Energy Outlook 2020.

With an established market and regulatory framework, the EU renewables industry is an attractive market for foreign investors. At the same time, emerging markets across the world provide significant opportunities as the clean energy transition moves ahead. EU companies have significant opportunities in emerging markets across the world, but are increasingly confronted with market access and regulatory barriers put in place by third countries to promote their domestic industry. Free trade and investment agreements and trade enforcement are important instruments to ensure undistorted trade and investment in clean energy technologies, and ensure market access for our companies Whilst the annual EU market for renewables will have double to achieve the 2030 targets, the majority of growth markets will be outside of the EU. At the same time, international competition is increasing with new technology suppliers from countries with rapidly growing renewables market expanding their activities across the globe.

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF The **'Power Up' Flagship** underlines the importance of renewable and hydrogen projects for a sustainable recovery. It would be important to integrate renewables investments in other flagship areas, such as the 'Renovation wave' and the 'smart mobility', linked to a charging infrastructure of Electric Vehicles. **For investments in renewables, local infrastructure and local projects have the highest job potential.** The RRF's stated ambition is to support the building and sector integration of almost 40% of the 500 GW of renewable power generation needed by 2030, support the instalment of 6 GW of electrolyser capacity and the production and transportation of 1 million tonnes of renewable hydrogen across the EU by 2025.

CRII+/ERDF/ESF/CEF These instruments are important to address the growing investment gap in the renewables sector as part of efforts to increase climate relevant spending under MFF. The Connecting Europe Facility will be available as of 2021 to support cross-border renewables projects, which could boost the industry. Furthermore, the Renewable Energy Financing Mechanism has been established to allow support for renewables projects across EU Member States. Supporting cross-border cooperation in the field of infrastructure network development to establish meshed infrastructure and joint application processes of different Member States will help to integrate the sector based on experience of Member States in the area of joint public procurement.

Horizon Europe (including European Partnerships) Continuous innovation will be needed to remain competitive, and improve the efficiency and capacity of technology, including in areas like new materials, new manufacturing processes, and new solutions for the installation, operation and maintenance of renewables projects. Digitalisation of energy will also require innovation to ensure interoperable systems and services, integration of renewables and appliances in balancing the grid and piloting of energy data spaces (as from 2021). Due to the rapid growth of mainly wind and solar PV, the development of new processes to support recycling and reuse of components, including critical raw materials, is essential for the unhindered growth potential and to reduce the industry's environmental footprint. It is necessary to reinforce research and innovation in the area of downstreaming and upscaling of renewable fuels. This includes advanced biofuels (which are the most readily deployable technologies of renewable fuels, and this could contribute to put in place hundreds of commercial plants) as well as the production of renewable hydrogen. **The newly established Clean Hydrogen Partnership will be very important to help scale up the European supply chain for renewable hydrogen**. The Clean Energy Transition Partnership is also playing a central role. It will contribute to development of the renewable technologies that are upstream in hydrogen and clean hydrogen value chain and are absolutely needed for a clean hydrogen production. Under the European Innovation Council, 300 million euros have been allocated to encourage breakthrough innovations delivering Green Deal objectives to high potential startups and SMEs. The engagement in Mission Innovation, in close collaboration with the Clean Energy Ministerial, contributes to strengthening the EU role in the world, in the context of the European Green Deal, by keeping countries involved in concrete discussions how to work on, learn from and facilitate deployment of clean energy innovations, and by keeping investment in clean energy high on the political agenda.

EU ETS Innovation Fund The Innovation Fund supports investments in innovative renewable energy technologies, energy storage and carbon capture and storage. This also includes production of low-carbon fuels/carriers such as clean hydrogen and manufacturing facilities such as batteries or PV panels. The Fund also supports decarbonisation of industrial processes and cross-sectoral projects with

renewable energy generation, storage and use. The support also includes carbon capture and use in the sectors covered by Annex 1 to the EU ETS Directive[294].

EU ETS Modernisation Fund The Modernisation Fund supports the decarbonisation of energy and industrial sectors in its ten beneficiary Member States. Renewable electricity generation, modernisation of energy networks or production of green hydrogen are among its priority areas for support.

Just Transition Fund Significant investments in renewables in coal as well as carbon-dependent regions could match existing infrastructure and skills in these regions, and could be promoted as one of the key markets to help regional development.

Digital Europe Programme The digitalisation of the energy sector is **critical for delivering an integrated energy system**, and a cost-effective transformation towards a decarbonised energy system. These include activities and pilots on interoperability of data and data spaces as well as data platforms and frameworks that build on the experience of large-scale pilots under Horizon 2020. The programme will call for the creation of an **Energy Data Space in 2023** which could provide a trusted data access, and support data sharing between energy generation, transmission System operators (TSOs) and distribution system operators (DSOs), across end-use sectors like mobility, commercial and residential buildings and appliances, and industrial processes. Furthermore, the **testing and experimentation facility for smart cities and communities** will allow this ecosystem to test the integration of renewables in community based energy systems. Under the Digital Europe Programme, the Commission is also supporting the reskilling and upskilling of workers through short-term courses in advanced digital skills.

InvestEU The Juncker Plan, predecessor of InvestEU, resulted in 50 TWh of additional electricity generation per year, of which over 91% from renewable resources[295]. To achieve our climate ambitions, we need close to a 1000 TWh of additional renewable power produced per year in 2030. The investment gap identified is EUR 30 billion per year for the current renewables target and EUR 50 billion per year to achieve the increased climate ambitions. With renewable power generation getting increasingly competitive, a new merchant market is emerging. By decreasing the risks associated with investments associated with renewable technologies, InvestEU helps reducing the cost of capital, especially in less mature markets Furthermore, new risks instruments will need to be created to cater to small- and medium-size enterprises to support the uptake of renewables.

Access to finance The EU taxonomy regulation on the establishment of a framework to facilitate sustainable investments and the delegated act provide the framework conditions for guiding investments towards renewables. At the same time, there are increasingly financing resources available from institutional investors for new supply projects in the renewables sector; however significant gaps still exist for local financing of infrastructure and small end-consumers.

EU Space Programme and European Defence Fund The EU Space Programme and the Defence Defence Fund could play a catalysing role in increasing the project pipeline and procurement of renewables in space and military applications, especially through innovation spillovers and in support of security and operational reasons. This could include support for research and innovation. Similar

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[294] https://ec.europa.eu/clima/policies/ets_en
[295] https://ec.europa.eu/commission/sites/beta-political/files/energy-sector-factsheet-oct_19_en.pdf
https://ec.europa.eu/commission/sites/beta-political/files/energy-sector-factsheet-oct_19_en.pdf
https://ec.europa.eu/commission/sites/beta-political/files/energy-sector-factsheet-oct_19_en.pdf

activities to support renewables programmes are already taking place in other countries, e.g. the renewables & microgrid programme developed by the US Department of Defense.

Supportive regulatory environment

Main Single Market barriers within the ecosystem **The Electricity Regulation and Directive have been updated and put in place**, and their timely and correct implementation, together with a liquid, competitive market offering dynamic price contracts is crucial to support the integration of renewables, including through a more central role for energy communities. This includes the use of heat pumps becoming competitive and benefitting from cheaper electricity in off-peak hours. The **gas regulation and Directive will need to be updated** to ensure a higher uptake of renewable gases and the preparations for the decarbonisation of gas package are underway. Many projects are developed independently from each other despite the fact that the efficient use of generated electricity can be greatly enhanced by so-called meshed grids linking the suppliers and consumers/transmitters of renewable electricity irrespective of the Member States concerned.

Furthermore, **for the emerging market of renewable hydrogen a regulatory framework needs to be developed that is fit-for-purpose for this nascent but rapidly growing market**, including through the revision of the TEN-E regulation. Enhanced market surveillance and targeted support to the build-up of supply chains will help to further boost the European renewables industry, particularly for rapidly growing markets such as for wind, solar PV, and heat pumps.

Standardisation **A framework for standardisation of renewable energy technologies is in place**, as well as means to track and inform consumers about renewable electricity, gases, heat and fuels. However, new standards will be needed to integrate distributed renewables in end-use sectors, ensure interoperability of different digital energy services and systems, and certification will need to be established for renewable fuels to ensure a fair comparison across the different decarbonisation options. The EU could play a more active role in accelerating the development of standards, including international cooperation.

Digital transformation Digitalisation has been recognised as one of the six enablers for a more integrated energy system based on renewables. In the energy sector, access to data across sectors like mobility, buildings and energy is instrumental for sustained investment. A **'Digitalisation of Energy Action Plan'** has been announced for 2022 in the European strategy for energy system integration. This communication will cover i) the development of a data-driven energy services market that will support flexibility of the energy system while providing better services to consumers; ii) empowering citizens to be part of the transformation ; iii) Enhancing the uptake of digital technologies in the energy sector; iv) Cybersecurity, and v) Addressing the energy consumption of ICT.

eGovernment **Permitting and administrative processes need to speed up to allow the renewables market to accelerate.** Digitalisation is expected to be key in doing so. The renewable energy directive already foresees simplified procedures, including through one-stop-shops, but additional efforts will be needed to address existing barriers that hinder the rapid deployment of renewables. Furthermore, urgent efforts to monitor and verify the implementation of existing rules and regulation around permitting are needed.

Green transformation On the supply side, **complex and burdensome administrative procedures** are perceived as one of the biggest obstacles to the growth potential of wind and solar photovoltaic (PV) sectors. The timely transposition of the Renewable Energy Directive could address

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this issue, including through the enhanced screening and elimination of redundancies in national permit procedures, reinforcing the ability in Member States for a systematic improvement of the handling of permit applications. Furthermore, **new legislation is considered to increase the existing target of at least 32% share of renewables in 2030, in particular by the increased uptake of renewables in end-use sectors like industry, buildings, and transport.** A revision of the renewable energy directive is being prepared, where new options to increase the share of renewables in transport, heating and cooling, and industrial applications are considered. There is also a high need of building capacity for renewable fuels to limit emissions in compliance with the Effort Sharing Regulation and the increased ambition of the European Green Deal to meet EU Climate Policy Goals in 2030 and beyond.

Strategic Public Procurement Public procurement can play a crucial role in enabling the development of integrated energy systems at local level, especially by triggering additional investments in renewables. Furthermore, additional investments in infrastructure networks are needed to tackle fragmentation and the inefficient use of the generated electricity.

Intellectual Property **Patenting activity in clean energy technologies peaked in 2012**, and has been in decline since[296]. The energy-renewables ecosystem is a high IPR-intensive industry and faces increasing competition from outside the EU, making the existing IPR framework all the more important. The unitary patent system proposed under the IPR Action plan will be a key tool for the EU's industrial recovery, especially for the renewable energy ecosystems.

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) **The renewables industry is an important driver for the demand of raw materials, including critical raw materials, where international competition for access to these materials is expected to increase.** The EU needs to address raw material dependencies and reinforce resilience of supply chains, including through international dialogue and undistorted trade and investment. Furthermore, developing domestic production capabilities for critical raw materials could improve security of supply, as well as recycling and other end-of-life options to recuperate raw materials. Research and innovation can play a key role in this regard.

Regulatory dialogue / cooperation Energy dialogues are in place with the major economies, in which renewables and renewables policies are taking centre stage. **However, renewables could also be introduced in other cooperation mechanisms, such as investment, trade, and industrial fora**.

Networks and governance

Industrial Networks The Clean Energy Industrial Forum for Renewables has been re-established[297], which will be an important vehicle to ensure political visibility, attract investments, and ensure a European supply chain. The yearly Competitiveness Progress Report[298] will support the monitoring of the indicators of the Clean Energy Industrial Forum for Renewable.

Alliances for batteries and clean hydrogen are already in place, which are crucial enabling technologies for upscaling the renewables sector. **Players from the renewable ecosystem are actively involved in the**

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[296] (COM (2020) 953)
[297] Based on the energy system integration and the offshore energy strategies
[298] As stipulated under Governance Regulation (2018/1999) article 35 (m).

European Clean Hydrogen Alliance. Alliance on Raw Materials will address the raw material dependencies and will reinforce resilience of supply chains.

Clusters cooperation Several cluster cooperations on renewable energy and energy efficiency exist. The tool could be promoted more widely in conjunction with the Just Transition Fund.

Enterprise Europe Network **The Enterprise Europe Network serves a significant amount of companies offering and looking for renewable energy technologies and services**. For this purpose, the EEN has also established a very active **Sector Group on 'Intelligent Energy'**, which gathers expert advisors in renewable energy sources, among others. As part of the EEN's roll-out of **Sustainability Advisors** and sustainability services, these services could be promoted more widely in conjunction with the new financing mechanisms that are being established for the industry.

Pact for skills **The clean energy technology sector continues to face challenges, in particular availability of skilled workers at the locations where they are in demand**[299]. Growth and jobs will not be achieved unless adequate and sufficient education and training opportunities are provided. The Pact for Skills[300] will be key for the acceleration of the renewables industry, including for offshore renewables as a major market for further deployment. The tool could be promoted widely in conjunction with the new financing mechanisms that are being established for the industry. Further initiatives would be necessary. Promoting training and skills would be one of the cornerstones of an industrial strategy on renewables. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Digital Innovation Hubs Digital innovation hubs will be important to help local SMEs, especially downstream, as well as end-users to take advantage of a more digitalised and decentralised energy system, including through local optimisation and use of distributed renewable energy resources.

Thematic Smart Specialisation Interregional Partnerships Partnerships such as the Sustainable Buildings Partnership, the Advanced manufacturing for energy applications Partnership, Solar Energy Partnership, Bioenergy Partnership and the Geothermal Energy Partnership promote interregional cooperation that support the development of renewable industrial ecosystem.

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[299] (COM (2020) 953)
[300] More on the Pact for Skills: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

9. Health Ecosystem

24.8 million direct employment[301]

9.5% of EU value added

493,000 firms
99.7% of SMEs

Transformative Initiatives

Boosting EU resilience and open strategic autonomy in the health area

Capacity building & digital upskilling to foster innovative healthcare services

Build a healthier society & empower citizens via advances in eHealth & leveraging the health data potential

The **structured dialogue initiative** announced in the pharmaceutical strategy for Europe will identify the causes and drivers of potential **vulnerabilities, and of potential dependencies of medicines supply chains**. The pharmaceutical strategy will also explore **how to tackle unmet needs** (e.g. antimicrobials, rare diseases). The **HERA Incubator** will help address the threats of new COVID-19 variant and the **Task Force for Industrial Scale-up of COVID-19 vaccines** will help to detect and respond to bottlenecks in production and supply of key inputs in real-time.

The current human and financial **capacity constraints** of healthcare systems need to be addressed, especially in light of future health emergencies and EU's ageing population. **Skilling of health workers** for the digital transformation is also a critical issue. **Proportionality tests before adoption of new regulation of professions, twinning exercises and dissemination of good practices** could help to foster innovative health care services.

The biggest opportunities in the coming years will stem from the **digital health technologies**. The upcoming **Regulation on Artificial Intelligence, legislative proposal on the European Health Data Space** and **standardisation** will bring more clarity to **health data** sharing, the **use of AI**, eliminate regulatory barriers and support a common EU-approach in the use of telemedicine services. The **Data Governance Act** proposal enables secure health data sharing.

Towards an EU policy toolbox fit for purpose

RRF can be used to address many of the Health ecosystem needs via **investments and reforms** of national health systems, strengthening resilience and crisis preparedness, primary care, increasing access to services, addressing the supply chain vulnerabilities as well as digital skills of healthcare workers, tele-medicines solutions and research, development and innovation

Industrial Networks such as industrial alliances, European Clusters Alliance, European Enterprises Network and Pact for Skills may be useful tools to **co-design and implement solutions** to current challenges: COVID-19 demand peaks, lack of skills, lack of reliable **intelligence on supply chains, raw material dependencies**, technological, political and governance challenge in the **health tech field.**

Strategic Public Procurement facilitates the purchase of **innovative and affordable health technologies[302], including green and digital solutions.** Public procurement plays a key role in bringing the EU industry, research centres, and EU and national regulatory authorities together and facilitates public-private cooperation with a view to address the needs of public health and health systems.

Strategic Partnerships in the health area could help to identify and **address vulnerabilities** of global supply chains of medical goods such as personal protective equipment, medical devices, pharmaceuticals that are of a key element of the EU's resilience and crisis preparedness. **The EU has already started to work with WTO members** to increase the cooperation and facilitate trade in health goods.

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[301] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics.
[302] WHO definition: A health technology is the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives.

The ecosystem at a glance

Sectors included in the ecosystem	**Manufacturing of pharmaceuticals and their key inputs, medical devices and equipment and personal protective equipment; Healthcare services (medical and residential care); Health tech and related services. Companies are often part of global and complex supply chains.** EU-based production for the goods segment has been declining partially due to re-location or subcontracting of production extra EU. The biggest part of this ecosystem's contribution to the EU added value is generated by health services provided through health workers and health care facilities.
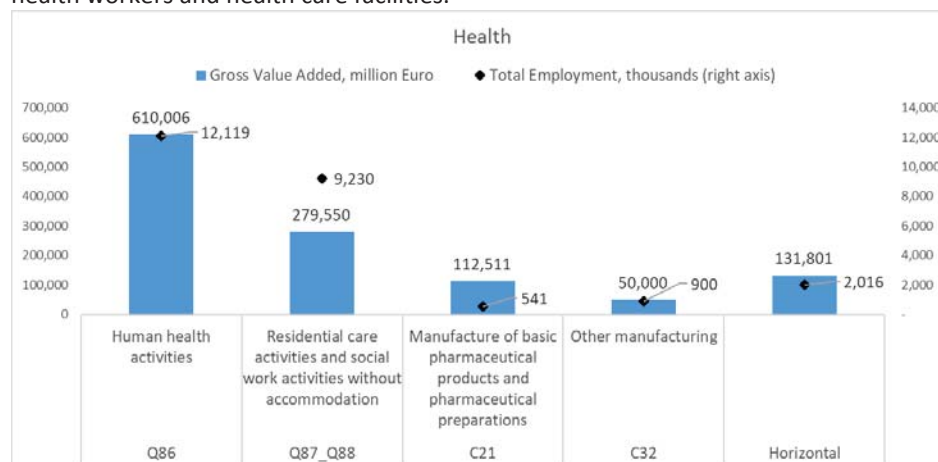
Note: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	The industrial structure of the Health ecosystem is diffused, with some big players and a significant number of SMEs. However, potential synergies between those two groups are not fully tapped and thus the upscaling of SMEs is seriously hindered. In addition, an even more important limiting factor is the fact that the demand side, which consists mainly of public buyers of the supplies or services, is highly fragmented. This fragmentation makes it very difficult for SMEs to access business opportunities. As a result the health ecosystem is not fully functioning and is hindered in its function of becoming an incubator of new innovative breakthroughs that are needed if we want to give the EU health industry a real boost and contribute to economic growth in the EU.
Current challenges	**The main structural weaknesses are supply chains vulnerabilities, healthcare capacity constraints and fragmentation.** As part of the supply chain is located in third countries (Asia in particular), goods production for the EU market relies on critical inputs from there (e.g. certain chemicals for medicines, certain components of medical devices, personal protective equipment). Healthcare suffers (human and financial) capacity constraints[303]. This is partly due to skill shortages and pay and working conditions are obstacles to attract and retain skilled staff needed to ensure resilience of the system in the longer-run. Coordination between national and/or public authorities within Member States remains difficult. Too often, public buyers award contracts to the bidder with lowest price only, which leads to market concentration and thus reduces the number of suppliers based in the EU. Further, they do not always have good knowledge of market suppliers. With regards logistics and supply chain management, there remains room for improvement in most Member States. **The COVID-19 crisis created demand peaks and showed coordination gaps at EU level.** The existing structural weaknesses and constraints impacted the capacity to deal with surge in demand despite efforts to ramp up production. During the first wave, restrictions to the free movement of goods on the Single Market affected the availability of certain medical goods and personal protective equipment (including for workers). The crisis highlighted the need for coordination, tools

[303] In the COVID-19 context, the need to address healthcare capacity constraints has been stressed for instance in COM/2020/724 final and COM(2020) 786 final

	to monitor production and match demand-supply at the EU level in certain cases. **The pandemic forcefully highlighted the value of innovative health technologies,** including in diagnostics and treatment and made the case for **strengthening research and innovation** in health. A key challenge is to build on this momentum and take major steps towards the digital transformation of health and care, building on digital technologies like AI and High Performance Computing while ensuring protection against cyber threats but answering the unmet needs at the demand site. Projects such as Innovation Broker can contribute to facilitate such matching. **New COVID-19 related challenges and threats continue to emerge**, ranging from variants to vaccine adaptation or mass production.
Forward-looking assessment	**Strengthening supply chains, improving the resilience of health systems, ensuring accessibility to and affordability of medicines, medical devices, health technologies, health services and continuity of care in health emergencies, addressing public health and health systems' needs and seizing opportunities of digital and green transition are the priorities of this ecosystem**. However, lack of reliable intelligence on supply chains can hinder sound policymaking. Improving the resilience of healthcare system requires more investment in capacity (including recruitment and skills), coordination, prevention and quality of care. Strategic public procurement and better knowledge of the suppliers by buyers can lead to more efficient purchases of medical goods and to the supply of greener solutions and innovation allowing for optimised care pathways. In order to boost COVID-19 vaccines production capacity in Europe, the Commission has set-up a **Task Force for Industrial Scale-up of COVID-19 vaccines** to detect and help respond to issues in real-time.[304] To address the threat of variants, the Commission will establish and operate a new bio-defence preparedness plan called **HERA Incubator**, to access and mobilise all means and resources necessary to prevent, mitigate and respond to the potential impact of variants.[305]
Global context	**The EU health industries are key players although in terms of global sales, the relevant market segments are dominated by North America** (e.g. in 2018, North America accounted for 48.9% of global sales of medicines compared to Europe (incl. Switzerland) accounting for 23.2%[306]) **or Asia** (e.g. for components for masks and gloves; regarding generic active pharmaceutical ingredients (APIs), the EU accounts for 24% of the world's API production compared to 65.5% being produced in Asia Pacific). Europe (incl. Switzerland) accounts for 27% of the medical devices market[307]. While R&D is a critical factor in global competition, EU invests relatively less than trading partners: 19.2% of industrial R&D investments in the EU goes in health innovation (compared to 26.4% in the US)[308]. The EU share of private unicorns in the health sector is 10% (compared to 8% in the US and 6% in China[309]). The EU pioneered on sophisticated biologic innovative medicines (and biosimilars), however, Asia and the US are rapidly catching up.

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[304] COM(2021) 78 final
[305] COM(2021) 78 final
[306] https://www.efpia.eu/news-events/the-efpia-view/blog-articles/would-the-last-pharmaceutical-investor-in-europe-please-turn-the-lights-out/
[307] https://www.medtecheurope.org/wp-content/uploads/2019/04/The-European-Medical-Technology-Industry-in-figures-2019-1.pdf
[308] 2020 EU Industrial Research and Development Scoreboard
[309] 2020 EU Industrial Research and Development Scoreboard

Mapping of policy tools in more detail

Funding and budgetary programmes

⚡ RRF   The RFF can address many needs identified for this ecosystem: (i) **supply chains vulnerabilities**; (ii) **resilience of healthcare systems**; (iii) investment in **innovative and sustainable production technologies**, (iv) **digital solutions**. A number of countries have proposed to invest in their health systems in order to improve resilience in different domains.

CRII+/ERDF/ESF/CEF **ERDF** can be used to transform and **improve health systems and regional health infrastructure, for digitalisation** (e.g. the Smart Specialisation Strategy, Digital Innovation Hubs, Testing and Experimentation Facilities) and transformation of health systems (e.g. integration of care, strengthening of primary care, disease prevention and health promotion, increasing the access to health services). For instance, in Brussels, ERDF funded centres for integrated care for vulnerable people, oncology training programmes, an application to access new rapid tests for chronic disease, a transdisciplinary and inter-university laboratory. **ESF+ can support improving accessibility, including for persons with disabilities, effectiveness and resilience of health systems. Reallocations under CRII+ were used** to purchase medical equipment, medication and personal protective equipment for healthcare facilities **during the COVID crisis**. **The REACT-EU initiative aims at increasing support to Member States, bridging the gap between first-response measures and longer-term recovery**. It provides additional funding for the most important sectors assisting the crisis repair actions that will be necessary to lay the basis for a green, digital and resilient recovery. **This involves among others support to health systems**.

Horizon Europe (including European Partnerships) Cluster 1 'Health' can support **innovative health technologies, ensure that they match public health needs and health systems' needs, ensure accessibility, affordability and availability**, including the green manufacturing of such health technologies as well as the uptake of innovative and digital health solutions, which effectively make health systems more effective and resilient. The planned **European Partnership on Innovative Health[310]** and the European Partnership on Health and Care Transformation[311] are expected to contribute significantly towards these goals.[312] Cluster 4 'Digital, Industry and Space' can promote **affordability, sustainability and security of supply of pharmaceuticals and chemicals, smart and multifunctional biomaterials for health innovations,** as well as provide concepts for circular economy solutions for **unsorted plastic (and other) waste such as personal protection equipment**. Horizon Europe will create a network of relevant research and technology organisations to increase uptake of digitally-enabled solutions.

Digital Europe Programme Digital Europe together with the Connecting Europe Facility will be used to create, scale up and deploy the **digital infrastructure needed to establish the health data space**. In particular, both programmes address the challenges of securely linking different kinds of health data across borders (such as electronic health records, images, and genomic data) and enabling its secure accessibility for research and innovation purposes. Digital Europe will also enable innovators in the sector to **deploy** their **AI and robotics based products faster in the market through a dedicated testing and experimentation facility.** The Digital Europe Programme will fund the design and delivery of specialised

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[310] https://ec.europa.eu/info/files/european-partnership-innovative-health_en
[311] https://ec.europa.eu/info/files/european-partnership-health-and-care-systems-transformation_en
[312] https://ec.europa.eu/info/files/european-partnership-innovative-health_en

programmes in key capacity areas like data and AI, cybersecurity, quantum and HPC and support the reskilling and upskilling of workers through short-term courses in advanced digital skills.

InvestEU The Research, Innovation and Digitisation (RID) window will fund high-risk and/or large-scale projects in the areas of **infectious diseases and antimicrobial resistance; rare and complex diseases; biomarkers/diagnostics/medical devices; and neurodegenerative diseases**, specifically targeting late stage clinical development, validation and market entry. InvestEU aims to fill in the investment gap as regards the **innovation and modernisation of health and care systems,** and allows to provide support for **renovation** of hospital and other care facilities.

Supportive regulatory environment

Single Market Surveillance There are **issues with capacity of Notified Bodies** and with new waves of infections there is the **risk of having non-compliant personal protective equipment entering the EU market** (NB: also relevant under enforcement of Single Market legislation).

Main Single Market barriers within the ecosystem **Regulatory barriers** in the health ecosystem relate to **complex regulatory environment and a lack of interoperable solutions**. **Systematic notification** via the SMTD Directive (EU) 2015/1535 of new draft national technical regulations and **cooperation on the adoption of voluntary international standards** for electronic health records, medicines and smart medical devices will help eliminating these obstacles. **High regulation, market fragmentation, and questions about cost-effectiveness and lack of understanding of new technology** hinder innovative health care companies to thrive. This can be overcome by **twinning exercises and demonstration actions, dissemination of good practices**, the provision of **assistance to SMEs** and the **promotion of the development of digital skills**. **Restriction of specific technologies** or modes of pursuit of health professions affects the development and use of modern health technologies and prevents the efficient practice of health care providers. The **proper implementation** of Directive (EU) 2018/958 on **a proportionality test before adoption of new regulation of professions** will help to eliminate unjustified restrictions. In the area of health public procurement, it appears that **public buyers often do not comply with the EU public procurement rules**, however monitoring tools are very limited. Member States introduce measures to limit the free movement of pharmaceuticals (parallel trade) if there are risks of shortages.

Standardisation It can help to consolidate EU position on global markets and to improve healthcare cost-efficiency. The **EU is leading the global effort towards regulatory convergence. The development of harmonised quality and safety standards for personal protection equipment and medical devices is improving.** A Commission recommendation on a European electronic health record exchange format to unlock the flow of health data across borders provides a framework for the further **development of common technical specifications for secure health data sharing across EU Member States. CEN is currently developing Technical Specification for mHealth**. However, when it comes to procurement, a general lack of standardisation makes it difficult for public buyers to avoid vendor lock-in. Standards for widely used medical equipment would reduce this risk.

Digital transformation The Commission's proposal for a Data Governance Act[313] aims to respond to the lack of clear rules/mechanisms for secure health data sharing across borders. **Lack of common approaches between Member States** (e.g. secondary use of health data; reimbursement rules for use of

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[313] COM/2020/767 final

telemedicine services) results in fragmentation, which **could be addressed in the legislative proposal on the European Health Data Space in 2021**. Stronger framework for use of Artificial intelligence is needed. The revision of the pharmaceutical legislation will assess additional needs for the digital transformation of the sector.

eGovernment The current legal framework already mandates the use of digital solutions in key stages of the public procurement life cycle, such as the bids submission and the acceptance of invoices. The **uptake of digital tools is rapidly increasing**. However, **data quality still needs to be improved**. The implementation of the new eForms (Implementing Regulation (EU) 2019/1780) and the future Open Data Space for Public Administrations[314] can help achieving better governance in the Public Sector.

Green transformation The pharmaceutical strategy[315] sets ambitious agenda regarding environmental impact of pharmaceuticals and of their manufacturing and waste, with a **specific focus on the antimicrobial resistance**. During the COVID-19 crisis, production of critical single-use personal protective equipment (e.g. masks) was ramped up thus creating additional waste, which if not properly managed and littered, goes against the commitments to fight plastic pollution and the commitment to shift towards a more circular economy. A further need of this ecosystem concerns the **renovation of hospitals to improve their energy performance**. The green tech investment initiative, as mentioned in the SME strategy, is also relevant to increase the **access to equity finance for innovative SMEs and start-ups** that develop and adopt **green tech solutions**. Green tech investment could encourage the development of innovative solutions that will help the health ecosystem to achieve the green transition.

Strategic Public Procurement A better uptake of the strategic use of procurement would help improve the sustainability of these supply chains. Moreover, value-based procurement is a useful tool to better integrate digital technology and innovative solutions in the health sector. This procurement is not limited to the purchase of medical goods, but considers the care path of the patient integrating criteria related to health system performance and patient outcomes, and aiming at more efficient processes and better health outcomes.

Intellectual Property The Commission announced in November 2020 measures to simplify and streamline the EU pharmaceutical intellectual property system and re-stated the European Commission's support for a rapid roll out of the unitary patent system. It will explore new types of incentives to tackle unmet needs (e.g. antimicrobials, rare diseases).

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) There are **no strategic partnerships to address vulnerabilities** stemming from production of certain critical inputs in third countries (personal protective equipment, medical devices, pharma) although many countries share similar concerns regarding for instance the concentration of sources of supply, manufacturing and quality issues. Better information exchange could contribute to addressing such vulnerabilities and strengthening the resilience against the external shocks in case of another global health crisis. To **improve the predictability of the trade in health goods**, the EU will work together with **WTO members** on increased cooperation and trade measures facilitation on a multilateral level.

Networks and governance

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[314] COM/2020/66 final
[315] COM(2020) 761 final

Industrial Networks The Industrial Alliance on Raw Materials will address the raw material dependencies and will reinforce resilience of supply chains. While not being an industrial alliance, a structured dialogue[316] with the actors of the pharmaceutical value chain, public authorities, civil society and research community was announced in the 2020 pharmaceutical strategy for Europe. It aims to 1) gain a better understanding about the functioning of the global pharmaceutical supply chains; 2) identify causes and drivers of potential vulnerabilities, including potential dependencies, threatening the supply of medicines; and 3) put forward measures and formulate policy options to be considered by the Commission and other authorities in the EU to strengthen the EU's resilience and ensure the security of supply of medicines. The deployment of European Health Data Space will provide the necessary data sharing infrastructure for diagnostic tools and treatments.

Clusters cooperation There are many cluster organisations working on health related topics. The European Clusters Alliance supports the uptake of Digital Health Solutions, including the Council of European Bioregions (CEBR).

Pact for skills The Pact[317] will facilitate public-private cooperation and set up large-scale partnerships, including at regional level. These partnerships will involve all stakeholders, notably SMEs who struggle with access to skills. It will also facilitate access to information on EU funding instruments for skills by offering a single-entry point at EU level. A multi stakeholder roundtable on 16 February 2021 kick-started this process. It will depend on private actors and national authorities in charge of re- and up-skilling policies to take targeted actions and establish a partnership. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Enterprise Europe Network EEN provides support to SMEs and facilitates business and technology partnership. It proved useful to address demand peaks during crisis e.g. the specific 'Healthcare against COVID' market place helped SMEs and public services to solve personal protective equipment shortages in 2020.

Digital Innovation Hubs Several of the European Digital Innovation Hubs (EDIHs) are specialised in the health sector. The network of EDIHs being set up under the Digital Europe Programme can help ensure that every company, small or large, high-tech or not, can take advantage of digital opportunities to optimise their production processes, and to innovate their products and business models.

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[316] https://ec.europa.eu/health/human-use/strategy/dialogue_medicines-supply_en
[317] More on the Pact for Skills: https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

10. Mobility – Transport – Automotive Ecosystem

14.6 million people employed[318]
(at least 16 million including indirect jobs)

7.5% of EU value added
(EUR 906 billion)

1.8 million firms
99.7% of SMEs

Transformative initiatives

A Fit For Purpose Legal Framework

The recently adopted Sustainable and Smart Mobility Strategy set out a predictable pathway for the ecosystem. Together with existing initiatives, they foresee major legislative adaptations (Euro7, CO2 standards, FuelEU Maritime, Rail Freight Corridors regulation, Combined Transport and batteries regulation). The ecosystem as a whole has to face huge investments both in legacy and green technologies at the same time. In the automotive sector alone, each car maker will have to spend up to €50 billion to address automation, connectivity and electrification challenges[319]. Clarity on legal framework is therefore a must.

Shift To Clean Mobility

So far, the **European Battery Alliance catalysed more than EUR 20 billion of private and public investment from 60 companies in 12 Member States. It shows how strategic dependencies can be successfully addressed.** It is expected that by 2025, EU battery cell production would reach **200-300** GWh. This would allow to produce 4 to 6 million electric vehicles[320]. The Clean Hydrogen Alliance will also be key for the whole ecosystem.

Fostering Automation

EU already has a legal framework for the approval of autonomous vehicles (General Safety Regulation) and for increased interoperability and capacity of rail transport (European Rail Traffic Management System). **Ensuring the deployment of key digital enablers and removing barriers to data sharing will be critical to improve efficiency and develop new market opportunities.** A vehicle will soon generate up to 4,000 gigabytes per day[321].

Towards an EU policy toolbox fit for purpose

Industrial Networks Any possible future alliance will benefit from the success of the European Battery Alliance in building a sustainable and circular value chain.

Pact for Skills The green and digital transformation will have huge impact on employment as well as up/re-skilling. Skills will be needed in chemistry (batteries), electronics, cyber security and artificial intelligence, as well as basic digital skills for the whole workforce.

RRF EU Recovery and Resilience Fund will help Member States to invest and launch reforms plans that will contribute to roll out recharging and alternative refuelling infrastructure as well as fleet renewal. **The RRF's stated ambition is to build, by 2025, one million out of the three million charging points needed in 2030 and half of the 1000 hydrogen stations needed.** Better integration and interaction of the different modes of mobility (and the needs of different transport users) will also be critical.

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[318] Figures for direct employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics. Data from 2018.
[319] McKinsey
[320] Data represents expected production (based on announced industry investments), with average battery capacity of 50kWh. Sources: Benchmark Minerals Gigafactory Tracking, Innoenergy, Own calculations on basis of announced investments
321 Intel.

The ecosystem at a glance

Sectors included in the ecosystem	**The Mobility – Transport – Automotive Ecosystem covers automotive, rail and waterborne. It is characterised by long and complex supply chain.** The ecosystem is dominated by a few players that became global players.
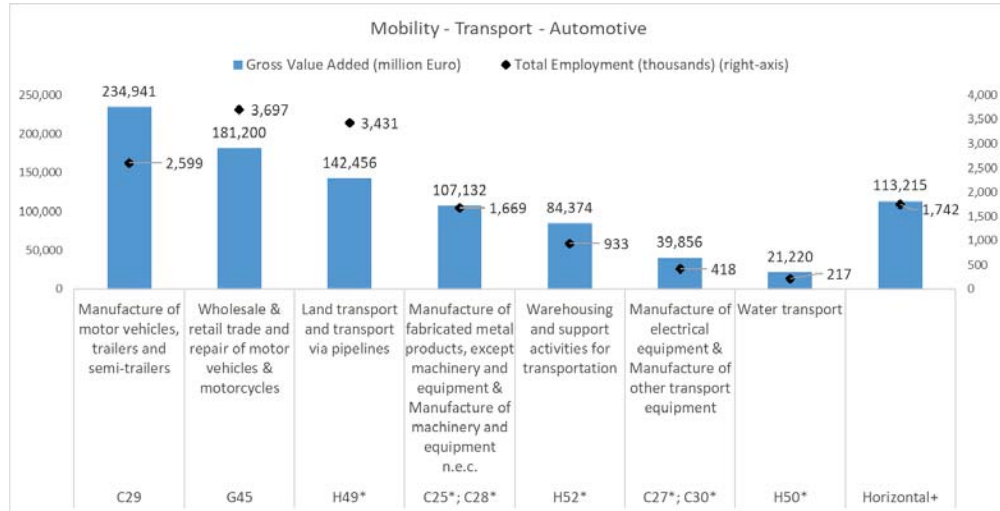
Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem; +Excludes contribution of C25 and C28.

Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	SMEs are not only predominant in retail (e.g. automotive), they are also directly engaged in production (and are often key suppliers to many larger manufacturers as they offer unique expertise and technical know-how at the level of components and sub-assemblies. They promote innovation through their flexibility, agility and highly specific knowledge. As an example, around 16 % of companies in the segment of the manufacture of locomotives and rolling stock and around 20% companies in the segment of signalling and train control equipment are SMEs. The main challenges for SMEs in the ecosystem are access to international markets, access to finance and protection of intellectual property rights.
Current challenges	The **automotive industry**, that was already facing structural challenges (CO_2, pollutant emissions, electrification), was hard-hit and suffered an unprecedented 23.7%[322] decrease of passenger car sales in 2020. Several carmakers[323] had to be bailed out due to liquidity problems. The massive use of furlough schemes did not prevent the announcement of several plant closures/job losses[324] at manufacturer or supplier level. Market volume in the **rail industry** expected to drop by 8% in 2020 due to the COVID-19 crisis. The long term rise in public debt risks reducing the size of rail products market, in particular in the western part of the EU. However, in the short term large amount of unprecedented fiscal stimulus and EU recovery programmes may limit this risk. The pandemic has hit **European shipyards** extremely hard in 2020, with new orders in Europe declining[325] around 60% in terms of Compensated Gross Tonnes (CGT) and by 77% of value. Yet, the impact of the COVID-19 pandemic was less

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[322] Source ACEA.

[323] FCA and Renault received state aid under the Temporary Framework to support the economy in the context of the coronavirus outbreak.

[324] Nissan, Renault, Bridgestone, Continental, etc.

[325] Shipbuilding includes the construction of ships and vessels both for commercial and naval use (i.e. for defence purposes), so there may be overlaps with the ASD ecosystem, although COVID19 has impacted the two market segments differently.

	pronounced in Asia, where governments have put in place enormous stimulus packages, local content policies and financing tools targeted to their domestic shipbuilders.[326] Given the huge investments needed to accompany the industrial green and digital industrial transformation and the global context competition rules are a vital part of the twin transition on green and digital.
Forward-looking assessment	All three components of the ecosystem face the same challenges in terms of **decarbonisation**, **digitalisation** and **global competition**. Clean technologies will reduce assembly costs (electrified vehicles have much less components), while self-driving and connectivity (e.g. access to in-vehicle data) will create new markets and services building on software and computing systems, requiring the acquisition of new skills in Europe. Huge investments are necessary to address these challenges[327], triggering technological alliances between manufacturers or with big technology companies.[328] Certain players also consider shifting to new business models to generate to revenue streams to compensate for the stagnation of volume sales. While short-term stimulus (scrapping/purchasing schemes) may address weak demand, more structural measures are needed to accompany the huge investments and to accelerate further decarbonisation (where the whole ecosystem is lagging) and digitalisation. The rebound of the ecosystem will very much depend on investments not only in the new technologies but also in the associated infrastructure as well as reskilling of the workforce. Digitalisation and automation can offer new opportunities for skilled workers, notably young workers and women. Intermodality must also be enhanced.
Global context	The pandemic has shown EU's supply chain dependence (e.g. specialised engines, electronic components) on third countries. EU companies are facing competition from Asia also in sectors where they were leaders. This happened in commercial cargo shipbuilding (in recent decades predominantly to Japan, South Korea and China) and it is happening now in certain rail and automotive markets (EU is now the second after China in terms of car market size and production). The example of the maritime industry shows that a niche strategy (cruise and passengers ships) can be risky, especially when faced with pandemic and global crisis. It is essential to ensure that EU makes the most of competition rules and Trade Defence Instruments[329] in today's world[330] and to make the most of Trade Defence Instruments[331]. Export markets are crucial to keep leadership and finance, investments in new technologies. Existing Free Trade Agreements (FTA) have been beneficial so far. Completion and finalisation of ongoing or completed trade negotiations (with e.g. Mercosur) will be important to provide new outputs to EU industry. As well as improved market access to EU industry.

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[326] Compared to Chinese shipyards' where order intake declined of around 20% from last year (in terms of CGT). Source: SEA Europe Market Monitoring.

[327] VW alone will spent EUR 75 billion for electrification and digitalisation until 2025.

[328] For example: (VW/Ford on self-driving). On digitalisation uptake either EU OEMs are partnering with big tech companies (Daimler-Nvidia or Waymo-FCA/Waymo-Volvo), or are developing in-house digital brands (VW /Car.software).

[330] A New Industrial Strategy for Europe, COM/2020/102 final

[331] For example, in the shipbuilding sector, traditional 'border measures' such as countervailing or antidumping duties are difficult to apply to unfairly traded ships. Indeed, these ships are often not imported/registered in the EU.

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF Funding Member State actions on charging and refuelling infrastructure, promotion of future-proof clean and digital technologies to accelerate sustainable, accessible and smart transport technologies (e.g. electric vehicles and clean vessels); stimulating demand through fleet renewals and a modernisation of rail and waterborne infrastructure ('Recharge and Refuel') in line with the objectives of the smart and sustainable mobility strategy, support the deployment of Cooperative Intelligent Transport Systems and 5G corridors for Connected, Cooperative and Automated Mobility (CCAM) and rail in combination with CEF funding. Crucial to support also R&I, automotive & transport industry modernisation and transformation of manufacturing and business model (e.g. Manufacturing 4.0, robotisation and value creation model implementation, relocation of production lines).

IPCEIs In December 2019, the Commission authorised State aid for the first battery IPCEI which involves 17 companies spread across 7 Member States and a range of innovative projects all along the value chain. The IPCEI decision authorised the granting of up to EUR 3.2 billion in State aid and this is expected to leverage a further EUR 5 billion in private sector investments. State aid for a second IPCEI was recently approved by the Commission in January 2021. This IPCEI involves 42 direct participants with activities in 12 Member States. The IPCEI decision has authorised the granting of up to EUR 2.9 billion in State aid with a further EUR 9 billion expected in private sector investments[332].

CRII+/ERDF/ESF/CEF CEF is applicable to mobility, transport and automotive particularly for infrastructure (alternative fuels infrastructure, (cooperative) intelligent transport systems smart grids, 5G corridor deployment), connected automated & connected mobility projects (incl. with cross-border, e.g. Project Terminal DE-BE-LU-FR or 5G sections for Connected and Automated Mobility (CAM) and rail) underpinned by cross-border cooperation agreements between Member States, e.g. Via Baltica. CRII+ support SMEs (working capital, cash flow issue) and job creation/youth employment for targeted automotive and mobility projects. ERDF and CEF are important funding tools for the rail sector, allowing for funding to expand, modernise and develop 'missing links' in the European rail network. CEF transport has supported ITS corridors for many years, since 2016 strengthened by the creation of the C-ROADS platform, uniting 18 Member States in harmonized deployment of C-ITS, improving road safety and traffic efficiency as well as preparing for CCAM. CEF Digital (building on the 5G Strategic Deployment Agenda for Rail released in April 2020 and the one for Connected and Automated Mobility released in October 2020), will stimulate investments into the deployment of pan-European 5G Corridors for Connected and Automated Mobility and rail. This activity will be key to provide the bandwidth required for the digitalisation of the automotive, mobility and transport sectors, along with investments in artificial intelligence, cybersecurity, supercomputing and cloud computing.

Horizon Europe (including European Partnerships) Huge R&D investments must be undertaken in clean technologies (batteries, hydrogen) as well as in digitisation (self-driving, connectivity, intermodality). Cluster 5 is relevant for the mobility ecosystem, providing that an adequate budget is allocated to the proposed partnerships. Ongoing projects already support decarbonisation (battery and other zero emission vehicle technologies) and self-driving (AI, on road testing, sensors). The three proposed partnerships 'Towards a competitive European industrial battery value chain (Batt4EU)', 'Towards zero emission road transport (2Zero)' and 'Connected, Cooperative and Automated Mobility '

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[332] https://ec.europa.eu/commission/presscorner/detail/en/IP_21_226

will benefit these sectors. The two proposed partnerships 'Transforming Europe's rail system' and the 'Zero - Emission Waterborne Transport' will likely benefit the rail and waterborne sectors.333 Two EU missions under Horizon Europe will focus on solving major societal challenges as adapting to climate change and living in climate-neutral cities, both closely related to transport and mobility. In relation to defence related shipbuilding, the sector will also be eligible for funding from the European Defence Fund. Under Cluster 4, four partnerships will contribute to the digitalisation of the automotive sector, namely: (i) the partnership for Smart Networks and Services (SNS), (ii) the partnership for Key Digital Technologies (KDT); (iii) the partnership on AI, data and robotics and (iv) the partnership Made in Europe.[334]

Digital Europe Programme The use of B2B digital platforms are instrumental for the proliferation of the ecosystem, which manages data flows across increasingly complex supply chains eventually leading to integrated Manufacturing Data Spaces. Exploiting data from connected vehicles will spur innovation for autonomous driving, traffic safety and mobility management. Digital Europe will enable the ecosystem to use cloud-to-edge based services, and a Mobility Data Space to develop new value-added data services across industrial actors and transport infrastructure providers. Furthermore, the ecosystem is encouraged to use the Edge-AI testing and experimentation facility to get access to secure, energy efficient and powerful AI chips that can be embedded in cars and other devices.

InvestEU It will fund major but also smaller-scale projects in (i) Batteries (more than EUR 1 billion in 2020 already with an estimate of total need of EUR 20-30 billion), (ii) connected and automated automotive, (iii) charging and refuelling infrastructures (more than EUR 2.5 billion already financed); (iv) clean vehicle fleet renewal (leased and shared fleet); (v) Modernisation of automotive & mobility industry production lines/supply chains (more than EUR 1.8 billion in 2020); (vi) support to new and advanced technologies for export (e.g. QEV project) – Also important for the ecosystem via EFSI (R&I) and for 5G projects.

Supportive regulatory environment

Single Market Surveillance Recently adopted motor vehicles Type-Approval Regulation 2018/858 has introduced market surveillance at EU level and reinforced Member State cooperation in a dedicated Forum. Particularly relevant in the RRF context, which aims at supporting market surveillance infrastructure and related investment to strengthen safety and reliability.

Main Single Market barriers within the ecosystem **RRF can support Member States' enforcement efforts**. This is particularly relevant for automotive market surveillance that require dedicated infrastructure (laboratories), hardware (portable emission systems), software (to detect defeat devices) as well as training to new technologies. This will also be critical to ensure safety of embedded Artificial Intelligence systems, ensure security of connected vehicles and clean air in urban areas. The 4th railway package, adopted in 2016, aims at reducing the fragmentation of the internal market for rail. The technical pillar of the railway package aims to simplify processes and reduce costs by establishing the European Union Agency for Railways as a 'one-stop-shop' for vehicle authorisation, safety certification,

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[333] The former aims at delivering technologies necessary for the railway system to become the backbone of an integrated and sustainable mobility in Europe; the latter to mobilise the waterborne sector to reinforce EU's global leadership in green shipping technologies, possibly regaining lost markets with a green technology lead.

[334] The first one intends to empower several vertical domains including smart transportation, and connected and automated mobility; the second one focuses on the development of electronic and photonic (light based technologies) components, and the software in the automotive sector; the third one will drive innovation, acceptance and uptake of these technologies, and their application to various sectors including the automotive one.

and the European Rail Traffic Management System ('ERTMS ') trackside approval in Europe. Full implementation now to be enforced.

FEU must remain a major promoter of international harmonisation to avoid fragmentation of global markets. This is relevant for the whole ecosystem, in particular for the maritime and railways components as final products can be in service for 30 years or more. Deployment and further standardisation in the field Intelligent Transport Systems services will also support the deployment of automated mobility.

Digital transformation Regarding the **automotive sector**, the EU is the first jurisdiction in the world that has adopted a legal framework for the approval of automated vehicles.[335] In addition, new rules to ensure fair and safe access to in-vehicle data will be proposed in Q4 2021 and create new market opportunities. The European global satellite-based navigation system, Galileo, provides improved positioning and timing information with significant positive implications for the mobility ecosystem. The data act will clarify data sharing and data governance. In the automotive sector, access to repair and maintenance information for independent garages and repairers remains an issue despite recent improvements brought in by the new Type-Approval regulation[336].

In the **rail sector**, ERTMS, and its upcoming new radio transmission subsystem Future Railway Mobile Communication System (FRMCS) is a European standard for a digital command and control system for trains. In practice, this system will allow for major efficiency gains in the operating of trains and create seamless cross-border rail services.

For the **waterborne sector**, investment could be made to support the transition to automation and digitalisation in the ecosystem, which will enable safer and more efficient shipping (i.e. foster development of Autonomous waterborne systems). The development of digitalised waterway infrastructure and traffic management systems could facilitate the take up of modernised vessels and better connectivity to other modes. Digitalisation can also support more efficient logistics and planning (smart shipping), also benefitting the cut in unnecessary pollution. The deployment of 5G network infrastructure, including cross-border corridors, would be an enabler of the digitalisation of the sector.

eGovernment The digitalisation also supports efficient information exchange and contributes to reducing administrative burden. Following the entry into application of the new Type-Approval framework on motor vehicles[337], digital processing and exchange of type approval documentation will be become the norm. Transparency will be enhanced through citizen access to technical information online. In the waterborne sector, the Regulation on the European Maritime Single Window environment (EMSWe)[338] will introduce a fully harmonised interface for reporting by ships calling at the EU ports. For multimodal transport, the Regulation on electronic freight transport information (eFTI)[339] will establish a harmonised and trusted environment for electronic communication between the economic operators and the Member States authorities in the EU continental traffic. What is more, the Digital Transport and Logistics Forum (DTLF) is currently working on a common framework to foster interoperability in data sharing between all types of supply chain stakeholders.

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[335] Regulation (EU) 2019/2144
[336] Regulation (EU) 2018/858
[337] Regulation (EU) 2018/858
[338] Regulation (EU) 2019/1239
[339] Regulation (EU) 2020/1056

Green transformation New pollutant emissions (Euro 7) and CO_2 targets for the **automotive sector** will be proposed in 2021, allowing the EU to have the most stringent emissions regulations worldwide in real-driving conditions. These stringent rules will foster innovation in clean technologies and pave the way towards zero-emission mobility. In parallel, the recently proposed Battery Regulation aims to ensure sustainable production and consumption as well as reduced carbon footprint.

The renewal of the **long distance rail** could be a priority as it brings the most EU added-value (streamlined cross border operations in particular) and will underpin the objective linked to the Green Deal of modal shift away from road. The schemes for renewal of interurban/long distance and freight fleet (main priority) and urban fleet (second priority) could be set up quickly because railway undertakings or transport authorities are familiar with technical aspects related to procurement of fleets. Renewal of rolling stock will contribute to the faster roll-out of Technical Standards of Interoperability (TSIs).[340] For the **waterborne sector,** investment is needed to support infrastructure for sustainable alternative fuels, on-shore power supply and investments in transformative clean and digital technologies and new zero and low emission solutions, including for clean energy storage in the vicinity of ports and (2) the development of new design, technologies, systems and systems of systems prepared to operate on alternative fuels (such as methanol, ammonia, hydrogen) and on new energy converters (such as fuel cells and batteries) . Within the European supply chain, pilot projects could be supported to build and operate economically competitive vessels that substantially reduce air pollution, greenhouse gas emissions, harmful water emissions and noise. A holistic approach to the upgrading of port infrastructures, including investments to make ports suitable for offshore energy assembly, manufacturing and servicing, could be favoured. [341] In this context a new FuelEU Maritime initiative is expected to create strong demand in the maritime shipping sector for the use of alternative fuels and on-shore electricity in ports.

Strategic Public Procurement Specific rules have been adopted to encourage the public procurement of clean vehicles (Clean Vehicle Directive 2019/1161) and ensure a certain proportion of procurement of clean vehicles. While the EU's procurement market is in practice open, European suppliers face barriers in the access to third country procurement markets, especially the rail supply. The rapid adoption of the International Procurement instrument would help to open third country markets. European suppliers, especially in the rail and maritime sectors are also concerned by the distorting effect of foreign subsidies in public procurement in the EU.

Transport infrastructure is equally important for ensuring smart and sustainable mobility. It is therefore essential that transport infrastructure projects are implemented in a sustainable way. Projects could take into account climate and environmental impacts and accessibility for users with disabilities or reduced mobility and elderly users as well as other equality related considerations, such as affordability and availability of transport for long-term comprehensive sustainability. The use of sustainability criteria in the procurement procedure in accordance with the existing rules, can ensure that.

Intellectual Property Standard essential patents on connectivity technologies is an issue with regard to the transition to connected cars. In November 2020, the Commission adopted an IP Action Plan

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[340] The EU funding would be made operational by Member States, which are planning to renew or retrofit their rolling stock fleet or purchase additional rolling stock, to use RRF for introducing purchase incentivising or scrapping schemes for very old rolling stock.
[341] Sustainable and Smart Mobility Strategy COM(2020) 789 final. Other relevant forthcoming initiatives: i) Revision of ETS to internalise cost of CO_2 emissions for maritime transport; ii) FuelEU Maritime, boosting production & uptake of renewable low-carbon maritime fuels; iii) Revision of the maritime legislation on flag state and port state control, accident investigation; iv) Revision of Ship Source Pollution Directive.

announcing initiatives to solve such issues. In follow-up, the European Commission will *inter alia* organise a roundtable to facilitate an industry-led solution. Securing patents is critical for the uptake of future proof technology and battery uptake as recently evidenced by soar in battery-related patent registrations.

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) **The pandemic has shown EU's supply chain dependence (e.g. specialised engines, semiconductors, logistics)** on **third countries.** Access to raw materials and their processing will be key for the development of an EU battery cell value chain. The EU needs to address raw materials dependencies and reinforce resilience of supply chains.

Regulatory dialogue/cooperation In the automotive sector, international harmonisation is already taking place at UN level under the impulse of the EU and could continue to be promoted. Regarding the shipbuilding sector, the Commission promotes dialogues and cooperation both at bilateral level with major trading partners and at multilateral level in international fora such as the IMO, the OECD WP6 and the WTO.

Networks and governance

Industrial Networks **The Battery Alliance** has been successfully engaged. Other industrial alliances, notably on **Raw materials**, **Clean Hydrogen**, **Plastics** will address the raw material dependencies and will reinforce resilience of supply chains. The **Clean Hydrogen Alliance** will be relevant for the green transition of the mobility ecosystem and includes stakeholders from automotive, rail supply and shipbuilding. A possible alliance on Renewable and Low Carbon Fuels could also play a role.

Pact for skills **An automotive partnership under the Pact for Skills (Automotive Skills Alliance) was launched in November 2020**. The Pact is being developed but has the ambition to upskill 5% of the workforce each year (around 700.000 employees) with anticipated investment of EUR 7 billion (mostly from industry but also EU funds as appropriate)[342]. The work will take account of the on-going blueprint sectoral skills projects underway addressing skills mismatches for automotive (DRIVES) and batteries cells (ALLBATS) production. The Digital Europe Programme, will fund the design and delivery of specialised programmes in key capacity areas like data and AI, cybersecurity, quantum and High Power Computing and support the reskilling and upskilling of workers through short-term courses in advanced digital skills. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Clusters cooperation There are currently 105 clusters registered at the European Cluster Collaboration Platform that are active in the automobiles sector.[343] There are also three partnerships representing 14 clusters working in the area of smart mobility receives funding under the Clusters Go International action.[344]

Enterprise Europe Network The Enterprise Europe Network (EEN) has a 'Mobility Sector Group' which will need to continue to evolve to help relevant SMEs address the triple transition to sustainability,

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[342] file:///C:/Users/rebailu/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/Automotive%20(3).pdf, See Pact for Skills https://ec.europa.eu/social/main.jsp?catId=1517&langId=en
[343] https://www.clustercollaboration.eu/cluster-list, https://www.clustercollaboration.eu/cluster-list, https://www.clustercollaboration.eu/cluster-list, https://www.clustercollaboration.eu/cluster-list
[344] https://www.clustercollaboration.eu/eu-cluster-partnerships/escp-4i/third-generation

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digitalisation and resilience. The EEN's 'Maritime Industry and Services Sector Group' will also need to continue to play a role.

Digital Innovation Hubs Several of the European Digital Innovation Hubs (EDIHs) are specialised in the automotive sector. The network of EDIHs being set up under the Digital Europe Programme can help ensure that every company, small or large, high-tech or not, can take advantage of digital opportunities to optimise their production processes, and to innovate their products and business models.

11. Proximity, Social Economy and Civil Security Ecosystem

22.9 million people employed[345]

6.54% of EU value added
(EUR 791 billion)

3.1 million firms
99.9% of SMEs

Transformative initiatives

Green transition, e.g. through upgraded social infrastructure and integrated local cooperation

Many actors in this ecosystem are pioneers in delivering on green transition in a fair and affordable manner. Supporting social economy, in particular by promoting enabling framework conditions and cooperation with other local actors, as well as with the public sector and mainstream business will encourage inclusive green growth and quality job-creation, e.g. via socio-economic **regeneration** of disadvantaged areas. Addressing investment gaps in **social infrastructure and skills** will have a direct impact on local carbon emissions and quality of social services.

Innovation capacity, access to effective digital solutions and digital skills

All subsets of the ecosystem need tailor-made **digital training** for its employees. EU instruments could enhance the **innovation capacity** of **entrepreneurs and help them develop solutions** that address local and societal challenges. Access **to effective technology solutions** adapted to social and local purpose could be facilitated, e.g. 'Tech4good'.

A Social Economy Action Plan for inclusive growth and jobs

The **Action Plan,** planned in 2021 will enhance social investment, support social economy actors and social enterprises to start-up, scale-up, innovate create quality jobs and enhance labour market participation. The objective is to boost the potential of the social economy to contribute to sustainable and inclusive growth and a fair recovery.

Towards an EU policy toolbox fit for purpose

Ecosystem strategy The measures which will be announced by the **Social Economy Action Plan** will promote awareness, visibility and recognition of social economy and support all stakeholders in building socially-mindful value chains. They will include targeted actions to strengthen its place in the EU **industrial landscape**, improve social economy access to finance and to markets, to support the greening and digitisation of the social economy, as well as initiatives designed to scale **SMEs** and replicate social innovations.

Inclusive Green Transformation Joint investment models can boost proximity and social economy's potential to develop **innovative services/products** in the field of green and ecological transition. These entail **cooperation and engagement** with public authorities, civil society and the wider business community, e.g. through 'Local Green Deals'. Investments and partnerships to modernise social infrastructure, tackle investment gaps and deliver on renovation and regeneration of (sub)urban spaces will be supported under the **Renovation Wave, Affordable Housing Initiative** and **New European Bauhaus**.

ERDF, ESF+, EAFRD, EaSI and RRF These funds provide opportunities to Member States to mobilise public-private investments to develop all parts of the ecosystem. This can help them to scale up, build innovation capacity and upgrade social infrastructure and services. RRF could address investment and reform needs with a priority for 'renovation'/affordable housing, 'reskilling and up-skilling' and 'modernising'.

Pact For Skills The pact for skills will leverage public and private engagement to **upskill/reskill the workforce within the ecosystem**, in view of the green and digital transformation and build businesses' (social) innovation capacity. Together with a blueprint for sectoral skills, this pact will also reinforce the social economy's role in the labour **market integration of vulnerable people.**

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[345] Figures for employment and value added are based on Eurostat National Accounts and SME shares on Eurostat Structural Business Statistics. Data 2018. These figures only captures part of the 'social economy' and 'proximity' concepts, as sectoral overlaps with other ecosystems occur and specific data on social economy shares in NACE are not available. Therefore, this estimate covers aggregated NACE code analysis.

The ecosystem at a glance

Sectors included in the ecosystem

The *'social economy'* encompasses a variety of businesses, organisations and legal forms, including non-profit associations, cooperatives, mutual societies, foundations and social enterprises. They share the objective of systematically putting people first and producing a positive impact on local communities. The social economy business model aims at reinvesting most of the profits back into the organisation and/or a social cause, and having a participatory/democratic form of governance[346]. Social economy is known to be anchored at local level and to foster socio-economic cohesion by promoting values such as solidarity, participation and cooperation. Social economy organisations operate in a large variety of economic sectors and are therefore linked with other industrial ecosystems. As a reference, an EESC study estimates there are 2,8 million social economy enterprises in Europe, representing 10% of all businesses in the EU. Almost 13,6 million people – about 6,2% of the EU's employees – work for social economy enterprises. On top of the paid workforce, social economy also mobilises volunteers, equivalent to 5.5 million full time workers.[347]

The '*proximity economy*[348]' includes services and businesses fostering local and short value chains for mainly local production and consumption. Proximity businesses include local SMEs operating personal and contact services, small shops, bars and restaurants, repair, cleaning and maintenance services, etc. The proximity economy also acts as the 'last-mile' delivery of goods and services of most of the ecosystems to the local businesses and citizens. A *proximity economy* is also characterised by the presence of diverse set of enabling 'proximity hubs' such as cities and local communities, community initiatives and businesses clusters, and public private partnerships.

In the context of this ecosystem, the Proximity dimension also includes **civil security services** (fire fighters, police forces, emergency teams, etc.), which operate at local level to support and protect citizens (including emergency incidents/disaster response) and are performed by public entities including an important share of volunteering work. Civil security services have clear links with security industry, which provides products and services used by security practitioners for the protection of citizens. The economic activity of these product and service providers is not included in this ecosystem, but spreads throughout several other ecosystems[349] .

The numerical estimations provided for this ecosystem (6.54% of EU GDP) capture only part of the 'social economy' and 'proximity' concepts, as sectoral overlaps with other ecosystems occur and available data on sectoral shares of social economy is limited.

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[346] See the Roadmap published by the Commission on the action plan for the social economy: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12743-Social-Economy-Action-Plan

[347] Figures for EU-28 from the EESC study 'Recent Evolutions of Social Economy – Study', 2017.

[348] The *"Proximity economy"* has many connections with other ecosystems such as *Tourism*, *Retail, Food, Mobility, Digital and Construction* Industrial Ecosystems. One characteristic vision for this proximity economy is the "15-minute city"[348], where everything a citizen needs is within a 15-minute walk or bike ride, and emphasises safe and inclusive communities, and housing that is affordable, accessible, and adaptable.

[349] EU industries, big and small, who provide products and services that enable civil security capabilities operate under ecosystems such as Aerospace and Defence (e.g. C4I systems, earth observation and satellite communications), Electronics (e.g. sensors), Digital (e.g. cybersecurity, digital forensics), Health (e.g. victims triage systems, biological decontamination systems) or Transport (e.g. manned and unmanned vehicles).
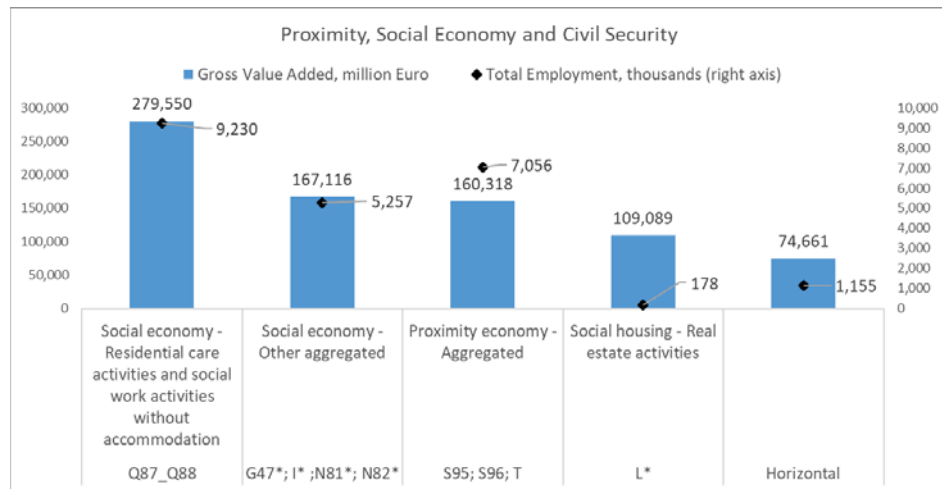
Proximity, Social Economy and Civil Security

■ Gross Value Added, million Euro   ◆ Total Employment, thousands (right axis)

Category	GVA (million Euro)	Total Employment (thousands)
Social economy - Residential care activities and social work activities without accommodation (Q87_Q88)	279,550	9,230
Social economy - Other aggregated (G47*; I* ;N81*; N82*)	167,116	5,257
Proximity economy - Aggregated (S95; S96; T)	160,318	7,056
Social housing - Real estate activities (L*)	109,089	178
Horizontal	74,661	1,155

Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem. The category 'Social economy – Other aggregated' includes: Retail trade, except of motor vehicles and motorcycles; Accommodation and food service activities; Services to buildings and landscape activities and Office administrative, office support and other business support activities. The category 'Proximity economy - Aggregate' includes: Repair of computers and personal and household goods; Other personal service activities and Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	99.9% of the Proximity & Social Economy companies are SMEs with significant part micro enterprises and starts-ups.350 However, beyond the consequences of the crisis, social economy organisations face structural and specific difficulties that hamper their potential to create more jobs and address societal challenges on a larger scale while inspiring systemic changes in the mainstream economy[351]. The survival of SMEs in this ecosystem is crucial for local prosperity in (sub)urban, rural and remote communities, as they offer essential services and goods in proximity of their clients and are often key driver for economic activity. They are an important part of the social fabric and contribute to vibrant city and town centres.
Current challenges	Across the ecosystem, **heavy disruptions linked to the COVID-19 crisis** and subsequent lockdowns had serious negative effects. Many enterprises and organisations could restart often only partially (and had to close again). Some of them partially adjusted by offering take-away, click-collect or redesigned their business models to serve different target groups online (i.e.: social services supporting vulnerable individuals and households). Businesses in the ecosystem are in most cases **very vulnerable** due to long periods of forced inactivity combined with operating with small liquidity reserves. Beyond the consequences of the crisis, social economy organisations face structural difficulties, both within and outside of the EU, that hamper their potential to create more jobs and address societal challenges on a larger scale while inspiring systemic changes in the mainstream economy. The Covid-19 crisis highlighted the value of social economy actors to support **vulnerable groups facing (potential) job-loss** and to help upskilling and reskilling for quick **cross-sectoral mobility** of the workforce to emerging jobs within the local economy. Actors in this ecosystem need clear **digital skills support** for their staff as well as support for the **digital transition** by access to affordable and adaptable technology as well as access to data. Specific capacity of social economy actors to develop **fair digital business models** based on open source protocols for data and technology could be supported and

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[350] Depending on specific country's welfare system, care and social services are performed by SME size organisations as well as large non-profit organisations (+10.000 employees).

[351] A recent study on the impact of the Commission's 2011 Social Business Initiative and its follow-up actions suggests that these initiatives did contribute to develop more favourable conditions for European social economy organisations, but that needs persist – although not with the same intensity across EU Member States and regions.

scaled (shared solutions by tech4good development and civic tech infrastructure, shared and cooperative platforms[352], digital commons, assistive technology, …).

In addition, social infrastructure is a crucial element, as it is often used or offered by social economy actors. Still, social infrastructure is not responding the current standards in terms of quality and energy efficiency. The 2018 'Report of the High-Level Task Force on Investing in Social Infrastructure[353]' calculated an annual **investment gap of EUR 142 billion for social infrastructure**, of which EUR 57 billion for social housing only. Such challenges can be translated in decarbonisation targets for the ecosystem (energy providers, buildings, industry, and transport), the deployment of relevant circular economy activities - as well as quality and liveability interventions.

Forward-looking assessment	Social economy business models are in line with changing preferences in citizen and consumer behaviour towards more sustainable patterns. However, a recent study on the impact of the Commission's 2011 Social Business Initiative and its follow-up actions identifies a set of main challenges for social economy: • the lack of recognition and understanding of social economy organisations • the access to tailored funding and business support (the funding needs which are not covered by the market were estimated at EUR 6.7 billion for the 2021-2027 programming period[354]). • the access to markets (socially responsible public procurement, relations with mainstream enterprises); • the ability to scale up social innovation; • limited skills development opportunities; • limited research focused on social economy and social enterprises. The Commission developed with the OECD and academics the Better Entrepreneurship Policy Tool designed for policy makers and stakeholders supporting social economy. This framework identifies policy dimensions relevant for supporting social enterprises as well as for social economy more broadly, by addressing different categories: 1/ Social Entrepreneurship Culture; 2/ Institutional Framework; 3/ Legal and Regulatory Frameworks; 4/ Access to Finance; 5/ Access to Markets; 6/ Skills and Business Development Support; 7/ Managing, Measuring & Reporting Impact. Further policy actions on social economy will consider this policy tool. For Proximity and Social Economy the shift to digital and new innovative activities/services can foster **local value loops** that encourage more local production, sharing and other circular business models (i.e.: community initiatives and businesses, social clusters) which in turn contribute to create a local circular economy system, especially at urban level, promote territorial competitiveness, resilience, inclusion and cohesion. Pioneering businesses in the ecosystem are keen on developing open (social) digital innovation and are frontrunners in the green transition (i.e.: local green deals, circular economy aspects such as green manufacturing and remanufacturing local circular loops, regeneration and renovation, eco-innovation…). Consequently, all subsets of this ecosystem have a huge untapped potential for the hyper connectivity enabled by (network) technologies (e.g. social networks, wikis, sensor networks, etc.), to stimulate and support cooperation among citizens and the adoption of collective solutions[355]. Such initiatives can only result from a multidisciplinary and bottom-up approach, harnessing collective intelligence in areas such as collaborative public services, collaborative consumption and sharing economy, collective sensing and action, crowd sourcing, collaborative making, open

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[352] A platform cooperative is a democratically owned business that uses a website, mobile app or a protocol to sell a product or a service. It is owned and governed by those who depend on them most—workers, users, and other relevant stakeholders.

[353] https://ec.europa.eu/info/sites/info/files/economy-finance/dp074_en.pdf

[354] See: Social enterprise finance market Analysis and recommendations for delivery options https://ec.europa.eu/social/BlobServlet?docId=22516&langId=hr

[355] See the projects funded through the H2020 initiative CAPS 'Collective Awareness Platforms for Sustainability and Social Innovation'

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	democracy and policy-making.
Global context	This ecosystem contributes directly to local prosperity and well-being of citizens, where they provide essential production, services and revenues. They improve resilience by reinforcing local value chains and promote citizens' engagement within their community. Replication and knowledge sharing through 'decentralised' business models is the manner they scale in a 'design global, produce local' fashion. Generally, they are less directly integrated in the global economy and value chains but are rather drivers for reinvesting in local prosperity and economy. For this reason the 'Global supply chains' aspect is not considered in this fiche. In addition, social economy has a considerable potential for creating fair development models and decent jobs outside of the EU, especially in our developing partner countries.

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF The extent to which RRF investments target actors in this ecosystem varies from one Member State to another. Some Member States have already flagged in their draft RRF proposals possible financial support for actors such as social housing associations, urban planning organisations, renewable energy cooperatives, service providers focussing on re/up-skilling, local production framed into local level circular systems, and work integration social enterprises. In particular, investment in renovation and affordable housing with actors belonging to this ecosystem would be key to tackle climate and biodiversity challenges, improve liveability and ensure a just transition that leaves no one behind. The RRF can support this ecosystem to help reshape the post-crisis economy by promoting inclusive and sustainable economic models.

However, many Member State authorities **do not integrate specific requests** for financial support regarding this ecosystem thus hampering its potential to bring systemic change. Local public authorities report often not being directly involved in the National Recovery Plans and fear not having access to the available resources to 'build back better'.

CRII+/ERDF/ESF+/CEF Generally, ESF+ (e.g. employment, social inclusion, social innovation and training) and ERDF (e.g. urban innovative actions, URBACT targeting housing and social infrastructure) are **key funding streams** for many social economy organisations and proximity actors. Between 2014 and 2020, almost 1 billion euros has been earmarked under the ESF specifically for social enterprise support. European Structural and Investment Funds remain relevant under the current programming period, along with InvestEU.

In addition, during the crisis, specific instruments (e.g. RRF, CRII+) were created to support the economy. However, namely for CRII+, in some member states associations may be excluded, as eligibility for such funding might be limited to 'for-profit' legal entities or explicitly exclude certain actors in this ecosystem. Temporary unemployment schemes are equally foreclosed either because the legal entity is 'not-for-profit' or because the employees (such as for "Work Integration Social Enterprises") are already partially subsidised. Finally, despite the immense increase in requests for social services, organisations are insufficiently backed by recovery support, which results in a shrinking offer and closures. The Commission invited Member States to ensure all social economy stakeholders could benefit equally from support and aid measures.

Horizon Europe (including European Partnerships) Social economy actors can benefit from Horizon Europe funding under various clusters. The first Horizon Europe Work Programme will e.g. support sustainable, smart and socially innovative cities and affordable housing districts as well as social innovation, including in domains such as civil security, with a select number of dedicated calls.

Digital Europe Programme Planned large-scale deployment of urban digital platforms, which will allow the management of large amounts of data and stakeholders as well as the creation of a data spaces for safe, secure, sustainable and smart communities that will foster data-driven innovation in support of the Green Deal and the digital transition. In addition, the Programme will accelerate the adoption of Urban Digital Twins, enabling cities to gain greater insights and new knowledge for policy development, while also enhancing citizen participation, for example in urban planning. The Digital Europe Programme, will fund the design and delivery of specialised programmes in key capacity areas like data and AI, cybersecurity, quantum and HPC and support the reskilling and upskilling of workers through short-term courses in advanced digital skills.

Just Transition Fund **A thriving local Proximity, Social Economy & Civil Security ecosystem is a key policy ambition to regenerate economic activity in areas that suffer from de-industrialisation and transition**. This requires investment and support programmes for unemployed and people that suffer from mass lay-offs, such as the EGF. Such programmes can boost local clusters/ partnerships, develop social capital in territories and

act as catalyst for industrial transformation[356] with a strong emphasis on social objectives. Actors of this ecosystem could therefore be fully part and make the utmost of the scheme to help ensure a fair transition. However, many Member State authorities **do not integrate specific requests** for financial support regarding this ecosystem thus hampering its potential to bring systemic change. Local public authorities report often not being directly involved in the National Recovery Plans and fear not having access to the available resources to 'build back better'.

InvestEU For social enterprises, and social economy by extension: the InvestEU Social Window will **de-risk investments** and improve the institutional capacity of financial intermediaries with the objective to improve access to finance via a guarantee and an equity instrument. These products will be based on the experience from EaSI and EFSI 2014-20 programmes that successfully boosted **social finance markets** in the EU. InvestEU will also invest in **social infrastructure and services**, where the huge investment gap[357] would require the best efforts from all players involved[358]

Access to Finance Given the local activity and often small size of actors in this ecosystem, their access to European funding is not easy. Intermediaries play a key role in facilitating this access, and procedures vary depending on the degree of decentralisation of fund structures. **European Structural and Investment Funds** are the most relevant ones, and more specifically **ESF+** given its social dimension.

Supportive regulatory environment

Main Single Market barriers within the ecosystem The European Commission is currently evaluating cross-border issues and opportunities for social economy enterprises and organisations and may reflect on possible action in the forthcoming European Action Plan for the Social Economy scheduled in 2021.

A number of professions involved in the proximity economy and specific subsets of the social economy are 'regulated professions' in several Member States (residential nurses, child care, social workers....), which means that most Member States also require a certain level of qualification and impose a range of other requirements for the practice of these professions. These professionals can face obstacles relating to the **recognition/exercise** of their professional qualifications and/or meeting other requirements to access a regulated profession, which would need to be **justified and proportionate**.

Digital transformation Actors in this ecosystem need **basic digitisation in the regular organisational processes** such as e-commerce, platform development, customer service software, digital (social) service tools, digital payments applications, etc. with tools tailored to their scale, reach and social purpose. Secondly, digital technologies and solutions, such as online collaborative and cooperative platforms, software applications (apps), distributed ledger technologies (DLT), Internet of Things (IoT), cloud computing and Artificial Intelligence (AI) enable a **wide variety of tools** to support the creation of social values, and are therefore called **'tech for good'**. Openness is a key requirement for such solutions, to ensure the interoperability among different platforms (open standards), replication and adaptability of the solutions (open source), independence from technology manufacturers (open hardware) and portability and sovereignty on personal data (open data). Open and cooperative platforms based on these principles will be crucial to enable the

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[356] Such experience is showcased in industrial modernisation projects, such as under the S3 platform where the potential of clusters for regeneration is supported https://s3platform.jrc.ec.europa.eu/social-economy.
[357] The 2018 'Report of the High-Level Task Force on Investing in Social Infrastructure ' calculated an annual investment gap of EUR 142 billion for social infrastructure, of which EUR 57 billion for social housing only
[358] EC Press release, 8 December 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2344.

digital transformation in an affordable, inclusive, effective and achievable manner[359] and boost '**digital social innovation'** (DSI).

eGovernment Many actors in this Ecosystem act as service providers (social services, employment services, training,..) for public authorities and suffer from **heavy administrative burden, lack of digital competencies** and **knowledge of procurement procedures**. Across Member States and even across regions large differences are notable. This significantly affects the overhead of service providers and their efficiency, which have usually very little administrative capacity in comparison with bigger SMEs and businesses. Minimal **coordination of information** streams between Management Authorities of structural funds (ESIF are most accessible for these ecosystem actors), national funds and direct management funds results in even more burden. In addition, accelerated efforts are needed to enact citizens' participation, enable local production, decarbonisation and circular actions, through participative models, digital platforms for easy access to technological solutions and strategic advice.

Green transformation Social enterprises can be **champions for the green transition**[360] and have business models promoting it. Some sectors, such as the social housing one, are a key policy target[361] to deliver on the transition. The social housing sector however **lacks resources** and needs **support schemes** like public/private investments to achieve tangible results. The **Affordable Housing Initiative**, part of the Renovation wave, will mobilise cross-sectoral project partnerships to promote efficient and circular processes, boost social engagement models to empower residents and stimulate cultural innovation.

It will be a key sector to support the implementation of leading policies and new green innovations, for example with regards to in the circular economy[362] or energy provision by cooperatives and communities[363].

Strategic Public Procurement Public procurement[364] is an important resource for many actors in this ecosystem but **efforts are still needed to develop awareness, and promote sustainable, high-impact Procurement at local level** as important driver for a smart, green and healthy future. **Social considerations are still not fully used by public authorities to facilitate access of social enterprises to procurement market.** The Commission is currently working to stimulate the development of socially responsible public procurement in the Member States. Work include the project *'Buying for Social Impact'* or the recent organisation of seminars in 15 Member States to raise contracting authorities' awareness in the scheme.

Networks and governance

Clusters cooperation Social Enterprises and Proximity businesses have a **direct interest** in local industrial and usually cross-sectoral cooperation. Many small local clusters (*Clusters of Social and Ecological Innovation*) start from grassroots initiatives to improve social/green impact of companies. This is crucial for local economic regeneration as proximity and social economy businesses have quasi zero incentives for delocalisation due to local rooting. A **clear and dedicated support** at the EU level is needed to support these clusters in their development and in sharing their modes of operation across countries. First steps were taken by including

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[359] For a list of such open source and collaborative software and hardware solutions, see https://joinup.ec.europa.eu/collection/digital-response-covid-19/open-source-solutions.

[360] See Hillman et al (2018), *Social enterprise as a potential niche innovation breakout for low carbon transition*, Energy Policy Review, Volume 117, June 2018, p. 445-456, https://doi.org/10.1016/j.enpol.2018.03.038.

[361] Heating/cooling of buildings accounts for ca. 40% of energy consumption and 36% of GHG emission; currently 75% of housing stock in the EU is inefficient. The renovation wave is part of the green deal and supports ambitions for social housing renovation, such as trough the Affordable Housing Initiative (GROW).

[362] 'Right to repair' and access to repairable products, Extended Producer Responsibility, limited or restricting eco-design obligations, taxation issues related to second hand.

[363] National regulation concerning energy provision hampering the development of local energy communities.

[364] A key objective of the 2014 overhaul of the European legislative framework on public procurement was to promote the strategic use of PP to the benefit of social and environmental goals.

green and social clusters in the **European Cluster Collaboration Platform (ECCP).** Social economy stakeholders and civil society will also be mobilised to collaborate with cluster organisations and cluster actors under the forthcoming **Joint Cluster Initiatives**.

Enterprise Europe Network Enterprise Europe Network (EEN) offers support for SMEs (i.e.: innovation, internationalisation) but many members of this network **do not have specific competences/knowledge to support this particular ecosystem** yet (i.e.: knowledge of the business model). However, following the publication of the SME Strategy, the EEN is currently building capacity in view of the introduction of **the Sustainability Advisors** (in Q1 2022), which will offer tailored services related to sustainability, including advice on social sustainability and social economy business models. The **European Social Economy Regions initiative** (ESER) contributes to the active promotion and development of social economy at regional and local level. The **Intelligent Cities Challenge** initiative (ICC) helps cities/proximity economy lead a green, digital and socially-responsible recovery, leveraging the uptake of advanced technologies. More synergies between ESER and ICC networks and the EEN could therefore be **systematically established** in terms of communication campaign, funding opportunities and partnerships possibilities. This would lead to increase the visibility of the ecosystem and highlight its contribution for territorial resilience.

Pact for skills **The current development of a Pact for skills for this ecosystem**[365] as well as the **Blueprint for cooperating on sectoral skills targeting Work Integration Social Enterprises** in 2021[366] and the **Guide of Reskilling for Cities[367]** in 2021 are crucial as many actors in this ecosystem have very little resources for training[368] policies. In January 2021 the Pact for skills for the proximity and social economy reached over 90 signatures. In this regard, cities are strategic stakeholders to organise and accelerate **cross-sectoral mobility** from lost jobs to emerging jobs (i.e. towards technological, green and health-related jobs) and prepare their economies for the skills of the future, and a network of **Cities of Excellence for Reskilling** collaborates to anticipate future skills needs. **ESIF is crucial** to support these businesses in the organisation in the response to their VET needs and in empowering their training capacity for staff and target groups. Furthermore, the SME strategy supports the **'digital volunteers' programme** to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Digital Innovation Hubs Digital needs of actors in this ecosystem can be addressed by EDIHs with a specific focus on rural, remote, local, social enterprises and communities as well as projects related to the Smart villages thematic group supporting rural and remote enterprises in their digital uptake (Rural Development Programme).

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[365] More on the Pact for Skills on https://ec.europa.eu/social/main.jsp?catId=1517&langId=en.
[366] More on Erasmus+ Blueprint for Sectoral Cooperation on Skills in Work Integration Social Entreprises (WISEs) is available on https://ec.europa.eu/programmes/erasmus-plus/projects/eplus-project-details/#project/621509-EPP-1-2020-1-BE-EPPKA2-SSA-B.
[367] A 'living' hands-on-guide, built on success stories from the Intelligent Cities Challenge network, to provide cities with concrete reskilling practices and learning experiences.
[368] Vocational Education Training & Life Long Learning.

12. Retail Ecosystem

29.8 million people employed[369]

11.5% of EU value added (EUR 1,385 billion)

5.5 million of firms 99.9% of SMEs

Transformative initiatives

A fairer and safer digital space supportive of the digital transformation of the ecosystem

Continuation of the COVID-19 related financial support will help companies maintain employment and adjust their business models

Development of solutions supporting the greening of the ecosystem

COVID-19 has sped up the digital transformation of the ecosystem. Online sales have sharply increased during the pandemic. Digital solutions would need to be accessible to help companies, in particular SMEs, embrace the digital transformation. Implementation of the proposed regulations for digital services and markets (DSA/DMA) will provide for a fairer and safer digital space and a supportive regulatory environment for all.

Support measures could minimise the ongoing disruption in the ecosystem caused by COVID-19 lockdowns, , increase retailers' resilience and help them recover. Help and **rapid investment will** assist retailers in their transition to **online presence and sales.** Retail is important for the cohesion of rural and urban areas, in particular in preserving the vitality of city centres.

Swift development of sustainable solutions will contribute to the green transition of the ecosystem and a stronger and more resilient Single Market. To improve the green performance of the ecosystem attention could be paid to the uptake of the circular economy and the use of green technologies.

Towards an EU policy toolbox fit for purpose

Funding and budgetary programmes The EU provides support measures, in particular for retail and wholesale SMEs and start-ups, for their digital and green **infrastructure and skills' development, mainly through funding programmes** (e.g. RRF, Digital Europe) used for investment in technologies and trainings, access to network, cloud and data, **Digital Innovation Hubs,** etc.

Enforcement of Single Market Rules Enforcement of existing Single Market rules, in particular on the free movement of goods and services and on the freedom of establishment, and adoption of the DSA/DMA are important for the recovery and resilience of the ecosystem.

Industrial Networks Retail and wholesale companies are part of cooperation networks (existing industrial alliances[370], Enterprise Europe Network, Pact for skills roundtables) and stakeholder platforms (the European Circular Economy Stakeholder Platform Coordination Group) and there is potential in their presence in industrial clusters.

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[369] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics.

[370] e.g. industrial alliances such as the Circular Plastics Alliance and the European Clean Hydrogen Alliance

The ecosystem at a glance

Sectors included in the ecosystem	**Retail (large companies, SMEs, online and offline), relevant wholesale, online platforms.**[371] **E-commerce represents 10-15% of total retail sales (much less for grocery retail)**[372]. **Market concentration differs across EU. The largest are mainly grocery chains, cosmetics, textiles and furniture sellers.** Most important e-commerce players come from outside the EU.[373] The performance of the ecosystem is key for household budgets and suppliers.
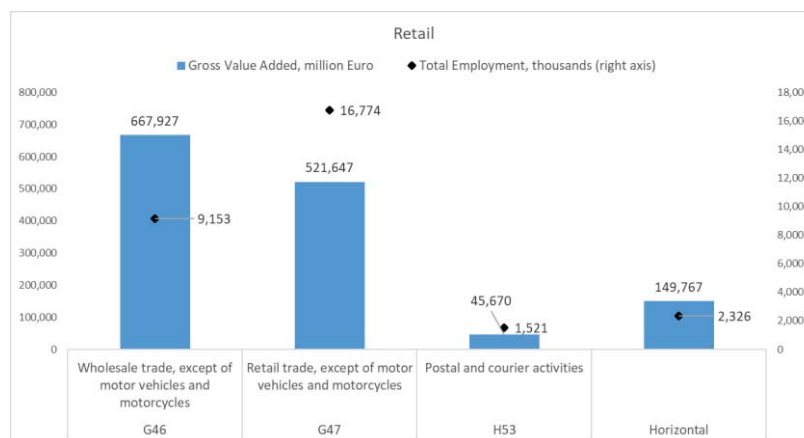
Note: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; **see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy.** Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	**99.9% of the 5.5 million companies are SMEs.** In 2019 only 20.5% of EU companies (<10 employees, not only retailers) sold online. Fewer than one in twenty SMEs sell goods online to buyers in other EU countries (4%), which compares to 11% of large enterprises (all companies, beyond retail)[374] Unlike larger firms, the ability of SMEs to develop internal digital infrastructures that can capitalise on the benefits of digitalisation, is limited by a lack of financial resources and/or skills. Greater uptake of online platforms is therefore especially important for SMEs. The survival of retail SMEs is crucial for urban and rural local communities, as they offer proximity, are an important part of the social fabric and contribute to vibrant city and town centres.
Current challenges	Challenges and opportunities stem from the **increase in digitalisation and changing consumer needs and shopping habits**. Restrictive regulatory requirements in some Member States may hinder companies' cross-border expansion. During the COVID-19 crisis, shops were either closed or bound by stringent precautionary measures. The turnover of grocery retail has increased, but so have the costs of operations due to safety measures. **Sales** of many non-grocery shops have **fallen dramatically.**[375] Online sales of some categories increased, but dropped for many other (mainly non-essential goods).
	In the context of the crisis, developing online sales was often decisive for the survival of physical retailers. Indications of excessive surge in prices of essential items or the reduction of sales for non-essential ones by big online platforms as well as their self-preferencing of own services affect smaller platform users. **Wholesale turnover is also impacted**, due to hotels and restaurants closures.[376] In some cases, the **free movement of goods and**

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[371] Also consumers, manufacturers, importers, packaging, transportation and logistics services (postal and couriers), fulfilment centres, marketing, financial and payment services, researchers and owners of retail surfaces. Overlaps with the agri-food, textiles, proximity and social economy ecosystems.

[372] Euromonitor, 2020

[373] Amazon, Alibaba (mainly in CEE) and eBay; but there are also important national and regional operators; Euromonitor, 2019.

374 Flash Eurobarometer 486

[375] The largest losses in sales were recorded in April 2020 vs April 2019 (-17.9 % for total turnover); Eurostat, STS data.

[376] Stakeholders estimate that 100,000 of jobs are at risk in France alone; EuroCommerce.

	employees was hindered, which disrupted supply chains and operations. EU consumer confidence in the end of 2020 still remained low.
Forward-looking assessment	The entry and operational conditions for the **omni-channel sales model** would need to be fair for all players. **Local online platforms** and other measures for a fair, open and safe online environment are important in particular for SMEs. Large online platforms could help SMEs digitalise. **Data protection, sharing and analytics deserve attention**. Turning to greener logistics and products, and the accessibility of small retailers in towns and rural areas could be further supported. All this needs **investment in digital and sustainable infrastructure and skills, in particular for SMEs,** innovative solutions for rural areas, DIHs, higher energy efficiency, green transportation, sustainable products, etc., as well as fair conditions on online platforms and partnerships with local authorities. **A resilient Single Market** is essential for the optimisation of supply chains and for the adoption of sustainable solutions.
Global context	Out of global top 250 retail companies, 88 are based in Europe.[377] E-commerce is the main driver and the main online players are non-EU, this poses a challenge for future growth of EU retail industry.

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[377] *Global Powers of Retailing 2020*; https://www2.deloitte.com/uk/en/pages/consumer-business/articles/global-powers-of-retailing.html

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Mapping of policy tools in more detail

Funding and budgetary programmes[378]

RRF Member States should focus at least 20% of their investments on the **digital transition. These investments can include digital infrastructure, local online marketplaces or platforms for small businesses** (e.g. through public-private partnerships with local authorities to improve the online presence of retail and wholesale SMEs), **digital skills** (from basic digital skills of SMEs owners and employees to more advanced ICT specialist skills for larger retailers). **The RRF can also support investments in infrastructure for commercial vehicles and future-proof clean technologies for transport** (e.g. electric vehicles for deliveries, hydrogen technology for long haul), **renovation of commercial buildings, circular economy infrastructure** (e.g. recycling centres), **public administration digitalisation for better business environment**, etc. It is crucial to support also R&I and the transformation of business models. Urgent intervention at EU and national level is needed to ensure that retail and wholesale companies, in particular SMEs, can benefit from the support measures, also for sustainable solutions and companies' resilience.

CRII+/ERDF/ESF/CEF ESF can boost **opening of shops, or improving digitalisation and digital skills**, e.g. though trainings. CEF **investment in transport, digital and energy** can improve goods transportation, and help diversify supply chains. It will also deliver improved broadband services everywhere in Europe. CRII+ **supports SMEs and start-ups** (working capital, cash flow issue) and job creation, including in retail. ERDF is indirectly highly relevant through **support for local shops**, their digital skills and low-carbon economy solutions, or through cities revitalisation (as far as they also benefit small retailers).

Horizon Europe (including European Partnerships) Ongoing projects under the Climate, Energy and Mobility cluster already **support decarbonisation** (battery and hydrogen technology relevant to goods transportation in the ecosystem). **Research and innovation in products and processes**, e.g. under the Digital, Industry and Space cluster foster the development of digital technologies such as sensors, data analytics, artificial intelligence and robotics relevant to retailers, for improved personalised customer experience and efficient delivery logistics.

Digital Europe Programme The programme could be used for **building strategic digital capacities of retailers and wholesalers** such as Artificial Intelligence, cybersecurity and the development of manufacturing data space across supply chains, **accessible data infrastructure, the digitalisation of retail operations, the delivery and fulfilment** (click-and-collect models, etc.), **as well as data analytics services for retail and wholesale SMEs and other digital technologies** and skills, including through Digital Innovation Hubs (DIHs). The programme is particularly important for EU SMEs and start-ups to enable them to recover and increase their competitiveness.

InvestEU Financing under the SME window is available to improve the retail SMEs competitiveness, but also to help them digitalise, innovate and become more sustainable. **Investment in areas such as batteries and clean technologies for transport, energy efficiency, sustainable infrastructure** (e.g. in-store equipment, waste management, renewable energy sources, packaging, transportation means, etc.), research, innovation and digitisation, could also be supported under the SME window.

Access to Finance Online or contactless payments are increasingly significant for retail and should not be distorted by disproportionate fees. **Improving accessibility and affordability of payment infrastructure, in particular based on instant payments, as set out in the Retail Payment Strategy is crucial.** [379]

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[378] Companies in the retail ecosystem do not seem to have experience in applying for support measures. Information on opportunities and facilitation of the application process would be useful.

EU Space Programme and European Defence Fund Relevant through the development of **satellite navigation** (improved logistics) and route optimisation for deliveries in e-commerce.

Supportive regulatory environment

Single Market Surveillance Important to ensure that products being sold by retailers and wholesalers have been designed and manufactured in accordance with EU requirements and are safe for consumers.

Main Single Market barriers within the ecosystem Enforcement of EU law, mainly the Services Directive and Article 49 TFEU, i.e. **national and local rules should be, non-discriminatory, justified and proportionate,** support companies in their expanding cross-border. Improving the business environment, e.g. in the proportionality assessment of local rules on retail establishment is important for the ecosystem to remain competitive. On the **free movement of goods and the freedom of establishment,** the Commission is looking into cases where Member States have put in force measures requiring retailers to source or promote national food products to the detriment of food products originating from other Member States. This is raising compatibility issues with Single Market freedoms. In the COVID-19 crisis context, the Commission is also paying attention to the free movement of goods and employees across borders. **The Ecommerce Directive enforcement can be improved** and the use of cooperation mechanisms by Member States could be updated. Enforcement of the 2018 rules on **online cross-border parcel delivery** services is necessary to allow cross-border services to increase. Enforcement of the **Platform to Business Regulation** will also be important to encourage and ensure retailers are treated fairly when using online platforms. A more robust enforcement by Member States of the **Geoblocking Regulation** is needed to ensure that consumers are not discriminated when they purchase online cross-border.

Standardisation In the context of **the green transition of retailers and wholesalers**, harmonisation of standards across the EU would help in the circular economy, green products, waste reduction, etc.

Digital transformation The Platform to Business regulation and the ranking guidelines for platforms [380] have put in place **a harmonised framework for minimum transparency and redress rights**. The Commission proposals on the **Digital Services Act (DSA) defined clearer responsibilities and accountability for online platforms and big players**, which serve as intermediaries to many SMEs, in particular during the crisis[381]. The DSA will also ensure better cooperation for the supervision of platforms and guarantee effective enforcement, also to fight fraud in online sales, and to remove illegal or dangerous goods from websites. **The Digital Markets Act (DMA) will ensure that markets characterised by large platforms acting as gatekeepers remain fair for innovators, businesses including online retailers, and new market entrants**[382]. It also foresees data related unfair practices that need to be banned, as well as certain data obligations[383]. The new rules would allow SMEs (including retail business users) to grow throughout the internal market. The **Regulation on data governance** will facilitate data sharing across the EU and between sectors to increase control and trust of companies. Retailers and wholesalers generate large amounts of data on products, sales and transactions, which is then used by manufacturers, service providers, and for business intelligence in general. But businesses have a

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[379] EuroCommerce position paper on the adoption of the EU Interchange Fee Regulation, 07.12.2020; https://www.eurocommerce.eu/resource-centre.aspx#PressRelease/13565

[380] Regulation (EU) 2019/1150 of the European Parliament and of the Council of 20 June 2019 on promoting fairness and transparency for business users of online intermediation services, OJ L 186, 11.7.2019, p. 57. Commission Notice Guidelines on ranking transparency pursuant to Regulation (EU) 2019/1150 of the European Parliament and of the Council 2020/C 424/01, OJ C 424, 8.12.2020, p. 1–26.

[381] The DSA proposed i.e. new measures to counter illegal goods, services or content online, such as "trusted flaggers" mechanism, traceability, transparency measures and address some concerns of retailers and brands.

[382] The DMA proposed i.e. obligations for gatekeepers to prevent unfairly benefitting from dual role or using data, self-preferencing, preventing consumers from linking up to businesses outside their platforms or prevent users from un-installing any pre-installed software or app, and imposing interoperability and access to data obligation.

[383] In particular, platforms should refrain from the use of non-publicly available data which is generated through activities of businesses. Platforms will also have clear obligations for gatekeepers including to provide effective portability of data.

limited choice of cloud solutions that meet their needs and expectations[384]. In the ecommerce sector, excessive surge in prices of essential items and deprioritisation of smaller sellers have been reported. Platforms put in place support actions to help their business users. This and the collaboration in detecting illicit practices could be made more structural. **Calling on large platforms in general, not only gatekeepers, to help smaller businesses survive and to share data,** and to maintain a fair, open and safe digital space are to be promoted, complementing the DMA/DSA proposals. This could be complemented by a good practices exchange among Member States and business operators. Digital product passports can facilitate access to supply chain sustainability data as well as consumer sustainability information.

eGovernment **One-stop shops with relevant information and access to online procedures to obtain permits and fulfil other requirements,** as well as eGovernment enable retailers to carry out their business with government more easily, more quickly and at lower cost, e.g. using Digital Identity.

Green transformation The uptake of circular economy solutions (e.g. in the areas of packaging and waste), sustainable transport (e.g. electric vehicles), eco-design of products, EU Ecolabel, Product Environmental Footprint, environmental claims, Extended Producer Responsibility schemes or sustainable building and EMAS are important for the green performance of the ecosystem and the resilience of the supply chains. Companies in the ecosystem emphasise that requirements relating to the green transformation should not increase red-tape. Balanced conditions and support for national or local online platforms that would bring together suppliers and buyers, help improve efficiency and sustainability of deliveries, help reduce waste, etc. Circular economy solutions for retailers and consumers are addressed in the Coordination Group of the European Circular Economy Stakeholder Platform and through the platform's EU Circular Talks.

Intellectual Property Better enforcement of IP rules would prove useful to fight against counterfeited and unsafe products being sold in the EU.

International partnerships and dialogue

Regulatory dialogue / cooperation   Regulatory dialogue within the EU is welcomed by stakeholders in the ecosystem. **Apart from retail regulatory restrictions, further dialogue is needed on Single Market issues (territorial supply constraints, TSCs), Single Market barriers to the green transition, etc**.

Networks and governance

Clusters cooperation An **important potential for cooperation between retailers and wholesalers and clusters, in particular in ICT solutions and skills, transport and logistics**, etc. First contacts between European Clusters Alliance and retail associations look promising. Currently, 24 clusters at the European Cluster Collaboration Platform are active in this.

Enterprise Europe Network **Retail and wholesale SMEs can benefit from EEN innovation support, expert advice on growth and expansion** into European and international markets and contacts with international partners. The EEN has a dedicated Retail sector group.

Pact for skills[385] It is estimated that COVID and automation combined are putting more than 5 million jobs at risk in retail and wholesale[386]. **Targeted up-skilling, in particular as regards the use of digital technologies,**

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[384] The Study on the economic detriment to SMEs from unfair and unbalanced cloud computing contracts | Shaping Europe's digital future (europa.eu) has shown issues encountered by SMEs with cloud service providers. Furthermore, the Impact Assessment for the Digital Markets Act (https://digital-strategy.ec.europa.eu/en/library/impact-assessment-digital-markets-act) has shown that obstacles to interoperability and data portability and lock- in of cloud service providers' customers, due to high switching costs, are the common practices in the cloud space.
[385] More on the Pact for Skills on https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

would enable businesses to retain part of the workforce. **Education** of retail employees is important also on the **sustainability** in food supply chain or reduction of the carbon footprint. The ecosystem pleads for **tailored-made apprenticeships** and continuous up- and reskilling workers in e-commerce, data science, digital contents creation, as well as in green technology and tackling sustainability challenges. There is no skills blueprint for the ecosystem, but **the social partners have recently agreed on a joint statement on skills** as part of the 'European Pact for Commerce'.

Digital Innovation Hubs **The participation and involvement of SMEs could be facilitated and promoted**. Through tailor-made advice and trainings, the network of local DIHs can help retailers and wholesalers gain knowledge, know-how and skills to digitalise, independent of their skills level. They also offer opportunities to test and experiment with digital solutions.

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[386] McKinsey *The future of work in Europe*; for total wholesale and retail sectors; at risk means facing reduction of hours or pay, or temporary or permanent layoffs; https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-europe#nga_section_header_main_0_universal_1

13.   Textile Ecosystem

4 million people employed[387]

0,70% of EU value added (EUR 85 billion)

267,000 firms 99.5% of SMEs

Transformative initiatives

Boosting EU market for sustainable & circular products

The Commission will adopt a **comprehensive EU Strategy for Sustainable Textiles[388] in 2021**. It will strengthen industrial innovation and boost the EU market for sustainable and circular textiles, including the market for textile reuse and drive new business models. The Strategy will encompass the whole value chain.

R&I funding to support innovation pathways

EU/national research and innovation funding is crucial to respond to future market demands such as material innovation, safe and sustainable product design, new business models, as well as recycling. This is relevant for the competitiveness of all segments of the ecosystem.

Investments to support textile recycling

Member States will need to implement new mandatory collection of textile waste set by the revised EU Waste Framework Directive as of 2025. In this context, and **to boost the EU market for sustainable and circular textiles,** support is needed for investments in collection, sorting and recycling plants.

Towards an EU policy toolbox fit for purpose

Pact for skills A pact on skills aims to develop the **skills needed for the green and digital transition. Skills needs are identified for design, product development, technical textiles production, digitalisation, sustainability and the circular economy.** The aim is to mobilise relevant stakeholders to address challenges in terms of up/reskilling the workforce.

Green transformation **The EU strategy for sustainable textiles** is expected to set out a direction for the green transformation of the ecosystem, in terms of environmental footprint, circularity and sustainable lifestyles. In parallel, the Commission has launched an impact assessment to identify potential policy measures regarding the **unintentional release of microplastics in the aquatic environment** during washing of synthetic textiles.

Single market surveillance **To ensure that imported clothes comply with EU legislation,** under the Intellectual Property Action Plan[389], the Commission will support Member States' customs authorities in improving customs control by reinforcing customs risk management. With regard to market surveillance, the European Chemicals Agency announced that inspectors in Member States will check textile products for compliance with restrictions for hazardous substances[390].

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[387] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics.

[388] As announced in the Circular Economy Action Plan - https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

[389] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0760&from=EN

[390] https://echa.europa.eu/-/eu-inspectors-to-check-consumer-products-for-hazardous-substances

The ecosystem at a glance

Sectors included in the ecosystem	**The textile ecosystem includes transformation of natural (e.g. cotton, flax, wool), man-made and artificial (synthetic polyester and viscose) fibres into yarns and fabrics, production of yarns, home textiles, industrial filters, technical textiles, carpets and clothing. The ecosystem also includes production of footwear and leather.** The ecosystem is particularly competitive in high-end clothing and technical textile for automotive applications, medical textile, agro textile and protective clothing. Most companies operate in complex value chains, making them dependent on external supplies, which can easily be disrupted.

Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex 4 of the SWD on Monitoring the Implementation of Industrial Policy.
Source: Eurostat, National Accounts. Data from 2018 (or latest year available

SME dimension	Small and medium sized enterprises are at the core of the industry representing 99.5% of the companies. Women represent more than 70% of all employees in the sector. Companies with less than 50 employees account for more than 90% of the workforce and produce almost 60% of the value added. The ecosystem is considered vulnerable given the high share of SMEs.
Current challenges	**The ecosystem has been hard hit by the shutdown of retail outlets.** In 2020 textile & clothing, footwear and leather goods retail sales decreased by 24.4%. EU turnover for textiles decreased by 9.3% and the decline in the clothing industry was 17.7%[391]. Demand for leather is weak and only very special market segments are doing better (luxury sector, automotive and furniture). Turnover in the tanning sector declined by close to 25%[392]. The footwear sector has seen a further decrease in sales as a result of the second lockdown in many Member States. Turnover for the footwear sector is estimated to decline by 30%[393]. The manufacture of nonwovens, which is a key raw material for face masks and medical gowns, has been more resilient. In particular, demand for materials used to fight the pandemic had strong growth rates. The most significant growth rate for nonwovens in 2020 was observed in nonwovens for medical use (+118.0%). In contrast, major declines were recorded in the sales of nonwovens materials to the construction and automotive markets[394].

Competitiveness challenges are also linked to a strong environmental footprint. A key challenge for the green transformation is to **boost investments to accelerate sustainability and circularity.**

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[391] Eurostat
[392] The Confederation of National Associations of Tanners and Dressers of the European Community (**COTANCE**)
[393] European Footwear Confederation; CEC
[394] https://www.edana.org/about-us/news/2020-nonwovens-market-insights

	During the coronavirus pandemic, **e-commerce *sales* have grown even further**. However, many SMEs struggle to market their products online. In this context, companies need to diversify their sales channels. Investments could be provided to help companies access online marketplaces and to present their collections digitally at virtual market places. SMEs in the textile ecosystem are being held back by a lack of skilled employees. Recent trends in terms of skills and occupational profile developments have led to the baseline assumption of a gradual shift from lower towards medium and higher skilled employees.
Forward-looking assessment	**Pursuing the goals set by the Green Deal should guide the actions for recovery** and create new opportunities for growth. **Priority is for sustainable investments** for sustainable product design, production processes, investments to develop recycled fibres and higher performing sustainable textiles, business models focused on resource efficiency and circularity. In addition, **investments in material and product innovation are needed to sustain Europe's leadership in technical and smart textiles.** The EU could drive the international standard setting process for smart textiles **to ensure a pole position in future markets**. In this context, there are opportunities to boost sustainable and circular textiles, including textile reuse, and drive innovation in technical and smart textiles and high-end fashion.
Global context	The ecosystem **is integrated in global value chains and depend on export markets at the same time as it faces strong international competition**. Over 60% in value of clothes sold in the EU are manufactured in third countries. **To guarantee a level playing field, it is particularly important to ensure that imports comply with EU legislation.** EU exports of textile and clothing decreased by 14% in 2020. The pandemic has shown EU's supply chain dependence especially for fibres and yarns from South East Asia.

Mapping of policy tools in more detail

Funding and budgetary programmes

CRII+/ERDF/ESF/CEF ERDF and ESF can support the adaptation of skills and innovation by enhancing research for innovative materials and innovation capacities, the uptake of advanced technologies and industrial transition. **Building cross-border infrastructure links is important for the industry's transition to circularity,** collaboration between textile companies and creative professionals. REACT- EU could in addition fund the prolongation of temporary unemployment schemes. Ongoing efforts will be needed to direct investments into priority areas and to secure adequate budget allocation for sustainability, digital and innovation projects.

Horizon Europe (including European Partnerships) While EU wide collaboration and strategy development has been effectively coordinated by the European Textile Technology Platform for more than 10 years, the implementation of the Strategic Innovation & Research Roadmaps have been hindered by the absence of a dedicated funding programme at EU level. **Horizon Europe draft work programmes envisage projects which include the support to innovative, safe and sustainable textiles** as well as to the broad manufacturing sector. Importance is given as well to the substitution of substances of concern during the production of textiles and to the minimisation of the release of certain substances and materials during the production and consumption phases (e.g. microplastics). The Made in Europe Partnership under Horizon Europe aims at transforming the manufacturing sectors, including the textile sector, towards reducing waste generation, circular and digital manufacturing.

Digital Europe Programme **The digital transformation of companies range from integrating digital in textiles (smart textiles), to smart production, digital marketplaces, design and to present textile, clothing and footwear collections at virtual Trade Fairs** as well as enabling more circularity and sharing of value creation in textile value chains. An important challenge for the companies, and notably SMEs, in the ecosystem is value creation out of industrial data, notably through the proposed manufacturing data spaces and testing and experimentation facilities, and the uptake of digital technologies at industrial level, enabled by the network of Digital Innovation Hubs under Digital Europe. Under the Digital Europe Programme, the Commission is also supporting the reskilling and upskilling of workers through short-term courses in advanced digital skills.

InvestEU **Relevant to invest in innovative SMEs' but also to develop innovative products and materials, including sustainable product design, manufacturing processes and circular business models, and to facilitate energy efficiency investments in manufacturing.** Under the SME window, debt and equity financing will be available not only to sustain SMEs' competitiveness, but also to help SMEs digitalise, innovate and become more sustainable.

Space and Defence programmes The textile sector has been involved in the Action for Defence Research and in particular with regard to lightweight and bulletproof garments. **Big potential to benefit from public spending in this area both as a source for product innovation and as an important market.**

Supportive regulatory environment

Single Market Surveillance **Sometimes imported products are not compliant with EU requirements. The problem has become more pronounced with the development of e-commerce.** It is estimated that

governments across the EU lose up to EUR 7 billion per year due to the presence on the market of counterfeit clothing, footwear and accessories[395]. With regard to market surveillance for the textile ecosystem, on 1 July 2020, the European Chemicals Agency announced that inspectors in Member States will check textile products for compliance with restrictions for hazardous substances. According to the rapid alert system for dangerous non-food products, RAPEX, in 2017, out of 2000 alerts, clothing was the third most important class of materials. In 22% of the cases the risk was associated to chemicals.

Main Single Market barriers within the ecosystem From a free movement of goods perspective, the ecosystem is characterised by few barriers. **The EU legislative framework requires compulsory labelling only for textile fibres composition and for non-textile parts of animal origin** (EU Regulation 1007/2011 on Textile Fibre Names). **All other labelling requirements are voluntary at EU level**. The Textile Regulation allows the use of schemes/labels such as OEKOTex 100, GOTS or the EU EcoLabel, which provide additional information on the environmental characteristics of textile products. REACH addresses chemicals in textiles as it covers all consumer products sold in the EU, including clothing. In cases where there is no harmonised regulation e.g. flammability for textile products, the General Product Safety Directive applies. With regard to the Waste Framework Directive, Member States will need to implement new requirements on mandatory collection of textile waste as of 2025. Concerning free movement of goods, industry has not raised any specific concerns recently and since 2018 the Commission has received only 7 notifications on textiles in the framework of Directive (EU) 2015/1535 (laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services). Hence, there seems to be, as such, no specific barriers today that could have an impact on the textile ecosystem. With regard to footwear, Directive 94/11/EC lays down rules on labelling materials used in footwear sold in the EU.

Standardisation **Several European standards exist to ensure conformity (e.g. personal protective equipment or wall-to-wall carpets), as well as on testing and measurement of performance of products.** With regard to care labelling, EU producers are free to use the care labelling ISO standards and the icons related to this or use other standards. For companies to participate in a data economy, data standards (for production, product design and on-textile data generation) and data sharing governance will have to be agreed among the various stakeholders. The ecosystem is pro-active in developing voluntary standards (e.g. test methods, technical definitions) within the European standardisation organisations for the assessment of properties and performance of textile products to ensure coherence (e.g. standards on microplastics emission and standards on smart textiles). It is important that EU (together with likeminded partners) lead in setting international standards for smart textiles.

Digital transformation Digitalisation needs have accelerated with COVID (i.e. digital market places, virtual trade shows), notably for the development of high-value smart textile and digitalised manufacturing, including mass customisation, efficiently using robotics and AI. It requires further support and training to be provided to digital transformation, including in the pre-production creativity phase of the manufacturing processes, such as design, prototypes and styling.

Green transformation While the green transition represents a substantial opportunity, the ecosystem mainly consists of SMEs, which need support to comply with sustainability requirements. The European Green Deal identified textiles as a resource-intensive sector requiring focused action. The Industrial Strategy of 2020 and the Circular Economy Action Plan announced that the Commission will adopt a comprehensive EU Strategy for Sustainable Textiles in 2021. **The EU Strategy for Sustainable Textiles will**

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[395] According to the 2020 Status Report on IPR Infringement

aim to support the industrial competitiveness, sustainability and innovation of the ecosystem and to boost the EU market for sustainable and circular textiles. The strategy will include the whole value chain, addressing sustainable product design, production processes and circular business models. Preparatory research for the textile strategy is carried out in order to gather quantitative information on material streams, business models and recycling technologies. This information will help to develop targeted actions in the textile strategy to increase circularity, promote sustainable lifestyles and reduce waste and material use.

Strategic Public Procurement Public buyers are increasingly aware of the complexity of the supply chain of textile products. **Sustainability criteria in tenders can be used to require more transparency from suppliers and more attention to compliance with environmental, labour and human rights standards.** Existing Green Public Procurement criteria for textiles[396] offer a good starting point for public buyers to implement Strategic Public Procurement. The guidance on socially responsible public procurement will help public buyers to improve transparency and due diligence in their supply chains.

Intellectual Property **Main concern for the sector is Intellectual Property Rights (IPR) infringements due to the presence on the market of counterfeit clothing and footwear.** The IPR Action Plan[397] includes many elements of importance for the ecosystem, e.g. Intellectual Property assistance to SMEs and fight against counterfeiting.

International partnerships and dialogue

Strategic Partnerships (Critical Materials and input) **The ecosystem depends on global supply chains especially for fibres and yarns from South East Asia**. Lack of supply of dyeing stuff has long been a concern due to supply constraints in South East Asia. Diversification and undistorted access to raw materials is of paramount importance to EU Textile Industry

Networks and governance

Clusters cooperation According to the European Cluster Collaboration Platform, **24 European clusters are registered in the Textile Manufacturing sector, 20 European clusters are registered in the Apparel sector and 17 European clusters are registered in the Advanced Textile material.** In addition, 7 textile clusters from 5 Member States are members of European Cluster Partnerships going international (incl. TEXGLOBAL and FASCINATE projects). These Textile Cluster Internationalisation projects support European clusters to develop joint international strategies and common actions strengthening European SMEs' access to third markets.

Enterprise Europe Network **Active Enterprise Europe Network (EEN) Textile & Fashion Sector Group organising matchmaking events, supporting young entrepreneurs in fashion, sharing of best practices for innovation and sustainability.** In addition, the Sector Group has close contacts with the industry and can be used as a tool to transmit information about EU programmes.

Pact for skills Since 2018, the project 'Skills4Smart textile, clothing, leather and footwear Industries 2030' was among the first-wave Blueprints for Sectoral Skills Strategies to identify skills gaps and develop job profiles for vocational training based on market intelligence.[398] **Skills needs are identified in the areas**

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[396]SWD(2017)231
[397] COM/2020/760 final
[398] More on the Pact for Skills on https://ec.europa.eu/social/main.jsp?catId=1517&langId=en

of design, product development, technical textiles production, digitalisation, sustainability and the circular economy. The sectors in the ecosystem have expressed their interest to engage on a Pact for Skills initiative. The aim is to mobilise relevant stakeholders to address challenges in terms of up/reskilling of the workforce. Furthermore, the SME strategy supports the 'digital volunteers' programme to promote the transfer of expertise in digitalisation from high-tech businesses to more traditional SMEs.

Digital Innovation Hubs **The Digital Innovation Hubs could help companies in the textile ecosystem to improve their processes, products and services through the use of innovative technologies**. Textile Innovation Hubs could provide access to the latest knowledge, expertise and technology to support and implement innovations across the value chain. As an example, they could provide services to SMEs to create digitally virtual collections.

Thematic Smart Specialisation Interregional Partnerships The S3 **Partnership for Smart Regional Investments on Textile Innovation** has the objective of strengthening regional textile innovation ecosystems across Europe and enabling Textile & Clothing SMEs to invest more in innovation.

14.   Tourism Ecosystem

20.3 million people employed[399]

**7% of EU value added
(EUR 850 billion)**

**3.2 million firms
99.8% of SMEs**

Transformative initiatives

Ensuring better tourism data sharing to make the ecosystem more resilient and sustainable

As data is spread across the ecosystem (tourism destinations, businesses and public authorities), **clear rules on tourism data access and sharing** could facilitate interoperability, stakeholder cooperation and investment in digital skills.

Leveraging EU funds to enable a sustained recovery and meet tourism investment needs

The COVID-19 crisis reduced drastically the investment capacity of the tourism ecosystem. EU funds could be leveraged to **invest in sustainable, safe and seamless travel**, as well as **technologies enhancing tourist experiences**.

Carbon-neutral destinations to contribute to EU climate goals

Delivering on **carbon-neutral destinations** requires incentives for public and private green investments, better knowledge-sharing between regions/cities, as well as tools to improve transparency, such as monitoring tools, carbon footprint trackers, auditing schemes (e.g. EMAS) and the use of labels (Ecolabel).

Towards an EU policy toolbox fit for purpose

Ecosystem strategy Setting a long-term vision for the ecosystem in a '**European Agenda for Tourism 2050**'[400], underpinned by shared priorities and agreed milestones between Commission, Member States and stakeholders.

Pact for skills **Upskill/reskill** the **workforce** for the green and digital transformation and evolving market trends through a tourism-specific 'Pact for skills' between industry, Vocational Education & Training providers and employment agencies[401]**.**

CRII+/ERDF/ESF/CEF Increasing public-private investment to help the ecosystem **meeting its investment needs** for greener business models and access to digital market places, starting with CRII+/ERDF/ESF/CEF and investments mobilised under RRF.

Intellectual Property Assess the feasibility of protecting **Geographical Indications (GI) for non-agricultural goods** as these are a way for some lesser-visited destinations to market themselves[402].

Standardisation Develop an EU deliverable on health protocols for tourism establishments and services to rebuild consumer confidence.

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[399] Figures for employment and value added are based on Eurostat National Accounts and number of firms and SME shares on Eurostat Structural Business Statistics
[400] as announced in COM(2020)550, Tourism and transport in 2020 and beyond.
[401] More on the Pact for Skills on https://ec.europa.eu/social/main.jsp?catId=1517&langId=en
[402] COM/2020/760 final

The ecosystem at a glance

Sectors included in the ecosystem	**In the EU, services providers at destination level (hospitality, attractions) are, in their majority, small local owners. Part of them are franchisees of a few multinational companies providing branding, marketing, management and selling services.** The sector of cross-border passenger transporters is consolidating around a large operators (airlines and cruises in particular) but to a lesser extent than in the US or China. They distribute their services directly or through travel agencies. The market share of traditional travel agencies has been decreasing steadily with the development of online entrants which emerged in the mid-1990s. In 2019, 80% of the European online market was controlled by two international companies incorporated in the USA[403]. The tour operators sector started its consolidation earlier, with 5 companies taking 70% of the European market in 2009.[404] This concentration continued through vertical and horizontal integration, notably around the 2 largest European tour operators, respectively incorporated in Germany and the UK. The collapse of a UK company in September 2019 and the COVID crisis are expected to lead to further concentration.
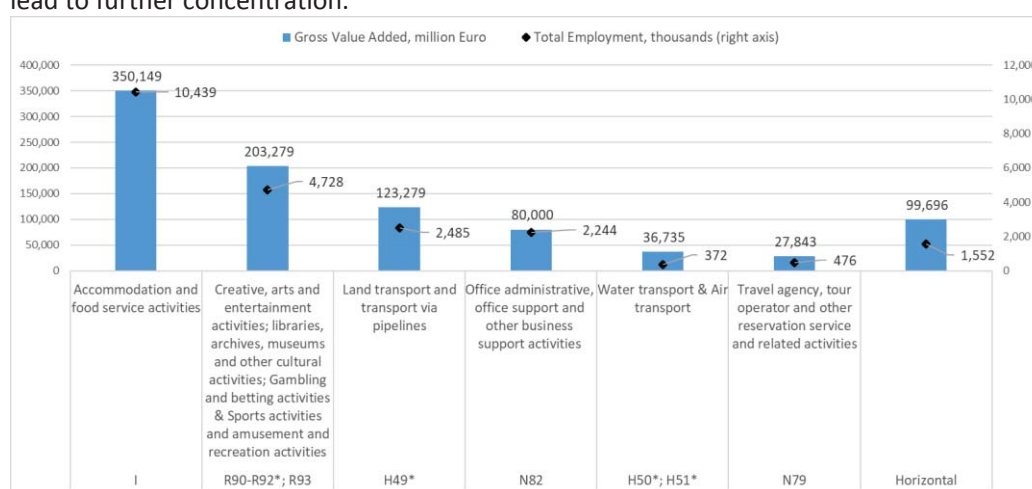
Notes: The bar labelled Horizontal refers to activities which contribute to all ecosystems such as professional services and utilities; see Annex of the SWD on Monitoring the Implementation of Industrial Policy. *Sector only partially attributed to the ecosystem.

Source: Eurostat, National Accounts. Data from 2018 (or latest year available).

SME dimension	SMEs represent 99.9% of the ecosystem's companies. They generate 63.66% of its value added and employ 83.63% of its workers. The proportion of micro and small companies is particularly high in hospitality (hotels, bars, restaurants), with many owners operating independently or under franchise from large groups. It is also true but to a lesser extent for travel agencies and coaches.
Current challenges	Over the last 10 years, the EU tourism ecosystem lost world market shares[405]. Europe being a mature travel market, it progressed in absolute terms but less than other regions (i.e. emerging markets). With drops of up to 80% in revenues in the last three quarters of 2020[406] for some sub-sectorsand up to 11 million jobs at risk[407], tourism services are at the bottom of the business confidence indicator (2020-21 winter season lost). Worst affected Member States are those highly dependent on tourism and unable to compensate loss of

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[403] Statista, 24 March 2021.

[404] Ecorys (2009), 'Study on the Competitiveness of the EU tourism industry', p.76.

[405] UNWTO (2018), 'European Union Tourism Trends', Madrid, p.63.

[406] Travel agencies and tour operators faced turnover losses of roughly 80% in the last three quarters of 2020. In the same period, air transport also lost between 60% and 70% of their revenues.

[407] European Commission Joint Research Centre (2020), 'Behavioural changes in tourism in times of Covid-19: Employment scenarios and policy options', JRC Science for Policy Report

foreign travellers with domestic tourism. The **estimated investment gap** for 2020-21 is EUR 161 billion (highest of all ecosystems)[408]. High level of indebtedness is reducing the capacity of most tourism sectors to invest in the development of more resilient supply chains and new services (e.g. decarbonised, slow tourism). 'Revenge tourism' is expected for Summer 2021 but the reduction in disposable incomes could **delay recovery to 2022-23**[409]. Business travel (generating up to 35% of the ecosystem revenues, e.g. through trade fairs) is expected to recover last.

Forward-looking assessment	Pre-COVID EU tourism was among top high-growth ecosystems, hiring many new workers particularly among the young, women and lesser skilled people. With temporary support to new tourism services, it could contribute massively to EU recovery. Accounting for 30% of EU exports in services[410], it could generate again surpluses helping the EU Balance of Payments with key countries like China. The 'European Tourism Convention'[411] identified a number of challenges for the future, including: the need to **retrofit travel and tourism infrastructure** to make it more resilient to future pandemics (avoiding closures); the need to better **coordinate risk assessment and risk management** (travel restrictions, vaccines, testing and quarantines); the need to support the **development of new tourism services** in line with evolving consumer patterns and post-COVID demand (safe and seamless travel; richer cultural experience at destination, …); the need to **promote and develop sustainable tourism** contributing further to regional development; the need to improve the regulatory framework to **minimise relocation risks** (tour operators / travel agencies headquarters, …) or the need to analyse whether the current regulatory framework for package travel, including as regards insolvency protection, is still fully up to the task of ensuring robust and comprehensive consumer protection at all times.
Global context	Other **key regions are recovering faster and/or suffering a smaller reduction** in domestic business and leisure travel (e.g. U.S. air traffic; China domestic tourism back to pre-COVID level since Oct 2020). Their companies are therefore in a better financial position. This increases EU **vulnerability to acquisitions by extra-EU actors**, with possible relocation of decision-making centres and online services as well as bigger transfer pricing problems. EU actors would lose part of their market share in the EU but also on other markets where they are active.

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[408] SWD(2020) 98 final, 'Identifying Europe's recovery needs', p. 41

[409] OECD (2020), 'Mitigating the impact of COVID-19 on tourism and supporting recovery', OECD Tourism Papers, 2020/03, OECD Publishing, Paris, 16 Dec 2020.

[410] Eurostat (addition of passenger transport and travel services).

[411] In October 2020, at the invitation of the European Commission, the 'European Tourism Convention' brought together members of the European Parliament, Member States, tourism industry and stakeholders to discuss the way forward. This section summarises the main findings of the Convention.

Mapping of policy tools in more detail

Funding and budgetary programmes

RRF National Recovery and Resilience Plans (RRP) can support the tourism ecosystem, in particular in terms of **improving sustainability, energy efficiency, decarbonisation and clean mobility, connectivity and digitalisation** (including for museums, galleries and cultural heritage sites), **up- and re-skilling** and modernisation of public tourism administration. Because of indebtedness level, Member States could consider prioritising grants over loans.

CRII+/ERDF/ESF/CEF A new guide to EU funding for tourism under preparation. CRII+ supports tourism SMEs. REACT-EU could fund the **prolongation of temporary unemployment schemes for tourism workers**. Tourism can get support from ERDF under various thematic Policy Objectives and ESF (Pact for Skills in tourism). CEF (transport) relevant for **decarbonisation of passenger transport**, for **improving connectivity** of lesser-known destinations and for innovative projects in sustainable multimodal passenger travel. Single Market Programme to develop SMEs capacities to carry out green and digital transition. The **5G** Strategic Deployment Agenda in CEF (digital) could support **seamless and safer travel**, as well as a digitally **enhanced experience for tourists at destination**.

Horizon Europe (including European Partnerships) Horizon Europe supports innovative solutions to promote and diversify cultural and sustainable tourism for the development of European regions and urban areas.

Digital Europe Programme Digital Europe Programmes supports measures for the uptake of technology by tourism SMEs and start-ups which could be exploited urgently.

InvestEU Tourism SMEs can benefit from funding through the dedicated **SME window of InvestEU**. There is a need to explore the possibility for **'short term car rental'** to benefit from **funding for clean vehicle fleet** and the possibility for the **accommodation sector** to benefit from special conditions (e.g. loan duration) under the 'Sustainable Infrastructure window' to facilitate for instance **energy efficiency investments**.

Supportive regulatory environment

Main Single Market barriers within the ecosystem Barriers to the Single Market for tourism services remain, in particular regarding the **short-term accommodation rental** and **car rental sectors**.

Standardisation Current proliferation of COVID-19 safety protocols for tourism services is costly for companies and possibly not reassuring travellers. At the invitation of the Commission, the European Standardisation body CEN is preparing a European tourism safety seal, which it plans to release mid-May 2020[412]. The Commission will work with Member States and the industry to ensure the rollout of this seal before the summer[413].

Digital transformation Digital technologies and data will not only enhance the tourism offer and **enable new business models** based on market intelligence, but also **improve the sustainability and resilience** of

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[412] COM(2021)129
[413] COM(2021)129

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the ecosystem through smart management of tourist flows and better resource management. However, their adoption is uneven across Member States (e.g. the number of hospitality businesses with online sales and reservations varies from 15% in Latvia to 68% in Denmark). Among the elements that could facilitate the digital transformation are: (i) **Secure data-sharing** with clear rules on interoperability and data governance, (ii) **better access of tourism businesses to online platforms** and implementation of the 2019 Regulation on platform-to-business relations[414], (iii) **adequate rules for packages sold online** under the Package Travel Directive as well as a robust and comprehensive consumer protection at all times[415], (iv) fit for purpose 2017 Delegated Regulation on **Multimodal Travel Information services** in particular for multimodal ticketing[416], (v) role of the **EU tourism statistics Regulation**[417] and (vi) potential **Tourism Dashboard**.

eGovernment The Commission is preparing a proposal on the digitalisation of (short-term) visa procedures[418] in order to attract more long haul travellers which are critical for tourism recovery (resilience issue). It is looking at **options for swift deployment of visa digitalisation** (already in place in the UK, Turkey, Australia, …).

Green transformation Sustainable destinations will help the tourism ecosystem meet the EU's environment and climate goals. This requires knowledge-sharing between regions/cities, transparent and comparable tools for monitoring tourism evolution, as well as public and private financial incentives for green investments (e.g. in infrastructure, mobility, beaches and ski resorts, skills). **Greening of tourism services** may be enabled by **investments in renewable energy, sustainable water management and nature-based solutions**; by ecosystem-specific tools providing transparency among businesses and consumers, such as sustainability measurement frameworks (e.g. **environmental footprint tracker, eco-management** and Sustainable Destination passport), **auditing schemes** (EMAS) or labels (Ecolabel); but also by the creation of a dedicated forum for stakeholder cooperation (European Tourism Sustainability Platform). In addition, the **Renovation Wave** offers opportunities to make tourism infrastructure more energy efficient. The '**Green Infrastructure Strategy**' linked to Nature 2000 is a key tool for supporting ecotourism.

Intellectual Property In November 2020, the Commission adopted an IP Action Plan announcing that it will be assessing the feasibility of **protecting geographical indications (GI) for non-agricultural goods.** Such initiative could contribute to the promotion efforts of some lesser-visited destinations and help boosting the economic recovery particularly in the most affected EU Member States.

Networks and governance

Pact for skills Need to pursue the work started with the 'Alliance for sectoral cooperation for skills' with a dedicated 'Pact for skills'[419] between industry, Vocational Education & Training providers and employment agencies (up to 25% of jobs in the tourism ecosystem **in need of up- and re-skilling**). [420]

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[414] For points 1 and 2, COM(2020) 842, COM(2020) 825.
[415] COM(2021)90.
[416] Directive (EU) N°40/2010, article 17 Reporting.
[417] Regulation (EU) N° 692/2011, article 7 Evaluation report.
[418] COM(2020) 690.
[419] More on the Pact for Skills on https://ec.europa.eu/social/main.jsp?catId=1517&langId=en
[420] WALQING study 2012. Employees from 18 to 64 years by educational attainment level in 2019 for EU 27 (Eurostat): 'Less than primary, primary and lower secondary education': 15,9% for all NACE activities v. 28,6% for Accommodation and food service activities; 'Tertiary education' (i.e. Bachelor and above level): 34,8% for all NACE activities v. 15,6% for Accommodation and food service activities.

Clusters cooperation Need for further cooperation between tourism clusters and building closer **partnerships with other clusters** (i.e. technology, cultural and creative industries, construction).[421]

Enterprise Europe Network Need for Enterprise Europe Networks Sector Group on tourism and cultural heritage to further **promote of new (green / digital) technologies** with the support of the new EEN Sustainability Advisors.

Digital Innovation Hubs Digital Innovation Hubs are key to support tourism SMEs in their digital transformation and foster the move to **data management and data sharing**.

Thematic Smart Specialisation Interregional Partnerships Need to forge more partnerships under the 'S3 Thematic Partnership on Digitalisation and Safety for Tourism' focusing on the **use of emerging technologies providing innovative and attractive experiences for tourists**.

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[421] 99 clusters linked to tourism and hospitality focus have created a profile on the European Cluster Collaboration Platform. One of the 24 'European Strategic Cluster Partnerships for Going International' relates to tourism (Welliance HOSPITALITY).

Annex 4: Monitoring the implementation of Industrial Policy

Key Performance Indicators

The Council Conclusions "A recovery advancing the transition towards a more dynamic, resilient and competitive European industry", adopted on 16 November 2020, "CALLS on the Commission to define key performance indicators for monitoring the industrial strategy and competitiveness […], including taking into account investment trends, and comparing those to other world regions". The conclusions also calls "for the objectives of the EU's industrial policy to be reflected in sound indicators, in particular concerning industrial competitiveness, industry's contribution to the green and digital transition and the Union's resilience and strategic autonomy while preserving an open economy."[422]

The set of KPIs presented below presents the analytical approach to address this request. The selection of KPIs also benefitted from previous work, notably under the Austrian Presidency, as summarised in the "Indicator Framework regarding Industrial Competitiveness".[423]

All the indicators are based on publicly available data. Hence, no additional reporting obligations for Member States is necessary to calculate them. The set of indicators presented below complements other existing monitoring tools used by the Commission and does not aim at replacing them. Its main purpose and benefit is to report in a synthetic manner and in a single document on the different areas identified as priorities for the European industrial policy. Regular reporting based on reliable data sources could support the Commission and the Member States in providing timely policy response in case of identified challenges.

The scope of this set of indicator is very wide, as wide is the scope of industrial policy. In particular, thanks to an approach based on ecosystems, this set of KPIs expand the scope of monitoring to economic activities beyond a narrow definition of industry, and includes business services, retail, cultural activities and the social economy.

The list of indicators put forward in this document is not rigid. As new data becomes available and policy priorities evolve, the KPIs could also evolve.

Structure of the document

The KPIs are clustered along four broad topics:

1. **Headline indicators**, providing a synthetic overview of the main trends of the EU economy and benchmarking against other countries;
2. **Short-term indicators**, to describe the evolution of the COVID crisis and provide a forward-looking analysis;
3. **Thematic indicators,** which proxy the following dimensions:
    a. Economic Resilience
    b. Digital transition

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[422] https://data.consilium.europa.eu/doc/document/ST-13004-2020-INIT/en/pdf
[423] https://data.consilium.europa.eu/doc/document/ST-11244-2018-INIT/en/pdf

> c. Climate neutrality and circular economy
> d. Single Market integration
> e. SMEs
> f. International dimension

4. **Indicators by ecosystem**, which describe the main features of the ecosystems and their performance.

The tables below summarises the selection of indicators by thematic area.

Table 1: List of KPIs horizontal and thematic KPIs

Thematic area	Indicator	Measure	Source
Headline indicators	Gross value added	annual % change	World Bank, National Accounts, Eurostat
Headline indicators	GDP per person employed	constant prices, annual % change	AMECO
Headline indicators	Number of employees	annual % change	AMECO
Headline indicators	EU global market share	%	Eurostat
Short-term indicators	Turnover	% of the same month in previous year	Eurostat, STS
Short-term indicators	Industrial production	% of the same month in previous year	OECD, Eurostat
Short-term indicators	Declaration of bankruptcies	Index	Eurostat, Experimental Statistics
Short-term indicators	Registration of businesses	Index	Eurostat, Experimental Statistics
Short-term indicators	Permanent, temporary and self-employment	Change with respect to same period in previous year	Eurostat, Labour Force Survey
Short-term indicators	Gross Fixed capital formation	% of same period in previous year	Eurostat, National Accounts
Short-term indicators	Economic confidence Indicator	Level	ECFIN
Economic Resilience	Net public investments	% of GDP	AMECO
Economic Resilience	Net private investments	% of GDP	AMECO
Economic Resilience	R&D expenditures	% of GDP	World Bank, Eurostat
Economic Resilience	STEM graduates	per 1,000 population aged 20-29	Eurostat and OECD
Digital transition	Integration of digital technologies	Index	DESI, Eurostat
Digital transition	Use of internet	Index	DESI, Eurostat
Digital transition	Connectivity	Index	DESI, Eurostat
Digital transition	Digital public services	Index	DESI, Eurostat
Digital transition	Human capital	Index	DESI, Eurostat
Digital transition	Population with basic or above basic digital skills	% of total population	Eurostat
Green transition	GHG emission intensity	tCO2e/GDP	UNFCCC and World Bank
Green transition	Electricity prices for non-household consumers	EUR/MWh	Eurostat
Green transition	Recycling rate of Municipal waste	% of total	Eurostat
Green transition	Circular material use rate	% of total material use	Eurostat
Single Market integration	Intra-EU trade	Import + Exports, bn EUR	Eurostat
Single Market integration	Intra-EU trade	Nominal growth rate y/y	Eurostat
Single Market integration	Price convergence	Coefficient of variation of PPP for GDP	Eurostat
SMEs	Persons employed in SMEs	Index 2008=100	Eurostat and DIW Econ
SMEs	Value added in SMEs	Index 2008=100	Eurostat and DIW Econ
International dimension	Extra-EU export	Bn EUR and nominal	Eurostat

		growth rate	
International dimension	Extra-EU import	Bn EUR and nominal growth rate	Eurostat

The majority of the indicators presented are calculated for the whole EU economy. In some cases, the most relevant macro components of the economy (e.g. industry, manufacturing and/or services) are also presented and, where possible and meaningful, international comparisons are included.

A selection of KPIs is also presented for the 14 industrial ecosystems, allowing for a more granular view of the main trends characterizing specific parts of the economy. The table below summarises these indicators.

Table 2: list of KPIs calculated by ecosystem

Thematic area	Indicator	Measure	Source
Headline indicators	Gross value added	Million EUR and % change 2015-2018	Eurostat
Headline indicators	Employment	Million EUR and % change 2015-2018	Eurostat
Headline indicators	Number of firms	Number	Eurostat
Green transition	Greenhouse gas intensity	Level and % Change 2015-2018	Eurostat
Short-term indicators	Confidence indicator	Level	ECFIN
International dimension	Export intensity	Extra EU Export/VA	Eurostat
Single Market integration	Intra-EU trade	% of total ecosystem trade	Eurostat
Economic Resilience	Churn rate of business	% change 2015-2018	Eurostat
Economic Resilience	Investments in tangibles	Level and % change 2015-2018	Eurostat

This set of KPIs takes into account, and in some cases partially overlaps, other thematic scoreboards that monitor specific policy areas. These initiatives complement the present, by analysing in greater detail and precision the impact and the performance of specific policie areas. Among them we can list the Single Market Scoreboard, The European Innovation Scoreboard, DESI, the Circular Economy Monitoring framework[424], the Eco-innovation Scoreboard[425], the Resilience Dashboards[426].

The main **technical** criteria driving the selection of KPIs can be summarised as follows:

1. Availability of data from public sources, to ensure reliability, transparency and replicability;
2. Availability of data for international comparisons;
3. Length of the time series, to follow the evolution over a sufficiently long time horizon;
4. Timeliness of the data;
5. Clarity and ease of interpretation.

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[424] https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework
[425] https://ec.europa.eu/environment/ecoap/indicators/index_en
[426] Proposed in the Commission's 2020 Strategic Foresight Report COM(2020) 493 final.

Headline indicators

Value added in industry and services
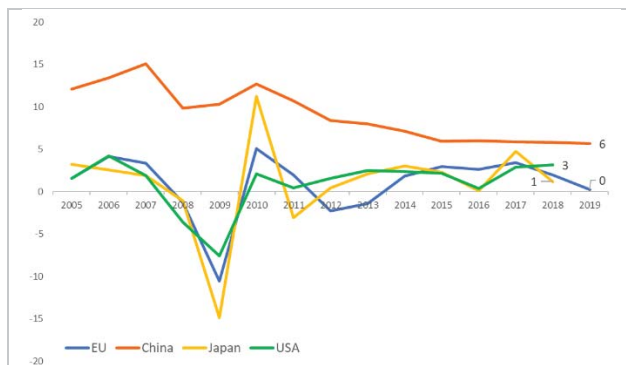
Value added in Industry (including construction):
annual % growth
Source: World Bank national accounts data
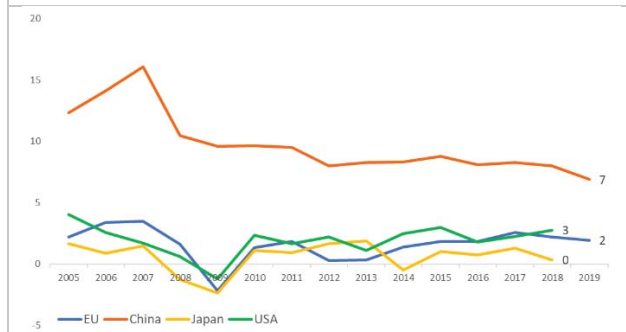
Value added in Services: annual % growth
Source: World Bank national accounts data

The overall composition of our economy has changed over time, with industry shrinking relative to services.[427] This is a global trend, influenced by many factors, including servitisation of industry. Changes in relative prices, driven by the broad decrease of prices of many manufacturing products, also contribute to this trend.

In industry, growth has been lower than international competitors, except for Japan in 2018. Services, grew faster, but not as fast as China and the United States. In particular, the performance of China signals its increasing importance also in service provision.

Nevertheless, Europe maintains a very strong industrial basis. The increasing importance of services is possible also thanks to the existence of a strong and dynamic industry.

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[427] Industry corresponds to ISIC divisions 10-45 and includes in mining, manufacturing, construction, electricity, water, and gas. Services correspond to ISIC divisions 50-99 and include wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services.

GDP per person employed
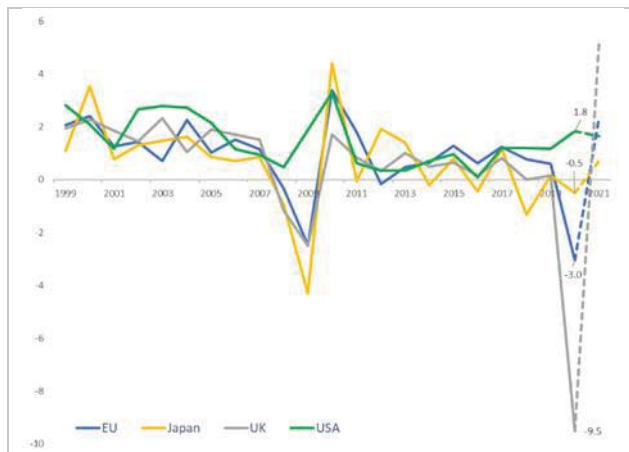
GDP per person employed: constant prices, total economy, % annual growth
Source: AMECO **Source**: AMECO

Another trend common to most advanced economies is the secular slowdown in productivity growth, something the EU is not immune from.

In particular, the EU has been experiencing a significant slowdown in labour productivity, matched by a similar trend in total factor productivity growth.

In 2020, a productivity drop is visible in all countries, but appears more severe in the EU and in the UK. For the EU, estimates suggest a significant rebound in 2021, but not sufficient to compensate for the drop in 2020.

Employment

Number of Employees: Total employment, domestic, annual % growth. Data for 2020 based on estimates.
Source: AMECO

The pandemic has triggered the deepest shock in the history of the EU. Such economic shock has caused also big employment losses. However, the international comparison shows how social safety nets in the EU played a major role in mitigating them, limiting the drop to -1.5% for the EU vs. -6.2% in the USA and -5% in Japan. In particular, the USA and the EU suffered a similar drop of hours worked. However, the drop in the number of persons employed sharply differed, most likely due to market regulation and heterogeneous measures to protect employment during the crisis.

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EU global market share

Share of world export: %
Source: Eurostat [xt_lt_introle]
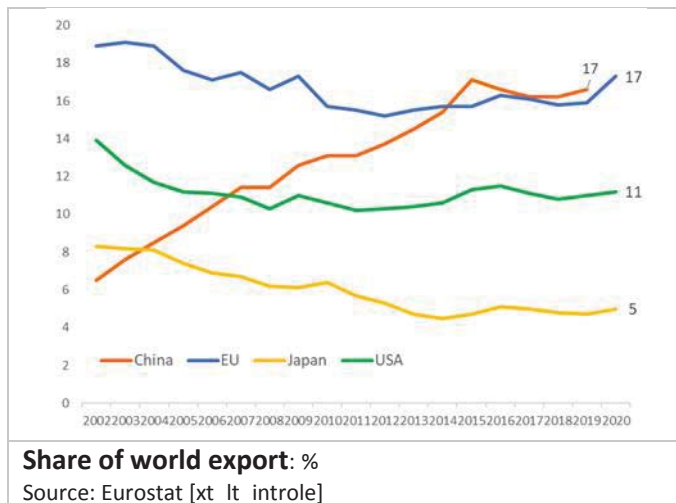
The EU share of world exports remained stable at about 16% in the last ten years, amid a very challenging environment in which the raise of China has been remarkable. However, in 2020, the EU recorded a significant increase, from 15.9% in 2019 to 17.3% in 2020.

Short-term indicators

Turnover

Turnover: % change with respect to the same month in the previous year
Source: Eurostat Short-term Statistics
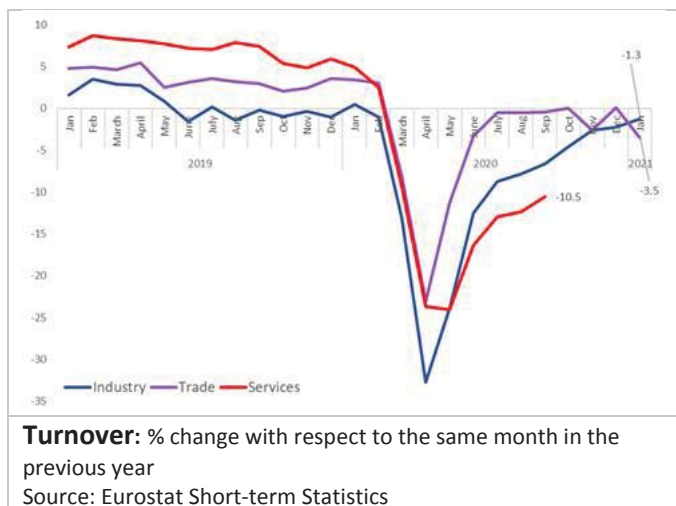
Turnover losses have also been dramatic, during the pandemic-induced lockdown, with a huge drop in April and May 2020 (-33% for industry, -23% for wholesale and retail trade, -24% for services). The shock has hit all sectors, but divergences start to emerge in the recovery phase, with retail and manufacturing recovering faster than services. In January 2021, turnover in industry had recovered to pre-Covid levels but it remains to be seen if the recovery is sustained.

Industrial production

Industrial production: relative to January 2015
Source: OECD
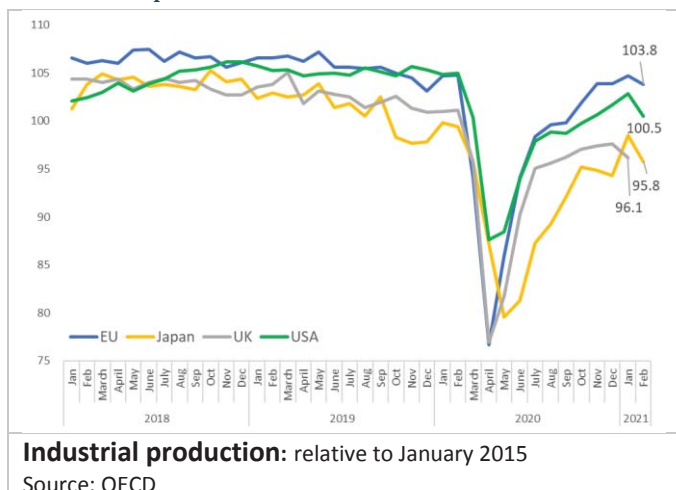
The fall in industrial production has also been remarkable, and deeper than other large economies at the beginning of the COVID-19 crisis. Nonetheless, its recovery was quick, also compared to international competitors. Data suggests that industrial production was back to pre-lockdown levels at the end of 2020.

Declarations of bankruptcies and Registration of businesses
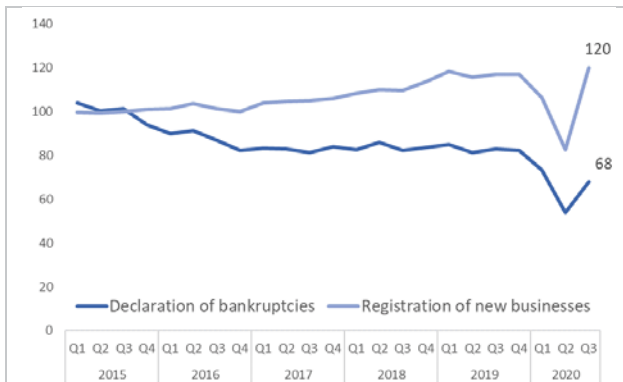
Declaration of bankruptcies and registrations of businesses: index 2015=100. Seasonally adjusted data.
Source: Eurostat, experimental statistics, incomplete coverage of EU

The number of declaration of bankruptcies has dropped with the inception of the COVID crisis (2nd quarter 2020). This is due to the support policies put in place by Member States to shelter business in response to the lockdown measures. However, the increase visible in the third quarter signals that, as the crisis continues, firms may be driven out of the market despite the public support.

The number of new registration of business has dropped very significantly in the second quarter of 2020. This is most likely due two effects: lockdown measures and the lack of confidence given the extreme uncertainty related to the evolution of the pandemic. In the 3rd quarter of 2020, when COVID-19 containment measures were somewhat relaxed in many Member States, the number of registrations of new businesses in the EU saw a significant increase compared with the previous quarter.

Permanent, temporary and self-employment
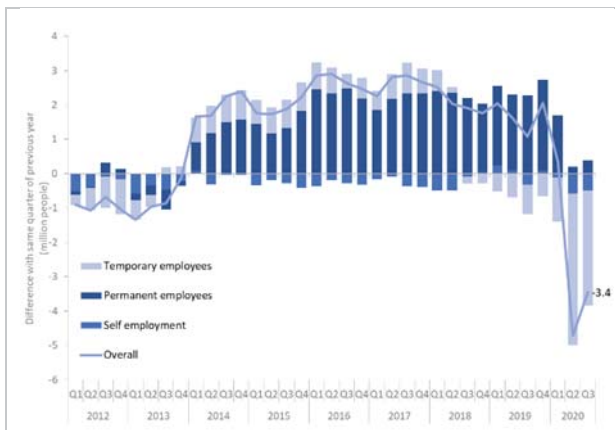
Permanent, temporary and self-employment: change with respect to same quarter in the previous year. Age 15-64.
Source: Eurostat, LFS [lfsq_egaps,lfsq_etgaed]. Data not seasonally adjusted

Data by employment type provides a clearer picture of the impact of the crisis in terms of social and economic aspects. The most significant drop in employments is by far amongst temporary employees, followed by self-employed. These types of workers were generally less protected by the public measures to cushion the effects of the crisis.

This picture of the employment drop matches the divergences of the impact of the crisis across economic activities, as temporary and self-employment are relatively more common in ecosystems as Tourism or Cultural and Creative activities.

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Gross fixed capital formation
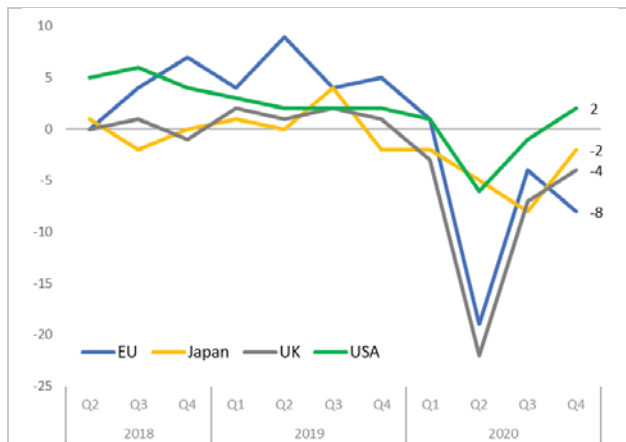
Quarterly Gross Fixed Capital Formation: Growth rate compared to the same quarter of previous year, seasonally adjusted.
Source: OECD

The lack of confidence related to the uncertain evolution of the pandemic is reflected in investments, as measured by gross fixed capital formation. This indicator touched its lowest level in the second quarter of 2020, falling by 20% compared to the previous year. While in the 3rd quarter there was a positive rebound, the last quarter was again trending down. Comparing internationally, the fall during the 2nd quarter of 2020 was much bigger in the EU than in the USA or Japan, and that the new dip at the end of the year is specific to the EU.

Economic confidence indicator
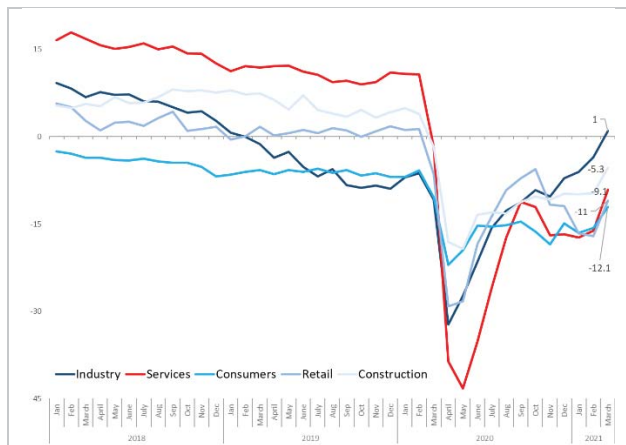
Economic confidence indicators
Source: Joint Harmonised EU Programme of Business and Consumer Surveys

The economic sentiment dropped dramatically to historical lows during the lockdown in spring. Since then, it recovered ground and clearly improved in March 2021. The analysis of the economic sentiment signals a decoupling between services, where it remains significantly negative, and industry, where instead it has recovered the pre-crisis level and has even turned positive in March.

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Economic Resilience

Net public investments
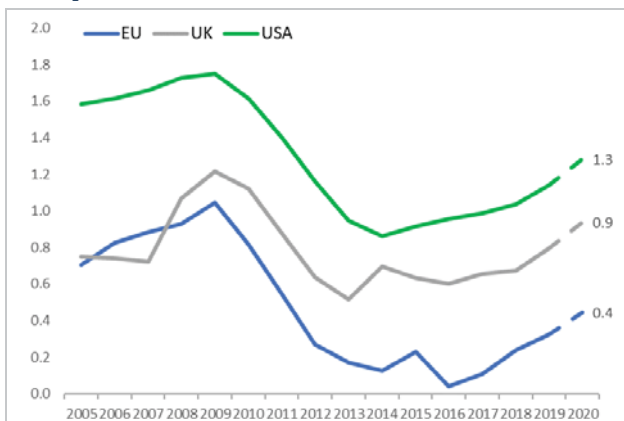
Public Investments: Net Fixed Capital Formation as a share of GDP. Data for 2020 based on estimates.
Source: own calculations based on AMECO data

Resilience is a concept encompassing several dimensions. As such, it is difficult to fully describe it with it with a limited set of economic indicators. Investments are a good proxy to monitor how European industry renews and upgrades its products and processes. As such, investments signals the extent to which industry prepares for the economic and societal challenges of the future.

Public investment between 2013 and 2018, in the EU and in the Euro Area in particular, was not even sufficient to compensate for the depreciation of the existing stock of capital, let alone to increase it. In 2019 and 2020, public investment has increased, and is likely to keep increasing in 2021, also thanks to the interventions at European and Member State level to support the economy during the recovery. This will bring a positive contribution, although remaining relatively low.

Net private investments
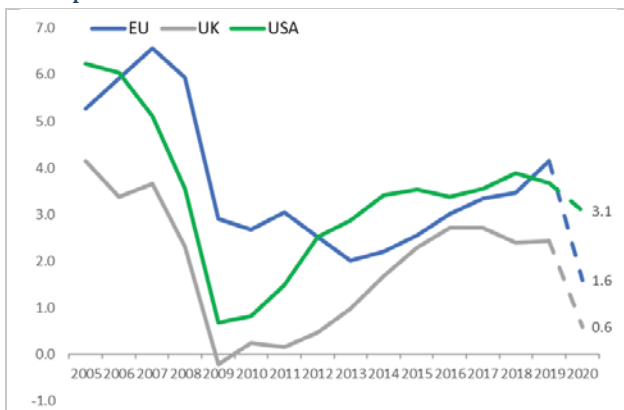
Private investments: Net Fixed Capital Formation as a share of GDP. Data for 2020 based on estimates.
Source: own calculations based on AMECO data

Private investment, on the other side, was on an increasing trend before the Covid crisis, also in line with international levels. The Covid shock, nevertheless, has caused a dramatic drop in the level of net private investment, in the EU as in the UK, while in the US such drop is less pronounced.

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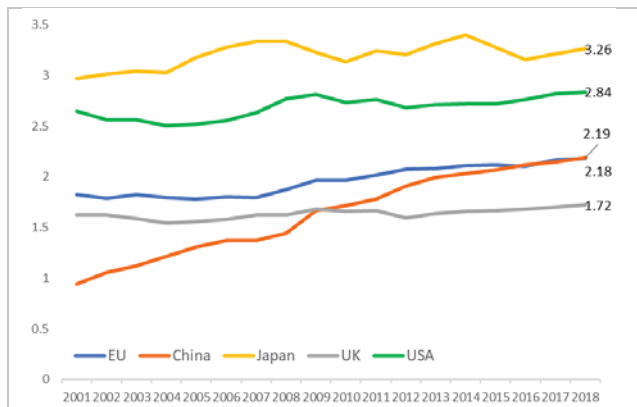
R&D expenditures

R&D expenditure: % of GDP
Source: UNESCO institute for Statistics through World Bank
API

In terms of R&D expenditures, the EU is lagging behind other major economies, such as the US and Japan. China is also rapidly increasing its level of investment in R&D.

STEM graduates
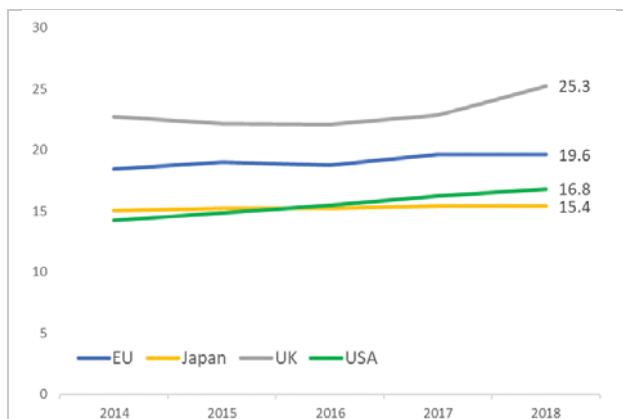
Graduates in STEM and related fields: per 1,000 population aged 20-29
Source: Eurostat [EDUC_UOE_GRAD02] and OECD [Distribution of graduates and entrants by Field]. Tertiary graduates (levels5-8), in natural sciences, mathematics, statistics, ICT, engineering, manufacturing and construction. Eurostat and OECD data not fully comparable

Skills in Science, Technology, Engineering and Mathematics (STEM) are essential to accompany the digital and green transition.

The share in the EU has been roughly constant in the last five years, while the USA and the UK both experienced an increasing trend.

Part of the differences in trend may be due to the international reputation of some USA and British universities in these field.

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Digital Transition

Digital Economic and Society Index and its sub components
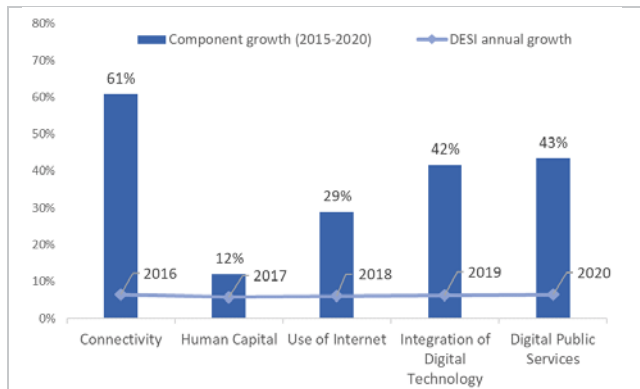
DESI: Annual weighted % growth
DESI components: % growth (2015-2020)
Source: Digital Economy and Society Index, European Commission

In the last six years, the Digital Economic and Society Index (DESI) has grown at a stable rate of around 6% annually. All components kept improving with some disparity among them. Human capital shows the smallest growth. The digital public services and the integration of digital technology and have grown by 43% and 42% in the last six years, with the latter starting from low levels, especially in some European Member States. The growth in connectivity has increased significantly, achieving a 61% growth since 2015 and with a strong increase in the last two years. The growth in use of the internet was of 28% since 2015.

Digital skills
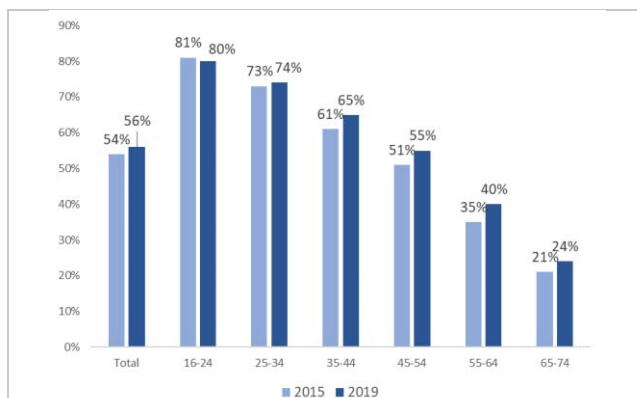
Share of population with basic or above basic digital skills: % of total population, by age group
Source: Eurostat [isoc_sk_dskl_i]

Skills encompass many dimensions, but one area where they are particularly important today is the digital world. The sudden increase in remote working and learning has shown the importance of digital skills. In 2019, the majority of the EU population had basic or above basic digital skills, although there is a wide dispersion across age groups. The share of total population with basic or above basic digital skills had increased in the last five years, by 2 percentage points.

Climate neutrality and Circular Economy

GHG emission intensity
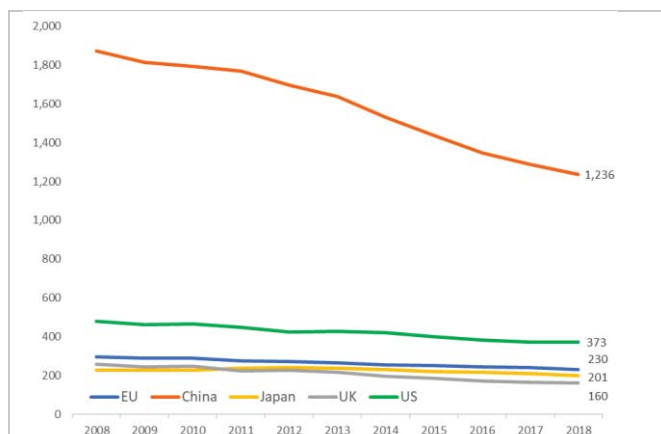
GHG emission intensity: GHG/GDP (tCO2eq/GDP constant)
Source: UNFCCC, World Bank

Greenhouse gas emission intensity is one of the most important factors in pursuing the European Green Deal and also one of the clearest indicators to measure its success. The GHG emission intensity of the EU is close to Japan, lower than the United States and significantly lower than China. In the last decade, the GHG emission intensity of the EU economy has decreased by 20%, comparable to the United States. China's emission intensity has decreased by 30%, but remains much higher.

Electricity prices

Industry Electricity Prices: International Comparison, EUR/MWh
Source: EC/SWD(2020)951 final, Trinomics (2020) Study on energy prices, costs and their impact on industry and households and Eurostat [NRG_PC_205]. EU data based on medium size industrial consumers (annual consumption of 2000-20000 MWh). From 2017 onwards, data is for non-household consumers, not only industry.

The green transition will require access to abundant, decarbonised and competitively priced electricity. While increases in electricity prices can trigger improvements in energy efficiency, electricity prices are also a key component of the competitiveness of some industries. It is important to monitor the evolution of electricity prices to evaluate the industry's incentives to decarbonise.

Despite the reduction in emissions, EU industry electricity prices have been relatively stable for the last decade. They are around twice as high as the US prices. Despite comparable emission intensity, prices in the EU are below the prices in Japan. Industrial electricity prices in China declined below EU prices in 2011 and have increased divergence with EU prices since 2018. EU industrial (non-household) electricity prices have fluctuated around 120 MWh in the last decade. An increasing trend can be observed in the last two years. There is a significant variation across Member States.

Circular material use rate
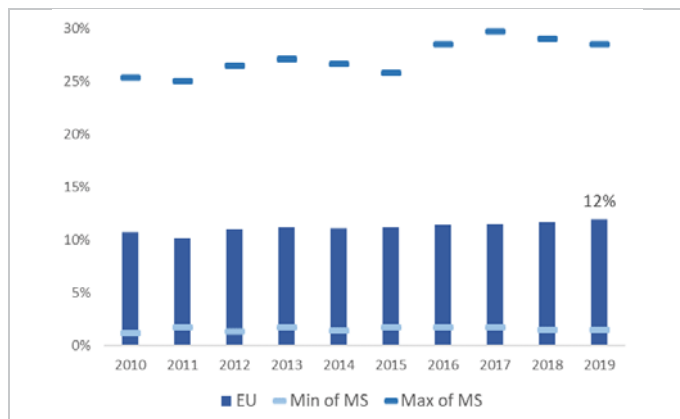
Circular material use rate: % of overall material use
Source: Eurostat [cei_srm030]

Scaling up the circular economy will play a key contribution to achieve climate neutrality by 2050. Increasing recycling rates offer a partial picture of the circular economy, as they do not capture the extend to which recycled materials find their way back into the economy. The circular economy aims at increasing the amount of material recovered and fed back into the economy, therefore reducing the generation of waste and limiting the extraction of primary raw materials.

The circular material use rate measures the contribution of recycled materials to overall materials demand. A high circularity rate value indicates that more secondary materials substitute for primary raw materials, thus reducing the environmental impacts of extracting primary material. In the last 10 years, the rate of re-use of materials in the EU has increased to 11.9% in 2019, a 1.2 percentage point increase since 2010. There is significant variation across Member States.[428]

Recycling rate of municipal waste
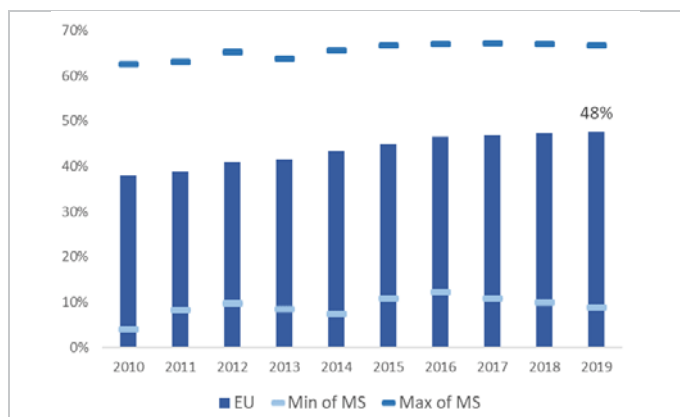
Recycling rate of municipal waste: % and variation across Member States
Source: Eurostat [CEI_WM011]

Nonetheless, increasing recycling is fundamental for the circular economy, as the demand and the supply of recycled material should naturally evolve together.[429] The Waste Framework Directive sets a target of 50% recycling of municipal waste in 2020.[430]

In the last decade, the recycling rates for municipal waste have increased by around 10 percentage points for the whole EU. Despite an increase for Member States with low recycling rates, heterogeneity

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[428] The new Circular Economy Action Plan for a cleaner and more competitive Europe announced that the Commission will revise the Monitoring Framework. New indicators will take account of the focus areas in this action plan and of the interlinkages between circularity, climate neutrality and the zero pollution ambition. Indicators on resource use, including consumption and material footprints to account for material consumption and environmental impacts associated to our production and consumption patterns will also be further developed.

[429] The indicators presented here describe only partially the complexity of the industrial transition towards a circular economy. The Commission in 2018 adopted a comprehensive framework of indicators to measure the transition towards a circular economy. The indicators of the framework follow the lifecycle of products and offer a snapshot on how well we save our resources. As such, the framework will continue being a fundamental element of industrial policy strategy.
https://ec.europa.eu/eurostat/web/circular-economy/indicators/monitoring-framework

[430] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain directives; Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (OJ L 150, 14.06.2018, p. 109-140).

remains high.

Single Market Integration
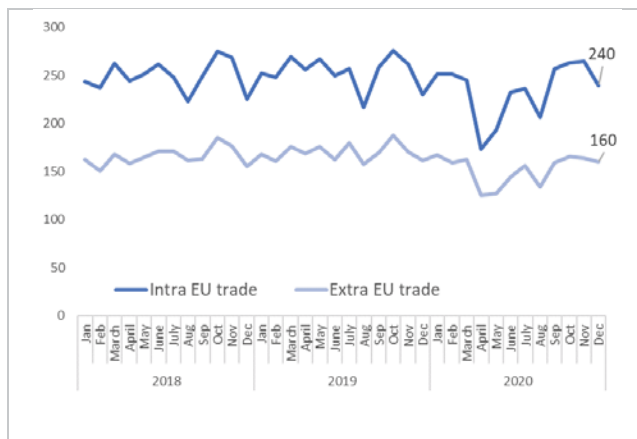
Intra-EU trade

Intra and Extra EU trade: EUR bn nominal values
Source : EU trade by CPA 2.1 [DS-1062396]

The single market is one of the most important assets of the EU and its further deepening is one of the goals of the EU. Intra-EU trade is a good proxy for single market integration. In December 2020, intra-EU trade was 50% higher than extra EU trade. The effect of the COVID-19 crisis was larger on intra-EU trade, but the recovery was also faster. Both intra and extra-EU trade grew in 2018 and 2019.
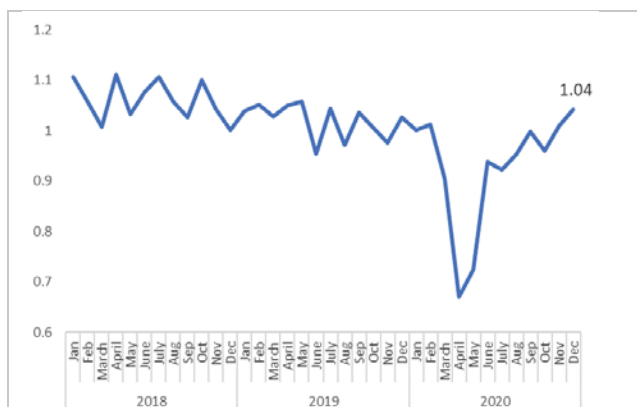
Intra-EU exports: % nominal growth over the same period of previous year
 Source : EU trade by CPA 2.1 [DS-1062396]

The COVID-19 crisis resulted in a significant downturn in intra-EU exports with a drop of over 30% in April 2020 as compared to April 2019. In December 2020, intra-EU exports was however, 4.1% higher than in December 2019. Year-on-year export grew for all months of 2018 and during ten months of 2019.

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Price convergence
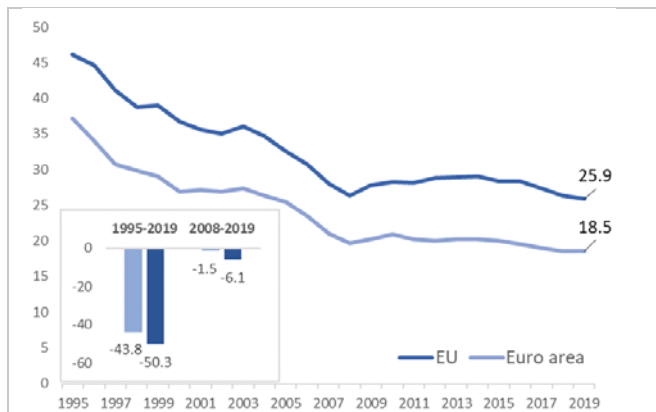
Price dispersion across Member States: coefficient of variation of price level indices, (PPP for GDP)
Source: Eurostat, [prc_ppp_conv]

To assess the integration of the European economy, it is useful to consider the differences in price level among different Member State economies. In the years running up to 2008 the dispersion in price levels in the EU drastically decreased, but increased again with the financial crisis. In the last five years, we could observe another, slower decrease. The movement of price dispersion within the Euro-zone in interesting, as a first approximation, to take into account the potential effect of exchange rates in the evolution of price convergence. While the trend is overall very similar, the comparison shows that most of the increase in the period 2008-2019 is due to variations outside the Euro area. This might be influenced by exchange rates fluctuations.

SMEs

Employment in SMEs
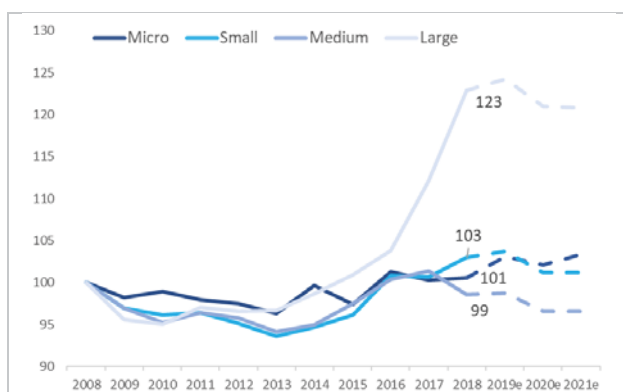
Number of persons employed: by size class, index: 2008=100
Source : Eurostat [sbs_sc_sca_r2]. Estimates for 2020 produced by DIW Econ, based on 2008-18 figures from Eurostat Structural Business Statistics Database and provisional data for 2019-2020 from the National Accounts database and the Short Term Business Statistics Database.

While SMEs represent the vast majority of EU companies, the increase in employment is more concentrated in large enterprises. Indeed, the number of people employed in large firms has increased significantly, in particular since 2016 while the number of people employed in medium-sized firms has reduced by a small but significant amount. This could signal a polarisation trend in the EU industrial fabric.

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Value added in SMEs
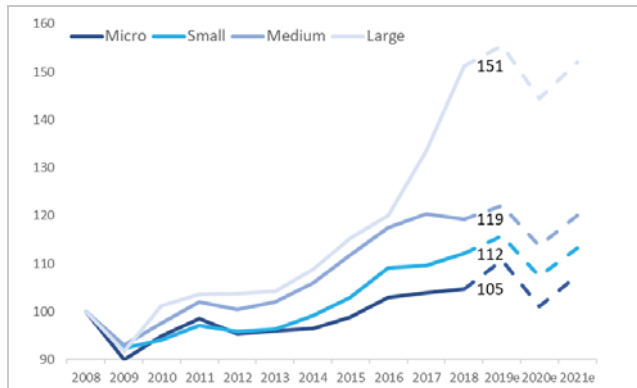
Value-added: by size class, index: 2008=100
Source : Eurostat [sbs_sc_sca_r2]. Estimates for 2020 produced by DIW Econ, based on 2008-18 figures from Eurostat Structural Business Statistics Database and provisional data for 2019-2020 from the National Accounts database and the Short Term Business Statistics Database.

In terms of value-added, all companies have increased their contribution. However, the difference across size class is striking, with large companies increasing their value added significantly more than micro, small and medium companies, in particular since 2016.

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International dimension

Extra-EU trade
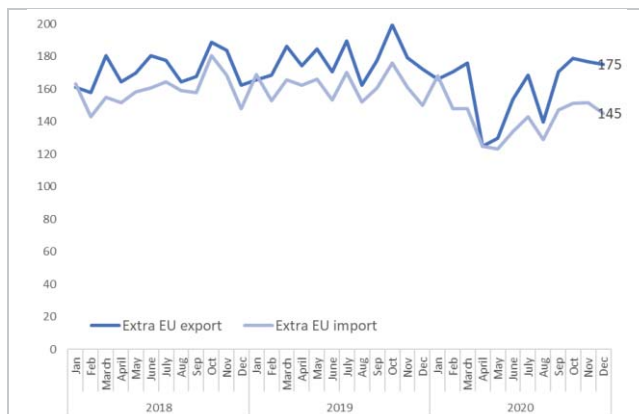
Extra-EU trade : EUR bn nominal values
Source : EU trade by CPA 2.1 [DS-1062396]

Extra-EU exports and imports have followed similar patterns in the last three years, with the net trade balance being always positive. The COVID-19 crisis resulted in a significant drop, in exports in particular, with a rapid recovery to pre COVID-19 levels.
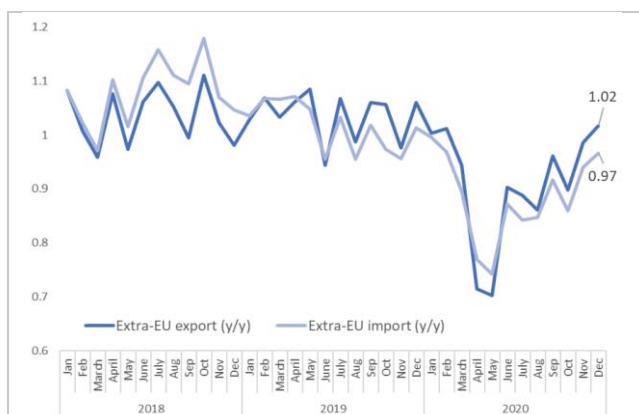
Extra-EU trade: % nominal growth over the same period of previous year
Source : EU trade by CPA 2.1 [DS-1062396]

The year on year growth rate of Extra-EU exports and imports have followed a similar pattern in the last three years. Extra-EU exports were more severely affected by the COVID-19 crisis but also recovered faster. In December 2020, extra EU annual exports growth became positive again and was 1.7% higher than in December 2019. The strength of the recovery is visible in comparison to the situation in April 2020, when both exports and imports were almost 30% down on their values of the previous year.

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Key Performance Indicators for EU Industrial Ecosystems

The KPIs presented in this section, describes the ecosystems in more details. The granularity of the sectoral classification for the data sources available is not ideal to describe the ecosystems precisely. Hence, the indicators below should be interpreted with caution. The methodology followed for the calculation of these indicators is explained at the end of this annex. Due to data availability, most of the indicators presented below do not capture the COVID-19 crisis period.

Headline indicators: the size and performance of ecosystems

The 14 industrial ecosystems, as defined in this document, represent roughly 80% of the European business economy in terms of value added and employment.[431] They differ significantly in terms of size (Table and Chart 1). Their size is influenced by several factors. For instance, Retail, by far the largest ecosystem, serves virtually all ecosystems, ensuring the contacts to final consumers. Energy Intensive Industries or Aerospace and Defence, are instead very "upstream" ecosystems. For this reason, although based on indicators as value added and employment they may look less relevant, their strategic value is fundamental, as their output is relevant for all other ecosystems.

Value Added and Employment, 2018
Source: European Commission analysis based on Eurostat [nama_10_a64] and [nama_10_a64_e]. Data refer to 2018, most recent year available.
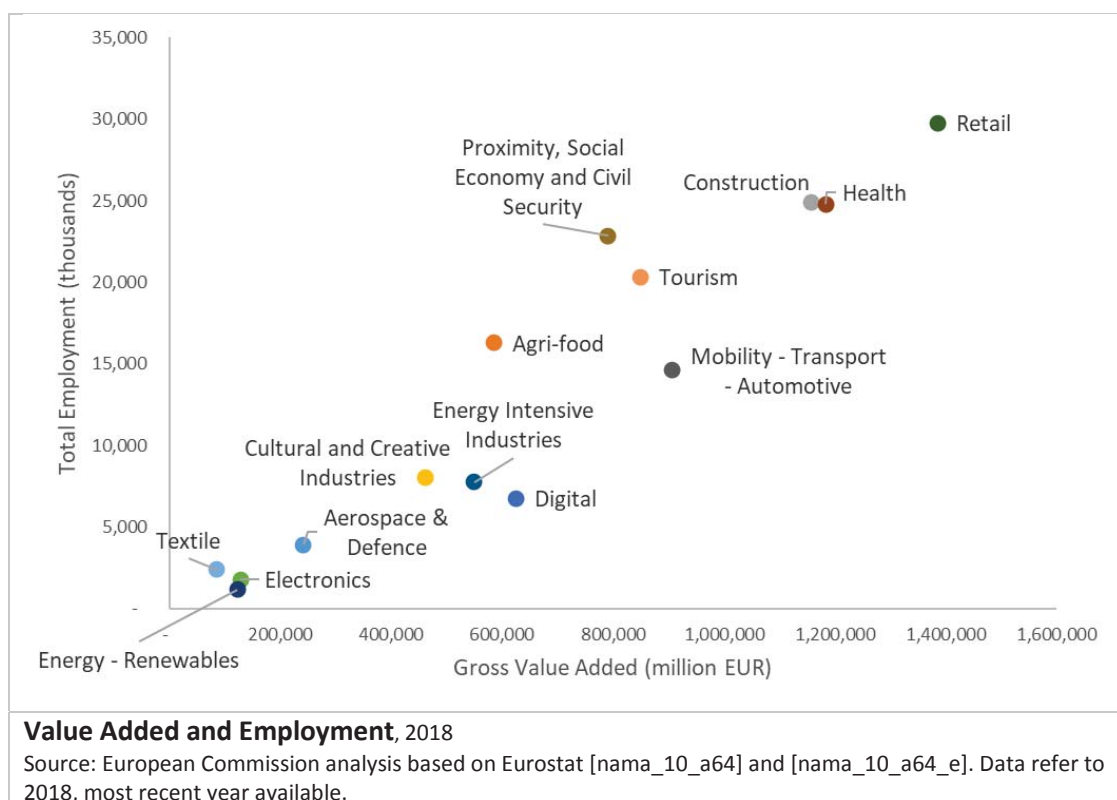
All ecosystems have grown in gross value added between 2015 and 2018, with Digital, Construction and Tourism showing the largest growth rates. Looking at employment dynamics, the Digital, Tourism and Mobility-Transport-Automotive ecosystems show the largest increase while Textiles and Agri-food have marginally reduced total employment between 2015 and 2018.

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[431] In this document, business economy is defined as total economy excluding financial services and public administration. While both financial services and public administration are clearly of great importance for the functioning of all industrial ecosystems, given their special nature, their inclusion in the calculation of the indicators would make some results more difficult to interpret.

Change in Value Added and Employment, 2015-2018
Source: European Commission analysis based on Eurostat [nama_10_a64] and [nama_10_a64_e].
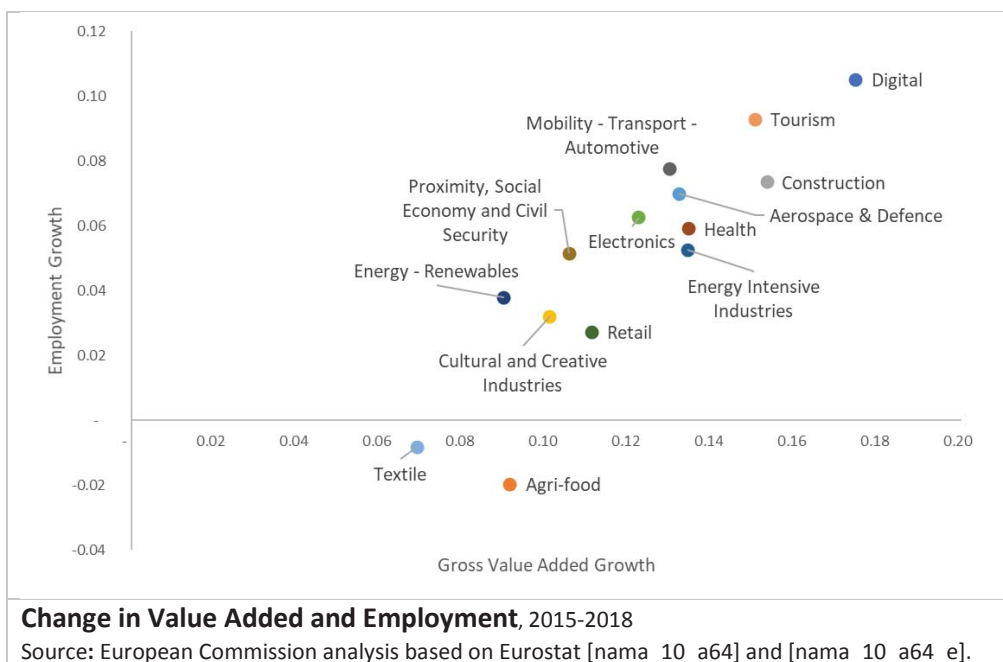
Table 1		
	Gross Value Added (million EUR)	Total Employment (thousands)
Aerospace & Defence	240,891	3,920
Agri-food	584,628	16,303
Construction	1,158,192	24,893
Cultural and Creative Industries	461,274	8,016
Digital	625,013	6,779
Electronics	127,990	1,787
Energy - Renewables	122,203	1,168
Energy Intensive Industries	549,428	7,760
Health	1,183,869	24,805
Mobility - Transport - Automotive	906,127	14,615
Proximity, Social Economy and Civil Security	790,734	22,876
Retail	1,385,011	29,774
Textile	84,930	2,388
Tourism	849,630	20,345

The number of firms varies significantly across ecosystems, signalling differences not only of size, but also of market structure. For instance, Retail and Proximity, Social Economy and Civil Security count also a very large number of small and labour intensive firms, while in other ecosystems more capital-intensive activities can lead to relatively more concentration (e.g. Energy-Renewables).

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	Retail	Construction	Tourism	Proximity, Social Economy and Civil Security	Mobility - Transport - Automotive	Cultural and Creative Industries	Digital	Agri-food	Energy Intensive Industries	Health	Textile	Aerospace & Defence	Energy - Renewables	Electronics
2015	5,539,466	5,001,976	3,022,083	2,963,543	1,744,998	1,154,126	1,071,429	571,572	538,158	458,765	253,155	240,113	88,813	99,975
2018	5,487,525	5,318,365	3,233,754	3,072,568	1,859,677	1,241,640	1,202,895	598,956	547,745	492,744	267,362	252,834	110,859	104,130

Number of Firms, 2015-2018
Source: European Commission analysis based on Eurostat, Structural Business Statistics

Green transition: GHG emissions

Reducing Greenhouse gas emission is a top priority of the Commission. The recently increased ambition of the decarbonisation target (-55% by 2030) will require an effort from all ecosystems.

GHG emission intensity (2018)**, change in GHG emissions and changes Value Added** (2015-2018)

Source**:** European Commission analysis based on Eurostat [nama_10_a64] and [env_ac_ainah_r2]. The size of the bubble represents GHG emission intensity in 2018. The ecosystem Energy-renewables does not include emissions from energy generation, as they are assumed to be zero. The grey bubble represents the full energy sector (NACE D35), included for the sake of comparison.

In the graph above, GHG emissions are assumed to be nil for the generation of renewable energy, which is included in the Energy-Renewables ecosystem.[432] Nonetheless, the corresponding share of value added attributable to renewables is still included in the Energy-Renewables ecosystem. For the sake of comparison, the NACE sector "Electricity, gas, steam and air conditioning supply" (D35) is presented in the figure under a different colour to distinguish it from the industrial ecosystems. The sector D35 includes emissions and value added for both renewable and non-renewable energy supply. As shown by the size of the bubbles, "Energy Intensive Industries" and "Agri-food" have the highest level of GHG emissions intensity in 2018. Most ecosystems have reduced their GHG emission intensity between 2015 and 2018, as the positive change in Value Added is larger than the change in GHG emissions. For completeness, the next figure shows the latest available figures on emissions per ecosystem.

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[432] This is of course an imprecise assumption, as even the generation of renewable energy requires a minimum of emissions.

GHG emissions, 2015-2019, million tonnes.
Source**:** European Commission analysis based on Eurostat [env_ac_ainah_r2].
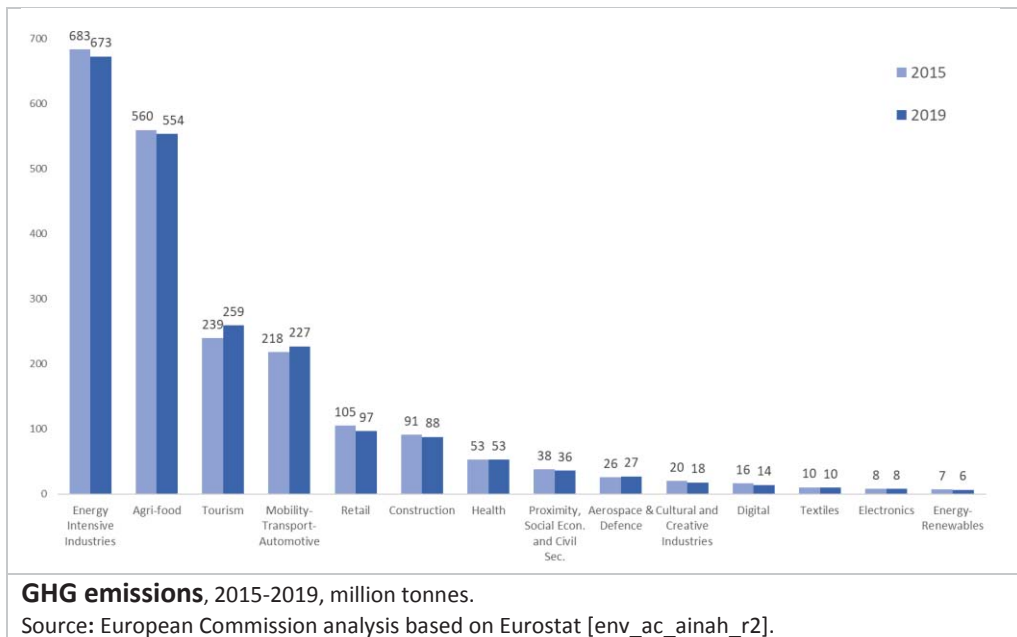
Short-term indicators: Economic confidence
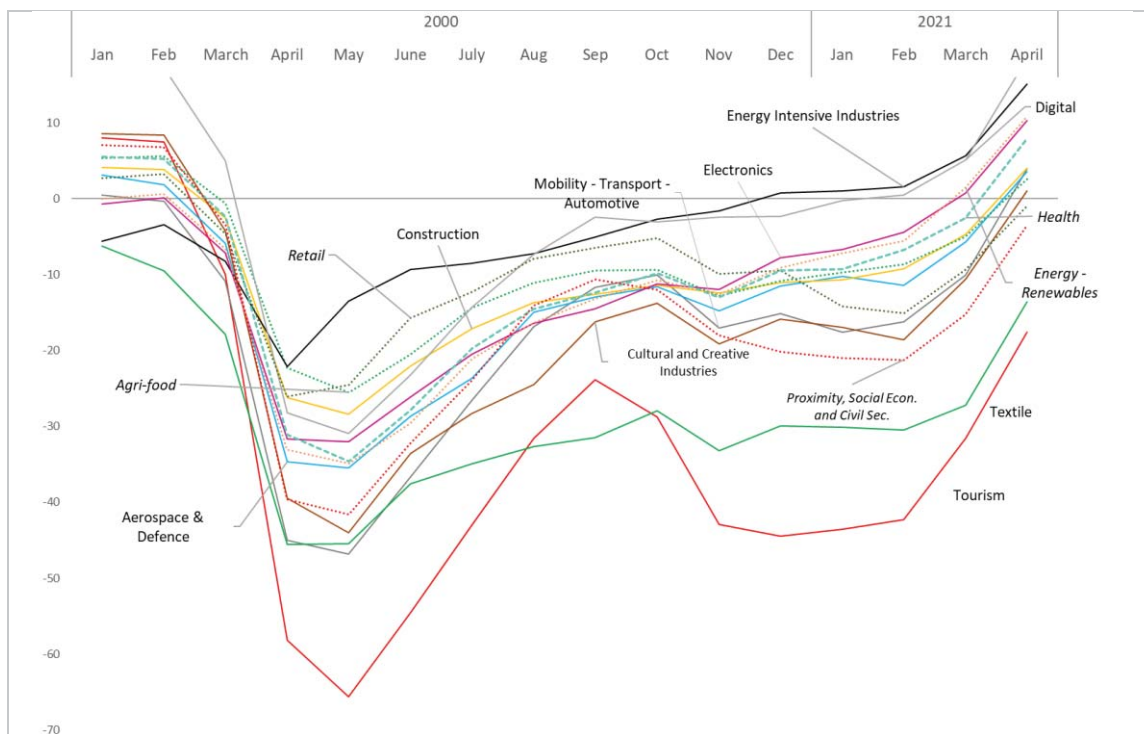
Confidence Indicator by Ecosystem – 2020-2021, monthly.
Source: European Commission analysis based on data by the Joint Harmonised EU Programme of Business and Consumer Surveys. Note: For "Retail", "Agri-food", "Proximity, Social Economy and Civil Security", "Energy-Renewables", and "Health", data coverage is partial, so they are depicted using dotted lines and the related values have to be interpreted with caution. Data for Cultural and Creative Industries may underestimate the impact of the crisis, as data for some relevant sectors are not available.

Survey data helps complement the analysis by providing very timely information before the publication of official statistics. In particular, data on turnover or industrial production do not cover the most recent months, but data from the Joint Harmonised EU Programme of Business and

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Consumer Surveys can provide useful insights when used to build an economic sentiment indicator for each ecosystem.[433] The evolution of the economic confidence indicators in most recent months signals that a second dip has hit the European economy in autumn 2020. However, there have been visible improvements in 2021. Services sectors are clearly the most affected, as well as retail, while manufacturing and construction seem to have better absorbed the second round of containment measures.

In April 2021, the economic confidence turned positive for most ecosystems, but remains negative in Textiles and Tourism, despite a significant improvement. The improvement is visible across all ecosystems.

International dimension: Trade

Export Intensity: extra EU exports as percentage of value added
Source: European Commission analysis based on Eurostat, EU trade since 1988 by CPA 2.1 [DS-1062396], last update 18 March 2021.
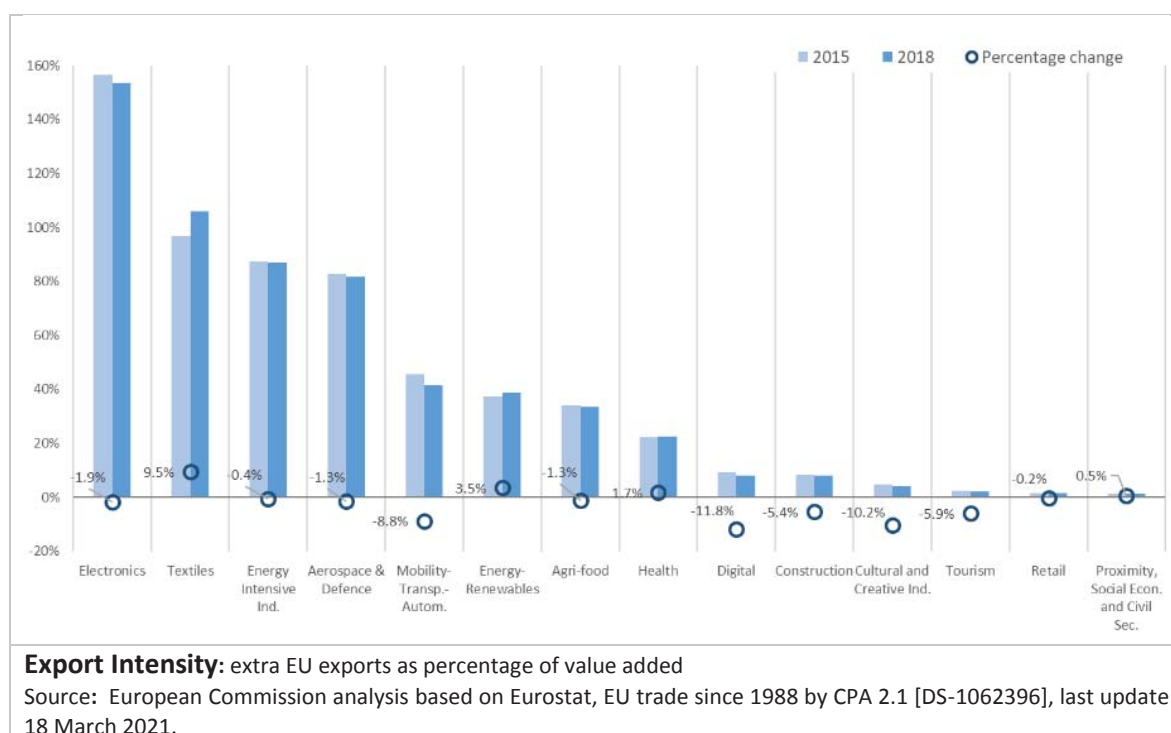
The fourteen industrial ecosystems, taken together are responsible for most of extra EU exports in goods.

However, Ecosystems differ significantly in their export intensity, with "Electronics", "Textiles" and "Energy Intensive Industries" showing the highest values. Given the profoundly different nature of the ecosystems analysed here, this divergence should not be interpreted as a signal of dismal performance by some of them. Indeed, export of goods is clearly not a core activity for ecosystems as Proximity, Social Economy and Civil Security, or for a service ecosystem as Retail. The change in

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[433] We build a profile of the economic sentiment for each ecosystem, by aggregating the data for the different sectors. We calculate a weighted average of the values of those sectors included in the definition of each ecosystem; the weights are based on the share of value added that each sector has in the total value added of the ecosystem, as a measure of the relevance of that sector to that ecosystem. This surveys-based indicator is highly correlated (80%) with the data on actual changes in turnover, for each ecosystems in each month. We can therefore use it to forecast the economic impact on each ecosystem in the most recent months.

export intensity across ecosystems between 2015 and 2018 has been relatively small. "Textile" is a notable exception, with an increase of export intensity of 9 percentage points.

All ecosystems rely more on intra EU trade than on extra EU trade. The changes since 2015 across ecosystems are small, with a maximum of 2 percentage points increase in favour of the intra EU trade.

Intra EU Trade: share of total ecosystem trade
Source: European Commission analysis based on Eurostat EU trade since 1988 by CPA 2.1 [DS-1062396], last update 18 March 2021.
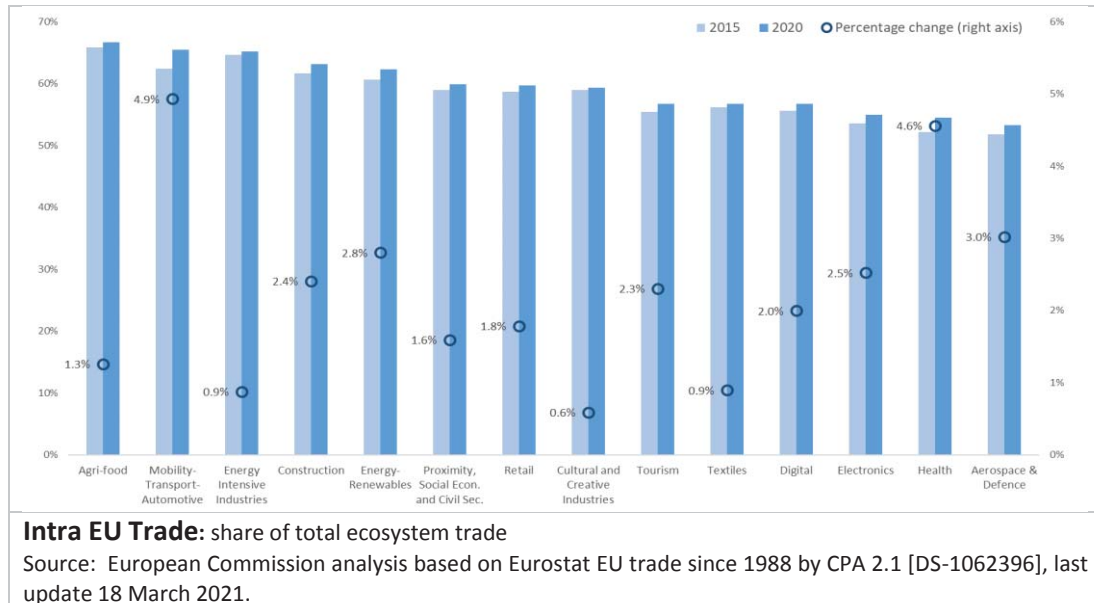
Around two thirds of trade of "Agri-food", "Mobility-Transport-Automotive" and "Energy Intensive Industries" takes place within the EU.

Resilience: the dynamism of ecosystems

The ecosystems differ less significantly in their level of dynamism, as measured by entry and exit of firms and by the churn rate, defined as the sum of birth and death rate of firms. These indicators proxy the degree of "creative destruction" of the ecosystems, which contribute to aggregate productivity growth of business (see Chart 2, left panel)[434]. The separate analysis of birth and death rates shows that for most ecosystems the birth rate is higher than the death rate, with the exception of Retail, for which the births and deaths are very similar.

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[434] See, for instance, Calvino, F., C. Criscuolo and R. Verlhac (2020), "Declining business dynamism: Structural and policy determinants", OECD Science, Technology and Industry Policy Papers, No. 94, OECD Publishing, Paris, https://doi.org/10.1787/77b92072-en.
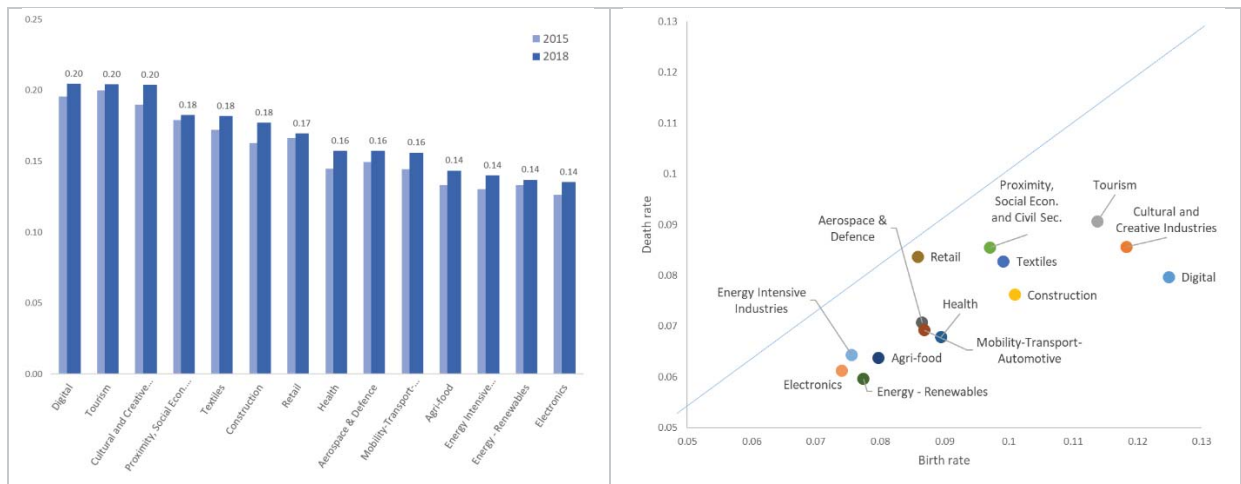
Churn rate of businesses of EU ecosystems, 2015-2018

Source: European Commission analysis based on Eurostat [bd_9bd_sz_cl_r2]. Data refer to 2018, most recent year available. Data is not fully available for some ecosystems. In particular, the values for Agri-food, Creative & Cultural Industries, and Proximity and Social economy are under-represented in these indicators.

The data used to calculate this indicator do not cover the whole economy. The ecosystems Agri-food, Health, Cultural and creative industries as well as Proximity, Social economy and Civil security are only partially covered, hence result should be interpreted with caution.

Resilience: Investments in tangibles

The table below shows a measure of investment intensity, given by the ratio of investment in tangibles to Value Added. The Energy-Renewable ecosystem shows the highest investment intensity, which is not surprising given the capital-intensive nature of energy generation.

Most ecosystems increased their investment intensity from 2015, with the only exceptions for Aerospace & Defence and Energy – Renewables, for which the ratio has been stable, mostly due to a strong increase of value added creation. However, this measure does not take into account investments in non-tangible goods, whose importance is rapidly increasing.
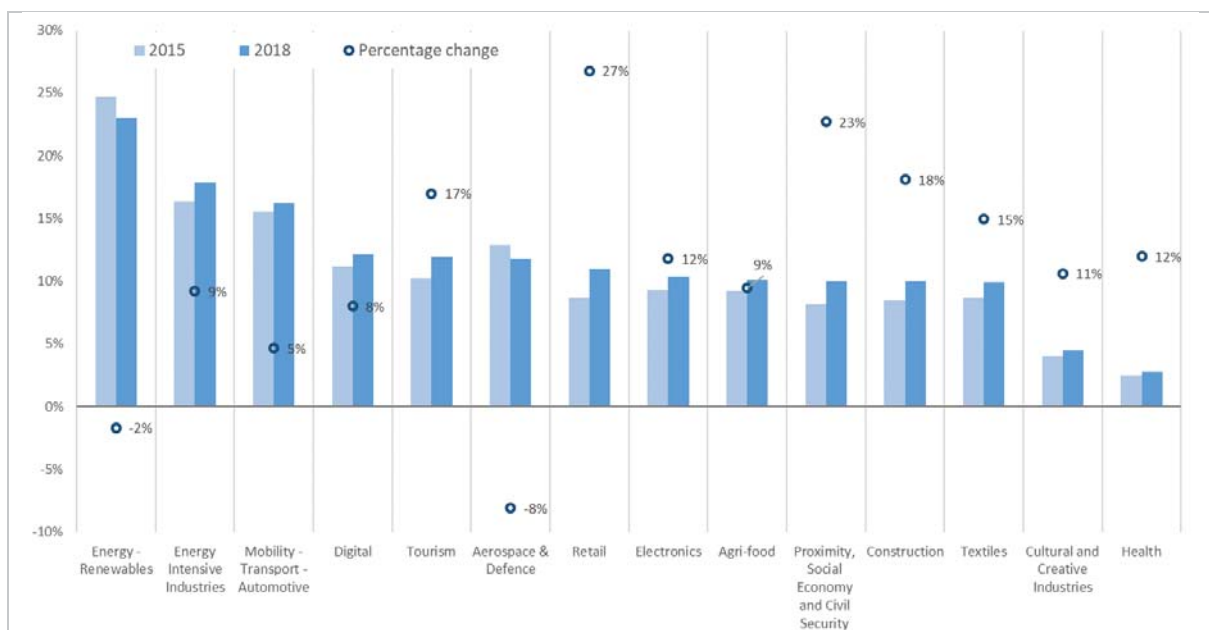
Investment in tangibles as a share of Value Added: 2015 and 2018 (%)

Source: European Commission analysis based on Eurostat, Structural Business Statistics [partial data coverage of some ecosystems notably Agri-food; Cultural and Creative Industries; Health; Proximity, Social Economy and Civil Security and

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Tourism].

The data used to calculate this indicator do not cover the whole economy. The ecosystems Agri-food, Health, Cultural and creative industries as well as Proximity, Social economy and Civil security are only partially covered, hence result should be interpreted with caution.

Methodology for constructing the data used for the analysis of industrial ecosystems

The industrial ecosystems in this report are composed of a number of related industries and competences that show strong inter-industry interdependencies. The industries are identified according to their main activities. The data used to compile indicators on the ecosystems are derived from official statistics, including national accounts, Structural Business Statistics, and Short-term business statistics. These statistical sources use the NACE rev.2 classification to identify enterprises according to their main activity.

The NACE rev.2 classification has also been used to define the 14 industrial ecosystems, as reported in the table below. The mapping provided in this list is based on 2-digits classification. This level of granularity is not optimal to identify all the elements of the ecosystems, but most of the data sources we used to calculate indicators in this edition of the Annual Single Market Economy Report are only available at the 2-digits level. This affects the precision of the indicators. The most relevant issues were alleviated by defining weighs for those 2-digits sectors that include activities relevant for different ecosystems. Weights have been calculated based on more granular datasets when available, or based on existing studies. They are reported in the column "Share". As ecosystems naturally overlap, some sectors are attributed to more than one ecosystem.

Ecosystem	NACE_R2	Description	Share*
Aerospace & Defence	C25	Manufacture of fabricated metal products, except machinery and equipment	0.03^
Aerospace & Defence	C26	Manufacture of computer, electronic and optical products	0.44
Aerospace & Defence	C27	Manufacture of electrical equipment	0.23
Aerospace & Defence	C30	Manufacture of other transport equipment	0.68
Aerospace & Defence	C33	Repair and installation of machinery and equipment	0.09^
Aerospace & Defence	H51	Air transport	0.09
Aerospace & Defence	H52	Warehousing and support activities for transportation	0.18
Aerospace & Defence	J61	Telecommunications	0.07
Aerospace & Defence	N80	Security and investigation activities	1
Agri-food	A	Agriculture, forestry and fishing	1
Agri-food	C10	Manufacture of food products	1
Agri-food	C11	Manufacture of beverages	1
Agri-food	C12	Manufacture of tobacco products	1
Construction	C31	Manufacture of furniture	1
Construction	F	Construction	1
Construction	M71	Architectural and engineering activities; technical testing and analysis	1^
Construction	N81	Services to buildings and landscape activities	1
Cultural and Creative Industries	C18	Printing and reproduction of recorded media	1
Cultural and Creative Industries	C32	Other manufacturing	0.08
Cultural and Creative Industries	G47	Retail trade, except of motor vehicles and motorcycles	0.01
Cultural and Creative Industries	J58	Publishing activities	1
Cultural and Creative Industries	J59	Motion picture, video and television programme production, sound recording and music publishing activities	1
Cultural and Creative Industries	J60	Programming and broadcasting activities	1
Cultural and Creative Industries	J62_63	Computer programming, consultancy and related activities;	0.004
Cultural and Creative Industries	M71	Architectural and engineering activities; technical testing and analysis	0.15^
Cultural and Creative Industries	M73	Advertising and market research	1
Cultural and Creative Industries	M74_M75	Other professional, scientific and technical activities and veterinary activities	0.64

Cultural and Creative Industries	N77	Rental and leasing activities	0.0006^
Cultural and Creative Industries	P85	Education	0.1
Cultural and Creative Industries	R90-R92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.8
Cultural and Creative Industries	S94	Activities of membership organisations	0.02
Cultural and Creative Industries	S95	Repair of computers and personal and household goods	0.26
Digital	C26	Manufacture of computer, electronic and optical products	0.22
Digital	J58	Publishing activities	1
Digital	J61	Telecommunications	0.97
Digital	J62	Computer programming, consultancy and related activities	1
Digital	J63	Information service activities	1
Digital	S95	Repair of computers and personal and household goods	0.48
Electronics	C26	Manufacture of computer, electronic and optical products	1
Electronics	C28	Manufacture of machinery and equipment n.e.c.	0.10^
Energy - Renewables	C27	Manufacture of electrical equipment	0.38
Energy - Renewables	D35	Electricity, gas, steam and air conditioning supply	0.29
Energy Intensive Industries	C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1
Energy Intensive Industries	C17	Manufacture of paper and paper products	1
Energy Intensive Industries	C19	Manufacture of coke and refined petroleum products	1
Energy Intensive Industries	C20	Manufacture of chemicals and chemical products	1
Energy Intensive Industries	C22	Manufacture of rubber and plastic products	1
Energy Intensive Industries	C23	Manufacture of other non-metallic mineral products	1
Energy Intensive Industries	C24	Manufacture of basic metals	1
Health	C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1
Health	C32	Other manufacturing	1
Health	Q86	Human health activities	1
Health	Q87_Q88	Residential care activities and social work activities without accommodation	1
Mobility - Transport - Automotive	C27	Manufacture of electrical equipment	0.03
Mobility - Transport - Automotive	C29	Manufacture of motor vehicles, trailers and semi-trailers	1
Mobility - Transport - Automotive	C30	Manufacture of other transport equipment	0.32
Mobility - Transport - Automotive	G45	Wholesale and retail trade and repair of motor vehicles and motorcycles	1
Mobility - Transport - Automotive	H49	Land transport and transport via pipelines	0.52
Mobility - Transport - Automotive	H50	Water transport	0.78
Mobility - Transport - Automotive	H52	Warehousing and support activities for transportation	0.39
Proximity, Social Economy and Civil Security	G47	Retail trade, except of motor vehicles and motorcycles	0.16
Proximity, Social Economy and Civil Security	I	Accommodation and food service activities	0.14
Proximity, Social Economy and Civil Security	L	Real estate activities	0.08
Proximity, Social Economy and Civil Security	N81	Services to buildings and landscape activities	0.28
Proximity, Social Economy and Civil Security	N82	Office administrative, office support and other business support activities	0.11
Proximity, Social Economy and Civil Security	Q87_Q88	Residential care activities and social work activities without accommodation	1
Proximity, Social Economy and Civil Security	S95	Repair of computers and personal and household goods	1
Proximity, Social Economy and Civil Security	S96	Other personal service activities	1
Proximity, Social Economy and Civil Security	T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	1
Retail	G46	Wholesale trade, except of motor vehicles and motorcycles	1
Retail	G47	Retail trade, except of motor vehicles and motorcycles	1

Retail	H53	Postal and courier activities	1
Textile	C13	Manufacture of textiles	1
Textile	C14	Manufacture of wearing apparel	1
Textile	C15	Manufacture of leather and related products	1
Tourism	H49	Land transport and transport via pipelines	0.45
Tourism	H50	Water transport	0.22
Tourism	H51	Air transport	0.91
Tourism	I	Accommodation and food service activities	1
Tourism	N79	Travel agency, tour operator and other reservation service and related activities	1
Tourism	N82	Office administrative, office support and other business support activities	1
Tourism	R90-R92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.66
Tourism	R93	Sports activities and amusement and recreation activities	1

*Shares shown in the table are computed based on value-added. Shares computed based on employment data are also used for the analysis but not shown.

^ Additional share on top of horizontal component (cfr. below).

Some sectors are horizontal in nature and, as such, they contribute to the well-functioning of all the ecosystems. These are marked as "Horizontal" in the table above. To take into account their contribution, these sectors have been distributed across ecosystems using Input-Output tables,. which allows to calculate how much each horizontal sector is used by the rest of the ecosystems. In particular, it is possible to calculate the share of value added of the horizontal sector which is embodied in the output of other sectors in the ecosystem. In general terms, these weights ($Weight_{is}^{kz}$) are defined as follows:

$$Weight_{is}^{kz} = \frac{v^{kz} \Lambda_{is}^{kz} \sum_{j=1}^{N} f_j^{is}}{va^{kz}}$$

where Λ measures the total euro worth of country-sector kz goods required to meet 1 euro worth of country-sector is' final demand, defined as ($\sum_{j=1}^{N} f_j^{is}$). Note that the final demand of country-sector is is consumed by different countries j. The value created by country-sector kz is captured by v^{kz}. The total value-added generated by country-sector kz is denoted as va^{kz}. In this setting, kz is the EU's horizontal sector and is captures the different non-horizontal sectors of the EU. Once these weights are defined at a NACE rev. 2 level, the second step uses the definition of different ecosystems in order to capture to what extend horizontal sectors are important for the different ecosystems. The weights are summarised in the table below:

	C25	C28	C33	E36	E37-E39	M69_M70	M71	M72	N77_N78
Aerospace & Defence	6.74%	6.79%	7.76%	1.74%	2.74%	2.50%	3.37%	5.65%	2.71%
Agri-food	6.62%	7.82%	11.85%	12.18%	9.48%	7.72%	6.02%	7.21%	8.21%
Construction	30.52%	19.84%	15.54%	10.25%	13.67%	11.51%	25.68%	10.41%	12.92%
Cultural and Creative Industries	0.90%	1.26%	1.32%	2.47%	1.89%	2.77%	2.03%	2.72%	2.85%
Digital	2.09%	3.05%	3.29%	2.22%	2.78%	5.13%	4.42%	6.90%	5.17%
Electronics	1.96%	2.26%	1.53%	0.69%	1.02%	1.17%	1.46%	5.07%	1.30%
Energy - Renewables	1.56%	1.60%	1.64%	1.13%	1.43%	0.97%	1.17%	0.83%	0.85%
Energy Intensive Industries	3.63%	4.01%	4.74%	4.01%	8.62%	4.91%	3.68%	3.06%	3.13%

Health	5.16%	5.62%	6.86%	11.10%	8.53%	8.76%	7.61%	14.22%	10.00%
Mobility - Transport - Automotive	23.55%	27.76%	16.53%	5.82%	9.82%	8.62%	9.29%	13.00%	8.55%
Proximity, Social Economy and Civil Security	2.35%	3.00%	3.57%	7.65%	5.37%	5.72%	4.42%	4.65%	6.12%
Retail	4.42%	5.73%	6.47%	7.41%	7.76%	13.45%	8.00%	8.14%	12.69%
Textile	0.85%	1.00%	0.97%	1.29%	1.44%	1.15%	1.12%	1.15%	0.99%
Tourism	3.68%	5.01%	7.17%	10.46%	7.12%	6.76%	5.49%	4.85%	8.28%

All weights refer to 2014, i.e. the latest year for which Input-Output tables are available. It should be noted that the list of "Horizontal" sectors does not include financial services. Financial services are obviously of primary importance for industrial ecosystems, as without those most of the daily operations and investments would be impossible. Insurance services are also of the essence. However, the relevance of these services is also reflected in the impact their inclusion would have on several indicators. Since in the analysis of KPIs we want to focus on the industrial component of ecosystems, we opted for excluding financial activities.