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PART 1/2

# COMMISSION STAFF WORKING DOCUMENT

# Annual Single Market Report 2022

**COMMISSION STAFF WORKING DOCUMENT**

# Annual Single Market Report 2022

*Disclaimer: This document is a European Commission staff working document. It does not represent an official position of the Commission onthis issue, nor does it anticipate such a position.*


## *Executive Summary*

***The Single Market shows signs of recovery, however the depth of the pandemic shock and the volatile recovery require continued vigilance****. After the big drop in 2020, the confidence indicators across industrial ecosystems have improved considerably throughout 2021, but have slightly declined again in December and in January 2022, amid concerns about new variants and possible containment measures. The economic consequences of the COVID-19 crisis as well as speed of recovery vary considerably across industrial ecosystems. Small and Medium Sized Enterprises (SMEs) will be key for recovering and strengthening the resilience of European industry.*

***The Single Market*** *grants businesses a large reserve of domestic demand and differentiated supply sources. This, together with the EU's integration in the global economy,* ***represents one of the main assets of our economy also in times of crisis.*** *In this context, the implementation and enforcement of Single Market rules remain crucial, both according to long term (e.g. Single Market Enforcement Action Plan) and short-term (e.g. COVID-19-related unilateral restrictions) priorities. The continued efforts to address the persistent barriers, including in the framework of the Single Market Enforcement Task Force, and the promotion of cross-border provision of services are also key.*

***During the pandemics and in the volatile recovery phase, supply and demand imbalances have emerged in various markets*** *such as medical materials, electronic chips, some metals or wood, leading to worries about price pressures. However,* ***the recent challenges in global supply chains point to the need to reinforce them to the benefit of a stronger Single Market****. The approach taken by the Commission during the COVID-19 crisis to secure the supply of protective personal equipment and ramp up the industrial production of vaccines provides an example of action to address severe supply risks for products of strategic importance. Furthermore, the implementation of the Industrial Strategy, as updated in May 2021, already focuses on boosting the resilience of the Single Market and industrial ecosystems by addressing strategic dependencies, ensuring a level playing field, incentivizing investment and international partnerships.*

***The green and digital transitions require substantial investment to overcome large-scale challenges****. Bold action is needed to preserve strategic value chains and enable project pipelines. This report outlines* ***the various instruments that have been used at EU level to mobilise the investments needed to achieve the green and digital transition and greater resilience of the Single market****.* For example, *the RRF and the NextGeneration EU play an important role. Public support should be coupled with accompanying reforms to make sure that investments fall on fertile ground and do yield the desired impact. The staff working documents is accompanied by five Annexes. Annexes 1 to 3 presents an overview of the implementation of*

*respectively the SME Strategy, the Single Market Enforcement Action Plan, the Industrial Strategy and its update. Annex 4 provides an overview of key performance indicators related to the Single Market. Finally, Annex 5 to this report provides an illustration of investment volumes for a number of industrial areas of relevance that play an enabling role for successful green, digital and resilient transitions and for the competitiveness of tomorrow's industry.*

# Table of Contents

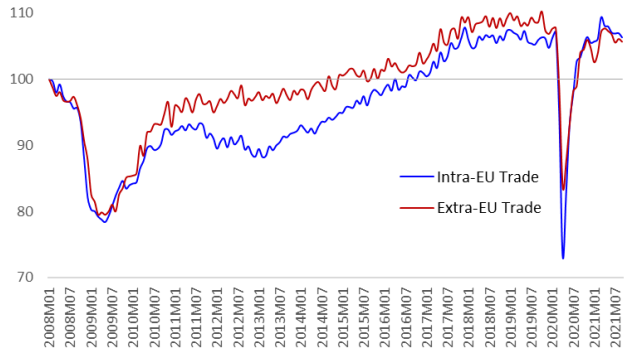
## 1. The State of the Single Market

**Chapter 1 provides an update on the state of the Single Market.** It includes information about recovery (including information about price developments) and productivity trends across all industrial ecosystems. It also reports on the supply challenges that occurred in the course of 2021 in several critical areas. These challenges bring renewed attention to the importance of strengthening the resilience of the Single Market and industrial ecosystems, addressing strategic vulnerabilities and better mitigating disruptions. Finally it zooms in on the economic situation of SMEs.

### *1.1. Economic Trends in the Single Market*

**The Single Market is Europe's most valuable economic asset, but it is also vulnerable to sudden disruptions**. The elimination of barriers to the free movement of goods, services, people and capital across Member States has provided more important and more diversified sources of funding, a more dynamic business environment, the critical mass to achieve economies of scale and a more efficient allocation of factors of production. It has also granted businesses a larger reserve of domestic demand and supply sources, together with the EU's trade integration with the rest of the world. The COVID-19 crisis, however, has shown that this asset is not a given: disruptions in the Single Market, such as border closures and breaks in integrated value chains, can rapidly escalate, deeply affecting citizens and businesses. In fact, the initial pandemic shock has hit intra-EU trade even harder than extra-EU trade (Figure 1). The access of EU operators to Third Countries markets has helped the EU economy to cushion the impact of the crisis and helped the recovery both from a supply and demand perspective.

**Figure 1: Volume index of trade within and outside the Single Market**

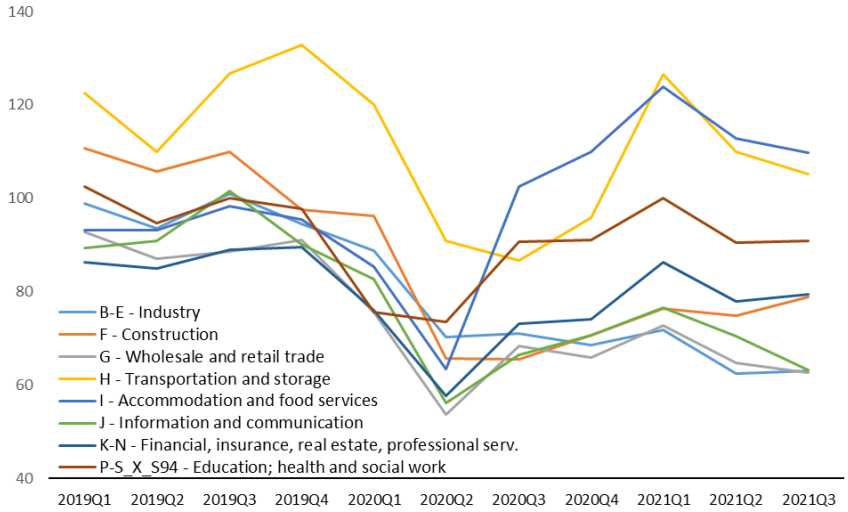



Source: European Commission services, based on Eurostat data. Note: the indicator shows the monthly volume index of trade in goods, with base January 2008 = 100, until September 2021; data are seasonally and working day adjusted.

**The crisis has had uneven consequences across the economy**, as shown for instance by the number of declarations of bankruptcies (Figure 2). While industry coped relatively well, accommodation and food services recorded a significant increase in the number of bankruptcies in the third and fourth quarters of 2020. Retail and wholesale services have also recorded more

bankruptcies than before the crisis. The national and EU support to companies has certainly reduced the number of bankruptcies, particularly in the second quarter of 2020. Transportation and accommodation suffered much more than the other sectors, in the course of 2021.

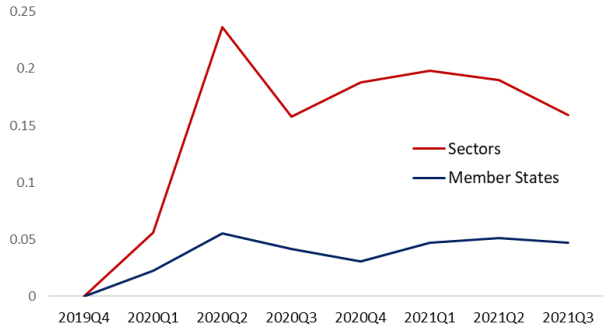
**Figure 2: Declarations of Bankruptcy**




Source: Eurostat, [sts_rb_q], index 2015=100

**Data also show that the variation of turnover across sectors has been greater than the variation of GDP across countries** (Figure 3); while country-level analysis remains useful, the industrial ecosystem perspective offers an insightful understanding of the state of the Single Market.

**Figure 3: Divergences in sectoral value turnover vs Member States GDP**



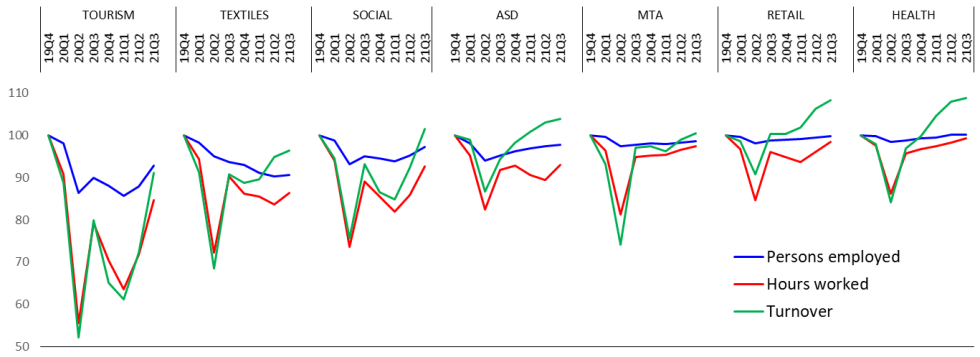

Source: European Commission services, based on Eurostat data. Note: the chart shows the coefficient of variation of the index of total turnover across NACE2 two-digit sectors and of the index of GDP across countries; both indexes are calculated with base 2019Q4.

### *1.2. The Recovery in the EU Industrial Ecosystems*

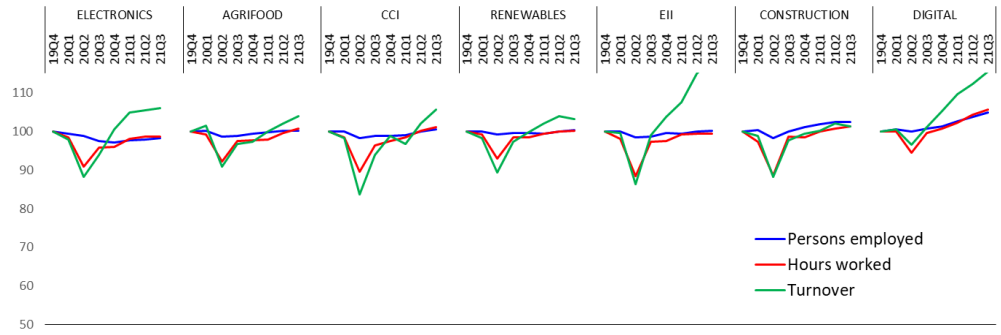
**The Single Market shows signs of recovery, despite the depth of the pandemic shock**. The EU as a whole has reached its pre-pandemic level of GDP in the third quarter of 2021 and all Member States are projected to have passed this milestone by the end of 2022.[1] The recovery is visible in the data on turnover in all EU industrial ecosystems (Figure 4): the index of total turnover in the second and third quarter of 2021 shows considerable improvement. In most cases, it also shows improvement with respect to the pre-pandemic level. However, the impact of the shock has been heterogeneous across industrial ecosystems; not all have managed to come back to 2019 levels and the speed of the recovery differs from one to another. Textiles, Tourism, and Proximity, Social Economy and Civil Security seem to have struggled the most.

**Some productivity gains can be observed in several ecosystems**. The gap between turnover and employment trends (in particular of hours worked) suggests productivity gains for some ecosystems: Digital, Health, Retail, Aerospace & Defence, and Electronics. These ecosystems are in fact more likely to digitalise some activities. Other ecosystems do not show similar productivity gains. The labour market is recovering in most ecosystems, in terms of both employment and hours worked, while still below pre-pandemic levels in Tourism and Textiles. The slightly stronger recovery in hours worked than in persons employed in Electronics, Agrifood, and Digital might indicate that in these ecosystems people are generally working longer hours than before.

**Figure 4: Index of turnover and employment by ecosystem (2019Q4-2021Q3)**



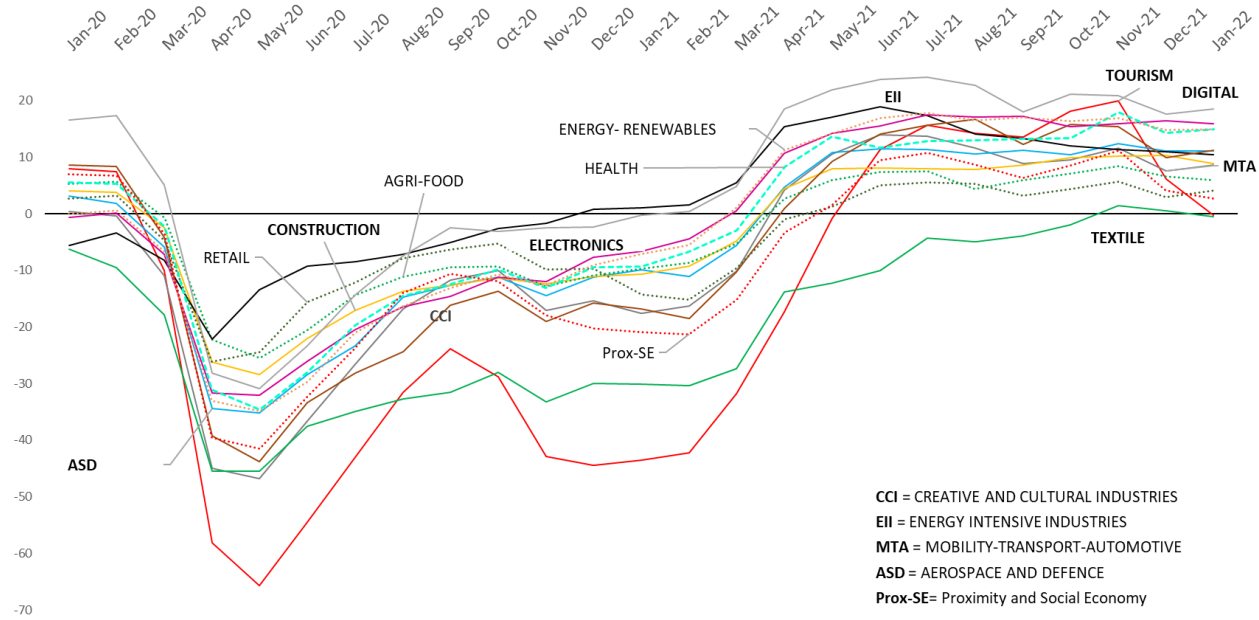

[1] European Commission, Winter Forecasts, 10 February 2022, available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_926.




Source: European Commission services, based on Eurostat data. Note: The charts show the evolution of the three indices for each ecosystem with base 2019Q4=100.

**Positive survey data on the economic sentiment confirm the recovery path in 2021, although the most recent evolution call for caution**. After the big drop in 2020, confidence has improved considerably throughout 2021. In November 2021, the economic confidence indicator finally turned positive in all ecosystems, while in December 2021 and in January 2022 it dropped, amid concerns about new variants and possible containment measures. The most considerable changes have occurred in Tourism, which had the second highest level of confidence, before the sharp deterioration suffered in December 2021 and January 2022. Tourism is the ecosystem which is the most sensitive to the evolution of the pandemic and related measures. More generally, the difference between the highest level of confidence (Digital) and the lowest one (Textiles) keeps declining, pointing to overall convergence. Steady deterioration of the confidence indicator in Energy Intensive Industries has been witnessed, since summer 2021 (Figure 5).

**Figure 5: Evolution of the Confidence Indicator by Ecosystem – Monthly**



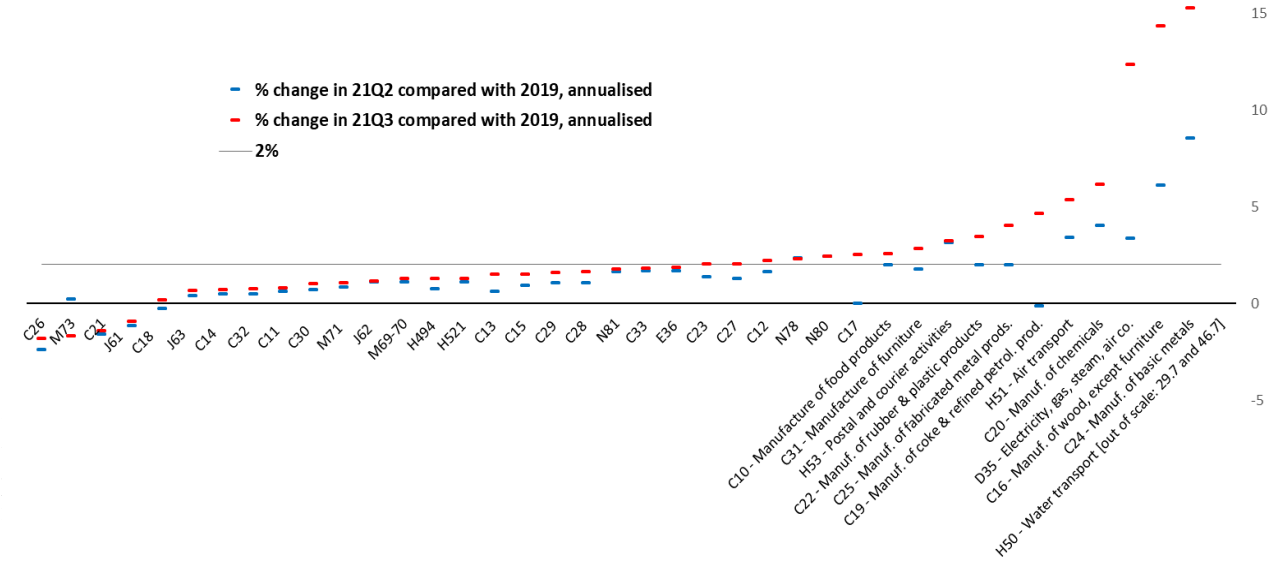
Source: European Commission services, based on data by the Joint Harmonised EU Programme of Business and Consumer Surveys. Note: For "Retail", "Agrifood", "Proximity-Social Economy", "Renewable Energies", and "Health", the available data is limited, hence dotted lines are used and the related values should be interpreted with caution.

### *1.3. Producer Price Increases*

**After the extremely low levels of the past year, producer prices are on the rise, and this may have an uneven impact in industrial sectors and ecosystems**. Furthermore, energy prices are increasing to unprecedented levels. Part of the standard inflation, which measures the variation of prices with respect to the previous year, is due to a base effect: given the stagnating or even decreasing level of prices in 2020, the 2021 data are in some cases inflated, and such effect will fade away only in 2022. In order to filter out this effect already in the 2021 data, we calculate the change on 2019 prices, and then annualise the values (Figure 8). In the third quarter of 2021 industry prices were 11.5% higher than in 2020, but 8.6% higher than in 2019, which means an average annualised inflation rate of 4.3% in 2019-2021. In the case of services, producer prices in the third quarter of 2021 were 4.0% higher than in the previous year, but only 4.8% (i.e. 2.4% annualised) higher than in 2019.

**The sectors with the highest rise in producer prices are mainly industry sectors**, but services sectors are also affected, notably those related to transport and postal and courier activities[2]. In manufacturing of basic metals and of wood, producer prices in the third quarter of 2021 were almost 15% higher with respect to 2019 on an annual basis; also in chemicals they are more than 6% higher. These developments pose some problems in the related ecosystems, mainly in Energy Intensive Industries, and to some extent in Automotive-Mobility-Transport.

**Figure 8: Annualised change in producer prices on 2019, sectors**



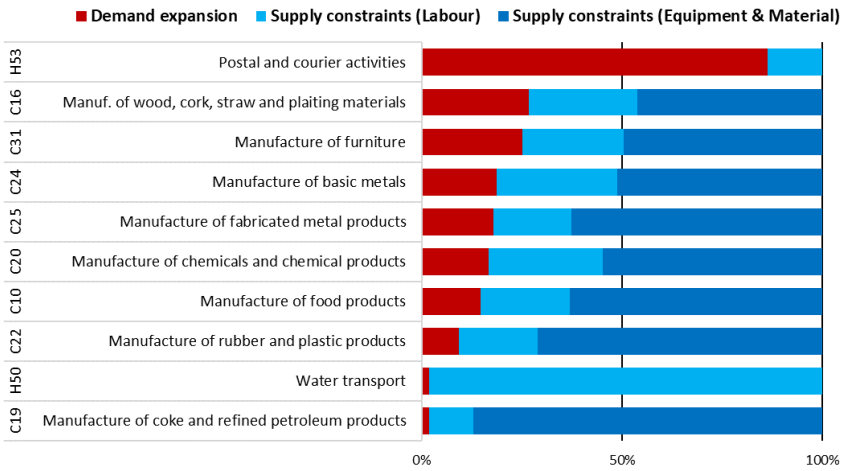

harbours due to localized pandemic clusters and the Suez Canal blockage further strained supply chains. As a consequence, shipping transit times increased and transport costs surged during 2021.
(ref. https://www.ecb.europa.eu/pub/pdf/ecbu/eb202108.en.pdf)

Source: European Commission services, based on data by Eurostat. Note: the indicator shows, for each sector, the annualised percentage change in producer prices in the second (blue) and third (red) quarter of 2021, with respect to the average of 2019. The values of sector H50 (Water transport) are out of scale, as the annualised increase in producer prices was 29.7% in the second quarter and 46.7% in the third one, i.e. by far the greatest increase across all sectors.

**Sectoral prices increases are due to a combination of demand and supply imbalances.** In an attempt to better understand which of the two forces is predominant at sectoral level[3], this section presents an indicator that could help assess the relative balance of supply constraints versus demand expansion in determining price pressures in each sector (see Box [1])[4]. The indicator shows to what extent the share of firms mentioning a demand expansion or a supply side constraint is different from the historical average in each sector. Such difference is expressed in standard deviations that measure the "impulse" coming from the two possible effects. The following figure shows that, based on this methodology, most of the price pressure observed would be due to supply constraints (in shades of blue, including labour supply) and much less to demand expansion (in red). In a second step, the analysis further looks into the relative importance of labour and equipment constraints within the overall supply-side effect. According to these indicators, in industry sectors, supply constraints seem to mainly originate from issues with equipment and materials (dark blue), while in services they seem mainly due to labour constraints (light blue).

**In the sectors most affected by price pressures, particularly in industry, supply constraints seem determinant to explaining price pressures**. This analysis hints at supply challenges as the key contributors to price pressures in the sectors previously identified, with the exception of *Postal and Courier Activities*, where the very significant increase of demand seems to be the root cause of surging prices. For all these sectors, this assessment would suggest that between 75% and 98% of the increase in prices would be associated to supply constraints, of labour or equipment and material. The analysis suggests that within the supply factors, labour constraints may be the main determinant of price pressures in *Water Transport*, while constraints of material and equipment may explain price pressures in the other sectors (in particular, *Manufacture of Coke and Refined Petroleum Products, Manufacture of Rubber and Plastics*, and *Manufacture of Fabricated Metal Products*) (See Figure 9).

**Figure 9: Relative importance of demand expansion vs supply constraints in determining price pressures**




[3] Other approach ... Bottlenecks: Where, Why, How Much ... of this analysis is to find indicators to ...

[4] Benoit F, Co ... sing Supply Chain Disruptions", Gr...

Source: European Commission services based on data by the Joint Harmonised EU Programme of Business and Consumer Surveys. Note: the indicator weights the number of standard deviations between the latest data point and the historical mean to capture the "impulse" coming from the different effects. Data refer to October 2021.

**The rise in energy prices contributes considerably to overall inflation and producer price pressures**. Energy prices staying at high level are increasingly affecting European households and businesses – in particular energy-intensive industries. It is also one important driver of the rising overall price levels. High electricity prices are driven by high and volatile gas prices strongly influenced by the geopolitical situation, in a way that could not have been foreseen and that creates more uncertainty. Households and companies face the prospect of higher energy bills at a time when many have been fragilised by loss of income from the pandemic. This risks weighing on the recovery and its fairness and inclusiveness[5].

### *1.4. Supply Chain Challenges*

**As the recovery goes on, towed by the progressive release of pent-up demand, concerns over supply and demand imbalances are emerging**. Supply constraints in specific value chains have been a major challenge since the start of the pandemic, with most of these challenges having in principle, a temporary nature. Some of these challenges included factory shutdowns, widespread lockdowns and mobility restrictions, which have led to logistic network disruptions, shipping cost increases and longer delivery times. However, an OECD study showed that many GVCs have continued to operate during the pick of the COVID crisis in 2020 (albeit with a lower output), including in activities which may not be regarded as essential. For instance, in the food industry (very much an essential activity), food supplies have proven relatively resilient. Trade openness is a clear supporting driver of the resilience of EU supply chains by expanding the range of alternative sources of supply. In spite of this, supply chain challenges have intensified in 2021.[6]

These challenges have negatively affected the European economy in 2021. This is a significant change for the EU, where demand and not supply has generally been limiting production. However, the bottlenecks in the transport and metals sectors are nevertheless expected to ease gradually, while the shortages of semiconductors are set to take longer to resolve.

According to the Commission's business surveys, supply-side bottlenecks in the European economy aggravated further in January 2022, which can be due among other factors to the surge in COVID-19 cases because of Omicron. Supply challenges for material and equipment were particularly severe in manufacturing while services were mainly affected by shortage of labour.

[5] COM/2021/660: Tackling rising energy prices: a toolbox for action and support. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0660.

[6] The Commission Business survey reports that for industry, supply-side concerns about materials and equipment are the single most critical factor for the first time recorded. In particular, in 2022-Q1, more than half (51%) of EU firms operating in industrial sectors reported supply challenges of materials and equipment.

The construction sector appears to suffer from supply challenges with regard to both labour and supply and equipment.

**Despite some vulnerabilities, international supply chains continue to be an essential tool to sustain our industrial output.** Integration into global networks have improved EU competitiveness due to various factors including a wider market access, as well as the possibility of accessing new suppliers.[7] While the increasingly complex supply chains have proven highly efficient, the pandemic has revealed some potential bottlenecks. Indeed, in times of crisis, unexpected pressure on critical business nodes, as a result of events such as the closure of an important firm or distress in a logistic harbour, can paralyze the entire chain. The concentration of suppliers in some sectors can be another major source of vulnerability for very complex and integrated value chains. The just-in-time or lean inventory replenishment approach (i.e. producing goods when needed and thereby cutting stocks and inventory) can be a source of vulnerability in the event of major disruptions.

**Skills shortages create a further drag on economic recovery and expansion**. Disruptions due to containment measures had a negative effect on also the skills of the workforce. Job losses trigger loss of skills, and new skills gaps and mismatches arise due to the different recovery paths and labour reallocation across sectors. The green and digital transitions will imply a further reallocation of labour, with the risk of increasing skills mismatches. If they remain unaddressed, such skills shortages could hamper growth.

**Supply and demand imbalances or tensions have emerged in many sectors:** semiconductors, agri-food products, such as soya beans and palm oil, wheat, critical raw materials, and possibly subcategories of chemicals, such as fertilisers, plastic components or dyestuff used in the textiles ecosystem. Preliminary data analysis based on price increase and business surveys on businesses' expectations confirm these trends overall. For instance, the share of firms reporting constraints in equipment in the third quarter was: 57.8% in the motor industry, 52.2% for electrical equipment, 45% for rubber and plastics.

**Such imbalances are negatively affecting EU industrial ecosystems.** For instance, significant supply challenges for semiconductors has been reported in many industries, with severe effects on sectors such as the automotive industry but also other sectors such as home appliances, gaming, smartphones, telecom or medical devices. Industrial automation manufacturers report tight supplies of semiconductors and concerns about rising prices and delays. The situation has led to substantial cuts in the production of motor vehicles manufacturers. Estimates suggest an

[7] According to a recent McKinsey survey (i.e. McKinsey (2021), How COVID-19 is reshaping supply chains, November 2021), firms suffering disruptions adapted their supply chain strategies and configuration to adjust to the new situation. Early into the crisis they responded that they would improve supply-chain resilience, combining increases in the inventory of critical products, components, and materials with efforts to diversify supply bases, and localize or regionalize supply and production networks. A follow-up survey, performed Q2/2021, indicated that, on average, firms have increased inventories rather than nearshoring suppliers with the objective of improving resilience.

8% cumulative volume loss in the first three quarters of 2021 compared to the 2019 yearly production[8].

**Magnesium and construction products provide further examples of recent supply challenges affecting the EU economy.** The recent supply challenge of magnesium (linked to curtailment of electricity use in China) represents a threat for the manufacturing of aluminium and steel and requires coordination of Member States' efforts. The EU faces a strong level of strategic dependency and high supply risks for magnesium, with China strongly dominating global production. In the construction ecosystem, many construction products (e.g. steel, copper, aluminium, wood and wood products, sand) experienced supply and demand imbalances and significant price increases in 2021 as well.

**Supply chain challenges can have a negative impact on the EU economy's recovery.[9]** The index of industrial production in the EU has shown signs of deceleration in autumn, after months of positive developments that led to pre-crisis levels. The latest data point to a significant improvement in November 2021; however in some countries, such as Germany, France, and Portugal, industrial production is still considerably below pre-pandemic levels. On the other hand, in Poland, Lithuania, Ireland, Belgium and Greece, instead, it is considerably higher. This is consistent with the national industrial structure that reflects to a greater or less extent the disruptions reported in specific sectors - such as the automotive industry - and in international supply chains.

### *1.5. Economic Situation of SMEs*

**SMEs have particularly suffered from the crisis.** Lockdowns forced many small businesses to close temporarily and, as a consequence, SME value added declined sharply, by 7.6% in 2020. Public support measures helped mitigate some of the damage – employment in SMEs declined, but only by 1.7%. Many industries, especially in the SME-intensive services ecosystems, experienced large declines in sales as a result of the lockdowns and other measures introduced by Member States to fight the spread of COVID-19[10].

**SMEs implemented a wide range of mitigation measures.** While some temporarily ceased to trade, many others made use of the different support programmes implemented by national governments, especially to pay their wages, overcome cash flow issues, and reduce working hours and/or staffing. Many SMEs also made greater use of digital tools to continue to operate and either moved to or increased their web-based selling.

**Digitalisation was of key importance for SMEs to weather the crisis. SMEs in the narrow digital sector only saw their value added fall by 0.5%, whereas non-digital SMEs' value**

[8] Weekly data gathering by IHS Markit. The estimate does not include possible losses incurred in the last quarter of 2021.

[9] The impact of shortages on manufacturing in the EU, (https://www.voxeu.org/article/impact-shortages-manufacturing-eu).

[10] See the Commission's SME Performance Review https://ec.europa.eu/growth/smes/sme-strategy/sme-performance-review_en.

**added fell by 8% in 2020.** The sectors in which SMEs were worst affected by the pandemic in terms of value added were 'accommodation and food service activities' (-37.8%), 'transportation and storage' (-16.1%), 'administrative and support service activities' (-13.3%), 'manufacturing' (-9.8%) and 'wholesale and retail trade' (-4.4%).

**The number of new business registrations and start-ups in the EU-27 fell in 2020 and remained subdued in 2021, and so did the funding for start-ups and scale-ups.** The EU, the UK, the US and the rest of the world all experienced declines in the creation of start-ups in recent years even before the pandemic[11]. However, the COVID-19 crisis accelerated these declines. The number of new start-ups fell by 54% in the EU, 60% in the UK, 61% in the US and 46% in the rest of the world in the 12-months period ending in August 2021 compared to the previous 12-months period.

**The number of bankruptcies of SMEs in 2020 fell in many Member States**, and although they have started to rise in 2021, bankruptcies remain at a lower level than before the crisis. This reflects the impact of the various economic support programmes implemented by Member States, forbearance by lenders and regulators, and reduced operations by legal and administrative authorities deciding on and recording bankruptcies. However, the overall figures mask significant differences by sector; as outlined in Figure 2, the situation for the accommodation and food services sector is significantly worse than before the pandemic. Therefore it is essential, when phasing out support measures, to avoid a cliff-edge for many SMEs. In this context, the Commission has decided to prolong the State Aid Temporary Framework[12] until 30 June 2022 and introduced new tools available to Member States until 31 December 2022 and 2023, to create direct incentives for forward-looking private investment and solvency support measures.

**Both EU SME value added and employment had grown by the end of 2021 compared to 2020**. Value added increased by 8.2% at EU level[13] (not adjusted for inflation). Recovery of SMEs is therefore expected to be much swifter than following the financial crisis.

**Although a continuation of the recovery is expected in 2022, some ecosystems have already returned to pre-crisis levels but not all ecosystems nor SMEs will return to pre-crisis levels at the same pace**. Even if across the EU-27, the numbers of SMEs and their value added are expected to surpass their pre-crisis levels, employment growth in SMEs is likely to remain subdued and, in certain Member States, might still remain below 2019 levels even throughout 2022. A recent survey by SMEunited has found that while SMEs' confidence in their own businesses in autumn 2021 had risen to pre-COVID-19 levels, their confidence in the overall

[11] Source: Crunchbase.

[12] Sixth Amendment to the Temporary Framework for State aid measures to support the economy in the current COVID-19 outbreak and amendment to the Annex to the Communication from the Commission to the Member States on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to short-term export-credit insurance, 2021/C 473/01.

[13] Source: calculations by JRC based on Eurostat Structural Business Statistics, Short-Term Business Statistics and National Accounts Database.

state of the economy had slightly fallen compared to the first semester of 2021[14]. Similarly, the 2022 Eurochambres Economic Survey found that while SMEs expect to further recover in 2022, most SMEs expect affordable access to energy and raw materials to be the main challenge ahead[15].

[14] SMEunited, The SME Business Climate Index and EU Craft and SME Barometer, https://www.smeunited.eu/admin/storage/smeunited/barometer-21h2-final.pdf.
[15] Eurochambres, Eurochambres Economic Survey 2022, https://www.eurochambres.eu/publication/eurochambres-economic-survey-2022-ees2022-2/.

## 2. Strengthening the Single Market Resilience

Chapter 2 reports on the actions taken to ensure a more resilient and predictable Single Market environment, the work of the Single Market Enforcement Task Force (SMET) and remaining barriers. A well-functioning and resilient Single Market remains the key asset and the necessary condition for a swift and transformative recovery of the EU economy. Therefore, maintaining a strong focus on enforcement and deepening of the Single Market framework is of clear priority.

The chapter looks into the challenges posed by the supply chain disruptions caused by COVID-19 pandemic and it describes the policy response that was rolled out, first to secure protective personal equipment supply and then to ramp up the industrial production of vaccines. It finally presents EU instruments and actions that were taken to boost resilience of the Single Market and industrial ecosystems as a follow up to the May 2021 Updated Industrial Strategy.

### *2.1. Single Market Enforcement and Remaining Barriers*

Commitment to the Single Market, compliance and the effective implementation of its rules allow citizens and businesses to fully benefit from their free movement rights, consumers to enjoy more choice and rights, and also facilitate green and digital transition.

*Enforcing the rules: Strategic report on Single Market enforcement*

**The implementation and enforcement of the Single Market rules is key to strengthening the integrity and resilience of the Single Market.** To address remaining barriers in the Single Market and to maximise the effectiveness and efficiency of compliance and enforcement across the EU, the specific actions and horizontal measures of the Long-term action plan for better implementation and enforcement of the Single Market[16] are being implemented (See Annex 2 Overview Table: State of play of the implementation of the Single Market Enforcement Action Plan) by the Commission together with the Member States.

**Containment measures adopted in response to evolving epidemiological situation have hindered or even paralysed free movement of goods, services and persons a number of times**. These restrictions were also subject to frequent changes, leading to a lack of predictability. Particularly in the early days of the pandemic, businesses and citizens suffered from restrictions, border closures and supply disruptions.

**The COVID-19 crisis has underscored the need to address the existing barriers to cross-border trade to preserve and enhance the free movement of goods and services and to unlock the full potential of the Single Market.** Effective competition in goods and services markets is needed to ensure the continuous increases in productivity and for consumers to benefit

[16] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A94%3AFIN.

from lower prices and wider choice**.** The Communication on Identifying and addressing barriers in the Single Market of 10 March 2020[17] highlighted 13 key barriers from a user perspective.

**Many barriers to the Single Market derive from national legislation or administrative requirements.** In this regard swift cooperation between Member States and with the Comission to address unilateral restrictions and prevent new ones is critical. COVID-19 has also generated a significant increase of the number of complaints by companies and citizens and has prompted the Commission to closely monitor and intervene where needed.

**Striving to preserve a well-functioning Single Market, the Commission concentrated its efforts on cases that have a significant impact on the Single Market,** special attention was paid to the area of goods, public procurement, late payments, and services[18].

**The Commission paid special attention to export restrictions and to compliance in the automotive sector.** In the area of goods, national bans or restrictions to the export of goods to other Member States (bans on medicinal products and prior declaration for export of construction products) threaten to undermine the essence of the Single Market and are being tackled forcefully through a combination of political outreach and formal enforcement action. In the automotive sector, EU-wide rules ensuring the proper functioning of the internal market introduced harmonised technical requirements and procedures permitting new types of motor vehicles and their trailers to conform to EU-approved requirements on safety and environmental protection[19] entered into force. The enforcement efforts have focused on ensuring full compliance with the rules governing the deployment of the Member States' supervisory action in this sector.

**Public procurement legal framework is essential to ensure transparency, full competition, equal treatment and effective expenditure of public finance.** The Commission enforcement actions focussed on the correct transposition of the 2014 public procurement directives in all the Member States. Previous restrictions hampering the participation of SMEs to public procurement, such as limits to subcontracting, or the obligation to dispose of a local representative in the trade of products like coffee, have been removed in 2021.The public procurement rules as framework rules also have an important role to play in the recovery and green and digital transitions, notably through the management of a significant portion of public funds, including RRF and other EU funds. Used strategically, they help addressing strategic dependencies and make the EU economy more resilient and sustainable, however their potential is not being fully explored by a number of public buyers.

[17] COM/2020/93 final. The Communication focuses on the top 13 barriers to cross-border activity, as most commonly reported by businesses (with regard to cross-border trade or establishment) and consumers (with regard to cross-border purchase of goods or services).

[18] The Commission adopted 120 decisions in formal infringement procedures, including 40 letters of formal notice, additional letters of formal notice, reasoned opinions and additional reasoned opinions and one letter of formal notice Article 260 (following a first judgement of the Court).

[19] The replacement of Directive 2007/46/EC governing type approval by the new Regulation (EU) 2018/858 is in force since September 2020.

**Further actions, such as the EU Observatory on late payments[20], are being developed to ensure Member States address unfair payment practices and delays in payments.** However, the improvement in reducing delays in some Member States[21] has been interrupted/reversed by the COVID-19 pandemic. The incidence of late payments temporarily increased during COVID-19 crisis and became one of the most important concerns for EU SMEs, affecting their resilience and the good functioning of supply chains. The average time for an SME to get paid increased from
35 days in 2019 to more than 52 days in 2020. The average payment delay slightly decreased in 2021, to 48 days, however, it remains substantially higher than before the crisis[22]. For each invoice that is not paid on time (or not paid at all), it is estimated that four additional invoices will not be paid, leading to a cumulative effect spreading through supply chains, undermining their viability and destroying their resilience. The enforcement actions of the Commission are contributing to make possible that the situation as regards backlog of late payments made to SMEs by public administrations in several member States, although still problematic, is constantly improving. Pilot work on the observatory is ongoing in the construction sector. Construction mostly relies on SMEs and is the sector most affected by late payments: in 2020, 42% of companies stated that late payment has a high impact on threat to survival of their business[23]. A report on late payments indicators for the construction sector was published in September 2021[24].

**In the area of services, the Commission moved forward, launching infringements regarding essential Single Market legislation.** Infringements were launched under the Professional Qualification Directive to address restrictive regulation of professions and issues related to recognition procedures, such as the European Professional Card, alert mechanism[25], partial access to or language requirements in professional services (e.g. accountants, tax advisers, architects, lawyers, doctors, veterinarians, and pharmacists). As a result of this, overall, 70% of grievances raised have been effectively solved before referral to the European Court of Justice, facilitating business opportunities for thousands of workers in professional services and increasing choices and quality of service for EU citizens.

**Putting in place e-government solutions and facilitating access to and exercise of service activities is critical to enable free circulation of cross-borders services[26].** The infringement

[20] The EU Observatory on late payments will monitor payment performance and practices by public authorities to businesses and in B2B transactions, across supply chains.
[21] For example in Italy, Belgium, Spain, Greece.
[22] European Payment Report 2021 (Intrum), available at https://www.intrum.com/publications/european-payment-report/european-payment-report-2021/.
[23] Report on late payments indicators for the construction sector, available at : https://ec.europa.eu/docsroom/documents/46899.
[24] The full report is available at https://ec.europa.eu/docsroom/documents/46899.
[25] An early warning mechanism introduced by Directive 2013/55/EC obliges the Member States to alert each other via the IMI about professionals in the areas of healthcare and education of minors, who have been banned, even temporarily, from practising their profession or parts of it.
[26] 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 - COM(2020) 93 final.

package launched under the Services Directive and continuous dialogue between the Commission and the Member States has led to significant advancements towards fully functioning Points of Single Contact (PSCs), a critical tool to support cross-border services provision, since they make it easier for businesses to navigate administrative procedures and access information. Numerous Member States thoroughly reviewed their PSCs with a view to, e.g., improve user interfaces, add foreign language translations, expand the possibilities to complete procedures online, integrate them more with other e-government tools and upgrade them to the standards required by the Single Digital Gateway Regulation. Both citizens and providers can benefit from the smooth functioning of cross-border services, however, further efforts are needed in a number of Member States

**Furthermore, a strong emphasis was put on ensuring a robust transposition and application of the Proportionality Test Directive via infringement action**, a major preventive tool to ensure that Member State do not unnecessarily restrict the functioning of the Single Market for professional services when adopting new, or modifying the existing, regulations of professions.

**Close cooperation with Member States' authorities is essential to deploy preventive and remedial actions. The Single Market Enforcement Task Force (SMET) became a key vehicle for coordinated work with Member States and a joint response.** Initially, SMET played an active role in addressing and countering the introduction of COVID-19-related obstacles hindering smooth functioning of the Single Market. SMET is also addressing concrete systemic barriers that hamper the full functioning of the Single Market[27], such as cross-border restrictions for professionals (prior checks of qualifications for temporary and occasional service provision and excessive document requirements); measures with potential protectionist effects in the agri-food sector; national certification schemes in construction services sector and restrictions related to non-harmonised construction products; excessive administrative burdens associated with the posting of workers, and availability of insurance for temporary and occasional services providers. In the future, SMET will pay particular attention to obstacles hindering a smooth recovery, and to barriers that hamper the green and digital transitions and delay the implementation of the national recovery and resilience plans.

**Effective enforcement actions have strengthened the fight against counterfeit and illegal products in the context of the COVID-19 pandemic.** The trade of counterfeit and sub-standard COVID-19 related products pose a threat to the safety of EU citizens, the EU's financial interest and legitimate EU businesses. In close cooperation with Member States' authorities, the Commission, via the European Anti-Fraud Office (OLAF), has investigated the circulation of such products on the market. Since March 2020, over 100 million counterfeit or sub-standard products have been seized or detained as a result.

[27] The First report on the work of the Single Market Enforcement Taskforce provides details on the achievements and substantial progress that has been achieved in these areas. https://ec.europa.eu/docsroom/documents/47154/attachments/1/translations/en/renditions/native.

**In preventing the creation of new barriers to the Single Market, the notification tools of the Single Market Transparency and Service Directives have played an important role.** The need for timely information on new barriers to the Single Market became particularly evident during the first months of the COVID-19 pandemic. The crisis led to an exponential increase of notifications, which continues to this day 969 notifications of draft national regulation on goods and services were examined during 2021.

**At the same time, the Commission stepped up efforts to enhance dialogue with Member States and boost efficient cooperation and swift exchange of information among public authorities.** Dedicated meetings[28] focused on finding solutions and accelerating resolution of infringement cases as well as other enforcement related issues linked to Single Market Transparency Directive notifications, Information and Communication System for the pan-European Market Surveillance (ICSMS) notifications and SOLVIT structural issues. In 2020, SOLVIT dealt with more than 2450 cases addressing concrete problems that citizens and businesses face due to a misapplication of the Single Market rules, out of which 87% were solved. Examples of issues addressed included labelling requirements, application for VAT refunds, and recognition of professional qualifications, among others. In 2021, the extension of the Internal Market Information System (IMI) was prepared to provide support for mobility of workers in the transport sector and refusals of granting of licences for the firearms. Cooperation and information exchange between OLAF, other Union agencies and bodies and Member States' anti-fraud coordination services (AFCOS), law enforcement and customs authorities also ensures protection of the Single Market through effective enforcement.

**The Single Market Scoreboard[29] continues to be a source of information for monitoring Member States' performances on the implementation of Single Market rules**. The 2021 edition of the Scoreboard has been upgraded[30] and in 2022 the Single Market Scoreboard will be further developed in order to better feed into the European Semester process.

*Remaining barriers: Single Market for services*

**The services sector and persisting obstacles deserve particular attention in the efforts to strengthen the EU's recovery and resilience.** This is because of its share in EU GDP and employment and its importance for driving the competitiveness of all industrial ecosystems and manufacturing supply chains. Well-functioning services sector will equally play an important role in supporting green and digital transitions of industrial ecosystems. Further efforts by all players with a view to investment and innovation as well as reducing regulatory restrictiveness in services would boost productivity and competitiveness of the EU services sector and manufacturing industries which source many services and increasingly offer their products in combination with services. The Commission is also pursuing dialogue with the Member States in

[28] Implementation of ACTION 22: Systematic periodic package meetings, from the Long-term action plan for better implementation and enforcement of Single Market rules - COM(2020) 93 final: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2020%3A94%3AFIN.

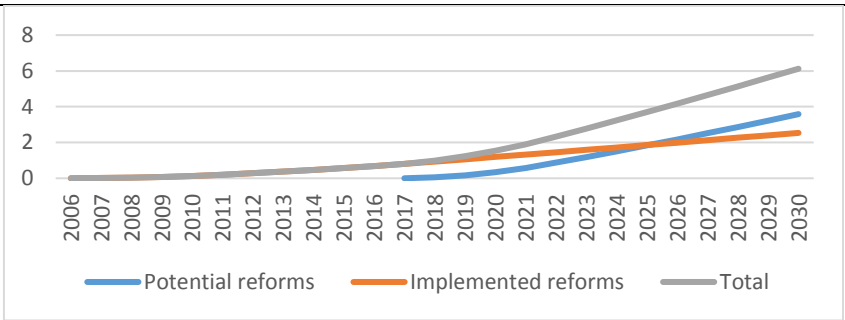
[29] https://ec.europa.eu/internal_market/scoreboard/.

[30] Three new policy areas were added: Market Surveillance, SMEs Business Environment and Circular Economy/ Greening of the industry and in addition the digital tool used for the Scoreboard was modernised.

the framework of the European Semester aiming to reduce unjustified or disproportionate obstacles hindering the performance of the Single Market for services.

**The economic performance of the Single Market for services can be improved by reducing regulatory barriers and ensuring that regulatory restrictions are adequate and proportionate.** According to a recent study[31], since the adoption of the Services Directive in 2006, there was only a small decrease in absolute level of barriers and more reform efforts are needed to remove regulatory and administrative barriers faced by service providers when operating in the Single Market[32]. Nevertheless, the reforms implemented so far would result in discounted cumulative gains of 2.1% of GDP by the year 2027. Furthermore, if Member States were more ambitious in implementing reforms (to reach the average of the 5 least restrictive Member States), the additional growth potential is estimated to be 2.5% of GDP[33] (see Figure 6).

**Figure 6: Impact of removal of barriers in the services sector on EU GDP**



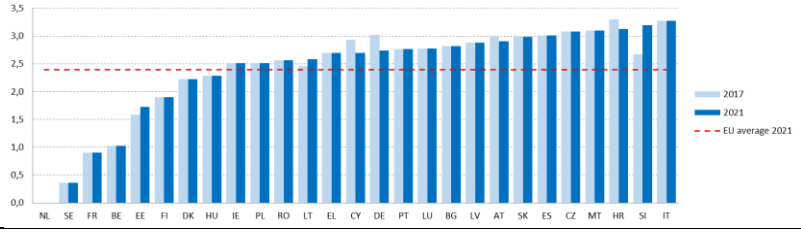

Source: The chart shows the cumulative net present value of GDP impact of already implemented reforms as well as of more ambitious reforms (to reach the average of the 5 least restrictive Member States) as percentage of base year GDP.

**Removing obstacles to cross-border provision of services and reducing administrative burden for posting of workers will boost the resilience of the EU economy.** In parallel to the full enforcement of the Services Directive and the Professional Qualifications Directive (reported in the previous section), the Commission is addressing those issues also through two targeted initiatives: i) a common electronic form for the declaration of the posting of workers: following a mapping of current national declaration procedures for posting of workers, the Commission launched a consultation process in several steps to devise the voluntary common form in close cooperation with Member States and stakeholders; and ii) use of European services standards as a tool to address cross-border barriers and increase consumers' confidence in cross-border provision of services.

[31] European Commission, DG GROW, Mapping and assessment of legal and administrative barriers in the services sector: summary report, 2021, https://data.europa.eu/doi/10.2873/419434.
[32] European Commission, DG GROW, Mapping and assessment of legal and administrative barriers in the services sector: summary report, 2021, https://data.europa.eu/doi/10.2873/419434.
[33] Barbero et al. (2022). A RHOMOLO assessment of the impact of regulation in the EU services sector. JRC – DG GROW Territorial Development Insights Series, JRC127035, European Commission, https://publications.jrc.ec.europa.eu/repository/handle/JRC127035.

**The July 2021 updated Commission recommendations[34] and the restrictiveness indicator for seven professional services reflect the very limited progress made by Member States in reforming professional regulations since the initial recommendations in 2017.** The updated recommendations on regulation of seven professional services - architects, engineers, lawyers, accountants, patent agents, real estate agents and tourist guides - aim to incentivise and assist Member States in creating a regulatory environment that is conducive to growth, innovation and job creation and above all to do away with persisting obstacles in the single market for services. These sectors provide intermediate inputs across all industrial ecosystems and play an essential role in the European economy and for the green and digital transitions. Only a few Member States have taken action to remove unjustified or disproportionate regulation. Overall, the reforms only partially addressed the Commission's 2017 recommendations, leaving significant room for further regulatory improvements in most Member States.

**Figure 7: Restrictiveness indicator: Civil engineers**




The Figure 11 shows the relative position of Member States in terms of the level of restrictiveness to access and exercise the profession of civil engineer, according to the new restrictiveness indicator. Since 2017, the indicator was slightly revised to better capture additional certification/attestation schemes, which make access to specific activities subject to additional authorisation requirements.

### *2.2 Addressing recent Supply Chain Challenges*

**Supply chain disruptions can be triggered by several factors** such as the scarcity of a given raw material, the sudden increases in temporary high energy prices or other bottlenecks along supply chains. A supply challenge can also be originated by a temporary or structural increase in demand that cannot be easily met by a corresponding increase in supply. Understanding the nature of the supply challenge is the necessary analytical step to be able to assess whether and if

[34] The update of the reform recommendations is based on a thorough assessment of the national regulatory frameworks applicable to the seven professions. The overall restrictiveness of national regulation is estimated using a composite restrictiveness indicator which provides a quantitative basis for benchmarking the Member States' regulatory frameworks for the seven professions by measuring their restrictiveness per Member State and per profession on a scale from zero (least restrictive) to six (most restrictive). The types of regulatory requirements covered by the indicator included: (1) regulatory approach: activities reserved to holders of specific qualifications, protection of title; (2) qualification requirements: years of education and training, mandatory state exam, continuous professional development obligations, etc.; (3) other entry requirements: compulsory membership or registration in professional body, limit to the number of licences granted, other authorisation requirements, etc.; (4) exercise requirements: restrictions on forms of company, shareholding and voting requirements, restrictions on joint exercise of professions, incompatible activities, etc.

yes what policy response would be appropriate. Any such policy response would have to come with a cost-benefit analysis.

**The COVID-19 pandemic highlighted challenges for the organisation of the Single Market in case of unforeseen crises and/or demand or supply shocks.** While the overall Single Market legal framework is considered sound, there are challenges in the field of information availability and communication channels, in particular with regard to a possible emergency response in specific sectors. These aspects may be further assessed in the impact assessment of the Commission's forthcoming proposal on the Single Market Emergency Instrument.

**The approach taken to tackle the 2020's shortage of personal protective gloves and to ramp-up COVID-19 vaccines production provides an example of action for future health crises**. Faced with last year's pressure on personal protective equipment supply (e.g. gloves and masks needed in the context of the pandemic) and vaccines, the Commission took a number of initiatives (see Box 1) to address this specific supply challenge. The experience in scaling up the manufacturing of COVID-19 vaccines (see Box 2), as well as the experience with monitoring supplies of critical raw materials offer additional examples of such actions for future emergencies.

**Box 1: The example of handling the 2020 supply crisis of personal protective equipment (PPE)**

In the first months of the COVID-19 crisis, the world faced massive disruptions. Combined with spiked, immediate demand, it resulted in a situation where protective personal equipment, of good quality in particular, was unavailable. Because of the exploding global demand, the world faced an accute situation of undercapacity which impacted all countries. The global shortage was felt by all countries, including China that hold more than 50% of the world production. It was therefore crucial to ramp up production globally. Concrete measures to address the above problems, taken by the Commission, included:

- intense cooperation with Third Countries to ensure the free flow of goods and avoid any disruption of supply chain in a situation of scarce goods,
- intense diplomatic dialogue with Third Countries to avoid that emergency sanitary measures impede the ramping up of production of essential goods for fighting the pandemic,
- establishment of a structured dialogue with associations representing relevant industry and with individual companies (e.g. IKEA[35], H&M);
- monitoring of supply through questionnaires about production capacity and existing stocks;
- matchmaking activities bringing together textile and PPE manufacturers, PPE and automotive manufacturers, to quickly reconvert/adapt/add production lines;
- streamlining the conformity assessment procedures for PPE[36] to be able to quickly provide equipment to healthcare systems, and call on Notified Bodies to prioritise essential medical equipment in the fight against COVID-19.

[35] For example, IKEA used its network with public authorities to help the matchmaking of its suppliers (mostly SMEs) who have converted their production to manufacture PPE. H&M used its supply chain to help addressing the high demand of PPE at the peak of the crisis (via donations to Italy and Spain), especially for frontline workers.
[36] Commission Recommendation (EU) 2020/403 of 13 March.

- creation of the Clearing House for medical equipment offered a platform for dialogue and sharing of information with Member States' representatives on the demand and supply of medical equipment at EU level and on means to overcome shortages and build capacity; and
- purchase of PPE through the Civil Protection Framework – RescEU and the use of the Joint Procurement Agreement[37]; export authorisation scheme to ensure adequacy of PPE supply obliged Member States to consult the Commission when assessing whether to issue an export authorisation.

**Box 2**: **The example of scaling up COVID-19 vaccine production**

**Scaling up COVID-19 vaccine production**

The pandemic created the need for substantive amount of COVID-19 vaccines to be provided within a very short timeframe. To meet this challenge the Commission established the Task Force for Industrial Scale-up. With the support of the Task Force, by the end of 2021, the EU had reached an installed annual production capacity of 5 billion doses of COVID-19 vaccine. By the beginning of February 2022, the EU had produced 3 billion doses and delivered 1.3 billion vaccines to Member States, enough to meet the EU targets both for vaccinations and donations to developing countries.

**The Task Force was successful in contributing to the rapid increase of Europe's industrial capacity to produce vaccines** through its five main tasks:

(i) **identifying and removing vaccine production bottlenecks in the EU**: Working closely with industry to identify vaccine production capacities and main bottlenecks in terms of capacity, the task force helps industrial partners find suitable solutions to resolve shortfalls of key supplies, thereby avoiding significant delays or disruptions in vaccine production.The task force has also engaged with manufacturers to support the launch of new production capacities and facilitated industrial reviews between Advance Purchase Agreements (APA) manufacturers and the EU countries where their facilities are located.

(ii) **mapping EU vaccine production capacities throughout the supply chain**: the task force surveyed vaccine production capacity in the EU. The results of the survey, as well as more detailed knowledge gained through regular contacts with APA manufacturers, other industry partners and EU countries, contributed to a detailed mapping of EU vaccine production capacities that is regularly updated.

(iii) **facilitating partnerships through matchmaking events for vaccine and therapeutics production**: two matchmaking events took place to date: the first EU matchmaking event on 29 and 31 March focussed on expanding vaccine production capacity and tackling supply chain bottlenecks; it gathered around 300 companies from 25 EU countries. A second matchmaking event, organised on 12 and 13 July, centred on the development and production of COVID-19 therapeutics and enhancing participation of EU companies in the therapeutics value chains and speed up connections between organisations.

(iv) **ensuring sufficient long-term manufacturing capacity for vaccines and therapeutics in Europe**: the task force contributes to broader efforts to ensure the EU's preparedness for the possible

[37] https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/public-health/ensuring-availability-supplies-and-equipment_en#identifying-demands-and-matching-supplies-of-medical-equipment

emergence of new variants or other health-related emergencies in the future by preparing the 'EU-FAB' project[38].

(v) **securing cross border supply chains, supporting global vaccine access and vaccine sharing efforts**: Working closely with Third Countries to avoid significant delays or disruptions in vaccine production, the Commission engaged with Third Countries to facilitate the free flow of vaccines and its inputs and develop vaccine production capacities around the world. It does so by working in partnership with EU countries and relevant stakeholders, and in direct contact with the COVAX Manufacturing Task Force and similar entities globally. For example, a regional hub for manufacturing COVID-19 and other endemic disease vaccines, hosted by the Institut Pasteur de Dakar in Senegal, will significantly increase Africa's medical and vaccine production capacity. Moreover, an EU-US Vaccines Task Force was established to jointly work on the bottlenecks in the supply chains, identify and solve problems related to the production of vaccines or therapeutics and other issues.

**As it has been the case for vaccines and PPE, coordination of efforts within and outside the EU helped provide an immediate response to address supply challenges.** Short-term actions to mitigate the effects of supply disruptions have included prioritisation of inputs for ecosystems/supply chains suffering from challenges, matchmaking of economic players, trade instruments including export transparency mechanisms, joint procurement and advance purchase agreements. In the case of personal protective equipment and vaccines, these actions have already been put in place on an ad-hoc basis up to the establishment of HERA. The Communication on the Contingency plan for ensuring food supply and food security in times of crisis (COM(2021) 689 final) of 12 November 2021 led to the establishment of the European Food Security Crisis preparedness and response Mechanism (EFSCM). Moreover, the European Chips Act[39] proposes a new governance framework to respond to the semiconductor shortage and to prevent future crises.

**Trade diversification and cooperation with extra-EU countries is also necessary to address supply challenges as well as strategic dependencies.** This is about working with key partners and diversifying sources. It encompasses talks with trading partners to secure and diversify supplies, trade agreements and other trade policy and diplomacy tools, and any other EEAS action. For instance, the Global Summit on Supply Chain Resilience of 31 October 2021 in Italy has allowed for the identification of shared principles to improve international coordination on all aspects of supply chains. The EU and the US are already engaged in a bilateral cooperation through the Trade and Technology Council. This work aims to build more resilient supply chains and includes a dedicated track on semiconductors (see the next section 2.3).

[38] EU FAB is part of the industrial dimension of the European Health Emergency Preparedness and Response Authority (HERA), as announced in the Communication Introducing HERA, the next step towards completing the European Health Union on 16 September. A prior information notice was published in Tender Electronic Daily, Supplement to the Official Journal (https://ted.europa.eu/udl?uri=TED:NOTICE:467537-2021:TEXT:EN:HTML) to inform economic operators of an upcoming public procurement procedure.

[39] COM(2022) 46 final of 8.2.2022; 2022/0032 (COD).

In addition **competition policy and enforcement** set predictable market conditions for companies to thrive in, with special attention to SMEs and start-ups, thereby enabling strong and diversified supply chains and ensuring companies have alternatives sources for their inputs.

**Member States have a key role to play in addressing shortages of products.** Their action is particularly relevant when it comes to national actions such as facilitating the granting of permits to production/extraction facilities, the removal of obstacles to production and logistics, notifications of intra EU export bans. They are also the key actors for the implementation of coordinated solutions such as joint procurement, stockpiling of critical inputs or export transparency mechanisms and the participation in multi-country projects. Their support is essential to reskilling and upskilling actions such as the Pact for Skills, or the EU Strategy for Universities, in particular to strengthen education and training relevance for future-proof skills.

### *2.3. EU actions to Boost Resilience Today*

**The Updated Industrial Strategy of May 2021 underscored the need to boost the resilience of the Single Market and industrial ecosystems, including by addressing strategic dependencies that lead to vulnerabilities of the EU economy**. The analysis of EU's strategic dependencies, carried out in May 2021, as well as the second round of in-depth reviews[40] pointed to a number of strengths and weaknesses and the Updated EU Industrial Strategy underscored the need for active, targeted use of relevant instruments to boost resilience of EU strategic supply chains. These instruments relate to putting in place the enabling regulatory environment, diversifying trade and building new trade partnerships to decrease dependences, by promoting diversification of sourcing, mobilising EU funding and private investments, spurring research and innovation, investing in EU's own capacity, including through the work of industrial alliances and the support of Member States to Important Projects of Common European Interest (IPCEIs) where appropriate.

**Actions are also being undertaken in some areas to boost resilience, build competitive supply chains and avoid strategic vulnerabilities.** The in-depth reviews[41] carried out as part of the Industrial Strategy of May 2021 and the second round of in-depth reviews[42] unveiled a number of strategic dependencies and vulnerabilities across several products and technologies, for which actions are being deployed.

**Legislation is being developed or updated to put in place a regulatory framework including to incentivising sustainable investment.** Appropriate rules provide the legal certainty and help to mobilise further investments, build project pipelines, close technological gaps and build resilient and more sustainable supply chains in a number of strategic areas. The proposal for regulation of batteries[43], the revision of the Renewable Energy Directive[44] and the Hydrogen and

[40] SWD(2021)352 and SWD(2022)41 on EU strategic dependencies and capacities: second stage of in-depth reviews.
[41] SWD(2021)352.
[42] SWD(2022) 41.
[43] COM Proposal of 10 December 2020, COM(2020)798 final.

Decarbonised Gas package[45] will promote the sustainability of these sectors in the EU. The European Chips Act has endowed Europe with a coherent vision and strategy for semi-conductors. Further examples are the recently agreed revision of the Regulation on the Trans-European Networks for Energy (TEN-E) that aligns EU energy infrastructure on the Green Deal objectives[46] and the Regulation on the EU Taxonomy for sustainable activities[47].

**Existing and proposed legislation can further ensure a level playing field**. Current procurement rules allow to exclude economic operators from third countries that do not have any agreement providing for the opening of the EU procurement market[48]. The proposed International Procurement Instrument[49] is intended to provide the EU with leverage to negotiate the opening of third country procurement markets on the basis of reciprocity. The proposals for new Regulation to address distortions caused by foreign subsidies in the Single Market[50] will provide further safeguards to preserve the level playing field.

**To mitigate the sustainability risks**, the EU has kept its active role in different policy areas to promote decent work in supply chains (e.g. trade, development, human rights), including through new legislative initiatives such as the one on platform workers and the sustainable corporate governance.

**International partnerships and trade diversification have helped boosting resilience in many strategic areas where vulnerabilities were identified.** With its unwavering support to the multilateral trading framework and the ongoing efforts to reform it, as well as its extensive network of Free Trade and Investment agreements, the EU is facilitating European businesses integration in global value-chains and creating opportunities for diversification. In certain strategic areas, in raw materials in particular, the EU has signed strategic partnerships to deepen the existing cooperation and exchanges (e.g. Canada and Ukraine), and the EU is working on developing similar partnerships with other key partners. In the digital area, under the Global Gateway strategy[51], the EU will work with partner countries to deploy digital networks and infrastructures such as submarine and terrestrial fibre-optic cables, space-based secure communication systems as well as cloud and data infrastructures, which together provide a basis for exchanges of data, cooperation in high performance computing, Artificial Intelligence (AI), and earth observation. The EU is promoting its regulatory frameworks based on its human-centric values through the establishment of digital partnerships with Japan, the Republic of

[44] COM proposal of 14 July 2021, COM(2021)557 final.
[45] COM proposal of 15 December 2021, COM(2021)803 final and COM (2021)804 final.
[46] Thanks to its new and updated infrastructure categories and a strengthened regulatory, planning and permitting toolbox for smart and sustainable infrastructure, the new rules TEN-E will help trigger and mobilise the needed investments (e.g. in hydrogen, grids or offshore renewable technologies). It also contributes to make the energy market more secure, better integrated and more competitive, by interconnecting the EU energy infrastructure and accommodating new energy trends, such as increased electrification, energy system integration or digitalisation.
[47] COM(2020) 852 final.
[48] As explained in Communication C/2019/5494.
[49] COM(2016)34 final.
[50] COM (2021)223.
[51] JOIN(2021) 30.

Korea and Singapore. The EU has also been engaging with some partners to reinforce a sectoral cooperation. This is for example the case with the U.S. within the Trade and Technology Council (TTC) which e.g. aims to jointly strengthen supply chains resilience in sectors of common strategic importance. The EU has also been working with Japan and Korea to address the question of semiconductors shortages.

**At multilateral level, the EU is supporting efforts to reinforce global value chains,** for instance by taking part in the Rome Supply Chains Summit on 31 October 2021, aimed at improving the transparency of supply chains, promoting openness, predictability, security and sustainability of international supply chains. The EU has also been involved in discussions amongst G7 countries to improve the coordination efforts to build resilient supply chains. The new Global Gateway Strategy[83] offers new opportunities to further develop and extend partnerships with third country partners by supporting the investment in infrastructure needed for boosting the resilience and sustainability of value-chains.

**Existing industrial alliances have proved instrumental to strengthening European open strategic autonomy.** Figure 1 provides an overview of the industrial alliances launched as well as those under consideration. The expertise developed by the alliances is valuable for identifying gaps and regulatory barriers or bottlenecks that need to be addressed along the relevant supply chains, to assess investment needs, build project pipelines and mobilise investments in strategic areas and technologies. For example, in the area of batteries supply chain, the identified priority to be tackled is the sourcing and processing of raw materials. In this regard, work and projects identified by the European Battery Alliance (EBA) and the European Raw Materials Alliance (ERMA) on battery raw materials are closely linked. ERMA highlighted also the need for regulatory measures that could incentivise the exploration, mining and circularity across the value chain[52]. ERMA also calls for access to finance tools to support projects' development and for the deployment of Horizon Europe programme to develop solutions for raw materials' substitution, recycling, sustainable extraction, etc. The European Clean Hydrogen Alliance helped identifying several regulatory gaps in the area of hydrogen supply chain[53]. The proposal to amend the Renewable Energy Directive (RED II)[54], Hydrogen and gas Package[55], and the

[52] This includes revising legislation relative both to the collection, extraction, and processing of magnets in Europe, and to the retention of End of Life products containing rare earth permanent magnets.

[53] This concern for instance: the missing legal definition of hydrogen, certification schemes for renewable and clean hydrogen, regulation of hydrogen infrastructures, framework for hydrogen infrastructure planning, conditions under which electrolysers producing hydrogen will obtain access to renewable electricity. Please also refer to the Reports of the alliance round tables on barriers and mitigation measures by EHPA of Sept. 2021.

[54] Proposal for a definition of renewable fuels of non-biological origin (RFNBOs) is included in the proposal to amend the Renewable Energy Directive (RED II).

[55] The Commission has proposed certification schemes in the proposals for RED III and in the Hydrogen and Gas Market Package of December 2021. Moreover, missing framework for hydrogen infrastructure planning is proposed to be established in the Hydrogen & Gas Market Package.

Alternative Fuels Infrastructure Directive, proposed as part of the July Fitfor55 package[56], provide solutions[57] to address many of these gaps.

**Figure 11: Overview of industrial alliances**


Source: European Commission services.

**Further alliances under preparation or consideration could enhance the EU resilience in other areas**. For example, in order to improve resilient EU access to space, the Commission is considering an Alliance on Space Launchers to bring together all industry players, existing and emerging, from demand and supply side, including from the public sector to work towards a globally competitive, cost-effective and autonomous EU access to space. The Alliance will benefit the whole space ecosystem, foster innovation and help to address needs from all actors, from start-ups and SMEs, to large enterprises. Moreover, following stakeholder consultations and expression of interest, the Commission is getting ready to launch an open call for membership applications for the Renewable and Low-Carbon Fuels Value Chain Industrial Alliance that was announced in the Sustainable and Smart Mobility Strategy. This is designed as

[56] The Regulation proposed in the Hydrogen and Gas Market Package and the Alternative Fuels Infrastructure Directive, proposed as part of the July Fitfor55 package, aim to address the issue of missing regulation of hydrogen infrastructure.

[57] For example, to tackle missing hydrogen standards, a Standardisation Working Group was established within the European Hydrogen Alliance to feed into hydrogen standard-making processes at the CEN/CENELEC, and the Strategic Standardisation Communication further examines hydrogen standards among its main priority. Hydrogen Alliance Working Group is being set up to examine the issue of hydrogen permitting procedures and develop policy recommendations and good practices, including for dialogue with Member States.

a complementary measure to the legislative proposals ReFuelEU Aviation[58] and FuelEU Maritime[59] with an aim to rapidly boost production, storage and distribution capacity of renewable and low-carbon fuels in these areas.

**Defence and space are equally critical sectors for the EU' open strategic autonomy.** Supply challenges in this area in crisis time can have a critical impact on the security of EU citizens, impacting the freedom of action of the EU Armed forces. The Observatory of Critical Technologies (OCT) launched by the Action Plan on Synergies will identify, monitor and assess critical technologies, their potential application and related value and supply chains[60]. The Commission has just published two Communications[61] presenting several measures to boost EU innovation and reduce strategic dependencies on technologies being critical for the defence, security and space sector. Based on the findings of the OCT, the Commission invites Member States to develop an EU-wide strategic coordinated approach for critical technologies, commits to review existing EU instruments to encourage dual-use RTD&I at EU level and launches an EU Defence Innovation scheme[62]. To reduce strategic dependencies the Commission will also systematically assess security and defence considerations when implementing or (re)designing EU industrial and trade instruments, incentivize joint procurement and ownership of defence capabilities, in particular when developed in a collaborative way within the EU. A further key objective is to reinforce the EU's overall resilience in different domains such as adapting to climate change, protecting against hybrid threats and defending the EU's and its Member States' interests in increasingly contested areas, such as cyber and space.

[58] COM(2021) 561 final.
[59] COM(2021) 562 final.
[60] The OCT will also analyse existing and foreseeable gaps, risks of strategic dependencies and vulnerabilities, and mitigating measures.
[61] A roadmap on critical technologies for security and defence (COM 2022 61) and a Commission contribution to European defence (COM 2022 60).
[62] It will include several concrete initiatives, namely a programme similar to CASSINI for defence, a dedicated Investment facility under InvestEU, as well as an Innovation incubator.

## 3. Investment for the Green and Digital Transitions and Resilience of the Single Market

The path towards a successful and fair green and digital transition of the Single Market and for boosting its resilience will need substantial investment to be undertaken. **The overall additional investment needs to meet the objectives of the twin transitions have been estimated at around EUR 650[63] billion annually up to 2030**, compared to the period 2011-2020, reflecting the required deep transformational change of the EU economy. The green transition accounts for EUR 520 billion or 80% of these needs, with 60% (or around EUR 390 billion) representing the energy policy and climate mitigation. The digital transformation in the EU was estimated to be at about EUR 125 billion per year.[64]

Private investment should account for the lion share of such endeavour, and public support tools should be used strategically to crowd in private investment and address market failures. This is even more important in a context where the EU has been experiencing investment gaps.

In this context, this chapter starts by outlining the instruments that have been used to mobilise the investment needed to achieve the green and digital transition and greater resilience of the Single market, such as industrial alliances, IPCEIs, or other appropriate State aid instruments, transition pathways, the Industrial Forum, the Horizon Europe Partnerships, the Invest EU, the Innovation Fund and the Recovery and Resilience Facility (RRF). It points to the value of the bottom-up process of transition pathways and of the engagement with stakeholders within the Industrial Forum.

It then provides an analysis of today's EU investment stance, drawing attention to the accumulated investment gap, and provides estimates of investment gaps by Member State.

Finally, taking a bottom-up approach, Annex 5 takes stock of investment volume which can be observed in a selection of nine critical industrial areas, in support of a green, digital and resilient EU: raw materials, batteries, solar PV, hydrogen, steel, cement, chemicals, clouds services, and cybersecurity. Annex 5 is not exhaustive in terms of the investments taking place in the selected areas, neither does it have the ambition to cover all critical areas within EU industrial ecosystems, but it provides an illustration on how real action is taking place on the ground.

[63] See COM (2021) 662: EUR 392 billion for climate and energy investments (SWD(2021)621 final), EUR 130 billion for environmental investments (SWD(2020)98 final table 1 ) Thus overall green investment needs thus sum up to EUR 520 billion. EUR 125 billion for digital investments (SWD(2020)98 final table 2).

[64] EUR 42 billion in communication networks, EUR 17 billion in semiconductors, EUR 11 billion in cloud. To note that this figure includes investments in digital infrastructure, digital skills and advanced technologies, but leaves out other dimensions such as digital public services. The Digital Compass Communication and the related policy programme "Path to the Digital Decade", proposes a new policy framework and new targets for the digital transformation of the EU to be achieved by 2030. COM(2021) 118 final; (COM(2021) 574 final). An update of the investment needs in view of the new ambitions for the Digital Decade is on-going.

### *3.1. What the EU is doing in terms of investment today*

**Europe's transition to climate neutrality and digitalisation will require profound changes of economic and business models, backed by substantial investments.** A fundamental shift to sustainability is required across ecosystems and businesses, including accelerated and deep decarbonisation and circular transition. Bold action and swift mobilisation of private and public funds will be needed to build the necessary underpinning strategic value chains and enabling project pipelines from research to deployment. A large amount of EU public resources has been already deployed through the RRF, the NextGenerationEU and other EU financing instruments.

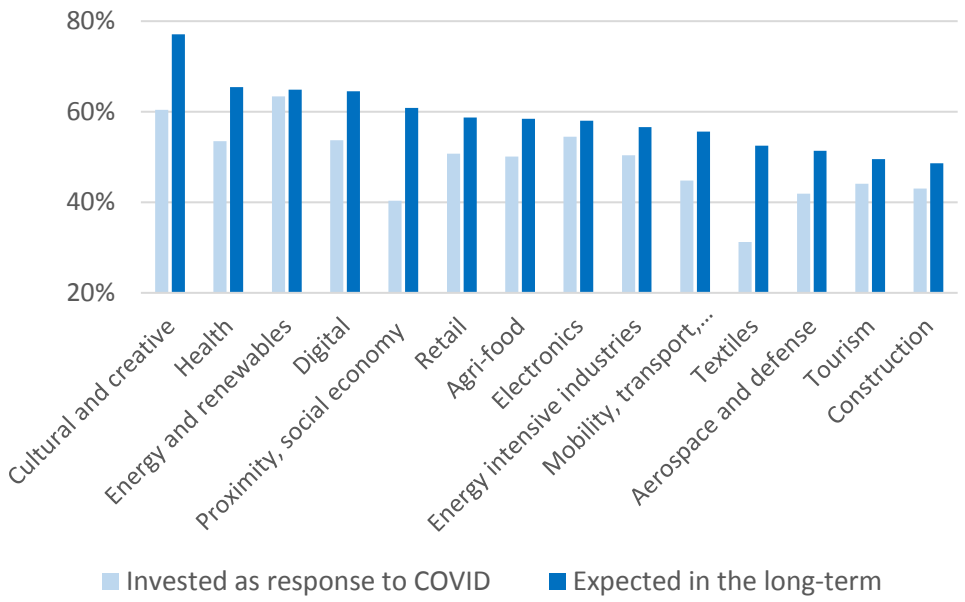
**The green and digital transitions offer important opportunities to first movers, in terms of business and job prospects.** For instance**,** as frontrunners in applying innovative, low carbon production pathways, while observing high environmental and social standards, European companies can set themselves apart from competitors and set global benchmark standards. For this scenario to materialise, workers need to be equipped with the skills required on a greener and more digital labour market.

**As a response to the COVID-19 crisis, EU firms in most industrial ecosystems have invested in digitalisation and are planning investments also in the long term for that purpose.** However, significant differences exist across industrial ecosystems (Figure 12). This is based on the EIB Investment Survey[65] which monitors investment and investment finance activities and captures potential investment barriers for the fourteen industrial ecosystems. In contrast to the more general digital transformation, the adoption of new advanced digital technologies (such as 3-D printing, advanced robotics, the internet of things, big data analytics and artificial intelligence, drones, augmented or virtual reality, or platforms)[66] is stalling in many ecosystems.

[65] The EIB Investment Survey 2022 covers about 12,000 EU firms every year. On average, each ecosystem represented in the figure is based on ca. 2,500 EIBIS observations, ranging from 1,700 observations in health or electronics, to more than 3,500 in mobility, retail or construction.

[66] For a more detailed discussion on how the pandemic has prompted many EU firms to accelerate their digital and green transformation, see EIB Investment Report 2021/2022: Recovery as a springboard for change.

**Figure 12: Digital investment and long-term investment expectation (share of firms in %), by industrial ecosystems**



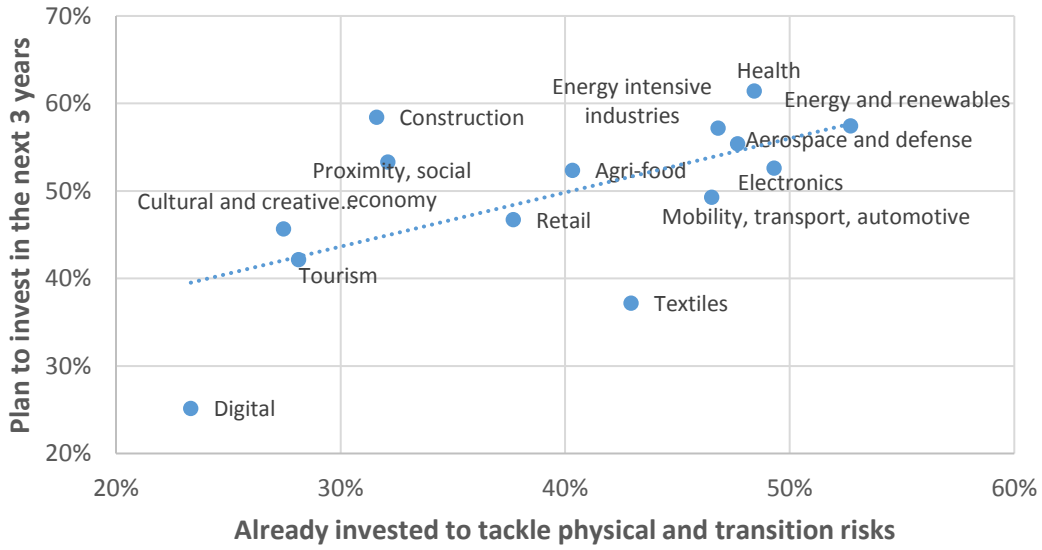

Source: EIB Investment Survey (wave 2021).
Question: As a response to the COVID-19 pandemic, have you taken any actions or made investments to become more digital? Do you expect the COVID-19 outbreak to have a long term impact on digitalisation?

A significant increase of investments can allow EU to develop critical and disruptive technologies to foster its productivity grow which can enable to finance the green transformation. The cumulative capital spending on physical assets for the net-zero transition between 2021 and 2050 would amount to USD 275 trillion globally[67].

**On the green front, in 2021, 43% of EU firms have already invested to mitigate the impact of extreme weather events and to reduce carbon emissions.** Moreover, 47% of firms have plans to make such investments in the next three years. On balance, most industrial ecosystems report to be well positioned to gain from the climate transition (Energy and renewables, Electronics, Health, Cultural and creative industries), whereas others state that the transition represents a risk (e.g. energy intensive industries, Mobility, transport and automotive). Furthermore, following the Fit for 55 adoption, many firms have also announced their pledge to become carbon-neutral in the next decades.

[67] Mckinsey, January 2022, the net-zero transition-report-jan-2022.

**Figure 13 Investment plans to tackle climate change impact, by industrial ecosystem**




Source: EIB Investment Survey (wave 2021).
Question: Now thinking about investments to tackle the impacts of weather events and to deal with the process of reduction in carbon emissions, which of the following applies?

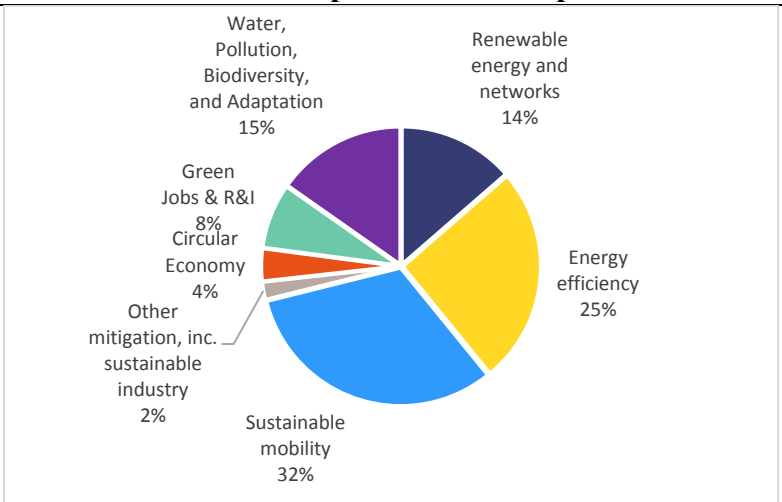
**Actions are also being undertaken in some areas to boost resilience, build competitive supply chains and avoid strategic vulnerabilities, including by mobilising strong investments.** The in-depth reviews[68] carried out as part of the Industrial Strategy of May 2021 and the second round of in-depth reviews[69] unveiled a number of strategic dependencies and vulnerabilities across several products and technologies, for which actions are being deployed.

**Industrial ecosystems will benefit from a significant funding under the RRF to support the green and digital transitions, with the mobility, construction and energy intensive industries ecosystems estimated to receive substantial investments.** While not sufficient to fill the entire investment gaps for the green and digital transitions, the RRF will be instrumental in getting the recovery on the right track, avoid business as usual, and implement reforms that will further enable the investments needed in the future.

**Around 40%, EUR 177 billion, of the total allocation in Member States' Recovery and Resilience Plans is related to measures supporting climate objectives.** In addition, the plans include over EUR 16 billion of additional environmental expenditure. The measures included in the RRPs address a wide of range of areas, including renewable energy and networks, energy efficiency, sustainable mobility, circular economy, green skills and jobs, sustainable industry, and other climate change mitigation and adaptation.

[68] SWD (2021)352 on Strategic dependencies and capacities.
[69] SWD(2022)41.

**Figure 14: Climate and environmental expenditure in adopted RRPs**



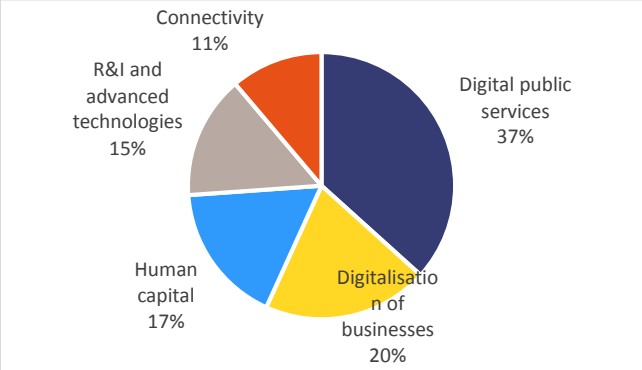

Source: European Commission services, based on the climate and environmental tracking in 22 adopted RRPs. Intervention fields are grouped according to list of policy areas that have been established by the Commission.

**The RRF will accelerate the green transition of European industry.** Around EUR 3.5 billion of the expenditure is directly targeting sustainable industry (including support schemes for industry in key green areas, industrial applications of hydrogen and remanufacturing measures)[70] however, support to industry goes beyond that. Investments in circular economy, and renewable energy and networks will contribute to a more resource and energy efficient industrial production. Hydrogen-related measures, which may provide a useful industrial feedstock and are particularly relevant for energy intensive industries, fall under the categories of renewable energy, R&I and energy efficiency in Figure 15, depending on the type of measure. Box 3 provides an overview on how these investments will support the green transition of the EU's industrial ecosystems.

**Total digital expenditure in the adopted plans amounts to EUR 117 billion, about 26% of the total plan allocation.** Investments in digital under the RRF target different areas across the digital policy spectra: digital connectivity and 5G deployment, digital skills development for the population and the workforce, digitalisation of public services, support to the digitalisation of businesses as well as R&D and deployment of advanced technologies.

[70] The figure refers to measures tagged under the intervention field 027 in Annex VI of the RRF Regulation.

**Figure 15: Digital transformation expenditure in adopted RRPs**




Source: European Commission services, based on the digital tagging in 22 adopted RRPs. Policy areas are established in the RRF Regulation.

**Box 3. The Recovery and Resilience Facility's contribution to the green transformation of the industrial ecosystems[71]**

For example, out of the 22 adopted RRPs so far, 12 RRPs include an investment dedicated to the Energy Intensive Industries' ecosystem. Several Member States plan to support a breakthrough innovation as well as the deployment of advanced technologies to decarbonise the EII via research and innovation instruments to improve the energy efficiency of processes and decarbonising industry's energy mix up to deploying carbon-free processes and carbon capture, storage and use.

The vast majority of RRPs investments in the construction ecosystem will support energy-efficient construction and renovation, notably as part of the Renovation wave[72].

Investment in sustainable mobility has been one of the key priorities of the Recovery and Resilience Facility, including the Flagship initiative "Recharge and Refuel". Overall, 22 Member States have included in their RRPs measures to support the Mobility-Transport Automotive ecosystem. The majority of the planned investments focus on green transition of the ecosystem. Among those, the deployment of recharging infrastructure features the most prominently, followed by the investments in railway and/or urban mobility infrastructure as well as grant and subsidy schemes to stimulate the renewal of the existing fleet into clean vehicles.

More information on RRF investments per industrial ecosystems is available on the website of the Internal Market, Industry, Entrepreneurship and SMEs[73].

**Recovery and Resilience Facility will provide strong support for SMEs; investments and reforms for SMEs represent approximately 10% of the total estimated RRF expenditure, worth EUR 44 billion**. Moreover, SMEs will benefit, partially or indirectly, from other RRF

[71] See the footnote 62.
[72] e.g. "Ecobonus and Sismabonus" in the Italian RRP, the "Thermal renovation of public buildings" in the French RRP or the "Federal funding for energy-efficient buildings renovation" in the German RRP.
[73] https://ec.europa.eu/growth/industry/strategy/ecosystems_en.

investments. Direct and indirect investments into SMEs together represent about EUR 109 billion[74].

**Besides supporting the green and digital transitions of the SMEs, RRF investments support SME's resilience and growth, in particular access to finance, entrepreneurship, research and innovation, internationalisation and skills**. The proposed investments will be underpinned by a set of reforms in the area of access to finance (for example direct financing for SMEs through start-up grants or green finance instruments, equity financial instruments and portfolio guarantees), business environment (such as reducing administrative burden and addressing regulatory obstacles) and skills. Finally, major investments in the industrial ecosystems, such as tourism and construction, will also substantially benefit SMEs as the latter are often key players in these ecosystems.

**Box 4: Implementation of the SME Strategy**

The SME Strategy[75] not only helps providing an immediate crisis support to SMEs, but is also key in supporting SMEs' recovery and fostering their resilience against future shocks, as well as their green and digital transitions.

Improving access to finance is one of the critical factors to enhance the resilience of SMEs. Despite large amounts of public support measures, it remains important to ensure that SMEs can get the financing they need. The new flagship programme InvestEU is expected to considerably increase investments in SMEs, both in capital support and equity financing. In addition, the European Commission has decided to prolong until 30 June 2022 the State Aid Temporary Framework[76].

Digitalisation proved to be one of the key factors explaining how well individual SMEs have been able to weather the COVID-19 crisis (see chapter 1). The SME Strategy will support SMEs with important tools facilitating their digital transition. For example, the Digital Innovation Hubs provide them with an access to technical expertise and experimentation as well as the possibility to 'test before invest'.

The SME strategy also includes a number of important support measures to help the SMEs succeeding in their green transition, including fully operational Enterprise Europe Network's (EEN) Sustainability Advisors helping SMEs transitioning to more sustainable business models, as well as the European Resource Efficiency Knowledge Centre (EREK) of the European Cluster Collaboration Platform showing/showcasing SMEs' new opportunities to embrace resource efficiency and benefit from circular economy business models.

Innovation in SMEs has to be underpinned by an environment conducive to entrepreneurship and protection of their intellectual property. The EU Start-up Nations Standard of Excellence, signed in March 2021, will ensure that start-ups and scale-ups in Europe benefit from best practices underpinning the world's most successful start-up ecosystems. In addition, more than 12 000 SMEs from all Member States have already benefited from the first EUIPO (EU Intellectual Property Office) SME Fund's

[74] The figure of EUR 109 billion includes both measures tagged as "Support to SMEs" (primary or secondary policy areas in the Recovery and Resilience Scoreboard) and additional wider measures which are likely to benefit SMEs.
[75] An SME Strategy for a sustainable and digital Europe (COM/2020/103), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0103, see table on Stocktaking of the implementation of the 2020 SME Strategy for a full overview of the implementation of the SME Strategy actions.
[76] Sixth Amendment to the Temporary Framework for State aid measures to support the economy in the current COVID-19 outbreak and amendment to the Annex to the Communication from the Commission to the Member States on the application of Articles 107 and 108 of the Treaty on the Functioning of the European Union to short-term export-credit insurance, 2021/C 473/01.

intellectual property vouchers.

For a full overview of the implementation of the SME Strategy, see the Annex 1 to this Report.

**Multi-country projects and technology driven Important Projects of Common European Interest (IPCEIs) can further steer investment and boost project pipelines in strategic value chains**, complementing the existing IPCEIs on batteries and microelectronics. A number of Member States have seized the opportunity offered by the RRF to include multi-country projects in their Recovery and Resilience Plans and indicated interest in participating in possible future IPCEIs in areas such as hydrogen, microelectronics, semiconductors, and cloud.

**The InvestEU Programme, focusing on the European Union's medium- and long-term policy priorities, will significantly support the European Green Deal and the Strategy on shaping Europe's digital future.** The InvestEU Regulation provides that the InvestEU programme will target at least 30% of investments (i.e. around EUR 120 billion) contributing to climate objectives. Under the sustainable infrastructure policy window, at least 60% of the investment (corresponding to around EUR 85 billion) shall contribute to meeting the European Union objectives on climate and environment. The InvestEU will also significantly strengthen investments in digital infrastructures, technologies, and skills, in particular through its window on Research, Innovation and Digitisation (which has a budgetary guarantee of EUR 6.6 billion, corresponding to around EUR 94 billion of investments).

**The European Partnerships in Horizon Europe are helping industry develop technologies to achieve their digital and green ambitions**, such as in the framework of the Batteries Partnership, the Clean Hydrogen Partnership or cluster 4 of the Horizon Europe supporting the sustainable transition of process industries (Processes4Planet), sustainable advanced manufacturing (Made in Europe) and research on raw materials. In particular, the co-programmed European Partnership on 'Towards a competitive European industrial battery value chain for stationary applications and e-mobility' has a budget of EUR 925 million for the period 2021-2027, while the partnership on Clean Hydrogen has a budget of EUR 2 billion for the same period. In addition, Horizon Europe will invest around EUR 300 million (2021/2022) on raw materials (through cluster 4 and 5 of Pillar II).

**Transition pathways aim at achieving that the different actors in an ecosystem follow a common and coordinated approach for the roll-out of actions supporting green and digital transitions of industrial ecosystems.** For this, the relevant actors in the ecosystems need to have a common understanding of challenges and opportunities, the direction to take, and set out the steps that individual companies and industrial ecosystems need to take and commit to implement those. By supporting a coordinated approach, transition pathways help reducing the transition risk and create better conditions for investment. This is of clear relevance, as the existing supply chains are changing and new ones are being built. Work on transition pathways is being made possible and largely facilitated through a continuous stakeholders engagement (in the Industrial Forum and through targeted stakeholder platforms, e.g. the High Level Construction Forum).

**The Commission has taken a prioritised approach to the work on transition pathways, starting with those where the transition is the most urgent.** An initial priority was Tourism and Energy intensive industries ecosystems where broad stakeholder consultations have taken place on the basis of initial analysis and scenario papers prepared by Commission services. In a number of industrial ecosystems such as Proximity and Social economy[77], Construction[78], Transport-Mobility-Automotive[79], stakeholder consultations have recently been launched**.** The transition pathway for the Tourism ecosystem[80], published in February 2022, proposes 27 action topics and 60 concrete actions to support the transition of this ecosystem, ranging from digital support to destination management to technology uptake for the reduction of CO2 emissions in touristic transport, etc. The co-implementation of these actions will be soon kicked-off thanks to a collaborative platform where all ecosystem stakeholders will be called to contribute.

**The Industrial Forum[81] aims at promoting wider partnership with the industry and all relevant stakeholders.** A dedicated task force is working towards a common understanding of challenges and opportunities of transitions, by developing common elements or horizontal building blocks[82] (the 'blueprint')**,** ranging from technological trends, capacity building and skills, investment needs, infrastructures, R&I and prototyping, competitiveness, governance to social actions.

**With the "Path to the Digital decade" initiative, the Commission is responding the need to coordinate EU's efforts and investments to shape its collective digital transformation.** Anchored in a vision for Europe's digital transformation by 2030, the Digital decade initiative revolves around four cardinal points: skills, government, infrastructure and business. With quantitative targets and key milestones, a joint governance structure including a traffic light monitoring system to identify successes and gaps, as well as multi-state projects combining investments from the EU, Member States and the private sector, the EU will be able to get together and foster investments in digital technologies and infrastructures to the benefit of citizens and businesses including SMEs.

**The European Research Area's policy agenda[83] is helping to accelerate the green/digital transition of Europe's key industrial ecosystems with Member States.** Its action 12 focuses (a) on the development of industrial technology roadmaps on low carbon technologies for energy-intensive industries and on circular industrial technologies, which feed into transition pathways for industrial ecosystems[84], (b) on the creation of a coordination mechanism to provide

[77] SWD(2021)982 final.
[78] https://ec.europa.eu/docsroom/documents/47996.
[79] https://ec.europa.eu/docsroom/documents/48535.
[80] https://ec.europa.eu/docsroom/documents/48697.
[81] The Industrial Forum as Commission expert group gathers wide range of stakeholders, including Member State authorities, industry representatives, Civil Society Organisations, and research and technology organisations.
[82] These building blocks can inform the work in many other ecosystems with ecosystem-specific approaches, recognising for instance the very different challenges of sustainability in the tourism ecosystem to that of the energy intensive industries.
[83] st14308.en21.
[84] Updated Industrial Strategy, COM(2021)400.

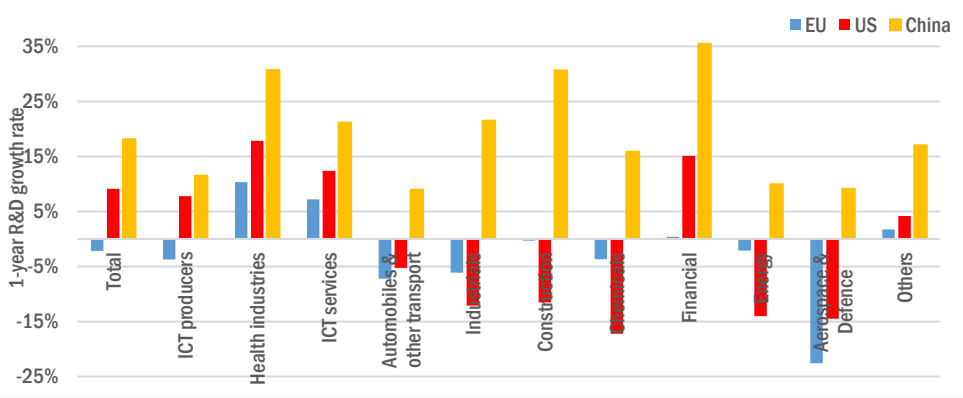
industry with the technology infrastructures needed to test, validate and upscale innovations, and (c) on better supporting the transfer of fundamental research results to industrial research and innovation.

**The EIB Group has intensified investments in the green and digital transitions**[85]; the Group will seek to support the sustainable transition by gradually increasing its share of finance dedicated to green investment to over 50% by 2025 and beyond. In 2021 the share of EIB investments that went to climate action and environmental sustainability projects rose to 43% (from 40% in 2020), for a total of EUR 27.6 billion investments supporting the green transformation of EU economies. In addition, a record EUR 20.7 billion went to support innovation, digital economy and human development. In its recent roadmap[86], the EIB identified 12 focus areas for green investments, this structure will help shaping EIB Group business development, including the provision of a financial and advisory support.

**Box 5: Growth and intensity of R&D investment - Industrial R&I Investment Scoreboard.**

In the COVID-19 crisis context, the latest R&D figures from the Industrial R&D Investment Scoreboard [87]show the resilience of industrial R&D investments as key for recovery and their potential for industrial transformation towards green and digital. However, the crisis further shaped the global tech-race in favour of EU competitors US and China. This is due to an increased demand for ICT and Health solutions, where these competitors have gained strength in the past decade. Global R&D growth was driven by the ICT services sector (15.5%), followed by the Health and ICT producers sectors (12.8% and 5.7% respectively). Most other sectors showed a decrease in R&D investment, particularly those hit hard by the crisis, i.e. Aerospace & defence (-17.0%) and Automotive (-4.3%). The Chemicals sector reduced R&D by 3.4%, continuing the negative trend observed in the past few years (see Figure 16).

**Figure 16: R&D investment growth 2019-2020 by sector and selected region/country**



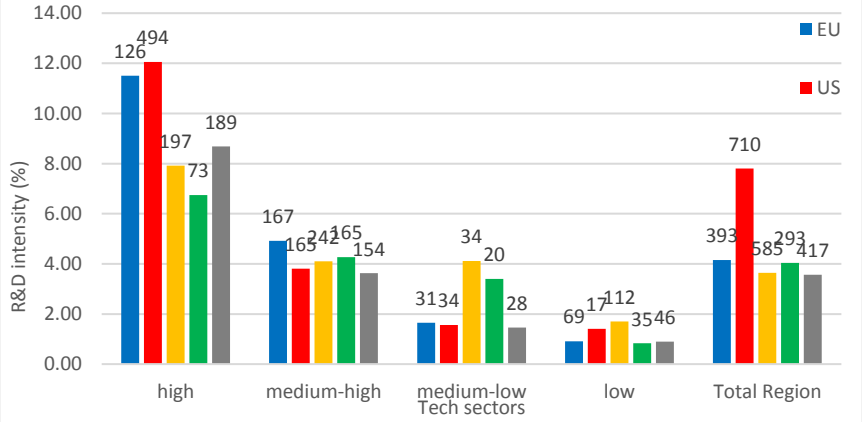

Note: R&D 2020 growth rates have been computed for 399 EU, 776 US and 597 Chinese companies for which data are available

[85] Climate Bank Roadmap 2021-2025, November 2020.
[86] https://www.eib.org/attachments/thematic/eib_group_climate_bank_roadmap_en.pdf.
[87] The Industrial R&D Investment Scoreboard monitors private R&I competitiveness based on timely statistics from companies' latest published accounts. It comprises key indicators on the 2500 parent companies and more than 800 thousand subsidiaries. These companies, based in 39 countries, each invested at least €36.5 million in R&D for a total of €908.9 billion. The 2021 Scoreboard total R&D is equivalent to approximately 90% of the world's business-funded R&D.

for both years 2019 and 2020. Sectors ordered from left to right in terms of overall R&D investment in 2020.
Source: The 2021 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD.

Comparing the 2016 and the 2021 Scoreboards, the most important development in the global R&D ranking is the increased presence of high-tech companies, mainly from China, which comes at the expense of more "traditional" sectors, mainly from the EU and Japan. China's presence increased very significantly through the addition of 269 companies to the 327 included in the 2016 Scoreboard. Overall decreases in the case of the EU, the US and Japan are of similar magnitude, but their mix is least concerning for the US, which managed to increase its presence in two of the key global sectors, i.e. health industries and ICT services, thanks to its sustained investment in software, internet and computer services technologies as well as in pharmaceuticals and biotechnology. The EU lost both R&D and number of companies in all four key sectors, slightly in ICT and health, more in automotive. However, it increased in industrial machinery and general industrials, which are two sub-sectors that encompass a number of medium-low and medium-high tech industries and some more or less knowledge intensive services. Figure 18 shows the importance of the number of Scoreboard firms in high R&D intensity sectors.

**Figure 17: R&D intensities by sector group and selected region/country**



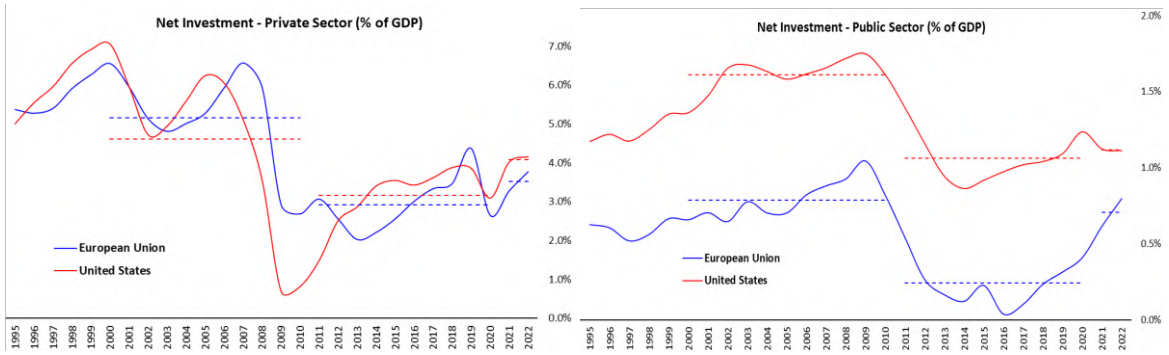

Note: R&D intensities have been computed for 2398 with Net Sales figures for 2020, representing 99.2% of the total R&D 2020. Number of companies per sector/region reported on top of each bar.
Source: The 2021 EU Industrial R&D Investment Scoreboard, European Commission, JRC/DG RTD.

The Scoreboard also shows that the EU companies are among the global leaders on high-value green patents and green patents in energy intensive industries; specific efforts will be needed to pursue the requirements of the European Green Deal as well as to sustain leadership and remain competitive on global markets.

### *3.2. Investment catching-up in the EU*

**Private investment in the EU fell abruptly after 2009, a trend common to other economies.** From an average level of net investment[88] of 5.2% of GDP during the first decade of the millennium, it fell to an average of 2.9% in the following decade. The gap accumulated in that second decade with respect to the first one was of the order of EUR 2.8 trillion. Therefore, the EU faced the COVID-19 shock having already accumulated a chronic lack of investment.

**Figure 18: Net Investment as a share of GDP in the EU and in the US, private and public sector, 1995-2022**




Source: Commission services based on data by AMECO, accessed on 7 January 2022. Note: the indicator shows the level of net fixed capital formation, operated by the private and by the public sector, as a share of GDP. Data for 2022 are based on the latest forecasts.

**A similar trend in contraction of private investment occurred in the US, although private investment in the US recovered slightly faster than in the EU**. Closing such gap with the US, in terms of share of GDP, would have meant for the EU private sector investing EUR 300 billion more already in the ten years preceding the pandemic. However, the big decline in investment in the EU is more visible when we look at net public investment. The financial crisis and the following years in particular, marked a clear break, as the level of net public investment decreased from an average of 0.8% of GDP in the first decade of the millennium, to an average of 0.2% in the following one, right before the COVID-19 shock.

**Investment in the EU has been hit by the pandemic shock, but is on a recovery path, also thanks to the bold action taken by Member States and the EU Institutions**. Both public and private investment levels are recovering now, and are back to the pre-crisis levels, with the help of EU instruments, such as NGEU, and specific efforts at national level. In the future, the green and digital transition will call for new, very significant efforts.

[88] Net investment refers to the net fixed capital formation, which takes into account the depreciation of the existing capital stock. In other words, it provides a measure of the actual investment done in the economy, which goes beyond the simple maintenance of the existing stock of capital.

**A closer look at country-specific trends provides more insights about the origins of these gaps** (See Figure 19 and Figure 20).

During the second decade of the millennium, right before the pandemic shock, most of the investment gap accumulated by the private sector in the EU clearly came from Italy. While in France and Germany the private sector maintained similar levels of investment in the two decades, a big drop occurred in Italy and in particular in Spain.

**Figure 19: Net Investment by the Private Sector, Country detail**

**PRIVATE SECTOR**
Private Sector Net Fixed Capital Formation

| | 1970-1979 | 1980-1989 | 1990-1999 | 2000-2010 | 2011-2020 | 2021-2022 |
|---|---|---|---|---|---|---|
| | Average Level % GDP | Average Level % GDP | Average Level % GDP | Average Level % GDP | Average Level % GDP | Average Level % GDP |
| EU | | | | 5.2% | 2.9% | 3.5% |
| BE | 6.8% | 3.8% | 6.4% | 4.3% | 3.8% | 4.8% |
| BG | | | 6.9% | 8.9% | 4.8% | 2.7% |
| CZ | | | 6.0% | 8.3% | 5.3% | 6.0% |
| DK | 8.1% | 5.6% | 3.6% | 4.1% | 2.6% | 5.7% |
| DE | 8.3% | 5.6% | 7.0% | 2.9% | 2.4% | 2.7% |
| EE | | | | 12.1% | 7.9% | 10.6% |
| IE | 8.0% | 9.1% | 7.4% | 10.0% | 8.0% | -2.2% |
| EL | 0.0% | 1.0% | 7.5% | 6.1% | -4.6% | -1.5% |
| ES | 12.6% | 7.2% | 8.1% | 11.1% | 3.2% | 4.0% |
| FR | 10.3% | 6.2% | 4.5% | 4.8% | 3.9% | 4.8% |
| HR | | | 0.2% | 4.4% | 3.0% | 2.8% |
| IT | 11.5% | 7.0% | 4.7% | 4.5% | 0.1% | 1.5% |
| CY | | | 3.4% | 8.5% | 4.0% | 7.3% |
| LV | | | -4.4% | 4.3% | -1.2% | 0.2% |
| LT | | | 3.6% | 7.8% | 5.8% | 8.6% |
| LU | 0.0% | 0.0% | 7.7% | 5.9% | 4.6% | 3.9% |
| HU | | | 3.1% | 6.4% | 4.1% | 7.5% |
| MT | | | 3.3% | 5.9% | 6.5% | 5.6% |
| NL | 8.6% | 5.6% | 5.3% | 4.3% | 2.8% | 3.9% |
| AT | 10.1% | 7.6% | 8.7% | 6.2% | 4.9% | 6.5% |
| PL | | | 3.4% | 6.0% | 5.3% | 3.8% |
| PT | 2.3% | 12.2% | 9.0% | 5.9% | -0.4% | 0.9% |
| RO | | | -2.9% | 4.5% | 4.7% | 7.3% |
| SI | | | 2.6% | 5.2% | -2.2% | -1.4% |
| SK | | | 0.3% | 3.3% | 3.2% | 2.4% |
| FI | 12.3% | 9.0% | 2.6% | 4.6% | 3.3% | 3.8% |
| SE | 8.9% | 9.1% | 5.9% | 5.6% | 5.7% | 6.5% |
| UK | 3.0% | 3.8% | 4.2% | 2.9% | 1.4% | 2.3% |
| USA | 7.0% | 6.1% | 5.0% | 4.6% | 3.2% | 4.1% |

Source: Commission services, based on data from AMECO, of 7 January 2022

In the same decade 2011-2020, a comparatively bigger fall in investment came from the public sector in the EU (see Figure 21). Germany and Italy alone account for most of the one-trillion gap vis-à-vis the US. The telling data are the virtually null net public investment in Germany during the first two decades of the millennium and the negative rate of net investment in Italy during the second one[89]. Low public investment, however, was also visible in France and Spain.

[89] A negative net investment rate means that the actual gross investment in the country was not even sufficient to compensate for the depreciation of the existing stock of capital.

**Figure 20: Net Investment by the Public Sector, Country detail**

**PUBLIC SECTOR**
General Government Net Fixed Capital Formation

| | 1970-1979 | 1980-1989 | 1990-1999 | 2000-2010 | 2011-2020 | 2021-2022 |
|---|---|---|---|---|---|---|
| | Average Level | Average Level | Average Level | Average Level | Average Level | Average Level |
| | % GDP | % GDP | % GDP | % GDP | % GDP | % GDP |
| EU | | | | 0.8% | 0.2% | 0.7% |
| BE | 2.7% | 1.2% | 0.0% | 0.0% | 0.2% | 0.7% |
| BG | | | -1.6% | 1.1% | 1.0% | 1.6% |
| CZ | | | -0.4% | 0.4% | -0.1% | 1.0% |
| DK | 1.6% | 0.0% | -0.2% | 0.0% | 0.8% | 0.6% |
| DE | 2.4% | 0.9% | 0.4% | 0.0% | 0.0% | 0.2% |
| EE | | | | 2.9% | 2.3% | 3.1% |
| IE | 1.9% | 1.8% | 0.6% | 2.2% | 0.6% | 1.2% |
| EL | 0.0% | 0.0% | 1.3% | 2.2% | -0.5% | 0.2% |
| ES | 1.4% | 1.9% | 2.5% | 2.2% | -0.2% | 0.0% |
| FR | 2.1% | 1.1% | 1.0% | 0.8% | 0.2% | 0.7% |
| HR | | | 1.7% | 3.0% | 0.4% | 2.5% |
| IT | 0.4% | 2.1% | 0.9% | 0.6% | -0.4% | 0.3% |
| CY | 0.0% | 0.0% | 1.3% | 2.0% | 0.5% | 0.8% |
| LV | | | -1.9% | -0.6% | 0.7% | 2.9% |
| LT | | | -0.8% | 1.0% | 0.8% | 1.2% |
| LU | 0.0% | 0.0% | 2.2% | 2.5% | 1.7% | 1.9% |
| HU | 0.0% | 0.0% | -1.1% | 0.4% | 1.4% | 3.0% |
| MT | 0.0% | 0.0% | 0.9% | 1.2% | 1.2% | 2.7% |
| NL | 2.6% | 0.9% | 0.6% | 1.0% | 0.4% | 0.5% |
| AT | 3.5% | 1.5% | 1.0% | 0.4% | 0.4% | 0.6% |
| PL | | | 0.4% | 1.3% | 2.1% | 2.3% |
| PT | 0.6% | 1.8% | 2.3% | 1.8% | -0.7% | 0.1% |
| RO | | | 1.3% | 2.8% | 2.2% | 4.0% |
| SI | | | 0.8% | 2.0% | 1.3% | 3.3% |
| SK | | | -1.3% | -0.5% | 0.7% | 0.9% |
| FI | 2.4% | 2.0% | 1.1% | 0.6% | 0.7% | 1.4% |
| SE | 3.2% | 1.4% | 1.4% | 0.9% | 1.3% | 1.8% |
| UK | 3.4% | 0.7% | 0.5% | 0.6% | 0.7% | 0.1% |
| USA | 1.7% | 1.8% | 1.4% | 1.6% | 1.1% | 1.1% |

Source: Commission services, based on data from AMECO, of 7 January 2022

**Even though both, private and public, investment levels in the EU are increasing in the current post-pandemic period, they remain considerably lower than in the US.** In 2021 and 2022, in fact, reaching the same levels of investment on GDP as the US would require an important effort by the private sector in Germany and Italy, whose gaps alone are even larger than the total EU gap (because other countries are compensating by investing more). Germany also accounts for more than half of the total public investment gap of the EU vis-à-vis the US. The country detail suggests that Germany and Italy are the two countries that have accumulated the largest investment gaps. Their underinvestment has determined most of the EU's gap.

**Annexes:**

| | |
|---|---|
| ***Annex 1:*** | ***Implementation of SME Strategy, and Overview Table of the implementation of the SME Strategy*** |
| ***Annex 2:*** | ***Overview Table: State of play of the implementation of the Single Market Enforcement Action Plan*** |
| ***Annex 3:*** | ***Overview Table of the implementation of the Industrial Strategy and its Update*** |
| ***Annex 4:*** | ***Key performance Indicators*** |
| ***Annex 5:*** | ***Investment volumes in a number of critical areas for the EU's green, digital and resilient transformation*** |