



EUROPEAN COMMISSION

RESILIENCE DASHBOARDS FOR THE SOCIAL AND ECONOMIC, GREEN, DIGITAL, AND GEOPOLITICAL DIMENSIONS¹

¹ The Commission welcomes comments and inputs on the resilience dashboards, to be sent to this functional mailbox: jrc-resilience@ec.europa.eu

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EXECUTIVE SUMMARY

This report presents the resilience dashboards developed by the European Commission in a process of collective intelligence with Member States and other relevant stakeholders, as a follow up to the 2020 Strategic Foresight Report². **The resilience dashboards** represent an innovative **monitoring tool** for the transition-led EU policy agenda. They provide a **holistic assessment of the ability to progress amidst challenges**, across four dimensions: social and economic, green, digital, and geopolitical.

The resilience dashboards are part of the Commission's effort to **embed strategic foresight into policymaking**, as the selection of the indicators takes a forward-looking perspective. Shedding light on important ingredients for successful transitions and coping with shocks, the dashboards **contribute to an integrated approach for measuring people's wellbeing beyond GDP**.

The dashboards contain a **battery of quantitative indicators from publicly available data sources**, depicting **vulnerabilities** (features that can exacerbate the negative impact of crises and transitions, or obstacles that may hinder the achievement of long-term strategic goals) and **capacities** (enablers or abilities to cope with crises and structural changes and to manage the transitions.). They are developed to help Member States self-assess and identify areas for action and further analysis. The dashboards follow a relative assessment approach and do not aim to rank countries. They also **cover a number of non-EU countries**, to assess the resilience of the EU as a whole compared to other countries. The resilience dashboards will be **regularly updated and reviewed in a collaborative manner**.

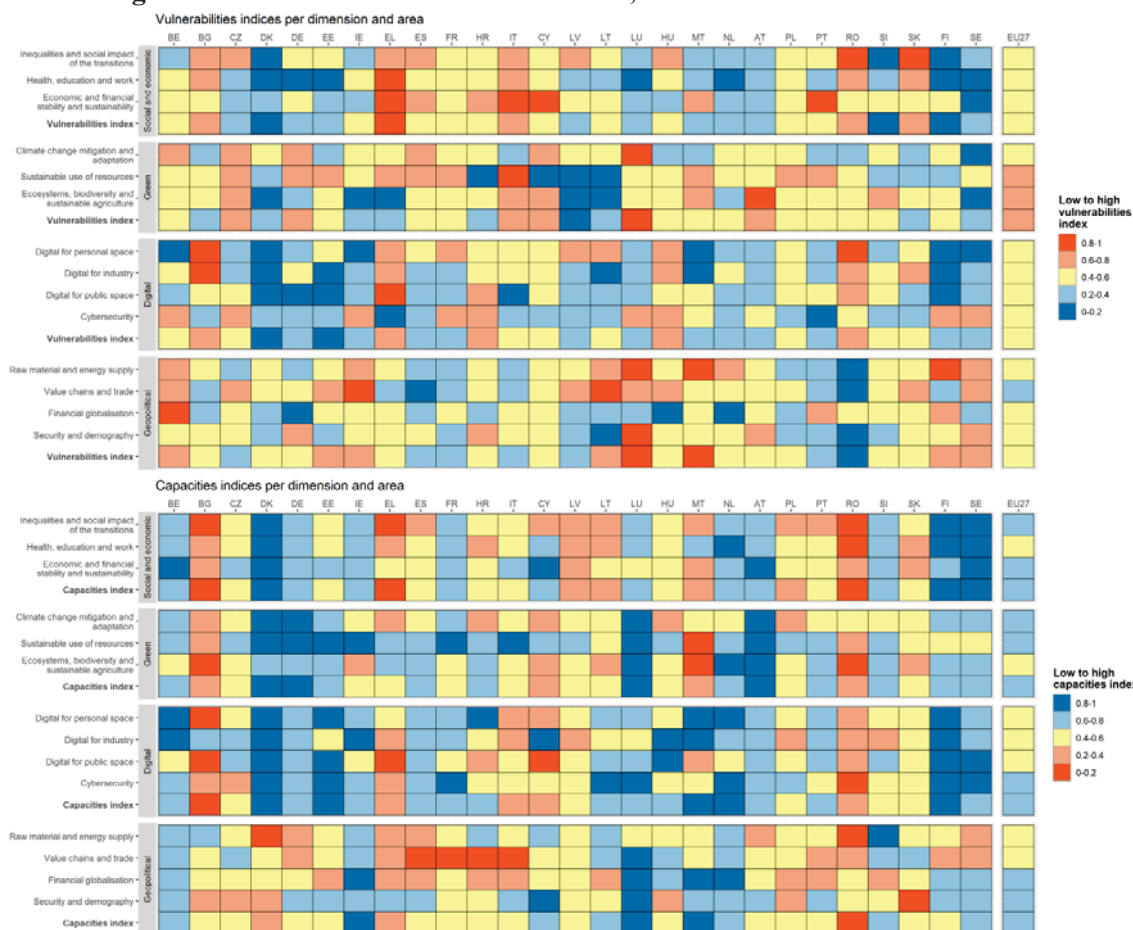
The dashboards are complemented by **synthetic resilience indices**, which illustrate the overall relative situation of vulnerabilities and resilience capacities along each of the four dimensions and their underlying areas (see **Figure 1** for the Member State and **Figure 2** for the global level). While allowing for a useful overview, these synthetic measures do not convey the complete information provided by the full set of indicators in the dashboards.

Figure 1 shows that for some Member States, the overall situation is fairly similar across all dimensions, both for vulnerabilities and capacities. In some other cases, the situation is rather different between vulnerabilities and capacities, but is still relatively homogenous within these two classes. Finally, there are many countries where the situation varies heavily across dimensions, going from high capacities (low vulnerabilities) to high vulnerabilities (low capacities).

Figure 2 displays the synthetic resilience indices across the four dimensions for the EU in comparison to other major global actors. The Union as a whole shows robust capacities in almost all areas, while the situation as regards vulnerabilities can still be improved.

² COM(2020) 493 final (https://ec.europa.eu/info/sites/info/files/strategic_foresight_report_2020_1.pdf)

Figure 1: Resilience of EU Member States, across all areas and dimensions.



The synthetic indices aggregate the relative situation of countries across all considered indicators. A higher vulnerabilities index indicates higher vulnerabilities (from blue to dark orange), while a higher capacities index indicates higher capacities (from dark orange to blue), compared to other countries.

Figure 2: Resilience of the EU in an international comparison, across all dimensions.



The synthetic indices aggregate the relative situation of countries across all considered indicators. A higher vulnerabilities index indicates higher vulnerabilities (from blue to dark orange), while a higher capacities index indicates higher capacities (from dark orange to blue), compared to other countries.

1. INTRODUCTION

The 2020 Strategic Foresight Report (SFR) presents the European Commission's strategy to embed strategic foresight into European Union policymaking. It identifies the first lessons from the COVID-19 crisis, introduces resilience as a new compass for EU policymaking and discusses the role of strategic foresight in strengthening the resilience of the EU and its Member States, ensuring that short-term initiatives are grounded in a longer-term perspective.

The Communication defines resilience as *the ability not only to withstand and cope with challenges but also to undergo transitions in a sustainable, fair, and democratic manner*, establishing a clear link between the concept of resilience and ongoing societal transformations³. It analyses resilience along four interrelated dimensions – social and economic, green, digital, and geopolitical – and explains its importance for achieving long-term strategic objectives in the context of the transition-led Commission agenda, while maintaining the EU's core purpose and integrity in a dynamic and, at times, turbulent environment.

In a multipolar, hyperconnected and contested global order, the EU aims to strengthen its responsible global leadership and partnerships, defending its core values and strategic interests, and persuade the international community towards common goals at the benefit of the entire globe⁴. In this context, strengthening the resilience of each Member State is not only beneficial at the national level, but it also contributes to achieving the resilience of the EU as a whole. This is particularly true for many current and future challenges such as potential supply shocks, climate change, migration challenges, health crises or cyber-threats.

This new focus on resilience calls for close monitoring. The 2020 SFR proposed prototype resilience dashboards aimed to assess the vulnerabilities and capacities of the EU and its Member States in each of the four dimensions, taking a forward-looking perspective informed by strategic foresight. Based on the first prototypes, the 2020 SFR announced further work towards developing fully-fledged resilience dashboards in a collaborative process involving Member States and other key stakeholders.

This document presents these new resilience dashboards. The purpose of the dashboards is to take a forward-looking perspective informed by strategic foresight, complementing existing policy coordination instruments and monitoring tools. They are the result of a collaborative process, to which all Commission services have contributed. Work took place in four dedicated Working Groups, with representatives of all relevant services, the EEAS, and the European Environmental Agency. This has ensured that the dashboards are designed in full coherence with and build upon existing and upcoming EU frameworks and policies

Experts from other institutions and academia were consulted in a dedicated workshop “*Measuring resilience and its role in the ‘beyond GDP’ paradigm shift*” on 25/2/2021. In April 2021, the

³ See also <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/time-transformative-resilience-covid-19-emergency>

⁴ See further in the forthcoming 2021 Strategic Foresight Report.

Commission launched a consultation process with Member States and in May 2021, the dashboards were presented in the first ministerial meeting of the EU-wide Foresight Network.

A broader consultation of the dashboards will run from 30 July to 30 September 2021 on the Commission's Strategic Foresight website⁵. The goal is to further improve the assessment of Europe's resilience, by opening the tool to further comments and suggestions, *inter alia* from other EU institutions and the European Social Partners.

The process of constructing the dashboards has revealed a lack of indicators and data in some areas. As many resilience-relevant indicators are under development, and new data are expected to become available, the list of indicators should be seen as dynamic and may be revised. The resilience dashboards will thus be regularly updated, adjusted, and reviewed, in a process of collective intelligence with the participation of Member States and other relevant stakeholders.

Using a battery of indicators, their goal is to provide a holistic assessment of countries' capacities and vulnerabilities related to the green, digital, and fair transitions, as well as to strengthen Europe's resilience to various shocks and its capacity to act in the global scene. The four dimensions are constructed not only to complement one another but also to underline their interconnections.

For instance, they stress some of the social and economic consequences of the green and digital transitions and look at economic aspects of Europe's geopolitical standing. In particular, the social and economic dimension includes indicators that point to vulnerable groups that may be adversely affected by the green and digital transitions (e.g., jobs at risk due to automation). The green dimension considers the potential increase in the use of energy due to the digital transition, as a challenge for the sustainable use of resources.

The dashboards also contribute to an integrated approach for measuring people's wellbeing beyond GDP⁶. They assess the ability to cope with present and future challenges, which is needed to achieve the wellbeing of current and future generations despite uncertain circumstances. Their multidimensional perspective sheds light on challenges and opportunities ahead, promoting the operationalisation of transition-led policies and helping to steer societal transformation towards a more sustainable development path.

These dashboards represent an innovative tool that can help countries assess areas for improvement and action and, in the medium term, will contribute to answering the important question whether our policies are making societies more resilient in the short and long run. The analysis is also extended to non-EU countries, to assess the EU's resilience in an international comparison. This is

⁵ https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en

⁶ Since the 2007 Istanbul Declaration on Measuring Social Progress and the 2009 report of the Stiglitz-Sen-Fitoussi Commission (<https://ec.europa.eu/eurostat/documents/8131721/8131772/Stiglitz-Sen-Fitoussi-Commission-report.pdf>), there has been much progress towards going beyond conventional economic measures like gross domestic product (GDP) to measure wellbeing a policy target. The Commission has actively participated in this debate, see, for instance, COM(2009)433 final, GDP and beyond: measuring progress in a changing world; and SWD(2013)303 final, Progress on 'GDP and beyond' actions. A recent overview of the beyond-GDP discussion is https://ec.europa.eu/info/sites/default/files/economy-finance/dp142_en.pdf. The study emphasizes the importance of distributional considerations, the depletion of natural resources and environmental sustainability as elements to include. Beyond these elements, components such as the role of social cohesion, building up social capital through social ties are also meaningful to measure societal resilience and wellbeing.

particularly relevant for the geopolitical dimension, where some aspects are meaningful dominantly at the EU-level aggregate.

The resilience dashboards complement and provide added value with respect to other Commission tools thanks to the following specificities:

- (i) while existing tools largely aim to assess development and progress in the EU and Member States, for instance along the transitions or as regards specific policy targets, the dashboards have been designed to “distil” resilience features, that drive the ability to make progress and reach those policy targets amidst challenges;
- (ii) while most existing tools tend to be sectoral or focus on single policy fields, the resilience dashboards offer a holistic and multidisciplinary picture, focussing on multiple dimensions of resilience at a time, as well as their interlinkages;
- (iii) the dashboards are informed by strategic foresight, in that they have been constructed through a collective intelligence process aimed to consider relevant megatrends (long-term driving forces that will most likely have a significant impact on Europe’s future).

Each resilience dashboard contains a selection of quantitative indicators (around 30 per dimension for the EU level analysis and 12 per dimension for the comparison with global players) depicting:

- (i) vulnerabilities, i.e., features that can exacerbate the negative impact of crises, structural changes and transitions, or obstacles that may hinder the achievement of long-term strategic goals;
- (ii) capacities, i.e., enablers of the transitions, or abilities to cope with crises and structural changes and to manage the transitions.

The dashboards follow a relative assessment approach and are not meant to rank countries. For each indicator, a scale of five colours indicates the countries’ relative situation in the latest available year (usually 2018-2020)⁷, compared to the pooled values of all available data for all Member States in the reference period 2007-2017. The indicators are drawn from publicly available data sources, mostly official statistics (e.g., Eurostat).

Compared to the prototypes in the 2020 SFR, these new resilience dashboards present the following methodological improvements: (i) a dynamic perspective of resilience, assessing changes of the indicators over time, where data are available; (ii) the assessment of capacities and vulnerabilities at EU-level; and (iii) the development of synthetic resilience indices, aggregating, for each country and the EU, the relative situation of vulnerabilities and resilience capacities along each of the four dimensions.

The structure of this report is as follows. **Section 2** summarizes the process of building the dashboards. **Section 3** explains the essentials of the underlying methodology. **Section 4** presents the Member State level dashboards in four dimensions and the corresponding synthetic indices.

⁷ The use of past data should not be seen as a limitation, as the forward-looking nature of the dashboards lies in the selection of the indicators. It should include aspects and issues that represent vulnerabilities or capacities that will or may become relevant in the future, both to achieve societal transformation and to overcome potential new shocks. The dashboards then present the current level of these foreseen vulnerabilities and capacities, not their projected future levels. It would be difficult to include indicators based on forecasts, as the underlying assumptions and methodologies would need to be accepted by the stakeholders.

Section 5 puts the four dimensions together. **Section 6** presents the extension beyond the EU. Annexes are in a separate document. **Annex I** gives details on the methodology, while **Annex II** presents the gap analysis. **Annex III** compares the resilience dashboards with other existing monitoring frameworks. **Annex IV** presents the correlation structure of the indicators. **Annexes V-VII** provide details on the indicators and corresponding data sources.

DRAFT

2. CONSTRUCTION OF THE RESILIENCE DASHBOARDS

The dashboards aim to capture vulnerabilities and capacities in the four dimensions:

- **Vulnerability:** it is a country's structural feature that points to elements of its systems (economic, social, and environmental) that can be disproportionately hit in case of shocks/structural changes, or can hinder the transitions (e.g., an obstacle to the transition). A particular case is represented by vulnerable groups, defined as groups of people who would suffer a major loss from and would have difficulties in coping with the shock/undergoing the transitions. For example, people whose jobs are at a high risk of automation.
- **Capacity:** it is a country's structural feature that points to elements of its system (economic, social, and environmental) underpinning its ability to cope with shocks/structural changes and achieve transitions successfully. Examples include policies (e.g., active labour market policies), human and social capital (e.g., skills and digital competences) as well as the capacity to innovate through e.g., investments or innovative enterprises.

In general, vulnerabilities are more related to the notion of risk (e.g., exposure or potential loss), while capacities point to the ability to cope and to grasp opportunities (absorption, adaptation, transformation)⁸. Both sides should be taken into consideration because they often require different types of policy interventions, and mitigating vulnerabilities should not be done at the cost of damaging existing capacities (or vice versa). In some cases, the classification of an indicator into capacities or vulnerabilities has a degree of subjectivity and is the result of expert assessment.

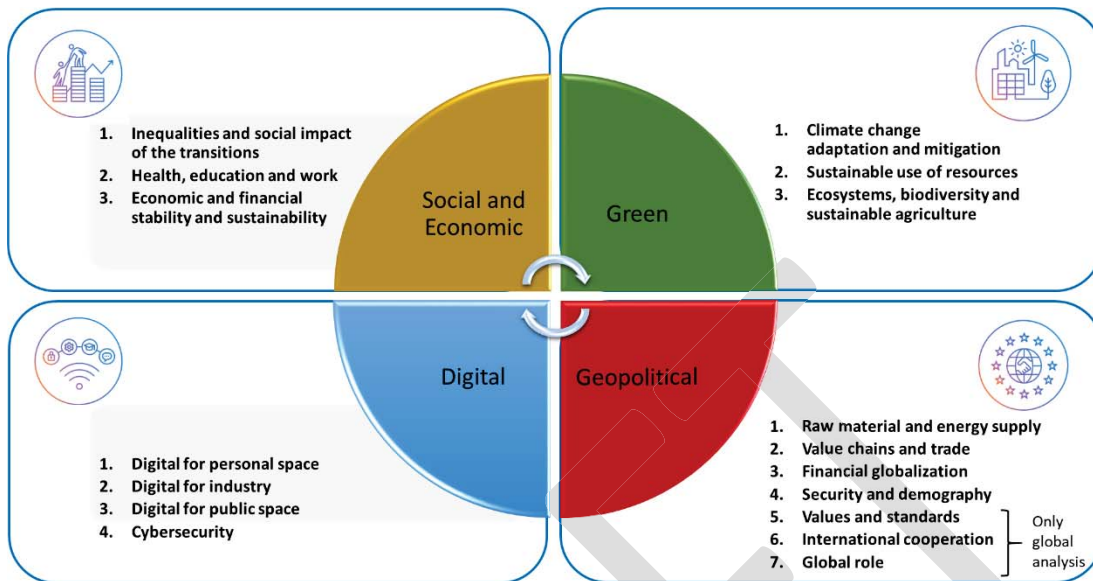
The dashboards are structured into broad areas, which should be considered as a guide for the reader through the indicators rather than a fixed organization. In some cases, indicators may fall under more than one area.

The construction of the dashboards for the Member State level consisted of the following steps:

- 1) **Development of the structure.** This was a conceptual step assessing all relevant topics for each dimension, organized in broad thematic areas. Sectoral aspects are important but should be well balanced and serve the purpose of painting the broad picture of the transitions and other challenges. **Figure 3** presents the areas covered in each dimension.

⁸ The distinction between vulnerabilities and capacities is more evident when considering shocks. For example, supplier concentration in raw materials or energy represents a risk to supply security, while innovations in the material and energy sectors are key capacities to tackle these risks. For structural changes and transitions, the distinction in some cases becomes less straightforward.

Figure 3: Areas covered in the four dimensions of the resilience dashboards.



For the social and economic, green, and digital dimensions the analysis is developed both at the level of EU countries and at global level. For the geopolitical dimension, the analysis is developed at both levels for the first four areas, while for the last three the analysis is only at global level.

2) Selection of the indicators. This was based on an extensive analysis of available indicators and data, followed by a collective assessment of their relevance and scope. Selection and allocation in the various areas were based on the following qualitative and quantitative criteria:

- Holistic view: covering as many and as multidisciplinary aspects as possible, while balancing indicators across areas and keeping their number contained at around 30⁹.
- Representativeness: what and how much the indicator tells us about the considered area.
- Relevance and value-added: how much the indicator is linked to resilience, whether it describes a specific vulnerability or a resilience capacity, and whether it adds value compared to standard progress indicators such as GDP.
- Coherence with other existing monitoring frameworks, to ensure alignment and avoid duplication (see Annex III).
- Forward-looking perspective: how much the indicator brings in forward-looking aspects.

⁹ Being restricted to a small set of indicators, the resilience dashboards exclude many important elements, such as detailed breakdowns by age, gender, disability status etc.

- Clarity: how clear the interpretation of the direction of change of the indicator is (the higher the better or vice versa)¹⁰, and whether it has a clear and intuitive meaning¹¹.
- Comparability: how much the indicator ensures meaningful cross-country comparisons, considering specific features of the country (e.g., area, economy, population, etc.).
- Data quality and availability: whether the indicator comes from official statistics. Priority was given to Eurostat, data from Commission services, and data from international institutions like OECD and World Bank¹².
- Granularity: whether data cover all Member States and span at least five years, to assess the evolution over time.

3) Mapping and streamlining the indicators. The indicators were mapped into the broad areas and assigned to vulnerabilities or capacities. The mapping was performed considering across-dimension linkages. For instance, indicators pointing to social and economic consequences of the twin transitions have been placed in the social and economic dashboard. The correlation structure of the indicators was also assessed (see Annex IV). The overall dashboards were streamlined in terms of their overall balance across areas, and between vulnerabilities and capacities.

4) Gap analysis (see Annex II). While the structure of the dashboards aims at being comprehensive, the selection of the indicators is at times limited by data availability or quality. This implies that there are gaps in each dimension. For some areas, new statistics are already being developed and collected and can be considered for future inclusion. For some others, further work will be required. As such, the list of indicators shall be considered dynamic and it may be reviewed regularly, allowing also factoring in new aspects of the transitions.

The Member State level dashboards are complemented with a global extension. These global dashboards contain a subset of indicators from the Member State level, spanning as much as possible the same areas. They seek to look at resilience at the level of the whole EU, comparing the situation across many countries of the globe¹³. By moving the focus beyond individual Member States, it becomes possible to indicate some of the extra strength that the EU level can add.

To span geopolitical aspects comprehensively, the geopolitical dimension contains a set of areas for which the analysis is only meaningful (or even possible) at the global level. The corresponding indicators do not necessarily indicate a clear vulnerability or capacity. Instead, they paint the global situation with the EU as one major actor.

¹⁰ All the indicators are treated in such a way that the higher the more resilient. This implies that for capacities the higher the better and for vulnerabilities the higher the worse.

¹¹ In particular, the dashboards try to avoid using composite indicators. The only exception is the Global Cybersecurity Index. In the social and economic dimension one indicator (Variation in performance explained by students' socio-economic status) is based on the Pisa index.

¹² For a limited number of indicators that point to particularly relevant concepts other sources of data were accepted (special surveys, indicators based on modelling, etc.). See Annex V for details.

¹³ The following countries are considered: Australia, Brazil, Canada, Switzerland, China, Indonesia, India, Japan, Korea, Mexico, Norway, Russia, Turkey, United Kingdom, and the United States. For India and Indonesia, data limitations are more severe than for other countries, but they are still included in the analysis due to their increasing global role.

3. METHODOLOGY – HOW TO READ THE RESILIENCE DASHBOARDS

The dashboards present a multidimensional picture, whereby different indicators are placed next to one another, assessing the situation of countries across a number of dimensions. They use the **latest statistical year available for each indicator** (usually 2018-2020)^{14, 15}. Their main **purpose is not to rank countries but to highlight strengths to be nurtured and areas for improvement**, also in view of further country-specific analysis and policy action. For example, extreme values for a single indicator may point to vulnerabilities or bottlenecks, despite a good situation in other aspects. In some cases, a challenge is represented by more than one indicator. It is thus important to look at all indicators at the same time.

Both the Member State level and the global dashboards follow a **relative assessment approach**, i.e., each country vis-à-vis the others over a reference period. An absolute assessment would require a consensus on critical levels of vulnerabilities or targeted levels of capacities¹⁶. For each indicator, a scale of five colours indicates the countries' relative situation in the latest available year, compared to the collection of values of that indicator for all Member States and all years in the reference period 2007-2017¹⁷. For instance, a high capacity for a country means that the corresponding indicator value is high in a historical comparison across all Member States¹⁸. Since the colour scheme is relative, countries with the lowest (highest) capacities and highest (lowest) vulnerabilities could still do well in absolute terms (and vice versa). In addition, the dashboards present the corresponding EU-level situation for each indicator.

The dashboards also show **arrows, indicating the direction of recent changes**. An upward (downward) arrow indicates a sizeable improvement (worsening) with respect to the preceding five years (2015)¹⁹. This indication is particularly useful to understand if the current position of a country or the EU is the outcome of progress or deterioration over the past five years.

The dashboards are accompanied by **synthetic indices** that illustrate **the overall situation of resilience capacities and vulnerabilities** of Member States and the EU, in each area and dimension. The synthetic indices aggregate the relative situation of the Member States and the EU across all indicators in the considered area or dimension²⁰. As such, they should be read as an overall measure of resilience in relative, and not absolute, terms. In addition, as usual for a synthetic measure, they do not convey the complete information provided by the full set of indicators in the dashboards, and as such, they cannot substitute them.

Annex I provides a more technical description and further details of the methodology.

¹⁴ Adopting a single reference year for all indicators would result in using outdated information for most of them.

¹⁵ The dashboards will be regularly updated and data revisions in official statistics will be taken into account within the reference data sets. These latter are expected to have limited impact on the dashboards.

¹⁶ Obtaining this for all the indicators would require an agreement on a battery of benchmarks and policy targets. Many indicators (e.g. education policies, taxation, or social policies) refer to areas of national competence, making this even more difficult.

¹⁷ The fast pace of the digital transformation necessitates to work with a shorter reference period for this dimension, 2015-2019. The same reasoning is applied to the indicator on the uptake of electric and hydrogen vehicles in the green dashboard. Finally, when less than four years of data is available for an indicator in 2007-2017, it is checked if 2015-2019 contains more data.

¹⁸ The global dashboards focus on the whole EU, so individual Member States are not included in the reference distribution.

¹⁹ An arrow up (down) for a vulnerability corresponds to a sizable decrease (increase) in this vulnerability in the last five years.

²⁰ The balance among the broad areas and across vulnerabilities and capacities within each dimension ensures that there is no need to assign importance weights to the individual indicators.

4. THE RESILIENCE DASHBOARDS IN FOUR DIMENSIONS

This section presents the proposed resilience dashboards along the four dimensions. The correlation structure of the indicators within each dimension is reported in Annex IV.

4.1. The social and economic dimension

Resilience in the social and economic dimension is defined in the 2020 SFR as “*the ability to tackle economic shocks and achieve long-term structural change in a fair and inclusive way.*” The dashboard looks at elements related to the main areas in the social and economic domain: inequalities and the social impact of the transitions, health, education and work, and economic and financial stability and sustainability.

Combining indicators that point to individual well-being, social capital, economic conditions, including at the regional level, and institutional features, the dashboard aims to provide a holistic picture of the social and economic vulnerabilities and resilience capacities of Europe’s societies and economies. Key topics such as social and economic status, equality, health, education, employment, regional disparities, and innovation are thus monitored across this dimension²¹.

Moreover, the dashboard links resilience to the social impact of the twin transitions, by pointing to vulnerable groups or conditions that emerge as a result of the green and digital transitions, such as employment in energy-intensive sectors, jobs with high automation risk, skills mismatch, or lagging regions. It also considers indicators related to mechanisms that enable countries to cope with structural changes or shocks, such as automatic stabilisers of the tax-benefit system, government expenditures on social protection, or active labour market policies. While constraints on the total number of indicators do not allow expanding in detail on the many underlying heterogeneities (for instance, by age, gender, disabilities, and ethnic background), it takes into consideration the regional dispersion in income and the gender employment gap²².

This dashboard also takes into account aspects related to social cohesion, which represents the ability of a society to bridge and bond together by drawing on social capital. Active citizenship in its realization of providing concrete support to other people in need represents a necessary social buffer to cushion crisis events. Finally, the dashboard aims to bring in forward-looking aspects like ageing and demographic developments, as well as investment and innovation, which will potentially have an increasing impact on health, wellbeing, labour markets, and fiscal sustainability going forward.

The first area of the dashboard is dedicated to **inequalities and the social impact of the green and digital transitions**, including regional disparities. In particular, the area accounts for manifestations of social and economic inequalities such as the at-risk-of-poverty and social

²¹ This is also aligned with the approach proposed in the conclusions of the Finland’s Presidency of the Council of the European Union in 2019 on the Economy of Wellbeing, that promoted a “cross-sectoral assessment of impacts on wellbeing in order to strengthen knowledge-based policy and decision-making”. See: Council of the European Union 13171/19: <https://data.consilium.europa.eu/doc/document/ST-13171-2019-INIT/en/pdf>

²² There are two additional equality-related variables in the digital dimension: the gender gap among ICT specialists, and the rural-urban gap in access to broadband. The risk from automation, or the sectoral adjustments necessitated by the green transition may also create important challenges to equality.

exclusion rate, the income quintile share ratio, and the regional dispersion in household income as a gauge for regional socio-economic vulnerabilities. It covers vulnerable groups that can emerge due to the twin transitions, e.g., employment in energy-intensive sectors or jobs with high automation risk. It also includes indicators that describe means to alleviate these inequalities such as government social expenditures, the impact of social expenditures on poverty reduction, as well as household savings. It is crucial that the current recovery and the transitions ahead do not magnify such inequalities. Another important aspect covered is societal cohesion, which is monitored by active citizenship.

The second area of social and economic resilience refers to **health, education, and work**. It covers the main features of education systems from early childhood until adulthood, also featuring the quality of education and the extent to which Europe's education systems promote equal opportunities for students' educational achievements, irrespective of their socio-economic backgrounds. This area also targets indicators related to emerging health risks on the vulnerability side (e.g., antimicrobial resistance, and the years of life lost due to PM 2.5) and corresponding capacities of the health system (such as a low rate of preventable and treatable mortality, and the number of healthy life years at birth). Various aspects of the labour market are also included, such as the employment rate, the gender gap in employment, or active labour market policies.

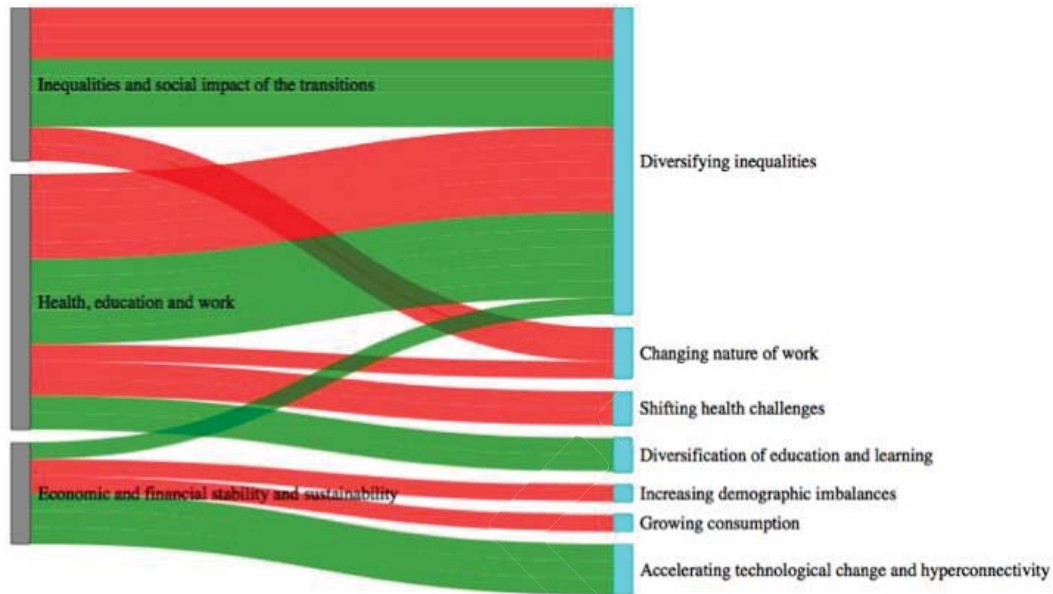
The third area covers **economic and financial stability and sustainability**, and the interlinkages with the public sector²³. This area highlights the vulnerabilities and capacities of banks and insurance companies to face financial shocks as well as threats through insufficient diversification of the economy. It includes the ability of society to be equipped for future transitions through investment in intangibles, which are important ingredients in innovative economies. It also features the key role of the government as an investor. Finally, it presents future challenges to the sustainability of the public sector, driven by demographic changes and high levels of indebtedness.

To highlight the forward-looking perspective of this dashboard, **Figure 4** presents a mapping between the indicators included and ongoing megatrends, in particular related to inequalities, health, education, and the changing nature of work²⁴.

²³ International and global aspects (intra-EU trade and the single market, extra-EU trade, value chains, FDI, financial integration) are addressed in the geopolitical dimension.

²⁴ https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en. The detailed mapping of each individual indicator is presented in Annex V. The megatrends are currently being updated. The mapping will be re-run with the new megatrends as soon as they will all become available.

Figure 4: Mapping of the indicators in the social and economic dashboard (left) and the megatrends (right).

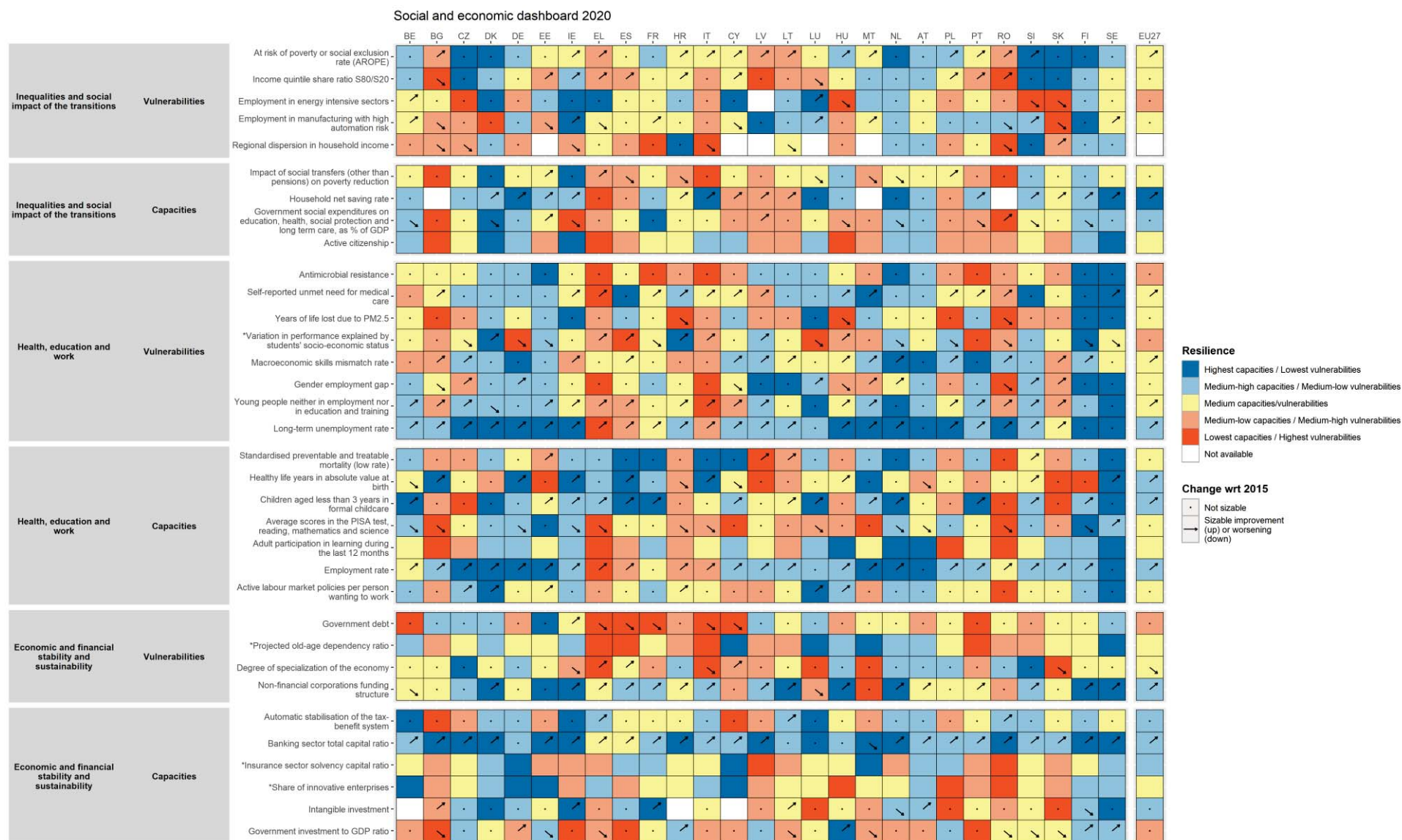


Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 5 presents the draft dashboard for the social and economic dimension, where the data refers to the latest available year. **Figure 6** and **Figure 7** plot the capacities and vulnerabilities indices. This shows both the countries' relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

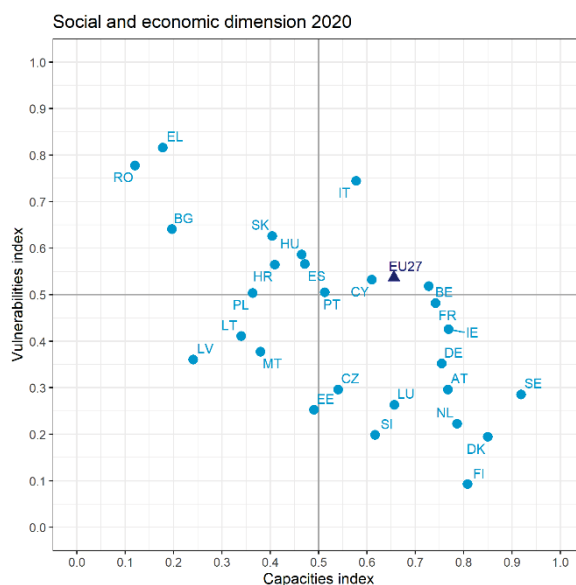
Draft, July 26, 2021

Figure 5: Social and economic dashboard, latest available year for each indicator.



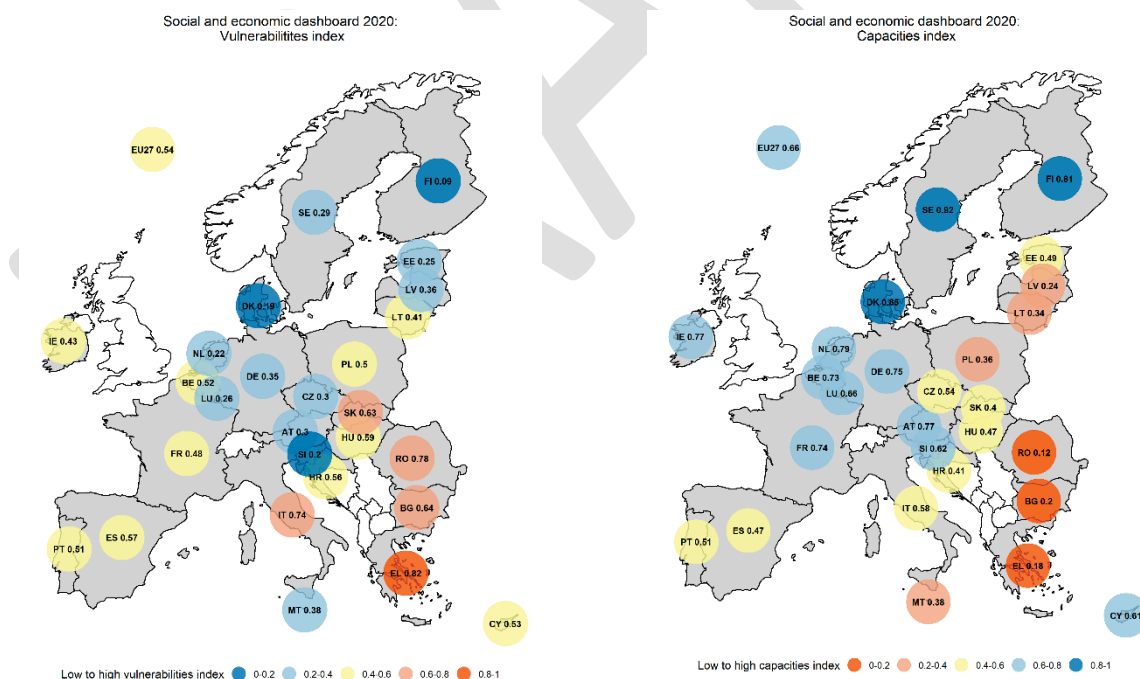
The dashboard includes a set of indicators important to grasp the level of vulnerability and resilience capacities within a country, relative to others. Data typically refers to 2018-2020. Download from Eurostat as of 18 June 2021. The colours indicate the position of a country in the distribution of all available values for EU countries in the 2007-2017 reference period (2015-2019 for indicators with an asterisk). An upward pointing arrow for a vulnerability indicates a substantial reduction (improvement). See Annex I for further details on the methodology, and Annex V on the indicators.

Figure 6: Social and economic dashboard: vulnerabilities versus capacities synthetic indices.



The synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

Figure 7: Social and economic dashboard: synthetic indices.



Differently from the dashboards, the colours for the indices are assigned by splitting the range of variation of the synthetic index [0,1] into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

4.2. The green dimension

Green resilience, as defined in the 2020 SFR, is “*about reaching climate neutrality by 2050, while mitigating and adapting to climate change, reducing pollution and restoring the capacity of ecological systems to sustain our ability to live well within planetary boundaries*”. The proposed dashboard aims at highlighting features that either represent a contextual criticality for the transition (e.g., soil erosion by water; CO₂ emissions from road transport), or the structural potential that can act as an engine towards its success (e.g., CO₂ absorption by forests; waste recovery rate).

The dashboard is structured along three broad areas covering: (i) *climate change mitigation and adaptation*, (ii) *sustainable use of resources*, and (iii) *ecosystems, biodiversity, and sustainable agriculture*. The indicators are broadly aligned with the policy areas of the European Green Deal²⁵ and the environmental objectives in the EU taxonomy legislation²⁶.

By 2050, the EU aims to become a climate-resilient society and the first climate-neutral continent²⁷. This will be achieved through a set of climate-targeted policies, among which many address the reduction of greenhouse gas emissions, endorsing carbon-neutral vehicles, boosting renewable energy, and promoting safe and sustainable, climate friendly technologies. As mitigation will not be enough, the EU needs to adapt in parallel to the unavoidable impacts of climate change and strengthen its climate resilience²⁸.

Along these broad policy lines, the **climate change mitigation and adaptation** area embeds indicators related to emissions (overall GHG and transport CO₂ emissions, but also carbon sink capacity of the forests). It includes sustainable mobility indicators such as carbon neutral vehicles share (Battery Electric Vehicles (BEV) and Hydrogen (H₂) fleet fuelled by renewable energies) and share of people that use “green” transport modes, such as trains. It highlights features that may hinder the achievement of climate neutrality (e.g., fossil fuel subsidies) and capacities that will facilitate the transition (e.g., use of renewable energy). Last but not least, given that the number of extreme climate events has been increasing, it shows the overall vulnerability to such events (fatalities to climate extremes) and the ability to adapt by sharing unevenly distributed losses (insured losses from climate extremes), which represent relevant forward-looking aspects.

The second broad area covers aspects of the **sustainable use of resources**. It includes aspects of material footprint (water exploitation, domestic footprint, material consumption, and energy use). It points to the ability to produce high values per unit of resources and energy (resource and energy productivity). It monitors the ability to foster the circular economy through close monitoring of waste generation and reuse of materials (including e-waste). Finally, it shows the overall size of the environmental goods and services sector, which contributes to minimize the impact of

²⁵ Broad policy areas, as defined in the Green Deal are Biodiversity, From Farm to Fork and Sustainable Agriculture, Clean energy, Sustainable industry and mobility, Eliminating pollution and Climate action. For more info, see: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

²⁶ Regulation (EU) 2020/852 (Taxonomy) on the establishment of a framework to facilitate sustainable investment, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852&from=EN>

²⁷ https://ec.europa.eu/clima/policies/eu-climate-action_en

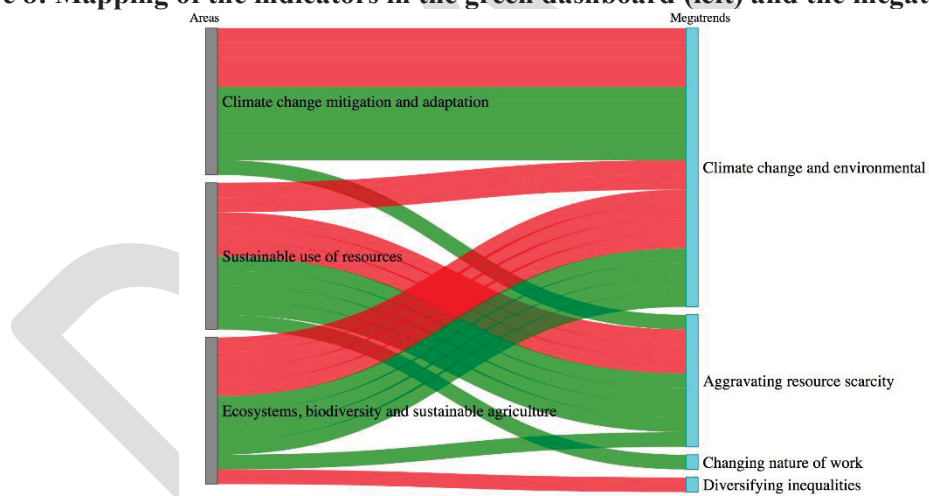
²⁸ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0082&from=EN>

economic activity on resource depletion or environmental degradation (Gross Value Added in the environmental goods and services sector). This sector will catalyse the transition in general.

The third broad area, **ecosystems, biodiversity and sustainable agriculture**, is closely related to the European Green Deal goal of restoring biodiversity and ecosystem services. Resilient ecosystems contribute to the carbon sink and have an important impact on climate change adaptation, resources, and health and well-being in general. They are also strongly connected to the goal of sustainable food systems²⁹. The indicators in this area monitor aspects and drivers of biodiversity (farmland bird index, soil erosion, sealing and organic carbon content); sustainable agriculture (farm income variability as an indicator of agricultural resilience, and organic farming as one potential example of agricultural practices particularly beneficial for biodiversity); and some management aspects of natural resources that have a strong impact on ecosystems (such as the use of pesticides, treatment of wastewaters, protection of natural areas and overall expenditure on environmental protection).

To highlight the forward-looking perspective of this dashboard, **Figure 8** presents a mapping between the indicators included and ongoing megatrends, mostly in relation to resource scarcity, climate change and environmental degradation.

Figure 8: Mapping of the indicators in the green dashboard (left) and the megatrends (right).



Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 9 presents the draft dashboard for the green dimension, where the data refers to the latest available year. **Figure 10** and **Figure 11: Green dashboard: synthetic indices.** plot the capacities and vulnerabilities indices. This shows both the countries' relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

²⁹ https://ec.europa.eu/info/sites/info/files/research_and_innovation/green_deal/updt-gdc_stakeholder_engagement_topic_07-1_biodiversity_and_ecosystems.pdf

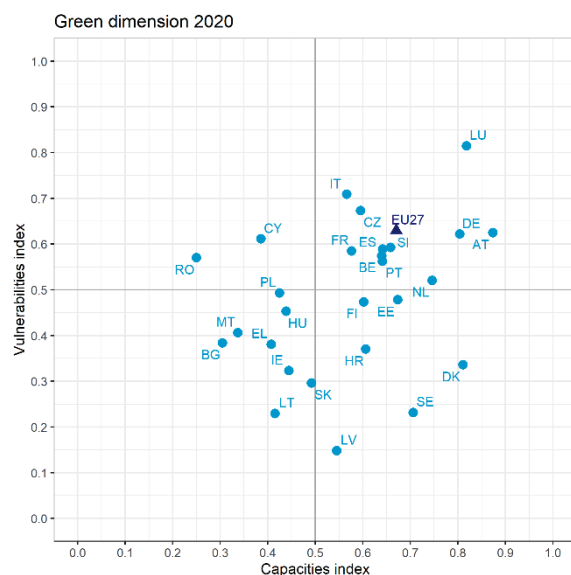
Draft, July 26, 2021

Figure 9: Green dashboard, latest available year for each indicator.



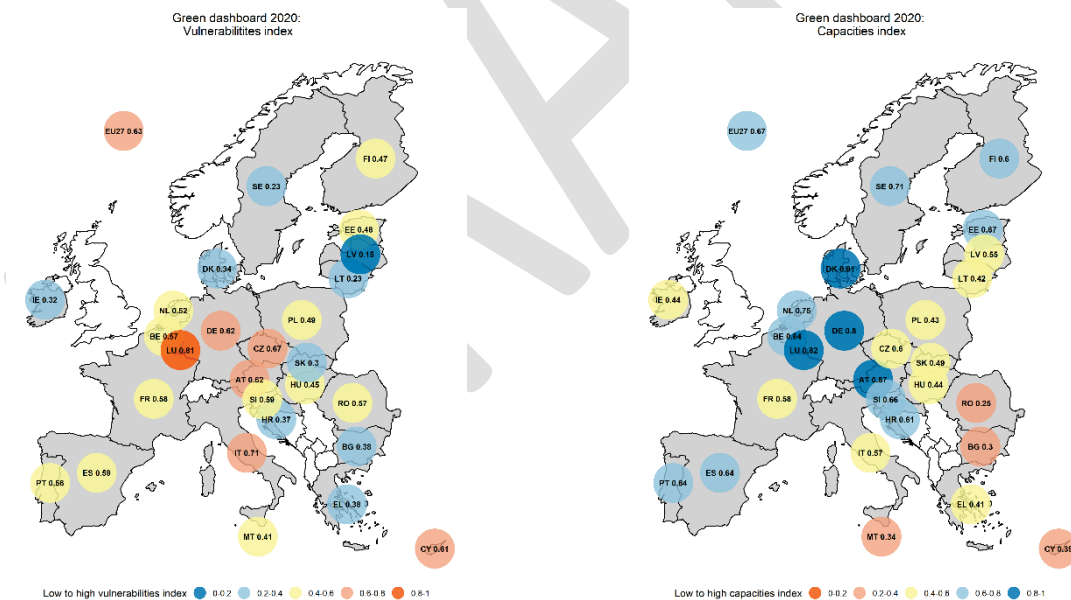
The dashboard includes a set of indicators important to grasp the level of vulnerability and resilience capacities within a country, relative to others. Data typically refers to 2018-2020. Download from Eurostat as of 18 June 2021. The colours indicate the position of a country in the distribution of all available values for EU countries in the 2007-2017 reference period (2015-2019 for indicators with an asterisk). An upward pointing arrow for a vulnerability indicates a substantial reduction (improvement). See Annex I for further details on the methodology, and Annex V on the indicators. Data for the domestic footprint indicator is still preliminary. The final version will become available in the next months.

Figure 10: Green dashboard: vulnerabilities versus capacities synthetic indices.



The synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

Figure 11: Green dashboard: synthetic indices.



Differently from the dashboards, the colours for the indices are assigned by splitting the range of variation of the synthetic index [0,1] into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

4.3. The digital dimension

Digital resilience, as defined in the 2020 SFR, is “*about ensuring that the way we live, work, learn, interact, and think in this digital age preserves and enhances human dignity, freedom, equality, security, democracy, and other European fundamental rights and values*”.

The proposed dashboard is framed, in line with the Commission’s Digital Agenda, around four areas. The first three are thematic: digital for personal space, digital for industry and digital for public space. The last one, dealing with cybersecurity, is transversal to the other three. In general, vulnerabilities reflect more the infrastructure side, and capacities are mostly associated with human capital and new digital services.

These different areas need to be considered together since the physical-digital integration will become a central element of our society, where the Internet of Things, smart home technology, the use of big data, and increasingly efficient technologies based on artificial intelligence will become the new normal.

The dashboard aims at representing the important aspects of our society that will be affected the most by the digital transition, acknowledging that some effects are difficult to predict and that interconnections and potential spillovers would play an important role. These characteristics make it quite challenging today to define clear boundaries among the different areas. In a near future, they would probably make it necessary to introduce new indicators to better describe the latest digital developments.

Indicators are grouped into different areas according to where their impact will have the largest effect. The first area, **digital for personal space**, relates to how the digital transition will affect the personal sphere. The on-life paradigm is already part of our society, and it is essential to keep monitoring the evolution of new means for education and re/up skilling, on new modalities of work (teleworking), and on the role of social media in shaping people’s future *on-life* behaviour.

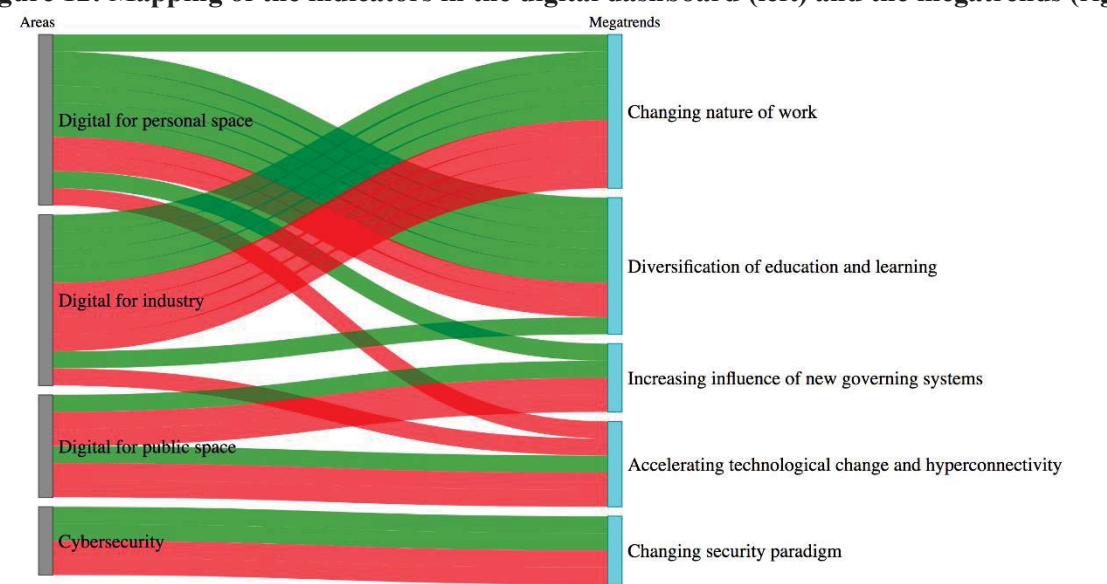
The second area, **digital for industry**, looks at the impact of digitalisation on the industrial sector through different elements in the business life cycle: from broadband access to the size and vitality of the ICT sector, and to the use of innovative platforms (e.g., cloud services and e-commerce).

Digitalisation of the **public space** is expected to be the new playing field, able to reduce existing digital divides. Both infrastructures (e.g., 5G) and the availability (or the lack of) of e-government services are considered.

Finally, the **cybersecurity** area depicts concerns and awareness of citizens towards cyber-threats, as well as the overall quality of security measures, in order to highlight how countries are dealing with potential new fragilities associated with the digital transition.

To highlight the forward-looking perspective of this dashboard, **Figure 12** presents a mapping between the indicators included and ongoing megatrends related to changing the security paradigm, accelerating technological change and hyperconnectivity, changing the nature of work, diversifying the education system, increasing the influence of new government systems.

Figure 12: Mapping of the indicators in the digital dashboard (left) and the megatrends (right).

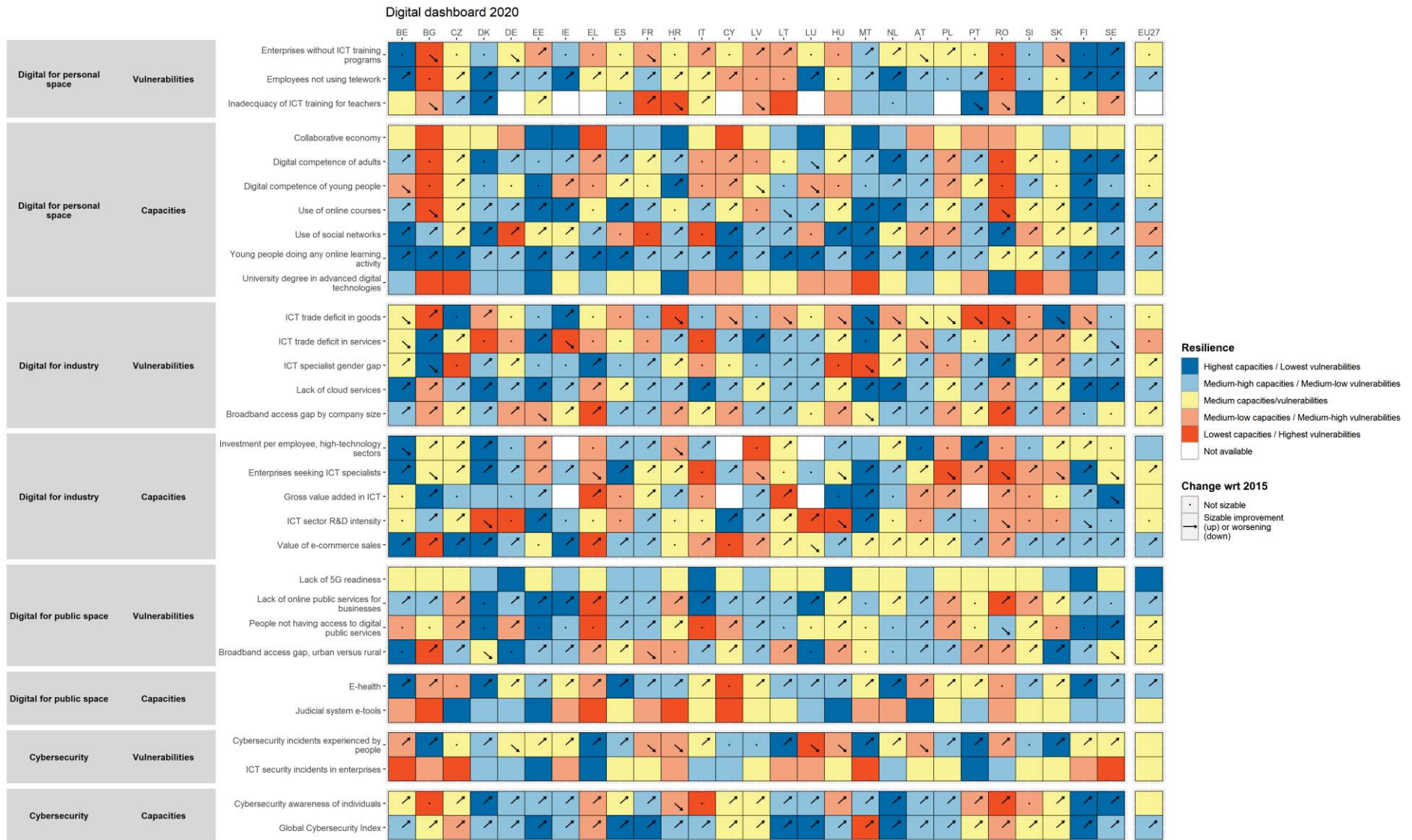


Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 13 presents the draft dashboard for the digital dimension, where the data refers to the latest available year. **Figure 14: Digital dashboard: vulnerabilities versus capacities synthetic indices** and **Figure 15** plot the capacities and vulnerabilities indices. This shows both the countries' relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

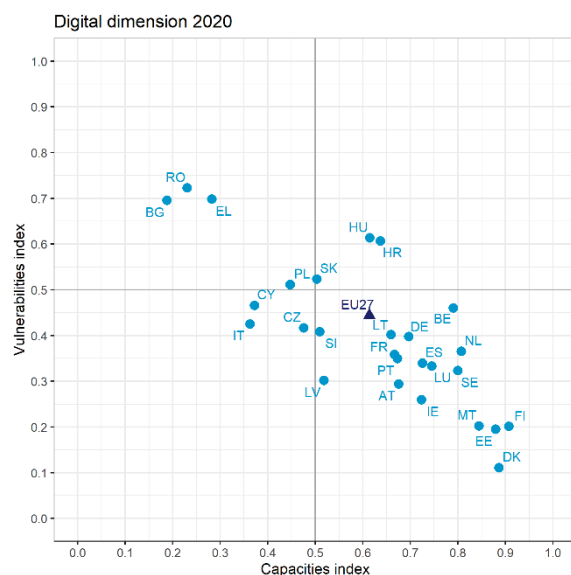
Draft, July 26, 2021

Figure 13: Digital dashboard, latest available year for each indicator.



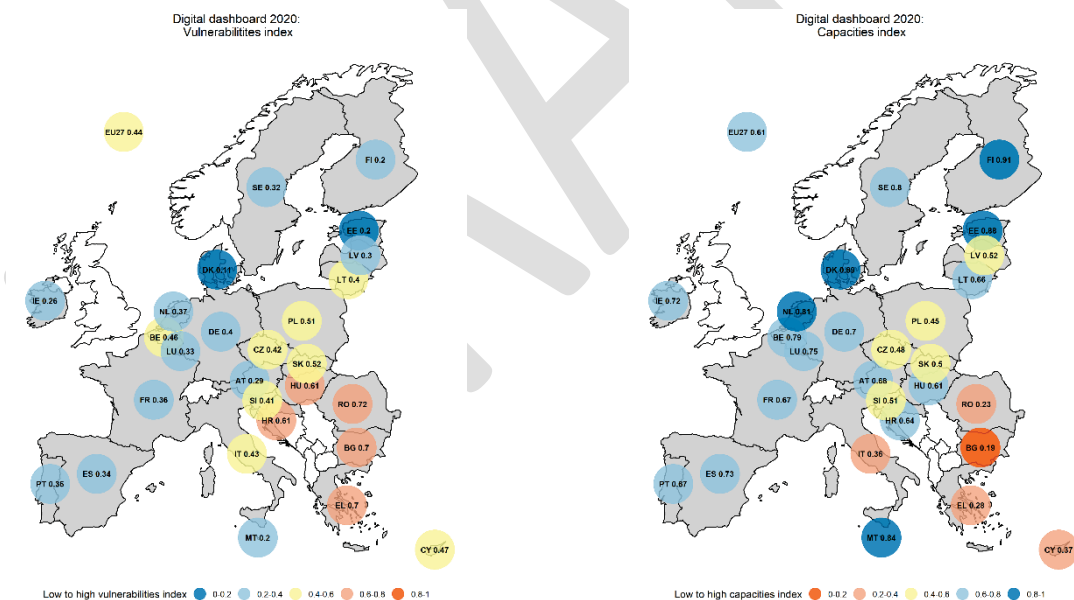
The dashboard includes a set of indicators important to grasp the level of vulnerability and resilience capacities within a country, relative to others. Data typically refers to 2018-2020. Download from Eurostat as of 18 June 2021. The colours indicate the position of a country in the distribution of all the available values for EU countries in the 2015-2019 reference period. An upward pointing arrow for a vulnerability indicates a substantial reduction (improvement). See Annex I for further details on the methodology, and Annex V on the indicators.

Figure 14: Digital dashboard: vulnerabilities versus capacities synthetic indices



The synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

Figure 15: Draft digital dashboard: synthetic indices.



Differently from the dashboards, the colours for the indices are assigned by splitting the range of variation of the synthetic index [0,1] into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

4.4. The geopolitical dimension

While the general notion of resilience adopted in the 2020 SFR is similar to previous communications on the EU's strategic approach to resilience³⁰, the notion of geopolitical resilience is more specific³¹: it relates to *Europe bolstering its 'open strategic autonomy' and global leadership role*. It is anchored in the expression of the EU's values within a highly interdependent world of competing powers³². The topic is further elaborated in the forthcoming 2021 SFR.

The collective intelligence process has highlighted that the geopolitical dimension features many aspects where a country-level analysis is not possible or is less ready to offer conclusions (e.g. for important aspects of trade, foreign policies, or international leadership). It also includes areas for which there are no standard statistical measures (disinformation, manifestation of EU values in trade agreements or international collaboration activities), or concepts which may be difficult to quantify (ability to steer the development of global institutions and multilateralism, ability to disseminate values, or hybrid threats). For these reasons, this dimension is organised around seven broad thematic areas. The first **four areas** feature **indicators** that monitor resilience **at the Member State level**. They are complemented with **three 'global areas'** that present **comparisons** only between the EU and some **non-EU countries** (e.g., the US, China, India, Japan, Russia, and the UK). These are presented and discussed in Section 6.

The first area focuses on the main aspects of Europe's dependencies and security with respect to **raw material and energy supply**. It covers potential vulnerabilities such as the supplier concentration in base metals and energy carriers, and the capacities of Member States such as intra-EU trade in energy and the rate of change in supplier diversification in base metals and energy carriers.

The second area on **value chains and trade** looks at the concentration of trading partners, which could unveil vulnerabilities in trade and value chains. It also monitors the trade openness of Member States with other EU countries (reflecting the role of the single market) and with third countries, and participation levels in global value chains, which are important capacities to counteract trade disturbances and to reap the benefits from global economic cooperation³³. Given the interplay of the indicators on value chains and trade concentration, it is particularly important to consider them simultaneously for an assessment of resilience.

³⁰ COM (2012) 586 final, "The EU Approach to Resilience – learning from Food Security Crises". 3 October 2012, JOIN/2017/021 final, "A Strategic Approach to Resilience in the EU's external action".

³¹ In its 2017 Joint Communication on 'A Strategic Approach to Resilience in the EU's external action', the Commission recognises the pressures affecting its external partners, and that EU external policy in advocating resilience of its partners can contribute to strengthening resilience within the Union itself. This is aligned with the 2020 SFR's notion of resilience as the *ability not only to withstand and cope with challenges but also to undergo transitions, in a sustainable, fair, and democratic manner*.

³² Open strategic autonomy is defined as "the EU's commitment to open and fair trade, preserving the benefits of an open economy and supporting partners around the world to lead the renewed and reinvigorated form of multilateralism the world needs. At the same time, the EU is aware of the need to reduce its dependency and strengthen its security of supply across key technologies and value chains (COM (2020) 456 final, "Europe's moment: Repair and Prepare for the Next Generation").

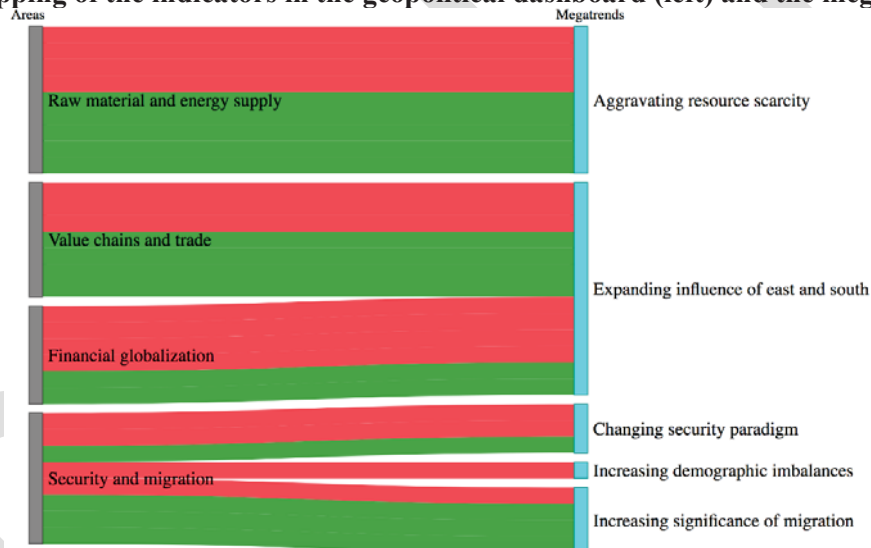
³³ A low degree of openness does not indicate a general "weakness" of an economy: a measure of openness can also be small if an economy is large and hence more self-sustained.

Financial globalisation treats vulnerabilities such as the concentration of FDI partner countries and external debt of Member States with respect to countries outside the EU. It also comprises financial integration with respect to EU countries and third countries as a key capacity.

Finally, in the **security and demography** area, the dashboard covers capacities and vulnerabilities for defence (like military personnel and expenditures, and disinformation originating from abroad) and some aspects on demographic trends³⁴ such as the fertility rate in Member States and the integration of migrants in the labour market.

To highlight the forward-looking perspective, **Figure 16** presents a map between the indicators included in the first four areas and ongoing megatrends. The ones that are particularly important in the geopolitical dimension are the expanding influence of East and South, aggravating resource scarcity, increasing demographic imbalances, the significance of migration, and a changing security paradigm.

Figure 16: Mapping of the indicators in the geopolitical dashboard (left) and the megatrends (right).



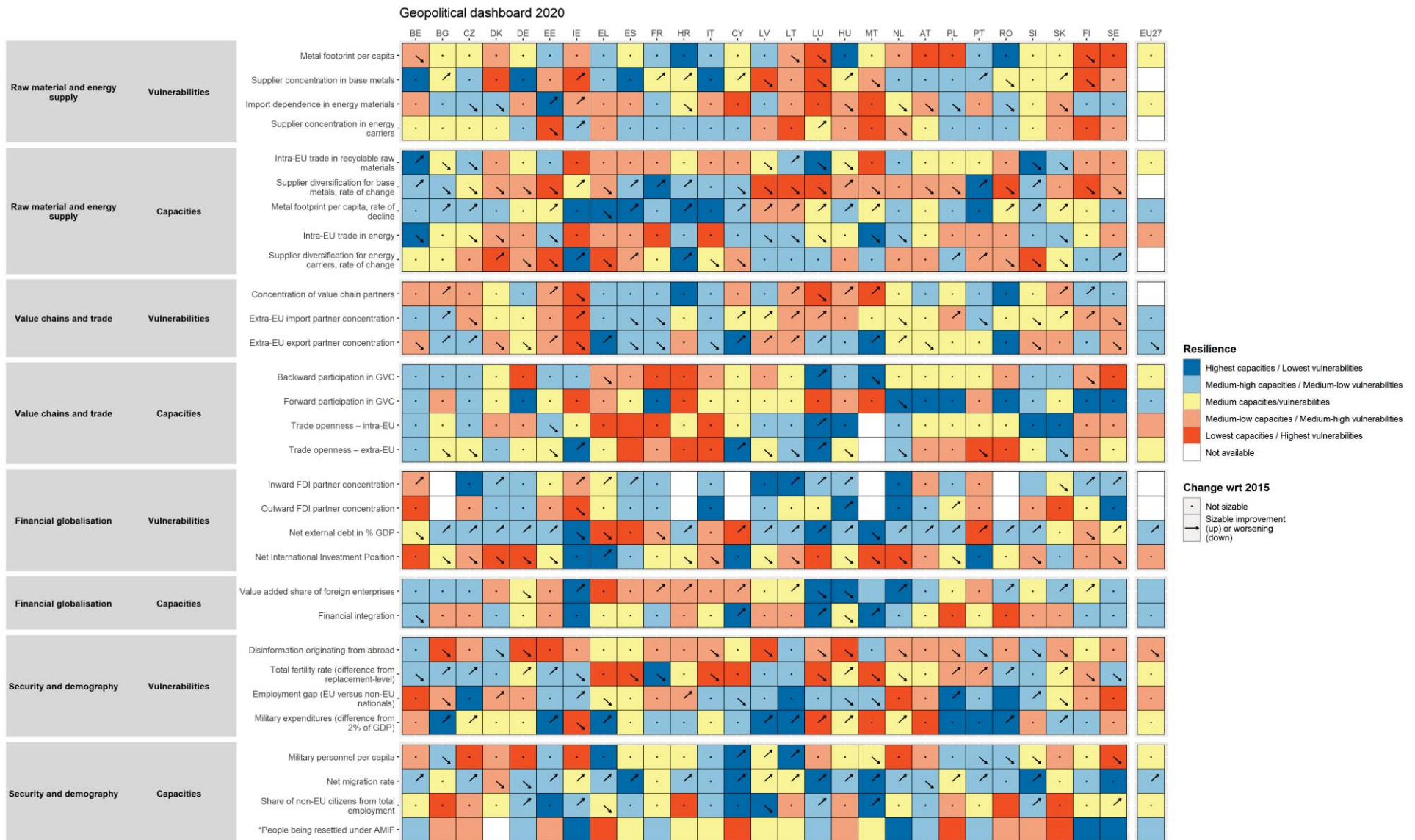
Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 17 presents the draft dashboard for the geopolitical dimension, where the data refers to the latest available year. **Figure 18** and **Figure 19** plot the capacities and vulnerabilities indices. This shows both the countries' relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

³⁴ Demography strongly overlaps with the social and economic dimension as well. We chose to include it in the geopolitical dimension to emphasize the challenges of a declining global population share of the EU, and of migration. This is also aligned with the 2021 Strategic Foresight Report.

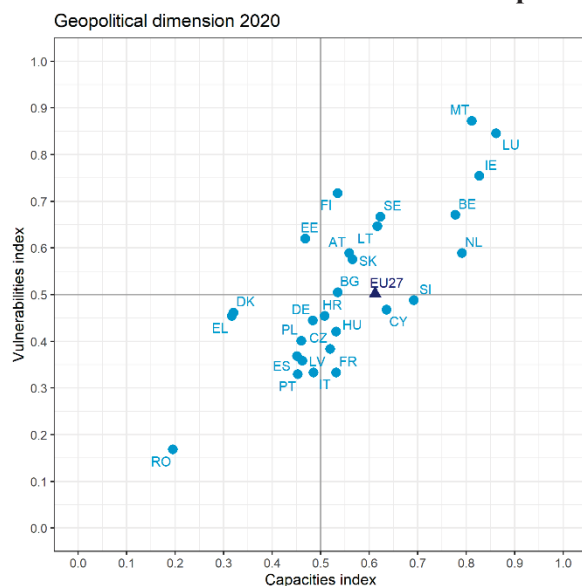
Draft, July 26, 2021

Figure 17: Geopolitical dashboard, latest available year for each indicator.



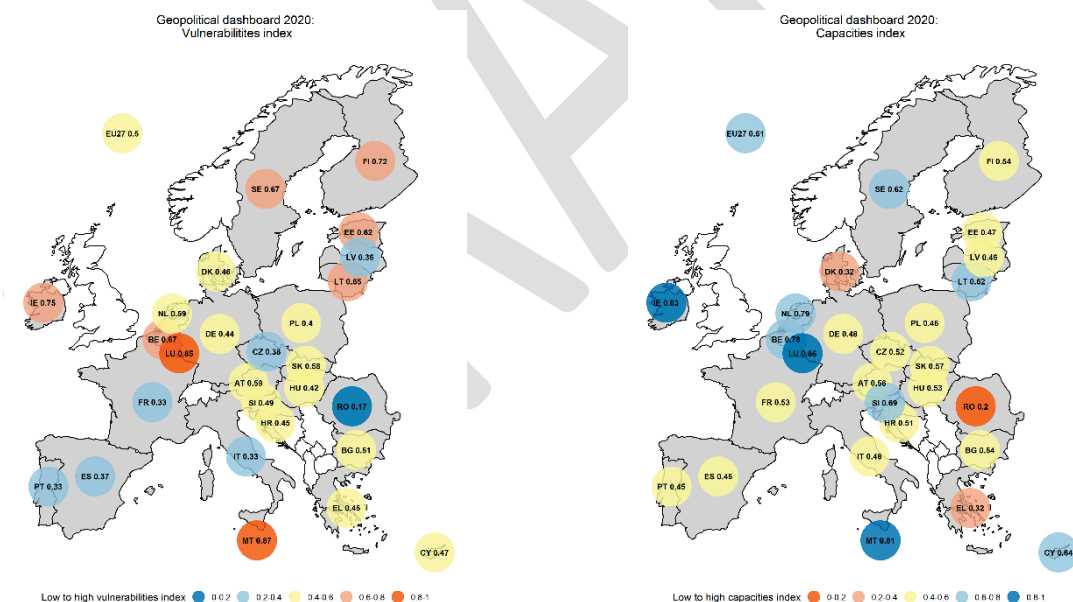
The dashboards include a set of indicators important to grasp the level of vulnerability and resilience capacities within a country, relative to others. Data typically refers to 2018-2020. Download from Eurostat as of 18 June 2021. The colours indicate the position of a country in the distribution of all available values for EU countries in the 2007-2017 reference period (2015-2019) for indicators with an asterisk). An upward pointing arrow for a vulnerability indicates a substantial reduction (improvement). See Annex I for further details on the methodology, and Annex V on the indicators.

Figure 18: Geopolitical dashboard: vulnerabilities versus capacities synthetic indices.



The synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

Figure 19: Geopolitical dashboard: synthetic indices.



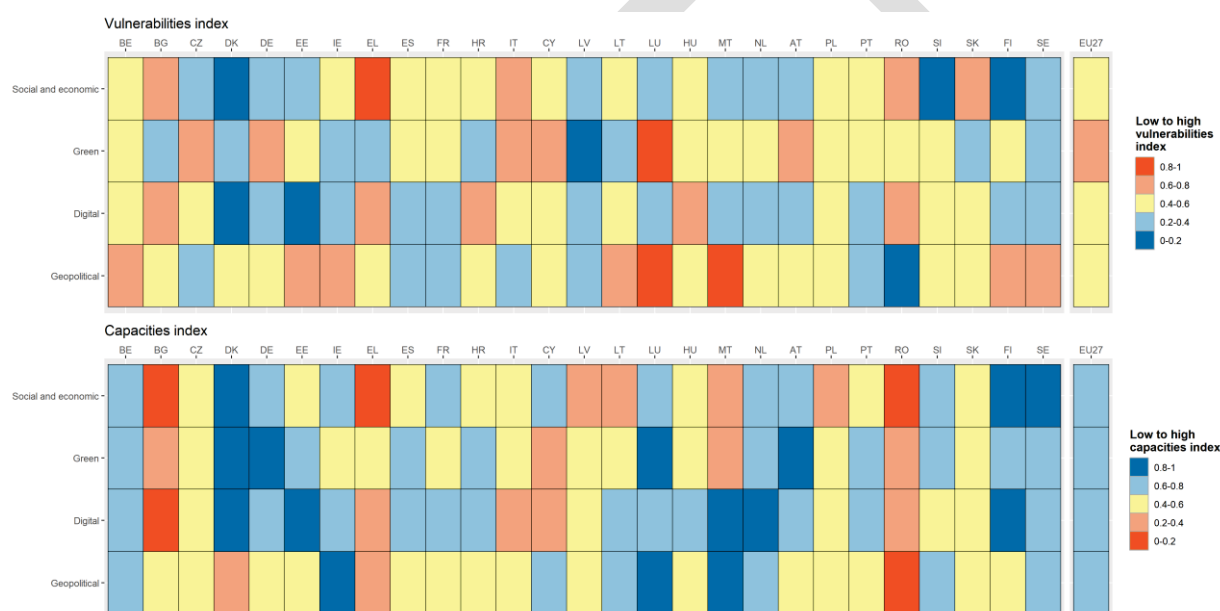
Differently from the dashboards, the colours for the indices are assigned by splitting the range of variation of the synthetic index [0,1] into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Members States and the EU across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

5. THE INTERCONNECTIONS BETWEEN THE FOUR DIMENSIONS

The four dimensions are constructed not only to complement one another but also to underline their *interconnections*. The situation of vulnerabilities or capacities across the various areas and the four dimensions may exhibit various patterns within each Member States and can show similarities or significant differences in general.

To uncover such relationships, **Figure 20** puts together the eight synthetic indices. The colours are assigned in the same way as on the maps for each individual dimension. For some Member States, the overall situation is fairly similar across all dimensions, both for vulnerabilities and capacities. In some other cases, the situation is rather different between vulnerabilities and capacities, but is still relatively homogenous within these two classes. Finally, there are many countries where the situation varies heavily across dimensions going from dark blue to dark orange.

Figure 20: Synthetic indices across all dimensions.



The synthetic indices aggregate the relative situation of the EU and its Member States across all considered indicators in the four dimensions. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

The overall similarity of the eight indices can be broadly assessed by looking at their pairwise correlations (**Figure 21**). The capacity indices are quite correlated, especially the social and economic, green, and digital dimensions. It implies that capacities tend to be similar across these three dimensions: if one dimension shows a high capacity, the other two also tend to be high. This is much less the case for vulnerabilities, except for a sizable positive correlation between the social and economic and the digital dimension, and a moderate negative correlation between the social and economic and the geopolitical dimension.

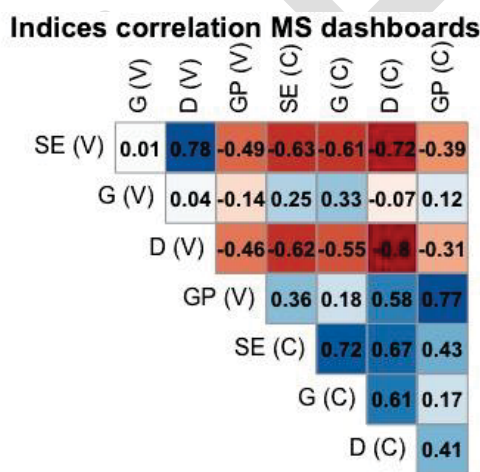
When looking at the relationship between vulnerabilities and capacities, the social and economic and the digital vulnerability indices stand out by exhibiting strong negative correlations with all capacities (except for the geopolitical). Green vulnerabilities are positively but only weakly

correlated with green capacities, and they appear to be unrelated to other capacities. Finally, geopolitical vulnerabilities show a strong positive correlation with geopolitical capacities, and a positive though somewhat weaker correlation with digital capacities.

It is worth emphasising the relationship between vulnerabilities and capacities within the same dimension. The geopolitical dimension has a positive and high “internal” correlation. It means that more vulnerable Member States also exhibit higher capacities to tackle the challenges. For the digital dimension, the pattern is exactly the opposite, as there is a large but negative correlation between digital capacities and vulnerabilities. For the social and economic dimension, the correlation is negative but not that strong. The green dimension has only a low (but positive) correlation between its vulnerabilities and capacities.

It is important to stress that these findings do not necessarily imply causality. For example, there is no guarantee that an improvement in geopolitical capacities would lead to a simultaneous increase in geopolitical vulnerabilities. Exploring such causal patterns would necessitate further analysis, also using the dynamic behaviour of the indices.

Figure 21: Correlation among the synthetic indices.



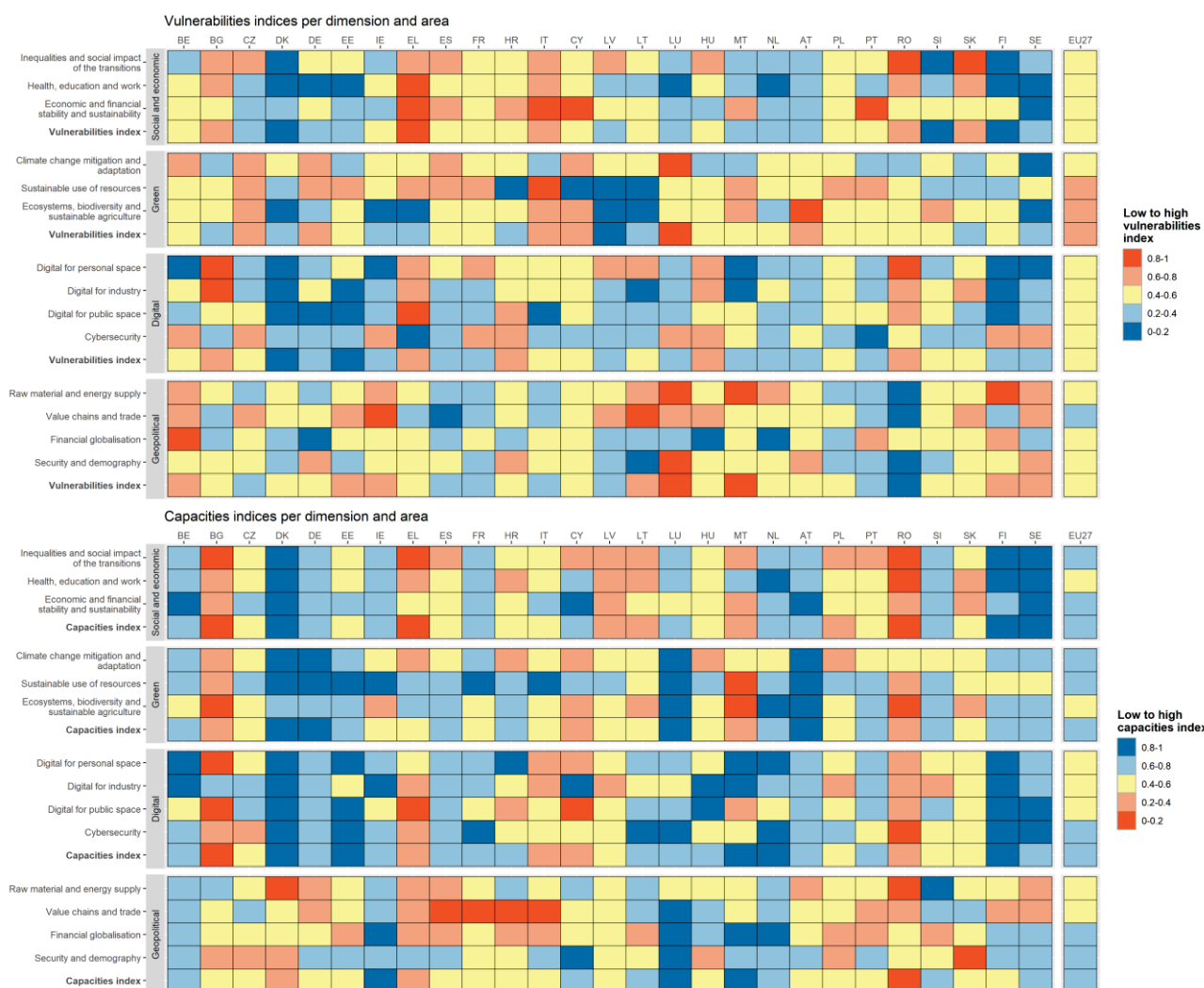
SE, G, D, GP denotes respectively the social and economic, green, digital, and geopolitical dimensions. V stands for vulnerabilities and C for capacities.

In addition, **Figure 22** presents the synthetic indices for each area of each dimension. In Annex IV, we also present the correlation structures of the synthetic indices across areas for each dimension. Like the dashboards, the synthetic indices reveal some heterogeneity with respect to vulnerabilities and capacities in the different areas and dimension.

Some countries have low vulnerabilities indices in all areas of the social and economic dimension while showing high capacities indices in the areas of inequalities and the social impact of the transitions and in health, education, and work. For other countries, the picture is more heterogeneous with higher (lower) vulnerabilities indices and lower (higher) capacities indices. In the green dimension, vulnerabilities indices are moderate to low while capacities indices are high, leading also to high capacities indices in all areas for the EU.

For the digital dimension, low vulnerabilities in the areas of digital for personal space, industry and digital for public space are often accompanied with moderate to high vulnerabilities in cybersecurity. In the geopolitical dimension, the area of value chains and trade reveals a moderate to low capacities index which is often accompanied with a low vulnerabilities index. Other areas such as financial integration and security and demography reveal a moderate to high capacities index.

Figure 22: Synthetic indices across all areas and all dimensions.



The synthetic indices aggregate the relative situation of the EU and its Member States across all considered indicators in the areas of the four dimensions. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities. See Annex I for further details on the methodology.

6. ANALYSIS AT THE GLOBAL LEVEL

6.1. Resilience dashboards at the global level

The analysis of resilience at the global level (**Figure 23**) mirrors the one developed at Member State level but suffers from data unavailability or cross-country comparability issues. For all dimensions, it is developed only for a subset of indicators presented in the Member State level analysis, with data coming from different data sources that cover a broad range of countries³⁵. Coherence in the definitions and data with respect to the Member State level indicators was a key criterion. For a few aspects, the indicators are slightly different compared to the Member State level analysis, in order to be able to capture some areas that would otherwise not be covered (e.g., education, innovation and digital aspects) or to better capture global heterogeneities (e.g., GHG emissions). Still, it was not always possible to balance the areas, and aspects of vulnerabilities and capacities.

The **social and economic** dimension for the global comparison aims at providing an assessment of vulnerabilities and capacities of the EU and other global players in tackling economic shocks and achieving long-term structural change in a fair and inclusive way. It is built to mirror as much as possible aspects on inequalities, health, education and work, and elements related to economic and financial stability and sustainability already present in the assessment at Member State level.

Compared to the dashboard at Member State level, one of the biggest gaps relates to aspects of social capital and cohesion such as trust in people or civic engagement. Another important gap relates to indicators on household savings, where it is difficult to obtain consistent measures across countries worldwide. On education, there is lack of indicators on literacy rate or on performance in education with the needed time and country coverage. To cover this area, an indicator depicting the share of graduates from tertiary education in the corresponding age group is included, which is not in the Member State level analysis. Furthermore, the global version of the ‘innovate enterprises’ indicator cannot be obtained. Data on the financial or banking situation in a global comparison are also difficult to find. Finally, in the area dedicated to health, the obesity rate of young children is included, to depict a potential future vulnerability of health status and healthcare systems, as obesity during childhood is often an indicator for obesity in adulthood.

The **green** dimension of the global dashboard aims at providing a comparative assessment of the capacities and obstacles on the worldwide road to environmental and climate sustainability. The dashboard can highlight the global leaders in terms of the green transition, and thus set up a benchmark for further improvements and provide an opportunity to learn from the best. Its focus is less on contextual features (i.e., climate-related disasters, forest capacity) and more on the ability (or the lack of it) to produce value with the most parsimonious use of the natural resources (resource and energy productivity, environmental innovation). Overall, all the three areas defined for the Member State dashboard (climate change adaptation and mitigation; sustainable use of resources; ecosystems, biodiversity, and sustainable agriculture) are balanced. The dashboard

³⁵ To ensure compatibility of indicators across countries, we relied mostly on data from the OECD, World Bank, IMF, or the UN. See Annex VI for full details.

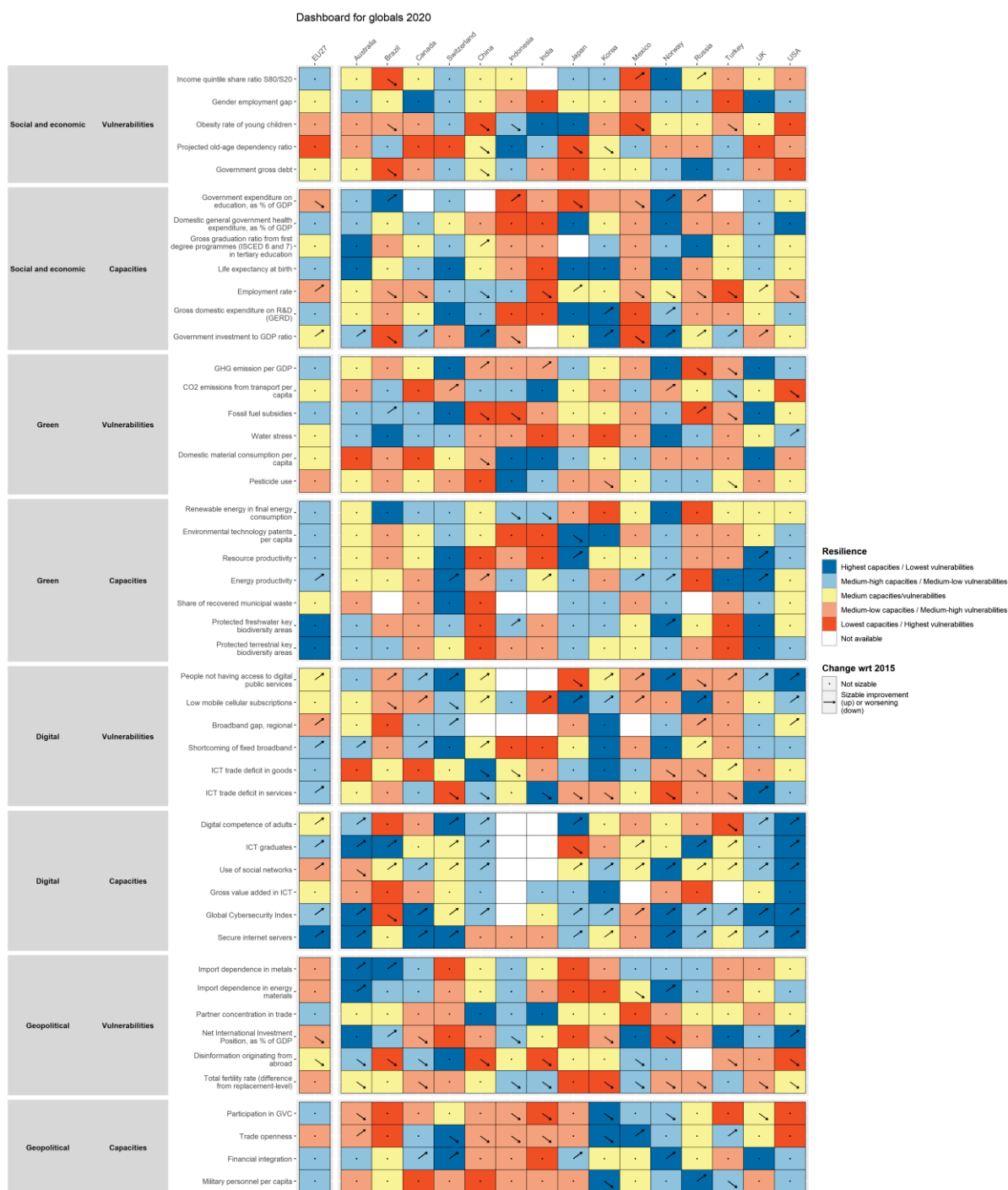
covers indicators on emissions (general GHG emissions and transport-related CO₂ emissions)³⁶, sustainable energy use (renewables and energy productivity), sobriety in resource use (water stress and domestic material consumption), environmental innovation, and protection of key biodiversity areas. Finally, there are indicators on potentially harmful practices, such as subsidizing brown energy (fossil fuels) and the extensive use of pesticides in agriculture. Despite the poorer cross-country coverage (four big countries missing), we include an indicator on the share of recovered municipal waste, because of the strong relevance of the circular economy for the green transition.

In the **digital dimension**, all areas (digital for personal space; digital for industries; digital for public space; cybersecurity) are represented with a good overall balance of capacities and vulnerabilities³⁷. Similarly to the Member State case, the time coverage is rather limited with respect to the other dimensions. A few indicators used in the global comparison are the same as those used in the Member State dashboard (e.g., ICT trade deficit in goods, ICT trade deficits in services). For some others, the lack of data forced the inclusion of different indicators to proxy the general concept behind the variables of interest (e.g., mobile subscription for 5G coverage; regional broadband gap for rural versus urban digital gap; shortcoming of fixed broadband; lack of cloud services). Main gaps with respect to the Member State dashboard lie in the field of young people digital skills (partly substituted by ICT graduates) and firms access to digital public services.

The **geopolitical dimension** consists of a subset of the indicators used in the Member State level dashboard. Import dependence on metals is the only additional variable, which is more meaningful in a global context than inside the EU, and thus replaces the supplier concentration indicator. Given the focus of the geopolitical dimension on extra-EU relationships, its global comparison is indicative of the strength of the Union level in some areas where collective coordination matters. For example, while single Member States can have high levels of external dependence in metal or energy imports, or high levels of partner concentration, these may be diversified at the Union level, emphasizing that the resilience of the EU can be higher than that coming from the aggregation of Member State indicators.

³⁶ For the comparison in the global setting, GHG total emission are rescaled on GDP instead of using GHG per capita indicator, as the latter is strongly driven by important differences in the size of the population. Still, CO₂ emissions from transport per capita are correlated with the GHG emissions per capita (a correlation of 0.82), hence still provide a proxy of countries emissions per capita intensity.

³⁷ An important source was the I-DESI indicator set (<https://digital-strategy.ec.europa.eu/en/library/i-desi-2020-how-digital-europe-compared-other-major-world-economies>). Here we relied on their normalised values, which give a complete coverage though based on imputation.

Figure 23: The global resilience dashboards for the four dimensions.

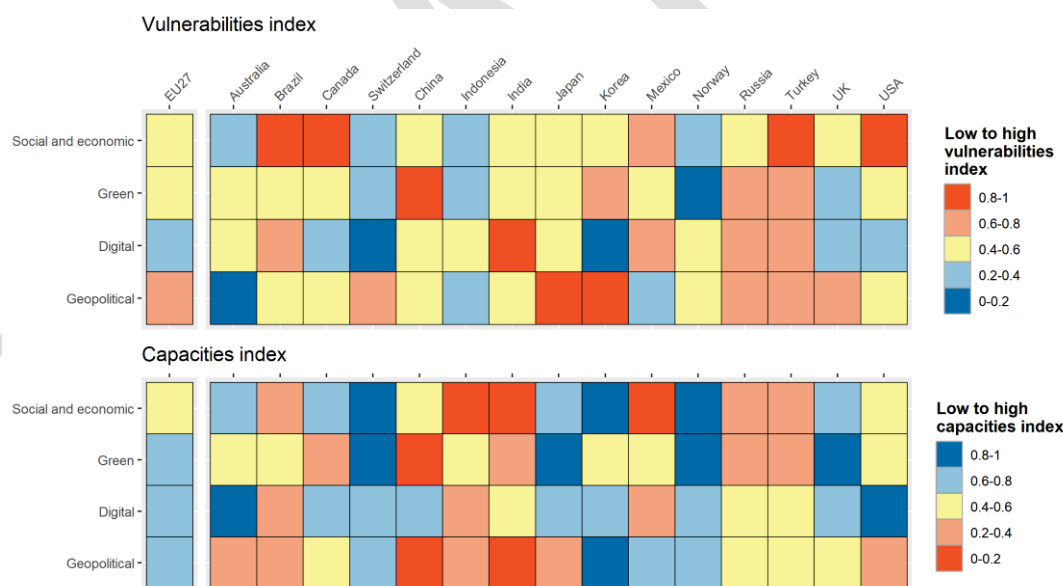
The global dashboards include a set of indicators important to grasp the level of vulnerability and resilience capacities within the EU27 as a whole, relative to other global actors. Data typically refers to 2018-2020. Download from all data sources as of 18 June 2021. The colours indicate the position of a country in the distribution of all available values for all of the countries displayed here in the 2007-2017 reference period. An upward pointing arrow for a vulnerability indicates a substantial reduction (improvement). See Annex I for further details on the methodology, and Annex VI on the indicators. .

Figure 24 displays the synthetic resilience indices across the thematic areas for the EU, in comparison to other major global actors. The Union as a whole shows robust capacities in almost all areas while the situation for vulnerabilities can still be improved.

In particular, the EU shows medium vulnerabilities in the social and economic and the green areas. Its situation is nevertheless better or similar to that of China, Japan, or the US. Together with other global actors such as Canada, the UK, or the US, the EU depicts a relatively low vulnerabilities index in the digital area, where only Switzerland and Korea outperform the Union. Geopolitical vulnerabilities are relatively high in the EU, similar to those of China, falling between Japan (even higher) and the US (lower).

Relative to China, the US, India and Brazil, the EU has higher capacities in the green and geopolitical areas, triggered mainly by its capacities in energy and resource productivity and the protection of freshwater and terrestrial areas (for the green) and in the financial integration and participation in global value chains (in the geopolitical dimension). Following the US and Australia, the EU fares well also in digital capacities, similarly to Canada, China, Japan, Korea, Norway, and the UK. Finally, EU capacities are medium in the social and economic dimension, similarly to China and the US.

Figure 24: The global synthetic indices for the four dimensions.



The synthetic indices of the global dashboard aggregate the relative situation of the EU27 and other countries across all considered indicators. A higher capacity index indicates higher (relative) capacities, while a higher vulnerability index shows higher (relative) vulnerabilities.

6.2. Global areas of the geopolitical dimension

The first global area (Area 5) aims to depict challenges to the **EU's ability to promote its values and disseminate its standards**. It covers topics like the situation of the environment, labour standards, product safety, food security, and also democratic values and human rights. In most cases, however, it is difficult to quantify specific vulnerabilities the EU may face, or the level of

capacities. The strategy is instead to indicate the global landscape, showing whether the EU situation is similar, better, or worse than in other countries³⁸. There are a couple of more direct measures as well: the share of trade directed to the EU from total trade can indicate the scope of influence of our standards.

The second global area (Area 6) looks at **aspects of international cooperation and soft power**. It includes elements like development finance, international cooperation in innovation, trust in in the United Nations, and various soft power indicators. Investing, trading, and funding for Africa are also covered under the cooperation header.

Finally, the **global positions and comparisons area** (Area 7) aims to capture **the overall “weight” of the EU vis-à-vis other global actors**. Its first sub-area focuses on **economic aspects**: the relative shares in total world GDP, trade, or foreign direct investments, the international role of the euro (as a reserve currency), net trade in food and agricultural products, or import dependence in cereals. Given its relevance for future preparedness, the second sub-area looks at aspects linked to **innovation**, such as expenditures on R&D, the share of patents from global patents, or the number of universities in relevant global rankings. The third sub-area is related to **demography**, including aspects of migration, population change, and life expectancy. A final aspect of this area is **hard and space power**, presenting indicators such as expenditures on space programs, satellite launches, military expenditures and personnel, international military missions, and exports of weapons.

Information is presented for the same countries as in the global dashboards. The EU values are represented either by Union-level indicators, or the median value of the 27 Member States³⁹. **Figure 25, Figure 26 and Figure 27** indicate the relative size or situation across the countries, using a similar colouring scheme as in the fully developed dashboards⁴⁰. Though all variables relate to various geopolitical challenges or resilience capacities, they do not quantify vulnerabilities or capacities as clearly as the indicators in the normal dashboards. Instead, they deliver a snapshot of the EU’s standing in values and standards, its international cooperation and soft power skills and its economic, demographic, and military power on the international stage. Details on the indicators are available in Annex VII.

³⁸ There are a number of potential approaches to quantify these aspects and to compare them across countries. For example, it may be possible to trace the adoption of various EU standards in third countries (as propagated in the 2020 book “The Brussels Effect: how the European Union rules the world”, by Anu Bradford), and compare it to the adoption of other standards (e.g., of the US or China). One can also invoke qualitative expert assessments: for example, external delegations may be asked to provide a synthetic judgement about digital policies in their host country and assess how aligned they are with the EU’s approach. Voting records in the UN or other international bodies could be analysed similarly.

³⁹ For many variables, EU level numbers cannot be obtained: for example, there is no EU value for the UN’s Gender Inequality Index, or it is not possible to say how many human rights treaties have been adopted at the EU level.

⁴⁰ The colours use the same percentile cutoffs as in the normal dashboards, referring to the distribution of the values in the reported years or periods (1, 2 or 3). Colours are such that the countries with the highest values (upper 12.5% of the data) are dark blue, followed by lower values (12.5% to 37.5% of the data) in blue. Countries in the central part of the data are coloured yellow. Dark orange indicates values that are in the bottom 12.5% while light orange between the bottom 12.5% and 37.5% of the data. For some indicators the colour scheme has been reversed, as indicated in Annex VII.

Figure 25: Dissemination of values and standards.

| | | | EU27 | Australia | Brazil | Canada | Switzerland | China | Indonesia | India | Japan | Korea | Mexico | Norway | Russia | Turkey | UK | USA |
|---|---|------|------|-----------|--------|--------|-------------|-------|-----------|-------|-------|-------|--------|--------|--------|--------|----|-----|
| Area 5A: Dissemination of values and standards -- values | Human rights* | 2011 | | | | | | | | | | | | | | | | |
| | | 2021 | | | | | | | | | | | | | | | | |
| | Gender inequality index* | 2005 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | World press freedom index* | 2013 | | | | | | | | | | | | | | | | |
| | | 2021 | | | | | | | | | | | | | | | | |
| | Control of corruption* | 2005 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Voice and accountability* | 2005 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| Area 5B: Dissemination of values and standards -- standards | Civil society participation index* | 2006 | | | | | | | | | | | | | | | | |
| | | 2020 | | | | | | | | | | | | | | | | |
| | Importance of democracy* | 2020 | | | | | | | | | | | | | | | | |
| | Labour standards: Social protection benefits* | 2020 | | | | | | | | | | | | | | | | |
| | Labour standards: Low pay rate* | 2018 | | | | | | | | | | | | | | | | |
| | Environmental standards: GHG emissions | 2010 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | Environmental standards: Water stress* | 2005 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | Environmental standards: Energy transition index* | 2012 | | | | | | | | | | | | | | | | |
| | | 2021 | | | | | | | | | | | | | | | | |
| | Product safety standards: product withdrawals | 2012 | | | | | | | | | | | | | | | | |
| | | 2020 | | | | | | | | | | | | | | | | |
| | Global Food Security Index* | 2012 | | | | | | | | | | | | | | | | |
| | | 2020 | | | | | | | | | | | | | | | | |
| | Share of national imports from world imports | 2011 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | Share of inward FDI from global FDI | 2010 | | | | | | | | | | | | | | | | |
| | | 2020 | | | | | | | | | | | | | | | | |
| | FDI restrictiveness index* | 2020 | | | | | | | | | | | | | | | | |

Cell colours indicate the relative position of a country-year cell among all countries considered in the reported years, from dark orange (worst) to dark blue (best). A white cell denotes a missing value. Stars indicate that the EU value refers to the median value across Member States.

Figure 26: International cooperation and soft power.

| | | | EU27 | Australia | Brazil | Canada | Switzerland | China | Indonesia | India | Japan | Korea | Mexico | Norway | Russia | Turkey | UK | USA |
|------------------------------------|--|-----------|------|-----------|--------|--------|-------------|-------|-----------|-------|-------|-------|--------|--------|--------|--------|----|-----|
| Area 6A: International cooperation | Development aid | 2011 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Share of patents with foreign partners | 2011 | | | | | | | | | | | | | | | | |
| | | 2017 | | | | | | | | | | | | | | | | |
| | FDI stock to Africa | 2015 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Trade with Africa | 2011 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| Area 6B: Soft power | Lending to Africa: debt outstanding | 2010 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Diplomatic posts* | 2016 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Trust in global institutions: UN* | 2007 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Passport Index* | 2015 | | | | | | | | | | | | | | | | |
| | | 2021 | | | | | | | | | | | | | | | | |
| | Nobel prize winners | 1901-2020 | | | | | | | | | | | | | | | | |
| | Olympic medals | 2016 | | | | | | | | | | | | | | | | |
| | FIFA ranking | 2021 | | | | | | | | | | | | | | | | |
| | International arrivals | 2019 | | | | | | | | | | | | | | | | |
| | Museum visits | 2019 | | | | | | | | | | | | | | | | |
| | World heritage sites | 2019 | | | | | | | | | | | | | | | | |
| | Net trade in cultural goods | 2010 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |

Cell colours indicate the relative position of a country-year cell among all countries considered in the reported years, from dark orange (worst) to dark blue (best). A white cell denotes a missing value. Stars indicate that the EU value refers to the median value across Member States.

Figure 27: Global positions and comparisons.

| | | | EU27 | Australia | Brazil | Canada | Switzerland | China | Indonesia | India | Japan | Korea | Mexico | Norway | Russia | Turkey | UK | USA |
|-------------------------------|--|-----------|------|-----------|--------|--------|-------------|-------|-----------|-------|-------|-------|--------|--------|--------|--------|----|-----|
| Area 7A: Economic importance | Stock market capitalisation | 2010 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | GDP in current USD (share from global) | 2000 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | | 2040 | | | | | | | | | | | | | | | | |
| | GDP in PPP (share from global) | 2000 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | | 2040 | | | | | | | | | | | | | | | | |
| | GDP per capita (in constant PPP) | 2000 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | | 2040 | | | | | | | | | | | | | | | | |
| | Trade: Exports (share from global) | 2012 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | Share of outward FDI from global FDI | 2010 | | | | | | | | | | | | | | | | |
| Area 7B: Innovation | | 2020 | | | | | | | | | | | | | | | | |
| | International role of the euro | 2020 | | | | | | | | | | | | | | | | |
| | Import dependence in cereals | 2009 | | | | | | | | | | | | | | | | |
| | | 2015 | | | | | | | | | | | | | | | | |
| | Net food trade | 2010 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| Area 7C: Demography | Expenditures on R&D (share from global) | 2010 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Share of patents from global patents | 2010 | | | | | | | | | | | | | | | | |
| | | 2017 | | | | | | | | | | | | | | | | |
| | Number of researchers | 2010 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| Area 7D: Space and hard power | Number of top 1000 universities | 2021 | | | | | | | | | | | | | | | | |
| | Foreign university students | 2014 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | Share of migrants | 2010 | | | | | | | | | | | | | | | | |
| | | 2020 | | | | | | | | | | | | | | | | |
| | Share of population in the world | 2000 | | | | | | | | | | | | | | | | |
| Area 7E: Military power | | 2020 | | | | | | | | | | | | | | | | |
| | | 2040 | | | | | | | | | | | | | | | | |
| | Life expectancy* | 2000-2005 | | | | | | | | | | | | | | | | |
| | | 2015-2020 | | | | | | | | | | | | | | | | |
| | | 2040-2045 | | | | | | | | | | | | | | | | |
| | Expenditures on space programs (% of total) | 2019 | | | | | | | | | | | | | | | | |
| | Expenditures on space programs (% GDP) | 2019 | | | | | | | | | | | | | | | | |
| | Satellite launches | 1957-1990 | | | | | | | | | | | | | | | | |
| | | 1991-2015 | | | | | | | | | | | | | | | | |
| | | 2016-2021 | | | | | | | | | | | | | | | | |
| Area 7F: Military power | Military expenditures | 2010 | | | | | | | | | | | | | | | | |
| | | 2019 | | | | | | | | | | | | | | | | |
| | Number of military personnel | 2010 | | | | | | | | | | | | | | | | |
| | | 2018 | | | | | | | | | | | | | | | | |
| | Military personnel in international missions | 2020 | | | | | | | | | | | | | | | | |
| | Exports of weapons | 2009-2011 | | | | | | | | | | | | | | | | |
| Area 7G: Military power | | 2018-2020 | | | | | | | | | | | | | | | | |

Cell colours indicate the relative position of a country-year cell among all countries considered in the reported years, from dark orange (worst) to dark blue (best). A white cell denotes a missing value. Stars indicate that the EU value refers to the median value across Member States.

ANNEXES – RESILIENCE DASHBOARDS FOR THE SOCIAL AND ECONOMIC, GREEN, DIGITAL AND GEOPOLITICAL DIMENSIONS

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ANNEX IA: METHODOLOGY - READING THE DASHBOARDS

The resilience dashboards, both at Member State and global level, present an assessment of country vulnerabilities and capacities in relative terms. They use a scale of five colours¹, which indicates each country's relative situation in the latest available year, compared to the collection of values of that indicator for all Member States and all years in the reference period 2007-2017. In the digital dashboard (and for one specific indicator in the green), the reference period is 2015-2019².

Figure A1: Assessing the position of a country in the reference dataset.

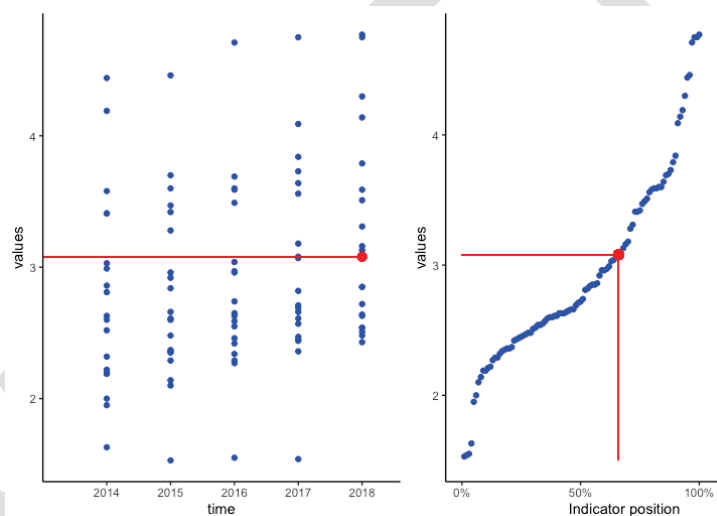


Figure A1 sheds light on the mechanics of this comparison. Its left panel shows the hypothetical distribution of values of an indicator across years, all countries. Each dot represents a country. The red dot is the value of the indicator for a specific country in the latest year. The right panel presents the overall distribution of the values of this indicator across countries and years, constructed by pooling together and ordering all values from the left panel. The red dot is the position of the specific country in this distribution. The corresponding value on the horizontal axis is the position used for determining the country's relative situation. A value of 70%, for example, means that exactly 70% of the values in the reference dataset are smaller than the red dot³.

Indicators that are located in the top 12.5% of the overall distribution (an indicator position above 87.5%) are coloured **dark blue**; **light blue** indicates countries falling between the top 12.5% and 37.5% (indicator position between 62.5% and 87.5%); **dark orange** indicates values that are in

¹ Differently from the prototype dashboards in the 2020 Strategic Foresight Report, here a more granular colour scheme is adopted. It allows for a better description of the countries' relative situation. Another methodological difference is that the relative situation is assessed using the percentile position in the reference distribution, not the z-score. This method is less sensitive to outliers and the asymmetry of the indicators' distribution.

² The choice of this reference period depends on the data coverage and the appropriate amount of data to build a base sample. It represents the longest possible common reference period. One should note that data availability across countries may vary from year to year. In the current exercise, all values have been taken into account. It means that countries with longer available data series will get a somewhat bigger importance in the distribution. Moreover, when less than four years of data is available for an indicator in the 2007-2017 reference period, it is checked if the alternative reference period from 2015-2019 contains more data. If so, this alternative reference period is used, and this is indicated with an asterisk in the dashboard.

³ If the distribution of one indicator is made of 100 values, then 0.7 means that the country today ranks 70th in this distribution from the bottom.

the bottom 12.5%; **light orange** between the bottom 12.5% and 37.5% of the reference data; **yellow** is used to indicate values in the middle, falling between the 37.5th and 62.5th percentile of the reference sample (**Figure A2**).

Figure A2: Colouring scheme for the dashboards. Numbers are percentiles of the reference data collection (all Member States and all years in the reference period 2007-2017).

| Vulnerabilities | Capacities |
|-----------------------|-----------------------|
| Bottom 12.5% (<12.5%) | Top 12.5% (>87.5%) |
| 12.5%-37.5% | 62.5%-87.5% |
| 37.5%-62.5% | 37.5%-62.5% |
| 62.5%-87.5% | 12.5%-37.5% |
| Top 12.5% (>87.5%) | Bottom 12.5% (<12.5%) |

In addition, the dashboards present the corresponding **EU-level position** for each indicator. EU-level values are taken from the same data source as for the Member States, whenever available. If not available, they are calculated as an appropriately weighted average over all Member States, where the weights are chosen to obtain the corresponding EU-level statistical measure for the specific indicator (most frequently GDP or population-based weights, depending on the indicator).

The dashboards also show **arrows, which indicate the direction of recent changes**. An upward arrow indicates a sizeable improvement with respect to the preceding five years (2015)⁴, while a downward arrow indicates a sizeable worsening. A change is called *sizeable* if the absolute change between the most recent data and the three-year average from five years earlier is larger than half of the size of the central range (size of the yellow bucket in term of indicator's values) of the reference data collection used for the colour scheme⁵. A dot indicates that no sizeable change has taken place over the most recent five years. An empty cell indicates that the five-year change cannot be calculated.

ANNEX IB: THE SYNTHETIC INDICES

Consistently with the relative assessment of countries' situation in the dashboards, the synthetic indices are constructed as follows⁶. First, for each indicator, we assess the position of a given country's value in the ranking of the reference dataset (all EU countries and all years in 2007-2017). This position is expressed as a percentage value in the range [0,100%], which corresponds to the percentile position of the country's most recent indicator value in the overall distribution (Figure A1). Then, for each country, the overall vulnerabilities (capacities) index is obtained by the median value over all the vulnerability (capacity) indicator positions⁷. A high vulnerabilities

⁴ The change is relative to the average value of the indicator in the period 2013-15. This choice is due to the fact that some indicators may not be available in all years, and taking such an average decreases the impact of missing data. Moreover, the average smooths potential outliers or short-term fluctuations in the time series.

⁵ As an example, the employment rate has a central range going from 62.2% to 66.3% so any change (between the 2013-2015 average and the latest year) larger than $(66.3\% - 62.2\%) / 2 = 2.05\%$ will be sizeable.

⁶ The methodology for the synthetic indices has been discussed with the JRC Competence Centre on Composite Indicators and Scoreboards, which is currently auditing the synthetic indices.

⁷ The balance among the broad areas within each dimension ensures that there is no need to assign importance weights to the individual indicators and to consider a weighted median approach.

index indicates high vulnerabilities, while a high capacities index indicates high capacities, compared to other countries. Similarly, synthetic indices by areas are computed by taking the median value over all the vulnerability (capacity) indicator positions that are included in the considered area.

These indices allow both cross-country comparisons within a given year, and assessments of changes over time for a given country⁸ and, going forward, at the EU level as the basis for comparisons with third countries. In addition, they allow the comparison of the situation across dimensions.

This approach delivers important benefits compared to other alternatives considered⁹. First, having a multi-year reference period (instead of a single-year one) means that it is meaningful to compare the index values over time: a higher value indicates a better situation¹⁰. Second, for the same reason, it is possible to construct indices both for a “proper calendar year” (e.g. 2018 data, provided that data allow) or for the “latest available year” (mix of data from various years). Third, the fixed reference period (instead of a ‘rolling period’, e.g. the past 10 years) implies that the current index will only change in the future if backward revisions of the data occur within the reference period. After a few years, one may decide to change the reference period (e.g. extend or shift), as well as to update the historical indices. Finally, the method is reasonably robust to extreme values and asymmetry in the indicator distributions, yet it is sensitive to changes in the underlying indicator values¹¹.

⁸ The possibility to extend the indices backward could present challenges due to missing data. Future editions of the dashboards will nevertheless allow obtaining future values of the index.

⁹ This approach was chosen from a couple of alternatives: using the average normalized value of the indicators (z-score or robust z-score); using the average, median, or the top 25th percentile of all the individual indicator positions, or following a non-compensatory method based on pairwise comparisons relative to the same reference period, like the Copeland method.

¹⁰ I.e., a higher value of the synthetic index implies a higher median value of the indicator positions in the same (fixed) reference distribution (typically 2007-2017). In fact, this property also holds for individual indicators: a percentile value (and colour) that is higher (darker) in a given year than in another indicates a higher indicator value.

¹¹ A non-compensatory method based on pairwise comparisons relative to the same reference period (like the Copeland method) would be highly sensitive to missing data, and at the same time, might be insensitive to changes in the indicators over time. I.e., it is possible that a handful of a country’s indicators change, but the effect is not visible in the index. The z-score method would have been too sensitive to extreme values and asymmetry, and would have required tight conditions on the correlations among variables. The method of using the median (or the top 25th percentile) is robust to the distribution of the indicators and their correlation structure, but might be less sensitive to year-to-year changes in indicator values. Using the mean is usually more sensitive to changes, but it is less robust to the statistical properties and correlation structure of the indicators. Since the mean and the median approach have turned out to be similarly sensitive to changes, while the 25th percentile approach was too sensitive to extreme values, we have selected the median approach.

ANNEX II: GAP ANALYSIS

The construction of the dashboards has shed light on several gaps in the availability and quality of indicators and data (insufficient time or cross-country coverage, inconsistencies in reporting, etc.). Future revisions of the dashboards could consider the use of new indicators in the areas highlighted below, as they will become available.

Social and economic dimension

Despite its broad range of topics and the overall good data availability, some important aspects of resilience in the social and economic domain could not be addressed. To monitor resilience with a forward-looking perspective, topics such as equality of opportunities and social capital are fundamental. In addition, and learning from the current COVID-19 pandemic, pending health and environmental threats could be addressed more prominently.

Future work to improve the dashboard should focus in particular on the following:

- **Equality of opportunities and inequalities.** Equality of opportunity refers to the opportunity to improve socio-economic status through education, and as such (its lack) is closely related to the manifestation of various inequalities in a society. The current dashboard proxies equality of opportunity with the gap in educational achievement between different socio-economic groups and features some forms of inequalities (gender employment gap, income quintile ratio). A further disaggregation by gender, age, disability, ethnic origin or urban versus rural level could shed light on the extent of equality of opportunity. These inequalities additionally highlight arising vulnerabilities (for example the gender pension gap or intergenerational discrepancies).
- **Adults not in training and employment.** The financial and economic crisis of 2008 and the economic and digital transitions have changed the skillset that is needed in the labour market. Many jobs are at risk to become obsolete, while others will be created. It is important to have a sense of how many people are able to adapt their competencies to a changing labour market. Currently, this phenomenon is monitored indirectly, by looking at adult participation in learning, long-term unemployment, employment in energy-intensive sectors, jobs with high automation risk as well as the share of young people neither in employment nor in education and training.
- **Social ties, social connections.** Both are fundamental building blocks of “social capital”, an important aspect of societal resilience. Currently, social ties are proxied by active citizenship, i.e. people’s engagement in voluntary activities. It would be important to include elements related to bridging and bonding at the community or country level. One of these could be the level of trust in other people. As of now, the time and country coverage of these type of data is not satisfactory.
- **Health:** although this domain is very high on the political agenda, for certain key aspects information is outdated. This is for instance the case for mental health and subjective social distress, the 5-year cancer survival rate, as well as access to green areas. There is a strong need to improve data availability and time coverage for monitoring purposes.

- **Structural unemployment**, i.e., the mismatch between available jobs and skills of the unemployed, is an important issue both in general, and during the transitions, due to the important structural transformations. This concept is currently proxied by the long-term unemployment rate, the employment rate in energy-intensive sectors, jobs at risk of automation and the macroeconomic skills mismatch indicator. More specific and targeted measures will be crucial to monitor and manage the enfolding sectoral reallocations, their social implications, and the adequacy of the competences and skills provided by the educational system.
- Another gap refers to the current and future evidence of **wealth accumulation and concentration**. The household saving rate is a rather incomplete measure of financial and real buffers that households can accumulate, and a measure of wealth would deliver a more complete picture. The distribution of wealth across households in the Member States is also important for intergenerational mobility and fairness¹².
- **High carbon intensity** of certain sectors increases trade-offs between generating **employment** and environmental pressures. Although in the current dashboard there is a narrow measure (the share of employment in energy-intensive manufacturing sectors), it would be beneficial to have a broader measure of the size/employment of the brown sectors.
- Likewise, it would be important to cover **employment opportunities and challenges** created by the **twin transition**, e.g. improving the indicator on the impact of automation on labour markets (e.g., robotisation, chatbots), better illustrating the challenges in certain sectors posed by the green transition, and including an indicator on green jobs. A further facilitator would be the ability of citizens to build “green skills” and to adapt to the green transition²⁶.
- A well-functioning **Single Market** is key for resilient growth and an area where the EU has a high degree of policy control. Currently, only the geopolitical dimension contains some indicators on intra-EU trade, which could be complemented by an indicator on the free movement of people, for example the mobility of those who work in regulated professions.
- Additionally, there is no apparent indicator measuring the **quality of and investment** into current and future infrastructures.
- Finally, an indicator on the **effectiveness and efficiency of governance and government policies** would be useful, but no such indicators exist, or they are too broad.

Green dimension

Broad thematic sub-areas that we believe are relevant, but are not covered in the dashboard are the following.

- **Food safety**. The current dashboard presents one indicator on pesticide risk, which relates both to the environment and to human health. However, the dashboard does not cover broader indicators of the ability to ensure food safety.

¹² There is evidence that the concentration of wealth is increasing in some Member States. Hence, further analyses of the distribution of wealth would be needed. Currently, available data such as the ECB’s Household Finance and Consumption Survey do not cover all Member States and are not timely enough.

- **Green buildings and renovation.** Although some indicators on the energy efficiency and sustainability of the built environment exist, their country and year coverage does not allow for their inclusion in this dashboard. As the renovation wave is a crucial part of the Green Deal strategy "for greening our buildings, creating jobs, improving lives", it would be relevant to cover some aspects¹³.
- **Transport footprint.** Ideally, the dashboard should contain indicators that point to the decarbonisation of several transport sectors (heavy-duty vehicles, aviation or maritime/waterways transport)¹⁴. Furthermore, for the sustainability of the passenger transport, there is insufficient data on the use of active transport modes (such as bicycles), where the cross-country and time coverage does not allow for the inclusion in the dashboard.
- **Urban/rural interdependencies.** It would be beneficial to have an indicator that can grasp the urban-rural divide in terms of the overall ability to face the green transition. In general, rural areas provide goods, amenities and ecosystem services that benefit the broader society; however, they are characterized by fragility in social, economic and environmental terms. Rural ecosystem pressures, urban sprawl, transport challenges and additional risks of natural disasters are just some examples of rural specific vulnerabilities.
- **Frugality.** The transition requires a shift in values in order to transform our economy and make it more agile, socially inclusive, and ecologically beneficial. This entails 'doing more with less', i.e., the ability to satisfy human needs staying inside planetary boundaries, develop high-quality products, and create more business and social value while minimising the use of diminishing resources such as energy, capital, and time¹⁵. More indicators and data may become available in the future.

The following areas have only been partially addressed, because the currently available data appeared not sufficiently complete or mature. New indicators and data are expected to become available in future:

- **Innovative practices in farming.** Innovative practices in farming are important to overcome challenges in agriculture, such as high dependency on phosphorus, intensive use of chemical fertilizers and negative impacts on biodiversity. An indicator on the agricultural area covered by organic farming has been included in the dashboards, but it is important to stress that there are other types of practices that can be highly beneficial for the green transition. One such practice is **precision farming**, a management approach that focuses on (near real-time) observations, measurement, and responses to variability in crops, fields and animals. It uses digital techniques to monitor and optimise agricultural production processes. It is a potentially relevant and forward-looking aspect since it aims to increase the quantity and quality of agricultural output while using fewer inputs (water, energy, fertilisers, pesticides...), through more advanced production technologies. The data will be available starting from 2023 and, possibly, integrated into the dashboard.

¹³ SWD(2020) 550 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122220757&uri=CELEX:52020DC0662>

¹⁴ Regarding aviation, the differences in methodologies covering transport activity and energy/emissions make the comparison across countries harder. Eurostat developed a methodology for territorializing the aviation activity, but its purpose is to compare the shares of each transport mode into the total transport situation, rather than the emissions at country level.

¹⁵ <https://sloanreview.mit.edu/article/the-rising-frugal-economy/> and <https://www.nesta.org.uk/event/rise-frugal-economy/>

- **Biodiversity loss.** On the one hand, indicators on the loss of biodiversity (Common and forest bird index, grassland butterfly index) present limitations in terms of country coverage. On the other hand, indicators that point to the drivers of healthy ecosystems and biodiversity (i.e. conservation status of natural habitats) are not timely enough. Future improvements in the monitoring system in terms of both pollinators as well as bird indexes are expected.
- **Sustainable forest management.** The role of forests is key both for maintaining biodiversity and for mitigating climate change effects, absorbing and acting as carbon sinks. The current dashboard does not cover aspects of the exploitation level of forests or their overall health, as current data is not available for all the countries,
- **Quality of water (phosphates and biological oxygen demand).** Such data, although it exists, is not available consistently across all the Member States.
- **Environmental taxation.** The current dashboard does not present any indicator about environmental taxation. The interpretation of data on energy tax revenues, for example, heavily depends on the energy intensity of the underlying economy. As a result, comparison by ranking has limited significance. Additionally, the existing energy taxation datasets suffer from some drawbacks, which limits the accuracy of the revenue estimates, and further results in limitations to cross-country data comparability. This is mostly due to differences in the national definition of energy taxes, including the distinction between fees and taxes, and the prevalence of the national accounting principles.
- **Green finance and investment.** Green bonds, finance for investments that are compliant with the EU taxonomy, as well as public and private expenditures on environment-related technologies are fields where some data exist but are not yet mature. There will be new data and indicators when the first taxonomy-based disclosures will become available for the companies subject to the Non-Financial Reporting Directive (under review).
- **Active engagement of the national and local administration towards the climate and environment goals.** Although we have considered including an indicator on the population under the Covenant of Mayors¹⁶, which covers the municipalities that signed the initiative for the climate action, it was deemed not extremely suitable as an indicator of the level of commitment relevant to the green transition and therefore excluded. New data on local engagement like active signatures may become available.
- **Citizen awareness and responsible consumption.** As stated in the European Climate Pact¹⁷, it is extremely important to involve people, communities and organisation to build a greener society. Everyday choices matter, and it would be very important to monitor the consumer choices and citizen awareness about the climate action climate and environment-conscious choices.
- **Role of agricultural soil** for achieving climate neutrality. This is a relevant aspect especially in the light of the future need to revert current trends of carbon emissions to carbon absorption by croplands.

¹⁶ The EU Covenant of Mayors for Climate & Energy brings together thousands of local governments voluntarily committed to implementing EU climate and energy objectives.

¹⁷ https://ec.europa.eu/clima/policies/eu-climate-action/pact_en

Digital dimension

Data collection and data quality in the digital dimension are particularly challenging, due to the continuous changes happening in the digital world (e.g., new mobile protocols, development of AI-based services, etc...). What is still missing in the present version of the digital dashboard can be classified into the following three broad categories:

1. The concept behind the data is clear and well defined, but the corresponding indicators are not yet representative and/or reliable. Typical examples are:
 - more specific **e-health** (or m-health) indicators;
 - the use of **open data** in public services;
 - **digitisation of the educational system**: human capital (teachers' and pupils' digital skills), digital infrastructures (availability of computers, Virtual Learning Environment);
 - **investment in the high-technology sectors** does not include the service sector;
 - public investment in AI.
2. The underlying phenomena are already present in the society, but official statistics do not yet provide indicators to fully represent them
 - **EU dependency on digital technologies** (e.g., Operating Systems, social platforms, cloud services);
 - digital currencies and in general, the **digitalisation of finance**;
 - **digital access to infrastructures and services**;
 - **smart energy systems** (smart meters, smart grids, smart buildings);
 - data on **energy use by cloud storage** and other big data services.
3. The concept itself is not yet well defined and/or there are no “natural” variables that may proxy it (brand new phenomena, subject to rapid changes). The main items are the following:
 - **digital literacy and awareness** (manage the overload of information, avoid excessive dependence on social media, especially for the young);
 - **digital democracy** (including fake news);
 - **impact of social media on financial markets** (the recent case of GameStop);
 - **personal data protection** (e.g. identity thefts)

More work would be needed to develop new indicators for some of these key aspects, overcoming the actual lack of official statistics as, for example, in the case of cybersecurity levels, digital preparedness of students and teachers, etc.

It would also be important to investigate the possibility to define and then use new indicators able to directly tackle potential trade-offs and synergies between those aspects whose impacts are likely to span across different dimensions. These include for instance energy demand and energy saving associated with digitalisation and their effects on the green transition or the impact of social media on social cohesion.

Geopolitical dimension

The part of the geopolitical resilience dashboard that focuses on external dependencies is mostly based on available data, in the areas of raw materials and energy supply, value chains, and economic and financial stability. Though it is fairly populated, there are some important gaps and ongoing work, including:

- **Military**, where it would be important to assess the effectiveness of spending (hence a “military capacity”), or the status of a common EU defence capacity, but where spending and the number of personnel serve as proxies.
- **Global aspects of cybersecurity** vulnerabilities, which represent a newly and quickly evolving threat. Though the Global Cybersecurity Index is employed in the digital dimension, it is more general and focuses less on global and geopolitical aspects.
- **Hybrid threats**, where currently we only have included an indicator of disinformation and some capacities that can be relevant against disinformation.
- **Environmental security**, where issues could include global threats to air quality, access to water, or the marine environment.
- It would be important to cover broad aspects of **future demographic changes with potential geopolitical implications**, including migration, ageing, brain drain, and other population dynamics, for which projections would be needed.
- **Dependence on external suppliers may be highly concentrated** into specific narrow industries or specific raw materials. General partner concentration measures would have only a limited capability to capture this. Work is ongoing to identify such sectors and materials, and to develop measures that can highlight their nature and severity.
- The adopted **indicators of value chains are limited to sectorial data** (global input-output tables). More disaggregated, or even firm-level data would be important to depict these relationships, with their implied benefits and dependencies.
- Detailed data on bilateral **FDI stocks and flows**, especially at sectoral level, are scarce. **Foreign ownership in certain, especially strategic sectors and assets** is also an important area with further data needs.
- In line with the need to increase pandemic preparedness and the EU’s resilience to potential shortcomings in critical medicines, an indicator of **manufacturing capacity within the EU for critical medicines** should be considered. Similarly, further strategic items could also be added. Currently, publicly available statistics do not cover this aspect. Data related to critical medical capacities is foreseen to become available during this year.

ANNEX III: COMPARISON WITH OTHER FRAMEWORKS, DASHBOARDS AND SCOREBOARDS

This annex discusses the linkages between the resilience dashboards and selected existing frameworks, dashboards and scoreboards (see also **Tables A1-A4** at the end of this Annex). These can either take a multidimensional perspective with a broad scope (e.g. the SDG indicators or the Transition Performance Index, TPI) or cover specific thematic areas (e.g. the Circular Economy Scoreboard or the Digital Economy and Society Index, DESI)¹⁸. The Commission is also preparing new monitoring tools (e.g. the Recovery and Resilience Scoreboard¹⁹, Digital Compass, Green Deal monitoring framework, Strategic Compass) or reviewing others currently in use (e.g. Energy Union 2030, New Circular Economy Action Plan). These processes are all coordinated in order to ensure coherence, exploit synergies and avoid duplication.

Indicators included in the resilience dashboards sometimes overlap with indicators in other monitoring tools. However, there are some important considerations on the way they were selected and presented, which make the resilience dashboards unique. First, the selection of the indicators is the result of a collective intelligence exercise, whose core debate was around the ability of the indicators to point to resilience aspects, as opposed to progress towards certain policy goals. Hence, the indicators were “distilled” and evaluated by the experts as representing vulnerabilities and capacities. Second, achieving a holistic perspective is also a driver for the selection of the indicators. Third, indicators in the resilience dashboards are not presented in their raw form. As explained in Annex IA, the colouring scheme illustrates the position of a country, based on the most recent data, within the overall distribution in a reference period (mostly 2007-2017). The use of arrows also offers a dynamic perspective.

Table A1 establishes a precise mapping between the social and economic dashboard and the SDGs, TPI, Social Scoreboard and the MIP indicators (the latter two only for the Member State level dashboard). **Table A2** links the green dashboard to the SDGs and TPI (also for the global dashboard), the OECD Green Growth indicator set, the EAP7 and the RES (only for the Member State dashboard). **Table A3** presents the comparison between the digital dashboard and the SDGs and TPI (also for the global dashboard), DESI, PREDICT and ITU (only for the Member State dashboard). Finally, **Table A4** compares the geopolitical dashboard to the SDGs and the TPI.

Multidimensional indicator frameworks

Sustainable Development Goals Indicators

Resilience is instrumental to achieve sustainability. A resilient society can respond effectively to shocks and structural changes while staying on or reaching a sustainable development path. Monitoring resilience and sustainable development are thus also related, and there is a natural link

¹⁸ One of the recent dashboards is the European Statistical Recovery Dashboard, which contains monthly and quarterly indicators to allow for the monitoring of economic and social recovery from the COVID-19 pandemic. We do not explicitly compare the dashboards with this tool, because it is narrower in timeframe and scope and it refers to single very specific shock.

¹⁹ The Commission is currently working on its preparation, as announced in the Recovery and Resilience Facility Regulation. The purpose of this tool is rather different compared to the resilience dashboards, as it aims to provide synthetic information on progress with the implementation of the Facility. See Regulation (EU) 2021/241 of the European Parliament and of the Council establishing the Recovery and Resilience Facility (OJ L57/17, 18.02.2021).

between the resilience dashboards and the SDG indicators. Both take a multidimensional perspective covering social, environmental and economic aspects of our society. The latter focus on progress towards achieving long term objectives; the former point to the abilities that enable or hinder countries to reach these goals in turbulent times, and incorporate forward-looking aspects to anticipate obstacles and opportunities.

The 17 SDGs are broken down by the United Nations into 169 targets, and progress towards these targets are tracked through a set of 231 indicators, based on data availability at global level²⁰. In the EU context, Eurostat regularly monitors the progress towards the SDGs. For this purpose, it coordinates the development of the EU SDG indicator set, keeps it up to date, and produces regular monitoring reports on the progress towards the SDGs. The EU indicators set is annually reviewed and the current version contains 102 indicators²¹.

A first mapping of the dashboard indicators to SDGs shows that the resilience dashboards span across all the goals. The entire set of indicators refers to 65 targets (out of 169). 83% of the indicators are linked to at least one specific target, and 6% generally to a goal. 26 indicators of the dashboards exactly coincide with indicators in the EU SDG set.

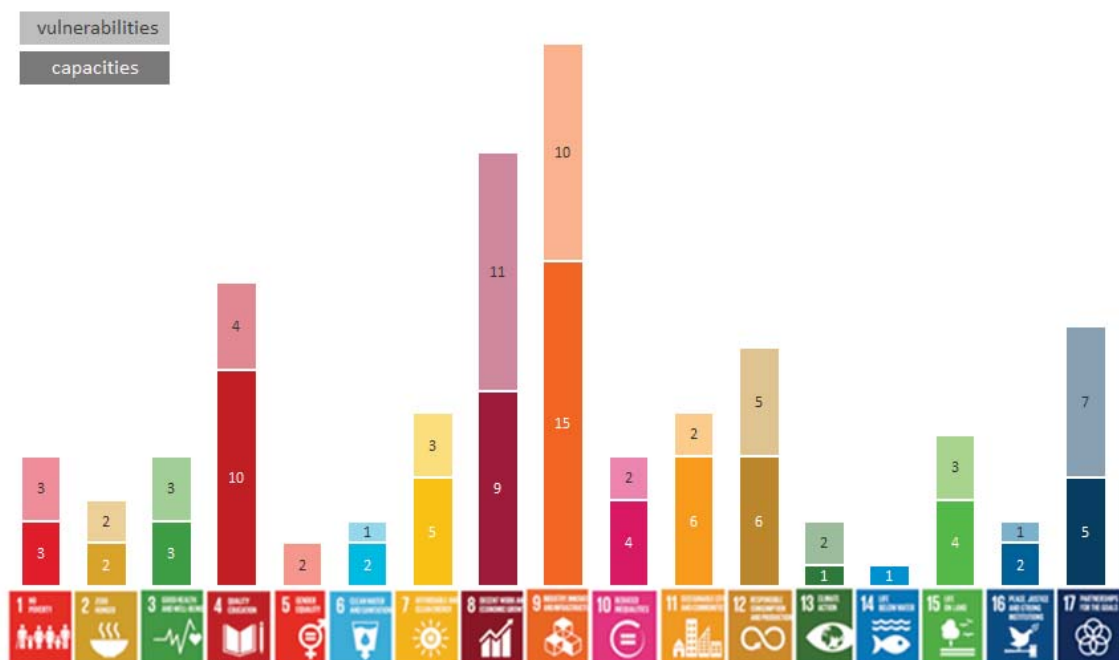
Figure A3 maps the current list of indicators in the resilience dashboards to the SDGs, considering all four dimensions. It shows the main prevalence of two goals: SDG 9 on infrastructure and innovation, and SDG 8 on sustainable economic growth and employment. Other significant goals linked to the dashboards are SDG 4 on quality education, SDG 17 on partnership and macroeconomic stability, and SDG 12 on sustainable consumption and production. **Figure A4** presents a mapping by the four dimensions. Lastly, **Figure A5** shows the main SDG targets that are linked to the resilience dashboards²².

²⁰ <https://unstats.un.org/sdgs/indicators/indicators-list/>

²¹ <https://ec.europa.eu/eurostat/web/sdi/indicators>

²² The most frequently mapped SDG target is 9.1, to “develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all”. Since the definition of infrastructure also includes telecommunications, including Internet connectivity and broadband access, many of the indicators from the digital dashboard are mapped to this target.

Figure A3: Mapping of the resilience dashboard indicators on the SDGs, number of indicators by goal, all four dimensions considered.



UN SDGs short description. 1: No Poverty, 2: Zero Hunger, 3: Good Health and Well-being, 4: Quality Education, 5: Gender Equality, 6: Clean Water and Sanitation, 7: Affordable and Clean Energy, 8: Decent Work and Economic Growth, 9: Industry, Innovation and Infrastructure, 10: Reduced Inequality, 11: Sustainable Cities and Communities, 12: Responsible Consumption and Production, 13: Climate Action, 14: Life Below Water, 15: Life on Land, 16: Peace and Justice Strong Institutions, 17: Partnerships to achieve the goals.

Figure A4: Mapping of the resilience dashboard indicators on the SDGs, by dimension.

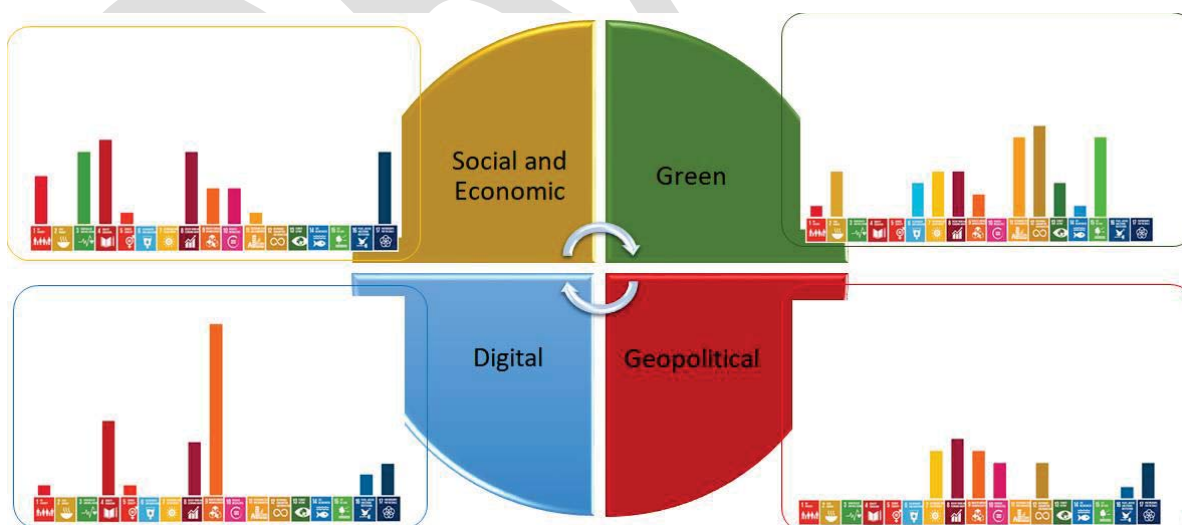
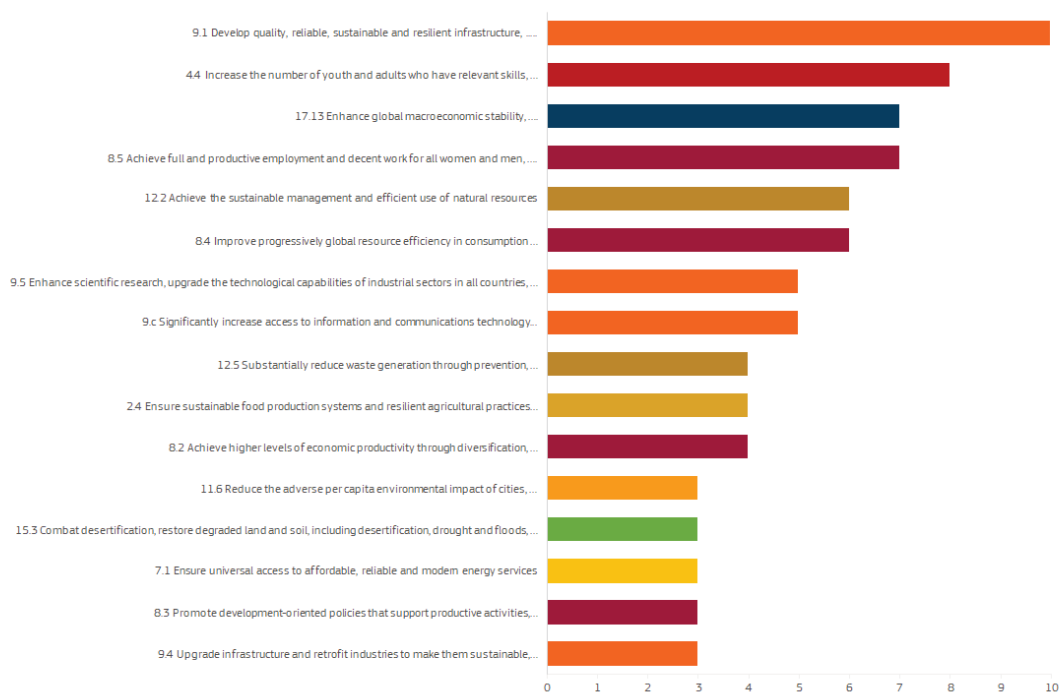


Figure A5: Main SDG targets detected in the resilience dashboard indicators, all four dimensions considered.



Transition Performance Index

The Transition Performance Index²³ (TPI) is a scoreboard that monitors and ranks countries from all over the world based on four transitions to fair and prosperous sustainability. It focuses on the transformations needed in the economy, the social sphere, the environment and in governance to progress towards the EU objective of competitive sustainability. Its explicit focus on the transitions makes it rather similar to the resilience dashboards approach. However, there are important differences: (i) the TPI approach does not focus on the behaviour of the single components of the index, (ii) the TPI explicitly ranks the countries according to their progress towards the transition, (iii) the number of indicators is smaller, 25 in total, (iv) the scope is much larger in terms of countries covered (72), (v) the TPI does not cover the digital dimension, (vi) the TPI prefers output over input indicators.

There are some common indicators between the TPI scoreboard and the resilience dashboards. Some of the examples in the Member State level analysis are healthy life expectancy, gender employment gap, GHG emissions per capita, energy and resource productivity, government investment and expenditure on R&D. It also focuses on other similar aspects, but using different indicators (for instance on biodiversity, use of pesticides, inequality, or innovation). The environmental component of the TPI does not contain forward-looking elements that may drive

²³ https://ec.europa.eu/info/research-and-innovation/strategy/support-policy-making/support-national-research-and-innovation-policy-making/transitions-performance-index-tpi_en

the transition (such as forest carbon capture capacity, waste management, sustainable energy, mobility or agriculture, environment-related innovation and investment).

The resilience dashboards at global level connect to both global frameworks of the TPI and the SDGs. Many of the indicators presented in the global dashboards of the social and economic and the green dimensions match both frameworks. This is due to the similar focus on social, economic and environmental aspects present in the three dashboards. Yet, the global digital and geopolitical resilience dashboards, due to their focus on specific topics, match the TPI and the SDGs only on few indicators such as digital competences and import dependency in energy materials.

Thematic tools

The **Social Scoreboard**²⁴ (SSB) has been designed as a reference framework to monitor ‘societal progress’ in a tangible, holistic and objective way. It monitors, notably in the context of the European Semester, Member States' performance in relation to the European Pillar of Social Rights and contributes to assessing convergence or divergence patterns across the Member States.

There is an important alignment of the social and economic resilience dashboard with the revised SSB in the last European Pillar of Social Rights Action plan. Both the SSB and the dashboard focus on certain groups at the margin of the society (such as the people not in education, employment or training and people at risk of poverty and social exclusion), vulnerabilities of the health system (unmet needs for medical care) and distortions in the labour market (gender disparities in employment).

Yet, while the SSB focuses on monitoring equal opportunities, working conditions and aspects related to social protection and inclusion, the social and economic resilience dashboard expands also on other topics such as economic and financial stability and sustainability. Unlike the SSB, the social and economic resilience dashboard addresses specific vulnerabilities in jobs at risks (employment in energy-intensive sectors and manufacturing with high automation risk). Furthermore, the social and economic resilience dashboard considers elements that characterize social capital (such as the participation in the voluntary activities), as it is at the core of the ability of a society to react positively to shocks and reinforce the social connections through which sometimes the community substitutes the institutions in protecting the marginalized people.²⁵

The **Macroeconomic Imbalance Procedure** (MIP) is a surveillance mechanism that aims to identify potential macroeconomic risks early on, prevent the emergence of harmful macroeconomic imbalances and correct the imbalances that are already in place. It is therefore a system for monitoring economic policies and detecting potential harm to the proper functioning of the economy of a Member State, of the Economic and Monetary Union, and the European Union as a whole. The social and economic resilience dashboard is broadly aligned with the MIP scoreboard in relation to indicators related to the internal (im)balances, such as government debt

²⁴ <https://ec.europa.eu/eurostat/web/european-pillar-of-social-rights/indicators/social-scoreboard-indicators>

²⁵ Indicators in the social and economic dashboards also partly overlap with those identified by the Social Protection Committee Indicator Group (<https://ec.europa.eu/social/main.jsp?catId=830&langId=en>) and the Employment Committee Indicator (<https://ec.europa.eu/social/main.jsp?catId=1528&langId=en>). Since both are also closely related to the Social Scoreboard, the comparison with them is very similar to the comparison with the Social Scoreboard indicators.

and the stability of banking and financial markets stability. There is a partial overlap with labour market indicators, such as long-term unemployment rate, unemployment rate and young people neither in employment nor in education and training (NEET). Certain MIP indicators are present in the geopolitical resilience dashboard, like the net international investment position, or have similar counterparts (indicators on exports, imports and FDI).

The **monitoring framework for the circular economy**²⁶ shows how the various elements of the circular economy are developing over time, to help identify success factors in the Member States and to assess whether sufficient action has been taken. It includes ten indicators (some of which are broken down into sub-indicators) that are organized in four broad areas: production and consumption, waste management, secondary raw materials and competitiveness and innovation. The overlap with the green resilience dashboard lies in the use of similar indicators for waste (generation rate of waste, e-waste, circular material use rate). In general, the green dashboard provides a more general and wide overview of the abilities and obstacles for the green transition as a whole, in which the ability to pursue a circular economy is one aspect of sustainable use of resources.

The **Resource efficiency scoreboard**²⁷ combines 32 indicators that aim to inform about the progress the EU Member States have made towards resource-efficient Europe. The lead indicator is resource productivity (based on which the values in the dashboard are presented). The second layer provides indicators on materials, land, water and carbon, where there is an overlap with the sustainable use of resources area of the green dashboard (DMC per capita, WEI+, GHG per capita, energy productivity, share of renewable energy in final energy consumption). Though more specific, the geopolitical dashboard also includes related elements, like the material footprint in metals. There are additional common areas of interest, such as biodiversity, circular economy or carbon-neutral mobility. The green dashboard is complementary to the resource efficiency dashboard, since it completes the picture with other aspects of green transition. These aspects are broader agricultural resilience indicators (soil carbon and farm income variability), vulnerability to climate change (fatalities from climate extremes) and the ability to adapt to it (insured losses to climate extremes), financing mechanisms that are favourable (national expenditure on environmental protection) or adverse (fossil fuel subsidies) to achieve climate neutrality and restore the environment. Also, the presentation of the indicators in the resource efficiency scoreboard is much different. It does not reflect the improvement/deterioration with respect to any reference period, but just plain data.

²⁶ SWD(2018) 17 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0029&from=EN>. Indicators in the circular economy framework are currently being reviewed, according to the New Circular Economy Action Plan published in March 2020 (COM(2020) 98 final).

²⁷ https://ec.europa.eu/environment/resource_efficiency/targets_indicators/scoreboard/index_en.htm, and https://ec.europa.eu/environment/resource_efficiency/targets_indicators/scoreboard/pdf/EU%20Resource%20Efficiency%20Scoreboard%202015.pdf

Environmental indicators for the monitoring of the **7th Environment Action Programme**^{28,29} (EAP) have been designed to track progress by 2020 towards the 7th EAP thematic priority objectives: i) preservation of the natural capital, ii) resource efficiency and low carbon economy, iii) environmental pressures and risks to health and well-being. The indicators measure progress towards a 2020 threshold (e.g. milestone, target, goal) associated with the achievement of a detailed objective (or parts of it). Given the common relevant thematic areas for the environment, there is an overlap between this monitoring framework and the green resilience dashboard: GHG emissions and emissions in transport, resource productivity, waste and waste management, share for renewable energy, size of the environmental sector in the economy, expenditure on environmental protection. However, the green resilience dashboard adds on other aspects of the green transition: agricultural resilience (soil carbon and farm income variability), forward-looking mobility indicators (share of BEV and H2 vehicles and change in transport mode), vulnerability to climate change (fatalities from climate extremes) and the ability to adapt to it (insured losses to climate extremes), financing mechanisms that are adverse (fossil fuel subsidies) to climate neutrality and innovation that is beneficial for the overall environment (environmental technology patents per capita). Also, the presentation of the indicators is much different.

Green growth indicators³⁰. The OECD's approach to monitoring progress towards green growth is designed to show the interactions between the economy, the natural asset base and policy actions. The measurement framework identifies 26 headline and a vast set of support indicators to capture the main features of green growth and monitor progress in four main areas: i) the environmental and resource productivity of the economy; ii) the natural asset base; iii) the environmental dimension of quality of life; and iv) economic opportunities and policy responses. Indicators that describe the socio-economic context and the characteristics of growth complete the picture. This set of indicators touches upon similar aspects as the green resilience dashboard (such as energy productivity and renewables, resource productivity and material footprint, waste generation, land, forest and water resources, environmental risks, environmental-related innovation). The OECD set provides figures for environmental taxation and transfers, official development assistance (environment-related government aid to developing countries), and poses a lot of emphasis on the carbon intensity of several economic sectors, which are areas that may be considered for the green resilience dashboard in future updates (see also gap analysis). Compared to this set, the green resilience dashboard is more streamlined, with a stronger emphasis on resilience-related features of countries.

The Digital Economy and Society Index³¹ (DESI) monitors Europe's overall digital performance and tracks the progress of EU countries in digital competitiveness. By providing data on the state

²⁸ Decision No 1386/2013/EU of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet'

²⁹ The 8th Environmental Action Programme will be adopted later in 2021. Alignment and coherence with the green resilience dashboard was ensured through coordinated discussions.

³⁰ OECD (2017), *Green Growth Indicators 2017*, OECD Green Growth Studies, OECD Publishing, Paris, <https://doi.org/10.1787/9789264268586-en>.

³¹ <https://digital-strategy.ec.europa.eu/en/policies/desi>

of digitisation of each Member State, it helps them identify areas requiring priority investment and action. It provides a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU Member States, across five main dimensions: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology, Digital Public Services.

With the same perspective, there are ancillary databases focusing on specific, yet vital, aspects of the digital transition. The Telecom Chapters of the DESI provide a snapshot of the electronic communications markets in each Member State.

As one of the actions put in place to assess women's inclusion in digital jobs, careers and entrepreneurship, the Women in Digital (WiD) Scoreboard assesses Member States' performance in the areas of Internet use, Internet user skills as well as specialist skills and employment based on 12 indicators.

International DESI 2020. The International Digital Economy and Society Index (I-DESI) mirrors and extends the DESI by utilising 24 datasets to enable trend analysis and comparison of the digital performance of 45 countries. The analysis includes the EU27 Member States and 18 non-EU countries that have a global distribution.

Prospective Insights in ICT R&D (PREDICT)³². PREDICT provides a sound database to analyse the supply of Information and Communications Technologies (ICT) and the investments in Research and Development (R&D) in ICT in Europe, with comparison to major competitors worldwide. In particular, it offers data to: (a) analyse the development of the ICT industries over a long period of time in Europe, its 27 Member States and 13 non-EU major economies among which the US and BRIC countries; (b) study the size, distribution and evolution of public and private allocations in ICT R&D, in the EU and other major and emerging economies.

International Telecommunication Union (ITU)³³. The International Telecommunication Union (ITU) is the United Nations specialized agency for information and communication technologies – ICTs. The Digital dashboard includes the Global Cybersecurity Index (GCI) which assess the state-of-the-art across: (a) Legal Measures; (b) Technical Measures; (c) Organizational Measures; (d) Capacity Building and (e) Cooperation – and then aggregated into an overall score.

Though quite comprehensive, these different tools associated with the development of digitalisation still take a “sectorial” perspective. DESI, at large, mostly refers to the users' side of the digital world. The ITU Global Cybersecurity Index provides an overall assessment of the security capacity, while PREDICT focuses on the digital innovation in terms of R&D. The digital resilience dashboard offers an holistic perspective and complements these tools by providing indicators on the level (and importance) of the digital economy, digital skills of various segments of the society (students, adults, teachers), novel public digital services (health, justice), and finally a couple of indicators on the digital divide (gender gap, rural versus urban, and small versus large enterprises).

³² <https://web.jrc.ec.europa.eu/dashboard/PREDICT/index.html?rdr=1619163281899>

³³ <https://www.itu.int/en/ITU-D/Cybersecurity/Pages/global-cybersecurity-index.aspx>

Detailed mapping of the Member States and global resilience dashboards with selected frameworks

Table A1: Indicators in the social and economic resilience dashboard aligned with some other existing tools.

| Area | Label | Indicator name- Member State level | SDGs | TPI | SSB | MIP | Indicator name- Global level | SDGs | TPI |
|---|--------|--|------|-----|-----|-----|---|------|-----|
| Inequalities and social impact of the transitions | SE_v01 | At risk of poverty or social exclusion rate (AROPE) | x | | x | | | | |
| | SE_v02 | Income quintile share ratio S80/S20 | x | ~ | x | | Income quintile share ratio S80/S20 | x | ~ |
| | SE_v03 | Employment in energy intensive sectors | o | | | | | | |
| | SE_v04 | Employment in manufacturing with high automation risk | o | | | | | | |
| | SE_v05 | Regional dispersion in household income | o | | | | | | |
| | SE_c01 | Impact of social transfers (other than pensions) on poverty reduction | o | | x | | | | |
| | SE_c02 | Household net saving rate | ~ | | | | | | |
| | SE_c03 | Government social expenditures on education, health, social protection and long-term care, as % of GDP | x | | x | | | | |
| | | | | | | | Government expenditure on education, as % of GDP | x | x |
| | | | | | | | Domestic general government health expenditure, as % of GDP | | x |
| Health, education and work | SE_c04 | Active citizenship | | | | | | | |
| | SE_v06 | Antimicrobial resistance | o | | | | | | |
| | SE_v07 | Self-reported unmet need for medical care | x | | x | | | | |
| | SE_v08 | Years of life lost due to PM 2.5 | o | | | | | | |
| | SE_v09 | Variation in performance explained by students' socio-economic status | o | ~ | | | | | |
| | | | | | | | Gross graduation ratio from first degree programmes in tertiary education | ~ | |
| | SE_v10 | Macroeconomic skills mismatch rate | o | ~ | | | | | |
| | SE_v11 | Gender employment gap | x | ~ | x | | Gender employment gap | x | ~ |
| | SE_v12 | Young people neither in employment nor in education and training | x | | x | | | | |
| | SE_v13 | Long-term unemployment rate | x | | x | x | | | |
| | SE_c05 | Standardised preventable and treatable mortality (low rate) | x | | x | | | | |
| | | | | | | | Obesity rate of young children | x | |
| | SE_c06 | Healthy life years at birth | x | | | | Life expectancy at birth | x | ~ |
| | SE_c07 | Children aged less than 3 years in formal childcare | o | | x | | | | |
| | SE_c08 | Average scores in the PISA test, reading, mathematics and science | o | | | | | | |
| | SE_c09 | Adult participation in learning during the last 12 months | x | | x | | | | |
| | SE_c10 | Employment rate | x | x | x | x | Employment rate | x | x |

| Area | Label | Indicator name- Member State level | SDGs | TPI | SSB | MIP | Indicator name- Global level | SDGs | TPI |
|---|--------|--|------|-----|-----|-----|--|------|-----|
| | SE_c11 | Active labour market policies per person wanting to work | o | | | | | | |
| Economic and financial stability and sustainability | SE_v14 | Government debt | x | x | | x | Government gross debt | x | x |
| | SE_v15 | Projected old-age dependency ratio | | | | | Projected old-age dependency ratio | | |
| | SE_v16 | Degree of specialisation of the economy | o | | | | | | |
| | SE_v17 | Non-financial corporation funding structure | o | | | | | | |
| | SE_c12 | Automatic stabilisation of the tax-benefit system | o | | | | | | |
| | SE_c13 | Banking sector total capital ratio | o | | | | | | |
| | SE_c14 | Insurance sector solvency capital ratio | o | | | | | | |
| | SE_c15 | Share of innovative enterprises | o | | | | | | |
| | SE_c16 | Intangible investment | o | | | | | | |
| | | | | | | | Gross domestic expenditure on R&D (GERD) | x | x |
| | SE_c17 | Government investment to GDP ratio | o | ~ | | | Government investment to GDP ratio | o | |

Note: The symbol x indicates the same indicator, ~ means a very similar indicator, with a somewhat different specification or normalization, while o indicates a conceptual match.
SDG – Sustainable Development Goals, SSB – Social Scoreboard, TPI – Transition Performance Index, MIP – Macroeconomic Imbalance Procedure.

Table A2: Indicators in the green resilience dashboard aligned with some other existing tools.

| Area | Label | Indicator name- Member State level | SDGs | TPI | OECD | EAP7 | RES | Indicator name- Global level | SDGs | TPI |
|--|-------|--|------|-----|------|------|-----|--|------|-----|
| Climate change mitigation and adaptation | G_v01 | Fatalities from climate extremes | ~ | | | | | | | |
| | G_v02 | GHG emissions per capita | o | x | | ~ | x | GHG emissions per GDP | x | x |
| | G_v03 | CO2 emissions in road transport | o | | | ~ | ~ | CO2 emissions from transport per capita | x | |
| | G_v04 | Fossil fuel subsidies | ~ | | ~ | | | Fossil fuel subsidies | ~ | |
| | G_c01 | Insured losses from climate extremes | ~ | | | | | | | |
| | G_c02 | CO2 absorption by forests | ~ | | | | | | | |
| | G_c03 | Electric and hydrogen passenger fleet | ~ | | | | | | | |
| | G_c04 | Inland use of train, bus and trolleybus | x* | | | | ~ | | | |
| | G_c05 | Renewable energy in final energy consumption | x | | ~ | x | x | Renewable energy in final energy consumption | x | |
| Sustainable use of resources | G_c06 | Environmental technology patents per capita | ~ | | x | | | Environmental technology patents per capita | ~ | |
| | G_v05 | Water exploitation index + | x | | ~ | | x | Water stress | x | |
| | G_v06 | Domestic footprint | ~ | | | | | | | |
| | G_v07 | Domestic material consumption per capita | ~ | | | | x | Domestic material consumption per capita | ~ | |
| | G_v08 | Waste generation rate | ~ | | | | ~ | | | |
| | G_v09 | Energy use in ICT | ~ | | | | | | | |
| | G_c07 | Resource productivity | x | x | x | x | x | Resource productivity | x | x |
| | G_c08 | Energy productivity | x | x | x | ~ | x | Energy productivity | x | x |
| | G_c09 | Circular material use rate | x | | | | | Share of recovered municipal waste | ~ | |
| Ecosystems, biodiversity and sustainable agriculture | G_c10 | E-waste recycling rate | ~ | | | | x | | | |
| | G_c11 | GVA in Environmental goods and services sector | x | | | | x | | | |
| | G_v10 | Farmland bird index | ~ | | | | x | | | |
| | G_v11 | Harmonized risk indicator 1 for pesticides | x | ~ | ~ | ~ | | Pesticide use | ~ | |
| | G_v12 | Soil sealing index | x | | | | | | | |
| | G_v13 | Soil erosion by water | x | | | | x | | | |
| | G_v14 | Farm income variability | ~ | | | | | | | |
| | G_c12 | Soil carbon content | ~ | | | | | | | |
| | G_c13 | Organic farming | x | | | | x | | | |
| | G_c14 | Urban wastewater treatment | x | | ~ | | | | | |
| | G_c15 | Natura 2000 protected areas | x* | ~ | ~ | | | | | |
| | | | | | | | | Protected key terrestrial areas | o | |
| | | | | | | | | Protected key freshwater areas | o | |
| | G_c16 | National expenditure on environmental protection | o | | | | x | | | |

Note: The symbol x indicates the same indicator, ~ means a very similar indicator, with a somewhat different specification or normalization, while o indicates a conceptual match, *, * indicates the indicator refers to two EU SDGs.. SDG – Sustainable Development Goals, OECD – Green Growth indicators, EAP7– 7th Environment Action Programme, RES – Resource Efficiency framework, TPI – Transition Performance Index,

Table A3: Indicators in the digital resilience dashboard aligned with some other existing tools.

| Area | Label | Indicator name- Member State level | SDGs | TPI | DESI | PREDICT | ITU | Indicator name- Global level | SDGs | TPI |
|----------------------------|-------|---|------|-----|------|---------|-----|---|------|-----|
| Digital for personal space | D_v01 | Enterprises without ICT training programs | o | | | | | | | |
| | D_v02 | Employees not using telework | | | | | | | | |
| | D_v03 | Inadequacy of ICT training for teachers | o | | | | | | | |
| | D_c01 | Collaborative economy | o | | | | | | | |
| | D_c02 | Digital competence of adults | o | o | | | | Digital competence of adults | o | o |
| | D_c03 | Digital competence of young people | o | o | | | | | | |
| | D_c04 | Use of online courses | o | | x | | | | | |
| | D_c05 | Use of social networks | o | | x | | | Use of social networks | o | |
| | D_c06 | Students doing any online learning activity | o | | | | | | | |
| Digital for industry | D_c07 | University degree in advanced digital technologies | o | o | | x | | ICT graduates | o | o |
| | D_v04 | ICT trade deficit in goods | | | | | | ICT trade deficit in goods | | |
| | D_v05 | ICT trade deficit in services | | | | | | ICT trade deficit in services | | |
| | D_v06 | ICT specialist gender gap | o | | | | | | | |
| | D_v07 | Lack of cloud services | o | | | | | | | |
| | D_v08 | Broadband access gap by company size | o | | | | | Shortcoming of fixed broadband | o | |
| | D_c08 | Investment per employee, high-technology sectors | o | | | | | | | |
| | D_c09 | Enterprises seeking ICT specialists | o | | | | | | | |
| | D_c10 | GVA in ICT | o | o | | | | GVA in ICT | o | |
| Digital for public space | D_c11 | ICT sector R&D intensity | o | | | x | | | | |
| | D_c12 | Value of e-commerce sales | | | | | | | | |
| | D_v09 | Lack of 5G readiness | | | x | | | Low mobile cellular subscriptions | | |
| | D_v10 | Lack of online public services for businesses | o | | x | | | | | |
| | D_v11 | People not having access to digital public services | o | | x | | | People not having access to digital public services | o | |
| | D_v12 | Broadband access gap, urban versus rural | o | | | | | Broadband gap, regional | o | |
| | D_c13 | E-health | o | | | | | | | |
| | D_c14 | Judicial system e-tools | o | | | | | | | |
| | D_v13 | Cybersecurity incidents experienced by people | o | | | | | | | |
| Cybersecurity | D_v14 | ICT security incidents in enterprises | o | | | | | Secure Internet servers | o | |
| | D_c15 | Cybersecurity awareness of individuals | o | | | | | | | |
| | D_c16 | Global Cybersecurity Index | o | | | | x | Global Cybersecurity Index | o | |

Note: The symbol x indicates the same indicator, ~ means a very similar indicator, with a somewhat different specification or normalization, while o indicates a conceptual match.
SDG – Sustainable Development Goals, DESI - Digital Economy and Society Index, PREDICT- Prospective Insights in ICT R&D, ITU- International Telecommunication Union ,
TPI – Transition Performance Index

Table A4: Indicators in the geopolitical resilience dashboard aligned with some other existing tools.

| Area | Label | Indicator name- Member State level | SDGs | TPI | Indicator name- Global level | SDGs | TPI |
|--------------------------------|--------|--|------|-----|---|------|-----|
| Raw material and energy supply | GP_v01 | Metal footprint per capita | o | | | | |
| | GP_v02 | Supplier concentration in base metals | | | Import dependence in base metals | | |
| | GP_v03 | Import dependence in energy materials | x | | Import dependence in energy materials | x | ~ |
| | GP_v04 | Supplier concentration in energy carriers | | | | | |
| | GP_c01 | Intra-EU trade in recyclable raw materials | o | | | | |
| | GP_c02 | Supplier diversification for base metals, rate of change | | | | | |
| | GP_c03 | Metal footprint per capita, rate of decline | o | | | | |
| | GP_c04 | Intra-EU trade in energy | o | | | | |
| | GP_c05 | Supplier diversification for energy carriers, rate of change | | | | | |
| Value chains and trade | GP_v05 | Concentration of value chain partners | o | | | | |
| | GP_v06 | Extra-EU import partner concentration | | | Partner concentration in trade (average of import and export partner concentration) | | |
| | GP_v07 | Extra-EU export partner concentration | | | | | |
| | GP_c06 | Backward participation in GVC | o | | Participation in GVC (average of backward and forward) | o | |
| | GP_c07 | Forward participation in GVC | o | | | | |
| | GP_c08 | Trade openness – intra-EU | o | | Trade openness | o | |
| | GP_c09 | Trade openness – extra-EU | o | | | | |
| Financial globalisation | GP_v08 | Inward FDI partner concentration | | | | | |
| | GP_v09 | Outward FDI partner concentration | | | | | |
| | GP_v10 | Net external debt in % GDP | o | o | | | |
| | GP_v11 | Net International Investment Position | o | | Net International Investment Position | o | |
| | GP_c10 | Value added share of foreign enterprises | o | | | | |
| | GP_c11 | Financial integration | o | | Financial integration | o | |
| Security and demography | GP_v12 | Disinformation originating from abroad | o | | Disinformation originating from abroad | o | |
| | GP_v13 | Total fertility rate (difference from replacement-level) | | | Total fertility rate (difference from replacement-level) | | |
| | GP_v14 | Employment gap (EU versus non-EU nationals) | o | | | | |
| | GP_v15 | Military expenditures (difference from NATO target) | | | | | |
| | GP_c12 | Military personnel | | | Military personnel | | |
| | GP_c13 | Net migration rate | | | | | |
| | GP_c14 | Share of non-EU citizens from total employment | o | | | | |
| | GP_c15 | People being resettled under AMIF | o | | | | |

Note: The symbol x indicates the same indicator, ~ means a very similar indicator, with a somewhat different specification or normalization, while o indicates a conceptual match.
SDG – Sustainable Development Goals, TPI – Transition Performance Index.

ANNEX IV: CORRELATION TABLES.

Social and economic dashboard 2020 : correlation matrix of percentiles

| | At risk of poverty or social exclusion rate (AROP) - % | Income quintile share ratio S80/S20 | Employment in energy intensive sectors | Employment in manufacturing with high automation risk | Regional dispersion in household income | Antimicrobial resistance | Self-reported unmet need for medical care | Years of life lost due to PM2.5 | Variation in performance explained by students' socio-economic status | Macroeconomic skills mismatch rate | Gender employment gap | Young people neither in employment nor in education and training | Long-term unemployment rate | Government debt | Projected old-age dependency ratio | Degree of specialization of the economy | Non-financial corporations funding structure | Impact of social transfers (other than pensions) on poverty reduction | Household net saving rate | Government social expenditures on education, health, social protection and long term care, as % of GDP | Active citizenship | Standardised preventable and treatable mortality (low rate) | Healthy life years in absolute value at birth | Children aged less than 5 years in formal childcare | Average scores in the PISA test, reading, mathematics and science | Adult participation in learning during the last 12 months | Employment rate | Active labour market policies per person wanting to work | Automatic stabilisation of the tax-benefit system | Banking sector total capital ratio | Insurance sector solvency capital ratio | Share of innovative enterprises | Intangible investment | Government investment to GDP ratio |
|-----------------|--|-------------------------------------|--|---|---|--------------------------|---|---------------------------------|---|------------------------------------|-----------------------|--|-----------------------------|-----------------|------------------------------------|---|--|---|---------------------------|--|--------------------|---|---|---|---|---|-----------------|--|---|------------------------------------|---|---------------------------------|-----------------------|------------------------------------|
| Vulnerabilities | 1 | 0.88 | -0.31 | -0.08 | 0.28 | 0.28 | 0.83 | 0.21 | 0.39 | 0.3 | 0.21 | 0.81 | 0.53 | 0.02 | 0.47 | 0.38 | 0.35 | 0.77 | 0.51 | 0.85 | 0.5 | 0.16 | -0.18 | 0.12 | 0.58 | 0.63 | 0.54 | 0.64 | 0.28 | 0.13 | 0.45 | 0.13 | 0.43 | 0.34 |
| | 0.86 | 1 | -0.24 | -0.12 | 0.31 | 0.06 | 0.4 | 0.17 | 0.4 | 0.08 | 0.01 | 0.41 | 0.33 | -0.1 | 0.45 | 0.18 | 0.17 | 0.74 | 0.31 | 0.5 | 0.44 | 0.17 | -0.13 | 0.08 | 0.45 | 0.45 | 0.31 | 0.47 | 0.28 | 0.11 | 0.28 | 0.16 | 0.35 | 0.2 |
| | -0.31 | -0.24 | 1 | 0.16 | 0.37 | 0.18 | -0.06 | 0.54 | 0.15 | -0.06 | 0.2 | 0.07 | -0.09 | 0.09 | 0.36 | -0.52 | 0.05 | 0.07 | -0.18 | -0.04 | 0.33 | 0.49 | 0.12 | 0.56 | -0.07 | 0.13 | -0.06 | 0.07 | 0.14 | 0.23 | -0.05 | 0.34 | 0.2 | -0.24 |
| | -0.08 | -0.12 | 0.16 | 1 | 0.2 | 0.23 | -0.02 | 0.24 | 0.07 | 0.19 | 0.39 | 0.33 | 0.2 | 0.01 | -0.01 | 0.09 | 0 | 0.11 | -0.07 | -0.09 | 0.18 | 0 | -0.09 | 0.29 | 0.28 | 0.03 | 0.2 | -0.06 | 0.33 | 0.05 | -0.23 | -0.06 | 0.01 | -0.02 |
| | 0.28 | 0.31 | 0.37 | 0.2 | 1 | 0.45 | 0.44 | 0.2 | 0.89 | 0.22 | 0.44 | 0.53 | 0.25 | 0.04 | 0.23 | 0.28 | 0.22 | 0.32 | 0.01 | 0.24 | 0.36 | 0.02 | -0.47 | 0.3 | 0.25 | 0.28 | 0.3 | 0.35 | 0.25 | 0.14 | 0.04 | 0.28 | 0.36 | 0.27 |
| | 0.28 | 0.06 | 0.18 | 0.23 | 0.45 | 1 | 0.57 | 0.34 | 0.43 | 0.27 | 0.66 | 0.65 | 0.51 | 0.62 | 0.33 | 0.34 | 0.58 | 0.35 | 0.28 | 0.38 | 0.35 | -0.1 | -0.3 | 0.24 | 0.56 | 0.37 | 0.66 | 0.49 | 0.14 | 0.39 | -0.02 | 0.21 | 0.29 | 0.38 |
| | 0.63 | 0.4 | -0.06 | -0.02 | 0.44 | 0.57 | 1 | 0.34 | 0.24 | 0.22 | 0.32 | 0.6 | 0.46 | 0.24 | 0.4 | 0.38 | 0.37 | 0.42 | 0.44 | 0.46 | 0.38 | 0.16 | -0.03 | 0.2 | 0.36 | 0.44 | 0.53 | 0.58 | 0.09 | 0.11 | 0.48 | 0.15 | 0.43 | 0.25 |
| | 0.21 | 0.17 | 0.54 | 0.24 | 0.2 | 0.34 | 0.34 | 1 | 0.04 | 0.2 | 0.45 | 0.47 | 0.19 | 0.04 | 0.52 | -0.35 | 0.28 | 0.4 | 0.43 | 0.37 | 0.87 | 0.7 | 0.13 | 0.78 | 0.48 | 0.58 | 0.28 | 0.47 | 0.34 | 0.21 | 0.19 | 0.47 | 0.52 | -0.09 |
| | 0.39 | 0.4 | 0.15 | 0.07 | 0.68 | 0.43 | 0.24 | 0.04 | 1 | 0.11 | 0.3 | 0.27 | 0.3 | 0.18 | 0.15 | 0.28 | 0.47 | 0.5 | -0.11 | 0.34 | 0.31 | -0.2 | -0.53 | 0.01 | 0.47 | 0.2 | 0.3 | 0.25 | 0.06 | 0.38 | 0.03 | 0.21 | 0.32 | 0.54 |
| | 0.3 | 0.08 | -0.06 | 0.19 | 0.22 | 0.27 | 0.22 | 0.2 | 0.11 | 1 | 0.14 | 0.52 | 0.46 | 0.12 | 0.13 | 0.26 | -0.01 | 0.07 | 0.08 | 0.01 | 0.11 | 0.01 | -0.27 | 0.07 | 0.28 | 0.21 | 0.6 | -0.09 | -0.11 | 0.11 | 0.14 | 0.05 | 0.13 | 0.11 |
| | 0.21 | 0.01 | 0.2 | 0.39 | 0.44 | 0.66 | 0.32 | 0.45 | 0.3 | 0.14 | 1 | 0.59 | 0.23 | 0.24 | 0.1 | 0.1 | 0.42 | 0.31 | 0.3 | 0.5 | 0.39 | 0.02 | -0.39 | 0.52 | 0.49 | 0.43 | 0.5 | 0.43 | 0.24 | 0.13 | -0.02 | 0.34 | 0.34 | 0.16 |
| | 0.61 | 0.41 | 0.07 | 0.33 | 0.53 | 0.65 | 0.6 | 0.47 | 0.27 | 0.52 | 0.59 | 1 | 0.67 | 0.39 | 0.52 | 0.29 | 0.23 | 0.45 | 0.52 | 0.48 | 0.5 | 0.15 | -0.21 | 0.43 | 0.58 | 0.51 | 0.77 | 0.56 | 0.28 | 0.34 | 0.19 | 0.24 | 0.28 | 0.34 |
| | 0.53 | 0.33 | -0.09 | 0.2 | 0.25 | 0.51 | 0.46 | 0.19 | 0.3 | 0.46 | 0.23 | 0.67 | 1 | 0.56 | 0.63 | 0.52 | 0.16 | 0.5 | 0.43 | 0.14 | 0.34 | -0.2 | -0.23 | -0.09 | 0.43 | 0.34 | 0.83 | 0.37 | 0.02 | 0.68 | 0.2 | -0.05 | 0.2 | 0.46 |
| | 0.02 | -0.1 | 0.09 | 0.01 | 0.04 | 0.62 | 0.24 | 0.04 | 0.18 | 0.12 | 0.24 | 0.39 | 0.56 | 1 | 0.27 | 0.15 | 0.17 | 0.07 | 0.22 | -0.1 | -0.07 | -0.4 | -0.18 | -0.2 | 0.12 | -0.1 | 0.58 | 0.12 | -0.21 | 0.65 | -0.2 | -0.2 | -0.25 | 0.42 |
| | 0.47 | 0.45 | 0.38 | -0.01 | 0.23 | 0.33 | 0.4 | 0.52 | 0.15 | 0.13 | 0.1 | 0.52 | 0.63 | 0.27 | 1 | -0.02 | 0.03 | 0.59 | 0.4 | 0.3 | 0.84 | 0.38 | 0.12 | 0.27 | 0.23 | 0.62 | 0.52 | 0.47 | 0.18 | 0.53 | 0.43 | 0.35 | 0.34 | 0.17 |
| | 0.36 | 0.19 | -0.52 | 0.08 | 0.28 | 0.34 | 0.38 | -0.35 | 0.29 | 0.26 | 0.1 | 0.29 | 0.52 | 0.15 | -0.02 | 1 | 0.25 | 0.18 | 0.17 | 0.17 | -0.01 | -0.41 | -0.18 | -0.31 | 0.36 | -0.05 | 0.37 | 0.16 | -0.03 | 0.04 | 0.18 | -0.09 | 0.21 | 0.39 |
| | 0.35 | 0.17 | 0.05 | 0 | 0.22 | 0.58 | 0.37 | 0.28 | 0.47 | -0.01 | 0.42 | 0.23 | 0.16 | 0.17 | 0.03 | 0.25 | 1 | 0.5 | 0.27 | 0.43 | 0.25 | 0.03 | -0.12 | 0.26 | 0.63 | 0.42 | 0.26 | 0.58 | 0.27 | 0.03 | -0.08 | 0.12 | 0.65 | 0.38 |
| Capacities | 0.77 | 0.74 | 0.07 | 0.11 | 0.32 | 0.35 | 0.42 | 0.4 | 0.5 | 0.07 | 0.31 | 0.45 | 0.5 | 0.07 | 0.59 | 0.18 | 0.5 | 1 | 0.31 | 0.5 | 0.6 | 0.17 | -0.13 | 0.27 | 0.62 | 0.65 | 0.47 | 0.66 | 0.44 | 0.21 | 0.28 | 0.2 | 0.56 | 0.25 |
| | 0.51 | 0.31 | -0.16 | -0.07 | 0.01 | 0.28 | 0.44 | 0.43 | -0.11 | 0.08 | 0.3 | 0.52 | 0.43 | 0.22 | 0.4 | 0.17 | 0.27 | 0.31 | 1 | 0.58 | 0.61 | 0.33 | 0.16 | 0.29 | 0.38 | 0.63 | 0.31 | 0.66 | 0.49 | 0.41 | 0.2 | 0.32 | 0.43 | 0.14 |
| | 0.65 | 0.5 | -0.04 | -0.09 | 0.24 | 0.38 | 0.46 | 0.37 | 0.34 | 0.01 | 0.5 | 0.48 | 0.14 | -0.1 | 0.3 | 0.17 | 0.43 | 0.5 | 0.58 | 1 | 0.86 | 0.41 | -0.12 | 0.46 | 0.58 | 0.58 | 0.21 | 0.75 | 0.52 | 0.05 | 0.43 | 0.51 | 0.57 | 0.13 |
| | 0.5 | 0.44 | 0.33 | 0.18 | 0.36 | 0.35 | 0.38 | 0.67 | 0.31 | 0.11 | 0.39 | 0.5 | 0.34 | -0.07 | 0.64 | -0.01 | 0.25 | 0.6 | 0.61 | 0.66 | 1 | 0.63 | 0.05 | 0.57 | 0.48 | 0.7 | 0.29 | 0.59 | 0.59 | 0.36 | 0.43 | 0.64 | 0.71 | -0.03 |
| | 0.16 | 0.17 | 0.49 | 0 | 0.02 | -0.1 | 0.18 | 0.7 | -0.2 | 0.01 | 0.02 | 0.15 | -0.2 | -0.4 | 0.38 | -0.41 | 0.03 | 0.17 | 0.33 | 0.41 | 0.63 | 1 | 0.55 | 0.74 | 0.19 | 0.45 | -0.18 | 0.34 | 0.34 | -0.11 | 0.47 | 0.47 | 0.53 | -0.41 |
| | -0.18 | -0.13 | 0.12 | -0.09 | -0.47 | -0.3 | -0.03 | 0.13 | -0.53 | -0.27 | -0.39 | -0.21 | -0.23 | -0.18 | 0.12 | -0.18 | -0.12 | -0.13 | 0.16 | -0.12 | 0.05 | 0.55 | 1 | 0.25 | -0.11 | -0.06 | -0.3 | -0.06 | 0.01 | -0.21 | 0.38 | 0.02 | 0.2 | -0.41 |
| | 0.12 | 0.08 | 0.58 | 0.29 | 0.3 | 0.24 | 0.2 | 0.76 | 0.01 | 0.07 | 0.52 | 0.43 | -0.09 | -0.2 | 0.27 | -0.31 | 0.26 | 0.27 | 0.29 | 0.46 | 0.57 | 0.74 | 0.25 | 1 | 0.41 | 0.49 | 0.08 | 0.41 | 0.47 | -0.1 | 0.17 | 0.41 | 0.5 | -0.26 |
| | 0.68 | 0.45 | -0.07 | 0.28 | 0.25 | 0.56 | 0.36 | 0.48 | 0.47 | 0.28 | 0.49 | 0.58 | 0.43 | 0.12 | 0.23 | 0.36 | 0.63 | 0.62 | 0.38 | 0.58 | 0.48 | 0.19 | -0.11 | 0.41 | 1 | 0.43 | 0.43 | 0.6 | 0.33 | 0.15 | 0.16 | 0.29 | 0.56 | 0.29 |
| | 0.63 | 0.45 | 0.13 | 0.03 | 0.28 | 0.37 | 0.44 | 0.58 | 0.2 | 0.21 | 0.43 | 0.51 | 0.34 | -0.1 | 0.62 | -0.05 | 0.42 | 0.65 | 0.63 | 0.58 | 0.7 | 0.45 | -0.06 | 0.49 | 0.43 | 1 | 0.42 | 0.63 | 0.41 | 0.14 | 0.32 | 0.38 | 0.59 | 0.18 |
| | 0.54 | 0.31 | -0.06 | 0.2 | 0.3 | 0.66 | 0.53 | 0.26 | 0.3 | 0.8 | 0.5 | 0.77 | 0.83 | 0.58 | 0.52 | 0.37 | 0.26 | 0.47 | 0.31 | 0.21 | 0.29 | -0.18 | -0.3 | 0.06 | 0.43 | 0.42 | 1 | 0.3 | -0.08 | 0.49 | 0.19 | 0.04 | 0.25 | 0.36 |
| | 0.64 | 0.47 | 0.07 | -0.06 | 0.35 | 0.49 | 0.58 | 0.47 | 0.25 | -0.09 | 0.43 | 0.56 | 0.37 | 0.12 | 0.47 | 0.16 | 0.59 | 0.66 | 0.66 | 0.75 | 0.59 | 0.34 | -0.06 | 0.41 | 0.6 | 0.83 | 0.3 | 1 | 0.54 | 0.13 | 0.27 | 0.3 | 0.56 | 0.3 |
| | 0.28 | 0.28 | 0.14 | 0.33 | 0.25 | 0.14 | 0.09 | 0.34 | 0.06 | 0.11 | 0.24 | 0.28 | 0.02 | 0.21 | 0.18 | -0.03 | 0.27 | 0.44 | 0.49 | 0.52 | 0.59 | 0.34 | 0.01 | 0.47 | 0.33 | 0.41 | -0.08 | 0.54 | 1 | 0.07 | -0.1 | 0.27 | 0.43 | -0.17 |
| | 0.13 | 0.11 | 0.23 | 0.05 | 0.14 | 0.39 | 0.11 | 0.21 | 0.38 | 0.11 | 0.13 | 0.34 | 0.68 | 0.65 | 0.53 | 0.04 | 0.03 | 0.21 | 0.41 | 0.05 | 0.36 | -0.11 | -0.21 | -0.1 | 0.15 | 0.14 | 0.49 | 0.13 | -0.07 | 1 | -0.03 | 0.05 | 0.06 | 0.36 |
| | 0.45 | 0.29 | -0.05 | -0.23 | 0.04 | -0.02 | 0.49 | 0.19 | 0.03 | 0.14 | -0.02 | 0.19 | 0.2 | -0.2 | 0.43 | 0.18 | -0.09 | 0.28 | 0.2 | 0.43 | 0.43 | 0.47 | 0.38 | 0.17 | 0.16 | 0.32 | 0.19 | 0.27 | -0.1 | -0.03 | 1 | 0.36 | 0.44 | -0.06 |
| | 0.13 | 0.18 | 0.34 | -0.06 | 0.28 | 0.21 | 0.15 | 0.47 | 0.21 | 0.05 | 0.34 | 0.24 | -0.05 | -0.2 | 0.35 | -0.09 | 0.12 | 0.2 | 0.32 | 0.51 | 0.64 | 0.47 | 0.02 | 0.41 | 0.29 | 0.38 | 0.04 | 0.3 | 0.27 | 0.05 | 0.36 | 1 | 0.47 | -0.07 |
| | 0.43 | 0.35 | 0.2 | 0.01 | 0.36 | 0.29 | 0.43 | 0.52 | 0.32 | 0.13 | 0.34 | 0.28 | 0.2 | -0.25 | 0.34 | 0.21 | 0.65 | 0.56 | 0.43 | 0.57 | 0.71 | 0.53 | 0.2 | 0.5 | 0.56 | 0.59 | 0.25 | 0.56 | 0.43 | 0.06 | 0.44 | 0.47 | 1 | -0.11 |
| | 0.34 | 0.2 | -0.24 | -0.02 | 0.27 | 0.38 | 0.25 | -0.09 | 0.54 | 0.11 | 0.16 | 0.34 | 0.46 | 0.42 | 0.17 | 0.39 | 0.38 | 0.25 | 0.14 | 0.13 | -0.03 | -0.41 | -0.41 | -0.26 | 0.29 | 0.18 | 0.38 | 0.3 | -0.17 | 0.36 | -0.06 | -0.07 | -0.11 | 1 |

Corr

1.0

0.5

0

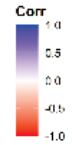
-0.5

-1.0

The correlations refer to the percentile positions (as detailed in Annex I) of the indicator values in the latest available year. A high percentile value in capacities indicates high capacities, while a high percentile value for vulnerabilities indicates low vulnerabilities.

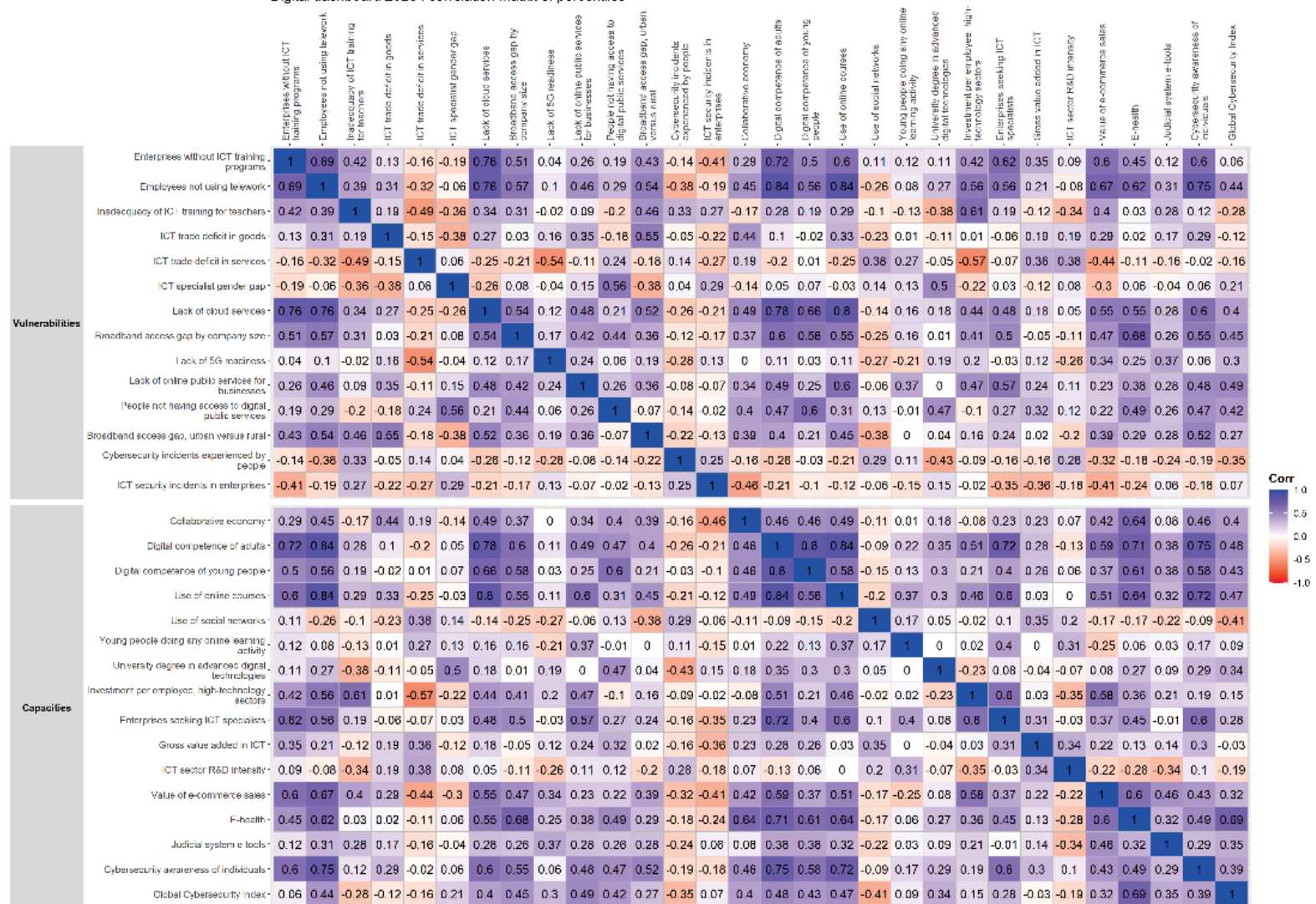
Green dashboard 2020 : correlation matrix of percentiles

| | | Exposure from climate extremes | -GHG emissions per capita | CO2 emissions in road transport | Fossil fuel subsidies | Water exploitation index | Domestic footprint | Domestic material consumption per capita | Waste generation rate | Energy used in ICT | Farmland bird index | Harmonised risk indicator 1 for pesticides | Soil sealing index | Soil erosion by water | Farm income variability | Insured losses from climate extremes | CO2 absorption by forests | Electric and hydrogen passenger fleet | Inland use of train, bus and trolleybus | Renewable energy in final energy consumption | Environmental technology patents per capita | Resource productivity | Energy productivity | Circular material use rate | E-waste recycling rate | Gross value added in environmental goods and services sector | Soil carbon content | Organic farming | Urban wastewater treatment | Natura 2000 protected areas | National expenditures on environmental protection |
|-----------------|--|--------------------------------|---------------------------|---------------------------------|-----------------------|--------------------------|--------------------|--|-----------------------|--------------------|---------------------|--|--------------------|-----------------------|-------------------------|--------------------------------------|---------------------------|---------------------------------------|---|--|---|-----------------------|---------------------|----------------------------|------------------------|--|---------------------|-----------------|----------------------------|-----------------------------|---|
| Vulnerabilities | Exposure from climate extremes | 1 | -0.06 | 0.11 | -0.04 | 0.38 | 0.41 | -0.64 | 0.08 | 0.09 | 0.08 | -0.12 | 0.4 | 0.54 | 0.14 | 0.01 | -0.29 | 0.06 | 0.24 | 0.3 | 0.08 | -0.55 | -0.48 | -0.3 | 0.23 | 0.3 | 0.2 | 0.01 | -0.06 | -0.46 | 0.02 |
| | GHG emissions per capita | -0.06 | 1 | 0.63 | -0.06 | 0.24 | -0.09 | 0.33 | 0.24 | -0.05 | 0.02 | 0.13 | 0.26 | -0.31 | -0.05 | -0.49 | 0.29 | -0.07 | -0.16 | 0.4 | -0.27 | -0.18 | -0.03 | -0.22 | -0.36 | -0.11 | -0.26 | 0.12 | -0.36 | -0.05 | -0.13 |
| | CO2 emissions in road transport | 0.11 | 0.63 | 1 | -0.33 | -0.05 | -0.33 | 0.2 | 0.07 | 0.08 | 0.14 | 0.36 | 0.28 | -0.12 | 0.18 | 0.53 | 0.16 | 0.43 | 0.13 | 0.13 | 0.44 | 0.38 | 0.24 | 0.3 | -0.28 | 0.06 | 0.36 | 0.13 | 0.36 | 0.11 | -0.18 |
| | Fossil fuel subsidies | -0.04 | -0.06 | -0.33 | 1 | -0.09 | 0.2 | -0.06 | 0 | 0.02 | 0.12 | -0.58 | 0.03 | 0.06 | 0.17 | 0.23 | -0.14 | 0.38 | -0.09 | 0.32 | 0.29 | 0.11 | 0 | 0.2 | 0.17 | 0.08 | 0.35 | 0.43 | 0.25 | -0.23 | 0.26 |
| | Water exploitation index | 0.38 | 0.24 | -0.05 | -0.09 | 1 | 0.39 | -0.25 | 0.31 | 0.05 | -0.05 | -0.15 | 0.45 | 0.31 | -0.01 | -0.12 | 0.18 | 0.12 | -0.12 | 0.42 | 0.04 | -0.28 | -0.03 | -0.2 | 0.32 | 0.13 | 0.36 | 0.17 | 0.03 | -0.12 | 0.08 |
| | Domestic footprint | 0.41 | -0.09 | -0.33 | 0.2 | 0.39 | 1 | -0.33 | 0.28 | 0.02 | 0.1 | -0.37 | 0.14 | 0.1 | 0.05 | -0.08 | -0.15 | 0.13 | 0.02 | 0.08 | -0.13 | -0.16 | -0.25 | -0.25 | 0.22 | -0.02 | 0.28 | -0.05 | -0.1 | 0.03 | -0.18 |
| | Domestic material consumption per capita | -0.64 | 0.33 | 0.2 | -0.06 | -0.25 | -0.33 | 1 | -0.06 | -0.13 | -0.04 | 0.16 | -0.37 | -0.44 | 0.01 | -0.12 | -0.02 | -0.17 | -0.15 | -0.33 | -0.12 | 0.64 | 0.03 | 0.39 | -0.34 | -0.52 | -0.17 | 0.05 | -0.15 | 0.23 | 0.17 |
| | Waste generation rate | 0.08 | 0.24 | -0.07 | 0 | 0.31 | 0.28 | -0.06 | 1 | -0.09 | 0.4 | -0.05 | 0.17 | 0.02 | 0.07 | -0.33 | 0.02 | -0.17 | 0.16 | 0.22 | -0.42 | -0.17 | 0.4 | -0.51 | 0.26 | -0.08 | -0.17 | 0.03 | -0.2 | 0 | -0.18 |
| | Energy used in ICT | 0.09 | -0.05 | 0.08 | 0.02 | 0.05 | 0.02 | -0.13 | -0.09 | 1 | 0.03 | -0.13 | 0.38 | 0.47 | 0.26 | -0.17 | -0.18 | -0.27 | -0.21 | 0.23 | -0.32 | -0.39 | -0.12 | -0.19 | 0.27 | 0.38 | -0.13 | 0.06 | 0.34 | -0.1 | -0.03 |
| | Farmland bird index | 0.08 | 0.02 | 0.14 | 0.12 | -0.05 | 0.1 | -0.04 | 0.4 | 0.03 | 1 | -0.12 | 0.33 | -0.15 | 0.26 | -0.32 | -0.03 | -0.47 | -0.04 | 0.08 | -0.41 | -0.07 | 0.12 | -0.7 | 0.08 | -0.21 | -0.15 | -0.18 | -0.1 | 0.18 | -0.56 |
| | Harmonised risk indicator 1 for pesticides | -0.12 | 0.13 | 0.36 | -0.58 | -0.15 | -0.37 | 0.16 | -0.05 | -0.13 | -0.12 | 1 | -0.3 | -0.06 | 0.11 | 0.05 | 0.3 | -0.03 | -0.06 | -0.36 | 0.01 | 0.2 | 0.17 | -0.14 | -0.14 | -0.34 | -0.03 | -0.38 | -0.23 | 0.05 | -0.15 |
| | Soil sealing index | 0.4 | 0.26 | 0.28 | 0.03 | 0.45 | 0.14 | -0.37 | 0.17 | 0.38 | 0.33 | -0.3 | 1 | 0.21 | 0.04 | -0.46 | -0.07 | -0.36 | -0.06 | 0.64 | -0.41 | -0.66 | -0.06 | -0.53 | 0.24 | 0.31 | -0.14 | 0.25 | -0.05 | -0.01 | -0.26 |
| | Soil erosion by water | 0.54 | -0.31 | -0.12 | 0.06 | 0.31 | 0.1 | -0.44 | 0.02 | 0.47 | -0.15 | -0.06 | 0.21 | 1 | 0.51 | 0.38 | -0.1 | 0.3 | -0.06 | 0.16 | 0.25 | -0.28 | -0.19 | 0.03 | 0.45 | 0.33 | 0.48 | 0.09 | 0.42 | -0.63 | 0.23 |
| | Farm income variability | 0.14 | -0.05 | -0.18 | 0.17 | -0.01 | 0.05 | 0.01 | 0.07 | 0.26 | 0.26 | 0.11 | 0.04 | 0.51 | 1 | 0.32 | -0.06 | 0.28 | -0.34 | 0.03 | 0.25 | 0.24 | 0.16 | 0.06 | 0.07 | -0.04 | 0.33 | 0.12 | 0.43 | -0.6 | -0.03 |
| Capacities | Insured losses from climate extremes | 0.01 | -0.49 | -0.53 | 0.23 | -0.12 | -0.08 | -0.12 | -0.33 | -0.17 | -0.32 | 0.05 | -0.48 | 0.38 | 0.32 | 1 | -0.07 | 0.72 | -0.02 | -0.21 | 0.8 | 0.52 | -0.01 | 0.54 | 0.21 | -0.08 | 0.64 | 0.08 | 0.49 | -0.48 | 0.42 |
| | CO2 absorption by forests | -0.29 | 0.29 | 0.16 | -0.14 | 0.18 | -0.15 | -0.02 | 0.02 | -0.19 | -0.03 | 0.3 | -0.07 | -0.1 | -0.06 | -0.07 | 1 | 0.22 | -0.35 | 0.06 | 0.09 | 0.08 | 0.3 | -0.11 | -0.25 | -0.05 | 0.15 | -0.12 | -0.16 | 0.04 | -0.29 |
| | Electric and hydrogen passenger fleet | 0.06 | -0.07 | 0.43 | 0.38 | 0.12 | 0.13 | 0.17 | 0.17 | 0.27 | -0.47 | 0.03 | 0.36 | 0.3 | 0.28 | 0.72 | 0.22 | 1 | 0.26 | 0.01 | 0.76 | 0.35 | 0.03 | 0.37 | -0.03 | 0.02 | 0.69 | 0.08 | 0.36 | 0.54 | 0.25 |
| | Inland use of train, bus and trolleybus | 0.24 | -0.16 | 0.13 | -0.09 | -0.12 | 0.02 | -0.15 | 0.16 | -0.21 | -0.04 | -0.06 | -0.06 | -0.06 | -0.34 | -0.02 | -0.35 | -0.26 | 1 | -0.16 | -0.06 | -0.12 | -0.07 | 0.07 | 0.11 | 0.23 | -0.29 | 0.08 | -0.05 | -0.02 | 0.19 |
| | Renewable energy in final energy consumption | 0.3 | 0.4 | 0.13 | 0.32 | 0.42 | 0.06 | -0.33 | 0.22 | 0.23 | 0.08 | -0.38 | 0.64 | 0.16 | 0.03 | -0.21 | 0.06 | -0.01 | -0.16 | 1 | 0 | -0.5 | 0.09 | -0.27 | 0.26 | 0.54 | -0.01 | 0.67 | 0.19 | -0.23 | 0.16 |
| | Environmental technology patents per capita | 0.08 | -0.27 | -0.44 | 0.29 | 0.04 | -0.13 | -0.12 | -0.42 | -0.32 | -0.41 | 0.01 | -0.41 | 0.25 | 0.25 | 0.8 | 0.09 | 0.76 | -0.06 | 0 | 1 | 0.44 | -0.02 | 0.59 | 0.06 | 0.11 | 0.6 | 0.31 | 0.49 | -0.49 | 0.43 |
| | Resource productivity | -0.55 | -0.18 | -0.38 | 0.11 | -0.28 | -0.16 | 0.64 | -0.17 | -0.39 | -0.07 | 0.2 | -0.66 | -0.28 | 0.24 | 0.52 | 0.08 | 0.35 | -0.12 | -0.5 | 0.44 | 1 | 0.23 | 0.53 | -0.22 | -0.52 | 0.33 | 0.01 | 0.14 | -0.04 | 0.2 |
| | Energy productivity | -0.48 | -0.03 | -0.24 | 0 | -0.03 | -0.25 | 0.03 | 0.4 | -0.12 | 0.12 | 0.17 | -0.06 | -0.19 | 0.16 | -0.01 | 0.3 | 0.03 | -0.07 | 0.09 | -0.02 | 0.23 | 1 | -0.09 | 0.03 | 0.1 | -0.08 | 0.06 | 0.18 | 0.13 | -0.09 |
| | Circular material use rate | -0.3 | -0.22 | -0.3 | 0.2 | -0.2 | -0.25 | 0.39 | -0.51 | -0.19 | -0.7 | -0.14 | -0.53 | 0.03 | 0.06 | 0.54 | -0.11 | 0.37 | 0.07 | -0.27 | 0.59 | 0.53 | -0.09 | 1 | -0.14 | -0.04 | 0.23 | 0.32 | 0.31 | -0.15 | 0.68 |
| | E-waste recycling rate | 0.23 | -0.36 | -0.26 | 0.17 | 0.32 | 0.22 | -0.34 | 0.26 | 0.27 | 0.08 | -0.14 | 0.24 | 0.45 | 0.07 | 0.21 | -0.25 | -0.03 | 0.11 | 0.26 | 0.06 | -0.22 | 0.03 | -0.14 | 1 | 0.26 | 0.16 | 0.22 | 0.37 | 0.03 | 0.2 |
| | Gross value added in environmental goods and services sector | 0.3 | -0.11 | 0.06 | 0.08 | 0.13 | -0.02 | 0.52 | 0.08 | 0.39 | -0.21 | 0.34 | 0.31 | 0.33 | 0.04 | 0.08 | -0.05 | 0.02 | 0.23 | 0.54 | 0.11 | 0.52 | 0.1 | -0.04 | 0.26 | 1 | 0.15 | 0.46 | 0.57 | 0.17 | 0.05 |
| | Soil carbon content | 0.2 | -0.26 | -0.36 | 0.35 | 0.36 | 0.28 | -0.17 | -0.17 | -0.13 | -0.15 | -0.03 | -0.14 | 0.48 | 0.33 | 0.64 | 0.15 | 0.69 | -0.29 | -0.01 | 0.6 | 0.33 | -0.09 | 0.23 | 0.16 | -0.15 | 1 | 0.03 | 0.24 | -0.42 | 0.26 |
| | Organic farming | 0.01 | 0.12 | -0.13 | 0.43 | 0.17 | -0.05 | 0.05 | 0.03 | 0.06 | -0.19 | -0.39 | 0.25 | 0.09 | 0.12 | 0.08 | -0.12 | 0.08 | 0.08 | 0.67 | 0.31 | 0.01 | 0.06 | 0.32 | 0.22 | 0.46 | 0.03 | 1 | 0.47 | -0.23 | 0.5 |
| | Urban wastewater treatment | -0.06 | -0.38 | -0.36 | 0.25 | 0.03 | -0.1 | -0.15 | -0.2 | 0.34 | -0.1 | -0.23 | -0.05 | 0.42 | 0.43 | 0.49 | -0.16 | 0.36 | -0.05 | 0.19 | 0.49 | 0.14 | 0.18 | 0.31 | 0.37 | 0.57 | 0.24 | 0.47 | 1 | -0.33 | 0.33 |
| | Natura 2000 protected areas | -0.46 | -0.05 | 0.11 | -0.23 | -0.12 | 0.03 | 0.23 | 0 | -0.1 | 0.16 | 0.05 | -0.01 | -0.63 | -0.6 | -0.48 | 0.04 | -0.54 | -0.02 | -0.23 | -0.49 | -0.04 | 0.13 | -0.15 | 0.03 | -0.17 | -0.42 | -0.23 | -0.33 | 1 | -0.26 |
| | National expenditures on environmental protection | 0.02 | -0.13 | -0.18 | 0.26 | 0.08 | -0.18 | 0.17 | -0.18 | -0.03 | -0.56 | -0.15 | -0.26 | 0.23 | -0.03 | 0.42 | -0.29 | 0.25 | 0.19 | 0.16 | 0.43 | 0.2 | -0.09 | 0.68 | 0.2 | 0.05 | 0.26 | 0.5 | 0.33 | -0.26 | 1 |



The correlations refer to the percentile positions (as detailed in Annex I) of the indicator values in the latest available year. A high percentile value in capacities indicates high capacities, while a high percentile value for vulnerabilities indicates low vulnerabilities.

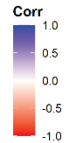
Digital dashboard 2020 : correlation matrix of percentiles



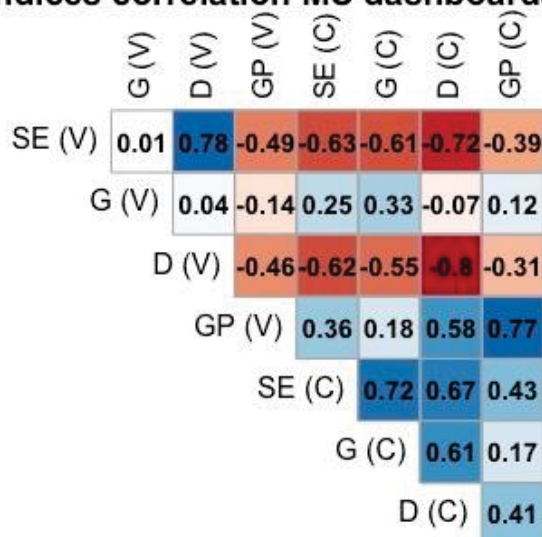
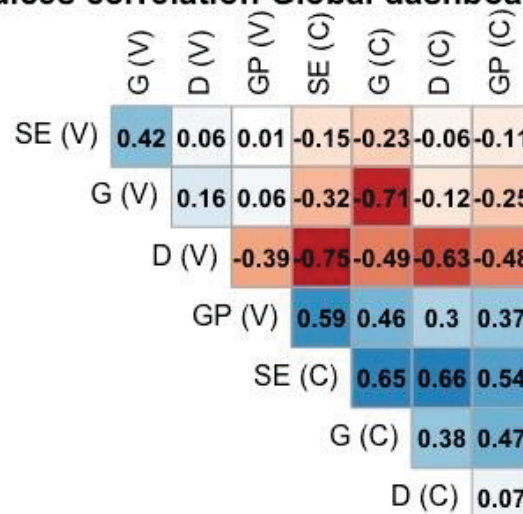
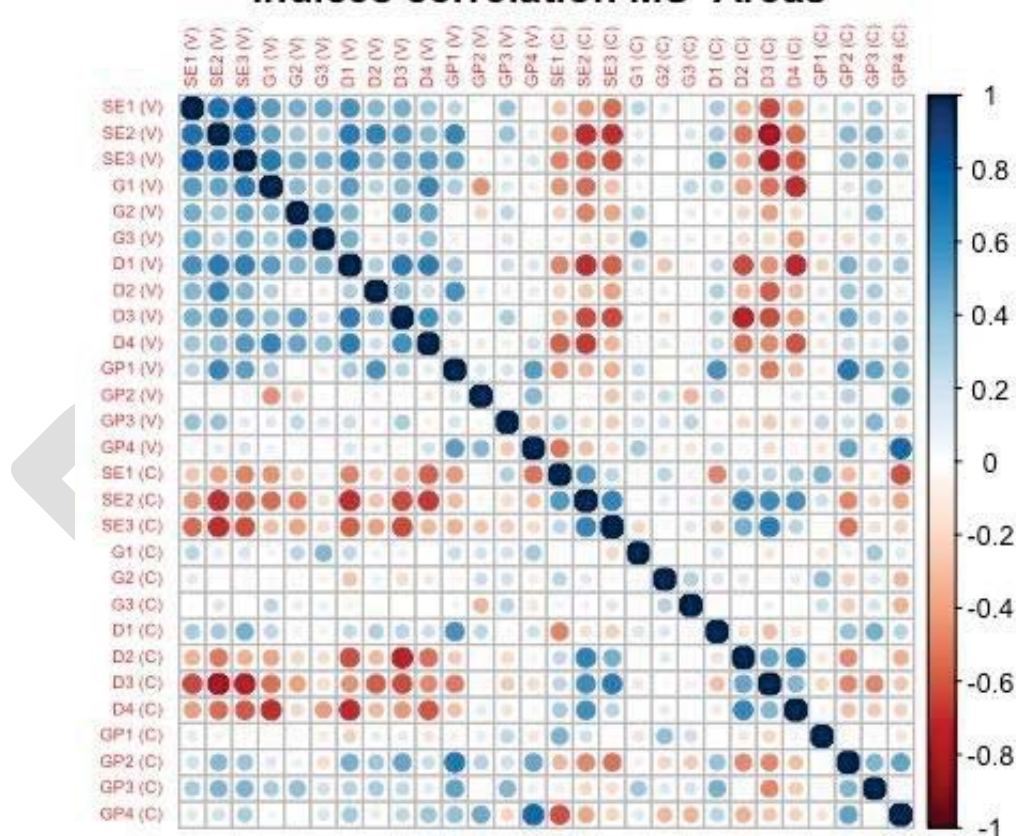
The correlations refer to the percentile positions (as detailed in Annex I) of the indicator values in the latest available year. A high percentile value in capacities indicates high capacities, while a high percentile value for vulnerabilities indicates low vulnerabilities.

Geopolitical dashboard 2020 : correlation matrix of percentiles

| | | - Metal footprint per capita | - Supplier concentration in base metals | - Import dependence in energy materials | - Supplier concentration in energy carriers | - Concentration of value chain partners | - Extra-EU import partner concentration | - Extra-EU export partner concentration | - Inward FDI partner concentration | - Outward FDI partner concentration | - Net external debt in % GDP | - Net international investment position | - Disinformation originating from abroad | - Total fertility rate (difference from replacement-level) | - Employment gap (EU versus non-EU nationals) | - Military expenditures (difference from 2% of GDP) | - Intra-EU trade in recyclable raw materials | - Supplier diversification for base metals, rate of change | - Metal footprint per capita, rate of decline | - Intra-EU trade in energy | - Supplier diversification for energy carriers, rate of change | - Backward participation in GVC | - Forward participation in GVC | - Trade openness – intra-EU | - Trade openness – extra-EU | - Value added share of foreign enterprises | - Financial integration | - Military personnel per capita | - Net migration rate | - Share of non-EU citizens from total employment | - People being resettled under AMIF |
|-----------------|--|------------------------------|---|---|---|---|---|---|------------------------------------|-------------------------------------|------------------------------|---|--|--|---|---|--|--|---|----------------------------|--|---------------------------------|--------------------------------|-----------------------------|-----------------------------|--|-------------------------|---------------------------------|----------------------|--|-------------------------------------|
| Vulnerabilities | Metal footprint per capita | 1 | 0.19 | 0.11 | 0.14 | 0.33 | 0.33 | 0.19 | -0.05 | -0.07 | -0.21 | 0.39 | -0.16 | 0.09 | 0.31 | 0.45 | -0.15 | 0.25 | 0.11 | 0.01 | -0.28 | -0.18 | -0.26 | -0.06 | -0.52 | -0.3 | -0.41 | 0.35 | 0.04 | -0.17 | -0.49 |
| | Supplier concentration in base metals | 0.19 | 1 | -0.24 | 0.47 | 0.39 | 0.61 | 0.34 | -0.21 | 0.05 | -0.39 | 0.15 | -0.02 | -0.22 | -0.13 | 0.11 | 0.19 | 0.52 | 0.47 | -0.19 | -0.42 | -0.28 | 0.26 | -0.24 | -0.38 | -0.34 | -0.24 | 0.11 | 0.31 | -0.15 | -0.21 |
| | Import dependence in energy materials | 0.11 | -0.24 | 1 | -0.06 | 0.3 | -0.39 | -0.26 | 0.28 | 0.05 | 0.18 | -0.12 | -0.35 | 0.62 | 0 | 0.41 | -0.04 | -0.2 | -0.19 | -0.14 | -0.11 | -0.27 | 0.43 | -0.04 | -0.3 | -0.05 | -0.4 | -0.09 | -0.35 | -0.29 | -0.06 |
| | Supplier concentration in energy carriers | 0.14 | 0.47 | -0.06 | 1 | 0.44 | 0.39 | 0.23 | -0.13 | 0.11 | -0.22 | 0.23 | -0.08 | -0.03 | 0.09 | -0.03 | -0.17 | 0.58 | 0.49 | -0.66 | -0.2 | -0.39 | 0.14 | -0.42 | -0.32 | -0.27 | -0.09 | 0 | -0.01 | 0.01 | 0 |
| | Concentration of value chain partners | 0.33 | 0.39 | 0.3 | 0.44 | 1 | 0.47 | 0.11 | 0.03 | 0.4 | -0.51 | 0.13 | 0.02 | -0.05 | -0.19 | 0.36 | -0.29 | 0.23 | 0.28 | -0.45 | -0.24 | -0.9 | 0.44 | -0.66 | -0.85 | -0.57 | -0.34 | 0.18 | 0.07 | -0.11 | 0.09 |
| | Extra-EU import partner concentration | 0.33 | 0.61 | -0.39 | 0.39 | 0.47 | 1 | 0.46 | -0.31 | 0.19 | -0.58 | 0.12 | 0.35 | -0.43 | -0.27 | 0.18 | -0.17 | 0.52 | 0.39 | -0.18 | -0.27 | -0.39 | -0.05 | -0.47 | -0.44 | -0.53 | -0.03 | 0.34 | 0.17 | 0.04 | -0.05 |
| | Extra-EU export partner concentration | 0.19 | 0.34 | -0.26 | 0.23 | 0.11 | 0.46 | 1 | 0.05 | 0.36 | -0.36 | 0.08 | 0.01 | -0.52 | 0.08 | 0.1 | -0.32 | 0.08 | 0.2 | -0.2 | -0.3 | -0.02 | -0.06 | -0.35 | -0.21 | -0.12 | 0.15 | 0.39 | 0.32 | -0.03 | -0.27 |
| | Inward FDI partner concentration | -0.05 | -0.21 | 0.28 | -0.13 | 0.03 | -0.31 | 0.05 | 1 | 0.53 | 0.21 | -0.4 | -0.2 | 0.06 | 0.26 | 0.2 | 0.11 | -0.3 | -0.26 | 0.14 | 0.03 | -0.18 | 0.23 | 0.06 | -0.01 | 0.08 | -0.23 | 0.07 | 0.03 | -0.15 | -0.13 |
| | Outward FDI partner concentration | -0.07 | 0.05 | 0.05 | 0.11 | 0.4 | 0.19 | 0.36 | 0.53 | 1 | -0.01 | -0.47 | -0.28 | -0.13 | -0.27 | 0.02 | -0.29 | -0.16 | 0.03 | -0.25 | -0.05 | -0.58 | 0.33 | -0.37 | -0.19 | -0.1 | 0.19 | -0.03 | 0.04 | 0.19 | 0.2 |
| | Net external debt in % GDP | -0.21 | -0.39 | 0.18 | -0.22 | -0.51 | -0.58 | -0.36 | 0.21 | -0.01 | 1 | -0.54 | -0.33 | 0.45 | 0.12 | -0.37 | 0.42 | -0.4 | -0.42 | 0.31 | 0.23 | 0.47 | -0.08 | 0.63 | 0.41 | 0.65 | -0.1 | -0.49 | -0.16 | -0.07 | 0.08 |
| | Net international investment position | 0.39 | 0.15 | -0.12 | 0.23 | 0.13 | 0.12 | 0.08 | -0.4 | -0.47 | -0.54 | 1 | -0.05 | -0.15 | 0.31 | 0.37 | -0.3 | 0.4 | 0.38 | -0.3 | -0.1 | -0.04 | -0.37 | -0.17 | -0.14 | -0.35 | -0.17 | 0.46 | -0.08 | -0.09 | -0.42 |
| | Disinformation originating from abroad | -0.16 | -0.02 | -0.35 | -0.08 | 0.02 | 0.35 | 0.01 | -0.2 | -0.28 | -0.33 | -0.05 | 1 | -0.26 | -0.07 | -0.17 | -0.14 | 0.22 | 0.24 | 0.22 | -0.02 | 0.07 | -0.1 | -0.19 | 0.01 | -0.22 | 0.28 | 0.16 | 0.15 | 0.09 | 0.2 |
| | Total fertility rate (difference from replacement-level) | 0.09 | -0.22 | 0.62 | -0.03 | -0.05 | -0.43 | -0.52 | 0.06 | -0.13 | 0.45 | -0.15 | -0.26 | 1 | -0.07 | 0.12 | 0.23 | -0.04 | -0.19 | 0.03 | -0.06 | 0.01 | 0.34 | 0.3 | 0.15 | 0.34 | -0.24 | -0.36 | -0.51 | -0.34 | 0.07 |
| | Employment gap (EU versus non-EU nationals) | 0.31 | -0.13 | 0 | 0.09 | -0.19 | -0.27 | 0.08 | 0.26 | -0.27 | 0.12 | 0.31 | -0.07 | -0.07 | 1 | 0.21 | 0.06 | -0.11 | -0.19 | -0.06 | -0.01 | 0.3 | -0.3 | 0.3 | -0.17 | -0.02 | -0.44 | 0.48 | -0.03 | -0.07 | -0.61 |
| | Military expenditures (difference from 2% of GDP) | 0.45 | 0.11 | 0.41 | -0.03 | 0.36 | 0.18 | 0.1 | 0.2 | 0.02 | -0.37 | 0.37 | -0.17 | 0.12 | 0.21 | 1 | -0.06 | -0.01 | -0.19 | -0.09 | -0.2 | -0.35 | 0.09 | -0.17 | -0.41 | -0.51 | -0.57 | 0.68 | -0.37 | -0.43 | -0.48 |
| Capacities | Intra-EU trade in recyclable raw materials | -0.15 | 0.19 | -0.04 | -0.17 | -0.29 | -0.17 | -0.32 | 0.11 | -0.29 | 0.42 | -0.3 | -0.14 | 0.23 | 0.06 | -0.06 | 1 | -0.07 | -0.33 | 0.53 | -0.03 | 0.36 | 0.11 | 0.83 | 0.22 | 0.26 | -0.34 | -0.14 | 0.12 | -0.25 | -0.11 |
| | Supplier diversification for base metals, rate of change | 0.25 | 0.52 | -0.2 | 0.58 | 0.23 | 0.52 | 0.08 | -0.3 | -0.16 | -0.4 | 0.4 | 0.22 | -0.04 | -0.11 | -0.01 | -0.07 | 1 | 0.76 | -0.23 | -0.07 | -0.14 | -0.16 | -0.27 | -0.21 | -0.33 | 0.03 | 0.1 | 0.13 | 0 | 0.08 |
| | Metal footprint per capita, rate of decline | 0.11 | 0.47 | -0.19 | 0.49 | 0.28 | 0.39 | 0.2 | -0.26 | 0.03 | -0.42 | 0.38 | 0.24 | -0.19 | -0.19 | -0.19 | -0.33 | 0.76 | 1 | -0.36 | -0.2 | -0.16 | -0.17 | -0.45 | -0.12 | -0.33 | 0.24 | -0.05 | 0.19 | 0.07 | 0.07 |
| | Intra-EU trade in energy | 0.01 | -0.19 | -0.14 | -0.66 | -0.45 | -0.18 | -0.2 | 0.14 | -0.25 | 0.31 | -0.3 | 0.22 | 0.03 | -0.06 | -0.09 | 0.53 | -0.23 | -0.36 | 1 | 0.03 | 0.42 | -0.14 | 0.69 | 0.38 | 0.24 | 0.04 | -0.02 | 0.32 | 0 | -0.11 |
| | Supplier diversification for energy carriers, rate of change | -0.28 | -0.42 | -0.11 | -0.2 | -0.24 | -0.27 | -0.3 | 0.03 | -0.05 | 0.23 | -0.1 | -0.02 | -0.06 | -0.01 | -0.2 | -0.03 | -0.07 | -0.2 | 0.03 | 1 | 0.13 | -0.28 | 0.14 | 0.14 | 0.42 | 0.09 | -0.11 | -0.14 | -0.12 | 0.4 |
| | Backward participation in GVC | -0.18 | -0.28 | -0.27 | -0.39 | -0.9 | -0.39 | -0.02 | -0.18 | -0.58 | 0.47 | -0.04 | 0.07 | 0.01 | 0.3 | -0.35 | 0.36 | -0.14 | -0.16 | 0.42 | 0.13 | 1 | -0.49 | 0.73 | 0.64 | 0.54 | 0.19 | -0.13 | 0.01 | -0.06 | -0.21 |
| | Forward participation in GVC | -0.26 | 0.26 | 0.43 | 0.14 | 0.44 | -0.05 | -0.06 | 0.23 | 0.33 | -0.08 | -0.37 | -0.1 | 0.34 | -0.3 | 0.09 | 0.11 | -0.16 | -0.17 | -0.14 | -0.28 | -0.49 | 1 | -0.2 | -0.25 | 0.05 | -0.14 | -0.25 | -0.13 | -0.15 | 0.18 |
| | Trade openness – intra-EU | -0.06 | -0.24 | -0.04 | -0.42 | -0.66 | -0.47 | -0.35 | 0.06 | -0.37 | 0.63 | -0.17 | -0.19 | 0.3 | 0.3 | -0.17 | 0.83 | -0.27 | -0.45 | 0.69 | 0.14 | 0.73 | -0.2 | 1 | 0.43 | 0.55 | -0.21 | -0.16 | 0.05 | -0.23 | -0.27 |
| | Trade openness – extra-EU | -0.52 | -0.38 | -0.3 | -0.32 | -0.85 | -0.44 | -0.21 | -0.01 | -0.19 | 0.41 | -0.14 | 0.01 | 0.15 | -0.17 | -0.41 | 0.22 | -0.21 | -0.12 | 0.38 | 0.14 | 0.64 | -0.25 | 0.43 | 1 | 0.49 | 0.57 | -0.31 | -0.13 | 0.17 | 0.13 |
| | Value added share of foreign enterprises | -0.3 | -0.34 | -0.05 | -0.27 | -0.57 | -0.53 | -0.12 | 0.08 | -0.1 | 0.65 | -0.35 | -0.22 | 0.34 | -0.02 | -0.51 | 0.26 | -0.33 | -0.33 | 0.24 | 0.42 | 0.54 | 0.05 | 0.55 | 0.49 | 1 | 0.15 | -0.53 | -0.07 | -0.27 | 0.21 |
| | Financial integration | -0.41 | -0.24 | -0.4 | -0.09 | -0.34 | -0.03 | 0.15 | -0.23 | 0.19 | -0.1 | -0.17 | 0.28 | -0.24 | -0.44 | -0.57 | -0.34 | 0.03 | 0.24 | 0.04 | 0.09 | 0.19 | -0.14 | -0.21 | 0.57 | 0.15 | 1 | -0.36 | 0.22 | 0.58 | 0.58 |
| | Military personnel per capita | 0.35 | 0.11 | -0.09 | 0 | 0.18 | 0.34 | 0.39 | 0.07 | -0.03 | -0.49 | 0.46 | 0.16 | -0.36 | 0.48 | 0.68 | -0.14 | 0.1 | -0.05 | -0.02 | -0.11 | -0.13 | -0.25 | -0.16 | -0.31 | -0.53 | -0.36 | 1 | -0.01 | -0.16 | -0.52 |
| | Net migration rate | 0.04 | 0.31 | -0.35 | -0.01 | 0.07 | 0.17 | 0.32 | 0.03 | 0.04 | -0.16 | -0.08 | 0.15 | -0.51 | -0.03 | -0.37 | 0.12 | 0.13 | 0.19 | 0.32 | -0.14 | 0.01 | -0.13 | 0.05 | -0.13 | -0.07 | 0.22 | -0.01 | 1 | 0.3 | 0.1 |
| | Share of non-EU citizens from total employment | -0.17 | -0.15 | -0.29 | 0.01 | -0.11 | 0.04 | -0.03 | -0.15 | 0.19 | -0.07 | -0.09 | 0.09 | -0.34 | -0.07 | -0.43 | -0.25 | 0 | 0.07 | 0 | -0.12 | -0.06 | -0.15 | -0.23 | 0.17 | -0.27 | 0.58 | -0.16 | 0.3 | 1 | 0.27 |
| | People being resettled under AMIF | -0.49 | -0.21 | -0.06 | 0 | 0.09 | -0.05 | -0.27 | -0.13 | 0.2 | 0.08 | -0.42 | 0.2 | 0.07 | -0.61 | -0.48 | -0.11 | 0.08 | 0.07 | -0.11 | 0.4 | -0.21 | 0.18 | -0.27 | 0.13 | 0.21 | 0.58 | -0.52 | 0.1 | 0.27 | 1 |



The correlations refer to the percentile positions (as detailed in Annex I) of the indicator values in the latest available year. A high percentile value in capacities indicates high capacities, while a high percentile value for vulnerabilities indicates low vulnerabilities.

Indices correlation MS dashboards**Indices correlation Global dashboards****Indices correlation MS Areas**

Pairwise correlation of the synthetic resilience indices by dimension for the Member State level dashboards (top left) and for the global dashboards (top right). The bottom panel shows the pairwise correlation of the synthetic indices by area and dimension, for the Member State level dashboards. SE, G, D and GP denote the four dimensions: social and economic, green, digital, and geopolitical, V and C stands for vulnerabilities and capacities, respectively. In the bottom panel, the areas in the four dimensions are numbered, e.g. SE1(V) denotes the synthetic vulnerabilities index for the first area of the social and economic dimension. See Figure 3 in the main report for the areas.

ANNEX V: DETAILS ON THE INDICATORS IN THE MEMBER STATE LEVEL ANALYSIS

Table A1: List of indicators included in the draft **social and economic dashboard** at MEMBER STATE level, with detailed definition and motivation for inclusion in the dashboard. In the *Rationale* of each indicator, we identify and point to the most relevant megatrend, for which measurement of the given indicator can provide an added value and insight. In some cases, additional megatrends are flagged, in brackets.

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|---------|--|--|------------------------|--|
| Social and economic dimension: Inequalities and social impact of the transitions VULNERABILITIES | | | | | |
| At risk of poverty or social exclusion rate (AROPE) | SE_v01 | People at risk of poverty or social exclusion are likely to be strongly hit by distress, and they often have fewer resources or capacities to cope. Megatrend: diversifying inequalities. | Share of the population who are at risk of poverty after social transfers, severely materially deprived or living in households with very low work intensity. | Eurostat: t2020_50 | 2020 (AT, BG, DK, EE, FI, HU, NL, RO), 2019 |
| Income quintile share ratio S80/S20 | SE_v02 | Elevated income inequality undermines social cohesion and increases the perception of unfairness of the poorest towards the richest. Moreover, high levels of inequality have negative implications for political stability, crime and corruption. All of these factors contribute to a more vulnerable society. Megatrend: diversifying inequalities. | The ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (bottom quintile). Income refers to household equivalised disposable income. | Eurostat: tessil80 | 2020 (AT, BG, DK, EE, FI, HU, NL, RO), 2019 |
| Employment in energy-intensive sectors | SE_v043 | People employed in energy-intensive sectors may face important sectoral shifts due to the green transition. Workers employed in these sectors might be at risk of unemployment, hence it is advisable to support them with reskilling programmes, to requalify their competencies and fit into a changing labour market. Megatrend: changing nature of work. | The share of people employed in the following sectors, relative to total employment: C20 (manufacture of chemicals and chemical products), C23 (manufacture of other non-metallic mineral products), C24 (manufacture of basic metals), and C29 (manufacture of motor vehicles, trailers and semi-trailers). ³⁴ | Eurostat: lfsa_egan22d | 2020, 2019 (EL), 2018 (CY, IE, MT) N.A. (LV) |

³⁴ This particular choice is in line with chapter 5 of the 2019 Economic and Social Developments in Europe Review: the sectors are the same as in Figure 5.1. Though mining is not included, its employment share is relatively low.

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|--------|--|---|---------------------------|--|
| Employment in manufacturing with high automation risk | SE_v04 | Manufacturing represents the industry sector where automation and the acceleration of the digital transition could hit workers the hardest. Megatrend: changing nature of work. | Share of jobs at risk of automation in the manufacturing sector. The following types of activities have been considered: OC3: Technicians and associate professionals; OC4 Clerical support workers; OC5 Service and sales workers; OC8 Plant and machine operators and assemblers; OC9 Elementary occupations. | Eurostat: lfsa_eisn2 | 2020 |
| Regional dispersion in household income | SE_v05 | This indicator monitors the dispersion of household income between regions of a country. While the EU as a whole will undergo the transitions, it is paramount to involve all regions in this process and leave no one behind. Megatrend: diversifying inequalities. | Dispersion measure, which takes into account the difference between the maximum and minimum regional value of household income in the same country. | Eurostat: nama_10r_2hhinc | 2019 (DK, SI), 2018, N.A. (CY, EE, LU, LV, MT, EU27) |
| Social and economic dimension: Inequalities and social impact of the transitions CAPACITIES | | | | | |
| Impact of social transfers (other than pensions) on poverty reduction | SE_c01 | The ability of social transfers to reduce poverty shows that the government can use its welfare system to insulate people from poverty. It can thus respond to financial and economic distress with lower well-being (distributional) losses. Megatrend: diversifying inequalities. | Relative reduction in the share of people at risk of poverty rate due to social transfers (excluding pensions). | Eurostat: tespm050 | 2020 (AT, BG, DK, EE, FI, HU, NL, RO), 2019 |
| Household net saving rate | SE_c02 | Households' savings create a buffer that can help to better absorb economic and financial distress and smooth the effects of income shocks, at least in the short period. Megatrend: diversifying inequalities. | Financial net worth of the balance sheets of households and non-profit institutions serving households (% of GDP). | Eurostat: tec00131 | 2020 (DE, DK, FI, IT, PT, SE, SK, EU27) 2019, 2018 (LU)N.A. (BG, MT, RO) |
| Government social expenditures on education, health, social protection and long-term care as % of GDP | SE_c03 | Government social expenditures are critical for building a more resilient society. Government intervention is necessary to help vulnerable groups, and to provide education and health for all of its citizens. Social expenditures are a precondition of a society based on fairness where no one is left behind. Megatrend: diversifying inequalities. | Government social expenditures on education, health, social protection and long-term care as % of GDP. | Eurostat: gov_10a_exp | 2019 |

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|--------|---|---|-------------------------------|---|
| Active citizenship | SE_c04 | Active citizenship advocates the civic engagement of people to take responsibilities on various actions related to social, environmental or rights issues. The proxy used is voluntary activities, which provide concrete social support and constitute an important social buffer in time of crises. Megatrend: diversifying inequalities. | Share of people in the population participating in formal or informal voluntary activities. This variable will be most likely part of EU SILC from 2022. | EQLS, Eurofound | 2016 |
| Social and economic dimension: Health, education and work VULNERABILITIES | | | | | |
| Antimicrobial resistance | SE_v06 | Anti-microbial resistance (AMR) is the ability of microbes to develop resistance to existing medicines like antibiotics. It is the “silent pandemic” that is recognised as a global health security threat that can potentially be more devastating than COVID-19. Monitoring AMR is a priority in the public health agenda of the current Commission. It is key to ensure that we develop effective policies to keep it in check (and even reverse it) and to safeguard our resilience. Megatrend: shifting health challenges. | Data retrieved from model-based estimation published in https://www.thelancet.com/action/showPdf?pii=S1473-3099%2818%2930605-4 . | ECDC | 2015 |
| Self-reported unmet need for medical care | SE_v07 | Individuals with unmet health needs may have unresolved health problems or be at risk of developing an illness, therefore they are more vulnerable. Megatrend: diversifying inequalities. | The share of the population aged 16 and over, reporting self-assessed unmet needs for medical care due to one of the following reasons: ‘Financial reasons’. | Eurostat: hlth_silc_08 | 2020 (AT, BG, DK, EE, FI, HU, NL, RO), 2019 |
| Years of life lost due to PM2.5 | SE_v08 | This indicator measures the impact of atmospheric pollution on human lives. The higher the score the bigger the vulnerability due to pollution. Megatrend: shifting health challenges. | Years of life lost per 100,000 inhabitants. | European Environmental Agency | 2018 |
| Variation in performance explained by students' socio-economic status | SE_v09 | Students' socio-economic status plays a role in determining positive achievement in education. A strongly positive relationship between socio-economic status and PISA performance suggests a scarce equality of opportunity within the country. An inclusive and resilient country is where the education system mitigates obstacles due to socio-economic status. Megatrend: diversifying inequalities. | Gap in education achievement measured by the PISA index between the top and bottom quartile, by socio-economic status of students | OECD: PISA | 2018 |

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|--------|---|--|-----------------------------------|-----------------------|
| Macroeconomic skills mismatch rate | SE_v10 | A high score in skills mismatch suggests that there is a large gap between the skills that the population has and the skills that the economy needs. The indicator provides a proxy of the need to update the education system to the job market to better cope with structural changes. Megatrend: changing nature of work. | The indicator is the relative dispersion of employment rates across broad skill groups (high, medium, low skills). The indicator is calculated as the sum, over the three skill groups, of the absolute difference between the share of a skill group in employment and its share in the population. | Labour Force Survey ³⁵ | 2020, 2019 (DE) |
| Gender employment gap | SE_v11 | The gender employment gap is linked to lower prosperity and progress because of a reduction in the pool of talent participating in the labour market. It creates a distortion in labour market dynamism to suboptimal use of resources which in times of crises determines an obstacle to a prompt and effective country's bounce forward. Megatrend: diversifying inequalities. | Difference between the employment rate of men and women of working age 20-64. | Eurostat: sdg_05_30 | 2020 |
| Young people neither in employment nor in education and training | SE_v12 | Young people neither in employment nor in education and training tend to lack the qualifications, skills and competences to successfully enter the labour market. They are also more vulnerable to shocks, and less able to respond/adapt to the dynamic adjustment of the labour market, especially at a time of the green and digital transition. Megatrend: diversifying inequalities. | Young people neither in employment nor in education and training (% of the population aged 15 to 29). | Eurostat: sdg_08_20 | 2020 |
| Long-term unemployment rate | SE_v13 | Long-term unemployment depletes human capital and makes the return to employment more difficult. Human capital is lost and the worker is not productive anymore, often permanently. Social consequences arise. Megatrend: diversifying inequalities (changing nature of work). | The long-term unemployment rate is the number of persons unemployed for 12 months or longer as a percentage of the labour force (i.e. economically active population). | Eurostat: une_ltu_a | 2020 |

³⁵ DG ECFIN and DG EMPL calculations. The methodology is adopted from 'Analytical web note 7/2015, Measuring skills mismatch', available at <https://ec.europa.eu/social/BlobServlet?docId=14974&langId=en>

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|--------|--|---|------------------------|---|
| Social and economic dimension: Health, education and work CAPACITIES | | | | | |
| Standardised preventable and treatable mortality (low rate) | SE_c05 | This indicator shows the ability of the national health system to provide the necessary health treatment via prevention as well as timely healthcare intervention Megatrend: shifting health challenges. | Preventable mortality refers to mortality that can mainly be avoided through effective public health and primary prevention interventions. Treatable mortality can mainly be avoided through timely and effective health care interventions, including secondary prevention and treatment. The data are presented as standardised death rates, meaning they are adjusted to a standard age distribution in order to measure death rates independently of different age structures of populations. | Eurostat: sdg_03_4 2 | 2018, 2016 (FR, EU27) |
| Healthy life years in absolute value at birth | SE_c06 | It is an indication of overall good health, environmental and social conditions which result in longer healthy life expectancy. Megatrend: diversifying inequalities, (shifting health challenges). | Healthy life years is defined as the number of years that a person is expected to continue to live in a healthy condition. It is based on age-specific prevalence (proportions) of the population in healthy and unhealthy conditions and age-specific mortality information. A healthy condition is defined as one without limitation in functioning and without disability. | Eurostat: hlth_hlye | 2019 |
| Children aged less than 3 years in formal childcare | SE_c07 | Formal childcare is the first and most important part of a socialization process and building of human capital. It reduces inequality, increases the likelihood of a better outcome in education for children and finally it reduces disincentives to female labour force participation. Megatrend: diversifying inequalities. | This indicator shows the percentage of children (under 3 years old) cared for by formal arrangements other than by the family. The indicator is based on the EU-SILC. | Eurostat: tepsr_sp2 10 | 2020 (AT, BG, DK, EE, FI, HU, NL, RO), 2019 |
| Average scores in the PISA test, reading, mathematics and science | SE_c08 | Better reading, mathematics and science skills are key to measure the quality of education. This indicator is a proxy for the basic individual ability to understand and process complex phenomena. Megatrend: diversification of education and learning. | Average PISA scores in reading, mathematics and science, among students aged 15. The three indicators are then aggregated at the country level. | OECD: PISA | 2018, 2015 (ES, EU27) |

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|--------|---|--|--------------------------------------|-----------------------|
| Adult participation in learning during the last 12 months | SE_c09 | Reskilling and upskilling can help employees (and the self-employed) to make a smooth transition to other tasks or jobs. This makes adult learning a key capacity for recovery and adaptation to the future of work. Megatrend: diversification of education and learning. | Total participation rate in education and training (excluding guided-on-the-job training) of adults who stated they received formal and non-formal training in the last 12 months preceding the survey. The source of this indicator will be EU Labour force survey from 2022. | Adult Education Survey ³⁶ | 2016 |
| Employment rate | SE_c10 | Being employed makes individuals economically independent and more empowered. People at work also maintain their skills and qualifications. Megatrend: diversifying inequalities (changing nature of work). | Share of population aged 20 to 64 which is employed. | Eurostat: lfsi_emp_a | 2020 |
| Active labour market policies per person wanting to work | SE_c11 | Active labour market policies (ALMP) are government programmes to help and support the unemployed and other disadvantaged groups in the transition from unemployment or inactivity to work. ALMP covers interventions that provide temporary support for groups that are disadvantaged in the labour market and aims at activating the unemployed, helping people move from involuntary inactivity into employment, or maintaining the jobs of persons threatened by unemployment. It enables labour market resilience by sustaining and stimulating work creation. Megatrend: diversifying inequalities. | Expenditures on active labour market policies per person wanting to work. Government expenditures on active labour market policies include labour market services, training, employment incentives, supported employment and rehabilitation, direct job creation, start-up incentives, out of work income maintenance and support, early retirement. By looking at expenditures per person wanting to work, it corrects for cyclicalities and hence enables comparison across countries and over time. | DG EMPL | 2018 |
| Social and economic dimension: Economic and financial stability and sustainability VULNERABILITIES | | | | | |
| Government debt | SE_v14 | Countries with high public debt have less room for fiscal interventions to support the economy and they are less attractive to foreign investors. | The total consolidated gross debt at nominal value in the following categories of government liabilities (as defined in ESA 2010): currency and deposits (AF.2), debt securities (AF.3) and loans (AF.4). The general government sector comprises the subsectors of central government, state government, local government, and social security funds. | Eurostat: sdg_17_4_0 | 2020 |

³⁶ Eurostat ad hoc extraction. This indicator is based on an ad hoc extraction performed by Eurostat. It corresponds to the Council decision of the target that at least 47% of adults aged 25 – 64 should participate in learning during the previous 12 months by 2025. As of now, the data source is the Adult Education Survey. From 2022, this variable should be regularly part of the Labour Force Survey. This indicator is aligned with the Social Scoreboard.

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|--------|---|---|------------------------|---|
| Projected old-age dependency ratio | SE_v15 | The higher is this ratio, the lower is the expected sustainability in the intergenerational change regarding the demographic aspects and the higher the economic burden on young people. It is worth noting that the projected old age dependency ratio is a key ingredient for assessing the implications of ageing, but the phenomenon is complex and has further important determinants. Megatrend: increasing demographic imbalances. | This indicator is the ratio between the number of persons aged 65 and over (age when they are generally economically inactive) and the number of persons aged between 15 and 64. The model to calculate this indicator takes into account assumptions on future age-specific fertility rates, probabilities of dying and net migration levels. 2019 data reports estimates of 2050. | Eurostat: TPS00200 | 2019 |
| Degree of specialization of the economy | SE_v16 | Since the theory of Optimum Currency Areas, and even recently after the last crisis, it has been established in the economic literature that a high degree of diversification shields countries and regions from being excessively hit by a sectoral shock. Sectoral/micro shocks, therefore, do not translate into macro disturbances. For the EU as a whole, however, country-level specialisation may lead to higher competitiveness. Megatrend: growing consumption (aggravating resource scarcity, expanding influence of east and south). | Herfindahl index across sectors (NACE2), represents the sectoral concentration of domestic production. Ideally, as low as possible, as highly diversified economies are more resilient. | Eurostat: nama_10_a64 | 2020 (IT, MT, SK), 2019, 2018 (BE, CY, DE, ES, FR, HR, LT, LV, PL, PT), 2017 (SE, EU27) |
| Non-financial corporation funding structure | SE_v17 | The indicator provides the average leverage of non-financial corporations (NFCs) in each Member State (the share of debt on total liabilities). It is an indicator of the ability to access additional borrowing for liquidity or investment needs. When leverage is low, NFCs have a high capacity to raise additional funds (via loans or capital markets) and to obtain better funding conditions in general. | Ratio of equity to total outstanding liabilities of non-financial corporations. | Eurostat: nasa_10_f_bs | 2020 (BE, EL, ES, FI, HU, PL, PT, RO, SE, SI, SK), 2019 |

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|--------|---|---|--|--|
| Social and economic dimension: Economic and financial stability and sustainability CAPACITIES | | | | | |
| Automatic stabilisation of the tax-benefit system | SE_c12 | Automatic stabilizers (taxes, social insurance contributions and income-related benefits) are timely and do not depend on policymakers' actions. They immediately provide relief where necessary and dampen the economic cycle. | It is the share of a shock in market income (before taxes and transfers) which is transmitted into disposable income (after taxes and transfers) in a country. | JRC calculation ³⁷ | 2019 |
| Banking sector total capital ratio | SE_c13 | It is an indicator of the losses that the banking sector can absorb with available capital before other liabilities are hit. The higher the total capital ratio the higher is the banking sector capacity to provide lending to the economy and to absorb individual or systemic shocks. | The Total Capital Ratio provides a measure of how much capital (equity + subordinated liabilities) the banking sector holds in comparison to the risks faced (credit, market and operational risks). It is calculated as: own Funds/ Total Risk Exposure Amount | European Central Bank | 2020, 2018 (LT, LV, EU27), 2017 (EE, FI) |
| Insurance sector solvency capital ratio | SE_c14 | The solvency ratio provides an indicator of how much resources (capital and subordinated liabilities) the insurance sector holds to offset unexpected losses arising from investments and insurance risks. A high value indicates that the insurance sector is able to absorb unexpected losses/pay-outs so it is resilient to financial and other shocks. Weaknesses of the insurance sector may spill over to the financial system. | Own funds/Solvency Capital Requirements Indicator | European Insurance and Occupational Pensions Authority | 2019 |
| Share of innovative enterprises | SE_c15 | Innovation stimulates competitiveness and helps an economy to be flexible to changes, to adapt faster and eventually to be able to transform in case of distress. Megatrend: accelerating technological change and hyperconnectivity. | Innovative enterprises are classified as those that had innovation activities during the period under review (2014-2016), regardless of whether the activity resulted in the implementation of an innovation or not. | Eurostat: inn_cis11_inact | 2018 |

³⁷ Using the Euromod simulation model. Based on 'Impact of fiscal policy on income distribution', in 'Report on Public Finances in EMU 2017', European Economy Institutional Paper 069, 2018, pp. 71-131: https://ec.europa.eu/info/sites/default/files/economy-finance/ip069_en.pdf

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|--------|--|--|-------------------------|---|
| Intangible investment | SE_c16 | Intangible assets are at the heart of what makes firms competitive. They are vital for productivity, economic growth, innovation and transformations. Megatrend accelerating technological change and hyper connectivity. | The stock of intangible capital at current prices over GDP. Intangibles include computer software and database, cultivated assets, research and development, and other innovative properties assets. | EU KLEMS, ³⁸ | 2017, 2016 (EE, ES, IE, LV, PT, RO, SE), 2015 (PL, EU27), N.A. (BE, CY, HR) |
| Government investment to GDP ratio | SE_c17 | Higher investment rates imply more capital for production. Government investment highlights the role of the government as an active investor. Government investment increases the capacity to face economic shocks by having buffers, and being able to channel resources to new sectors during adaptation and (if needed) transformation. | It is defined as gross fixed capital formation (GFCF) of the government sector as a percentage of GDP. | Eurostat: SDG_08_11 | 2020 (DE, DK, FI, IT, PT, SE, SK, EU27), 2019, 2018 (LT, MT), 2017 (BG) |

³⁸ <https://euklems.eu/download/>. Growth and productivity accounts. This indicator has been computed as ‘Capital in computer software and database, cultivated assets, research and development and other innovative properties assets’, over GDP.

Table A2: List of indicators included in the **green dashboard** at Member State level, with detailed definition and motivation for inclusion in the dashboard. In the *Rationale* of each indicator, we identify and point to the most relevant megatrend, for which measurement of the given indicator can provide an added value and insight. In some cases, additional megatrends are flagged, in brackets.

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|-------|--|--|---|-----------------------|
| Green dimension: Climate change mitigation and adaptation VULNERABILITIES | | | | | |
| Fatalities from climate extremes | G_v01 | Understanding climate-related losses is crucial to improve the accuracy of climate risk assessment. Countries with higher risk of severe losses might require more important effort in terms of climate change adaptation plans, which can represent a challenge to the green transition. Megatrend: climate change and environmental degradation. | Number of fatalities to weather or climate-related extreme events over the period 1980-2019, per 1 million population. | European Environment Agency: CSI042/CLIM039 | 2019 |
| GHG emissions per capita | G_v02 | Greenhouse gas emission is a major driver of climate change. Countries with higher GHG emissions may need to devote more efforts to achieve climate neutrality. As part of the European Green Deal, the Commission proposed to raise the 2030 target, to at least 55% decrease in GHG emissions with respect to 1990. Megatrend: climate change and environmental degradation. | Total national emissions of greenhouse gases in million tonnes per capita. Different gases are integrated into a single indicator expressed in units of CO2 equivalents. The indicator does not include emissions and removals related to land use, land-use change and forestry (LULUCF), but it includes international aviation. | Eurostat: t2020_rd300 | 2019 |
| CO2 emissions in road transport | G_v03 | Road transport is responsible for a large share of CO2 emissions in the EU. High levels of CO2 emissions represent an important challenge in the transport sector for its shift towards sustainable mobility. Megatrend: climate change and environmental degradation. | Per capita CO2 emissions of road transport. | Eurostat: env_air_gge | 2019 |
| Fossil fuel subsidies | G_v04 | Fossil fuel subsidies may encourage an excessive use of fossil fuels and reduce the incentive to use other forms of cleaner energy. They can thus represent an obstacle to boosting the green transition. Megatrend: climate change and environmental degradation. | Total post-tax consumer subsidies expressed as a % of GDP, that allow the consumer prices for energy to be below supply costs plus the efficient levels of taxation. | International Monetary Fund ³⁹ | 2017 |

³⁹ <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|-------|---|--|---|-----------------------|
| Green dimension: Climate change mitigation and adaptation CAPACITIES | | | | | |
| Insured losses from climate extremes | G_c01 | Insurance has been acknowledged as a systemic adaptation tool, which allows to transfer potential future losses due to climate-related extreme events to a party which is more prepared to absorb them. The higher the share of insured losses, the better are the expectations of coping with the potential future consequences of climate extremes. This indicator points to the ability of a country to close the climate protection gap. Megatrend: climate change and environmental degradation. | Share of insured losses of weather or climate-related extreme events over the period 1980-2017, expressed as a percentage of total losses. | European Environment Agency: CSI042/CLIM039 | 2019 |
| CO2 absorption by forests | G_c02 | Forest provide important ecosystem services, particularly in relation to CO2 capture. They represent carbon sinks that will contribute to achieving carbon neutrality. Megatrend: climate change and environmental degradation. | Level of CO2 absorption (negative of emission) by the forests, rescaled to the total land cover. | Eurostat: env_air_gge and lan_lcv_ovw | 2019, N.A. (MT) |
| Electric and hydrogen passenger fleet | G_c03 | Low-emission alternative energy can support the decarbonisation of transport. Monitoring the BEV and H2 vehicle market share can provide a forward-looking metric for the state of decarbonisation of road transport across the EU. Megatrend: accelerating technological change and hyperconnectivity. | Percentage of battery electric (BEV) and hydrogen (H2) vehicles of the total fleet of passenger cars. | European Alternative Fuels Observatory⁴⁰ | 2020 |
| Inland use of train, bus and trolleybus | G_c04 | Inland use of train, bus and trolleybus is a proxy of the uptake of more sustainable patterns of passenger transport. The ability to achieve ambitious climate goals requires a shift to more sustainable transport modes. Megatrend: climate change and environmental degradation. | Percentage of transport by buses, coaches, and trains in total inland passenger transport performance, measured in passenger-km. | Eurostat: tran_hv_psmo | 2018 |

⁴⁰ <https://www.eafo.eu/vehicles-and-fleet/overview>

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|-------|---|---|---|-----------------------|
| Renewable energy in final energy consumption | G_c05 | High renewable share implies less use of fossil-based energy sources, hence contributing to the goal of climate neutrality. Countries with a higher share of renewable energy are better placed to achieve the objectives of the Green Deal and can exploit the opportunities of this sector better. Megatrend: aggravating resource scarcity. | Share of renewable energy consumption in gross final energy consumption according to the Renewable Energy Directive. The gross final energy consumption is the energy used by end-consumers (final energy consumption) plus grid losses and self-consumption of power plants. | Eurostat: t2020_rd330 | 2019 |
| Environmental technology patents per capita | G_c06 | Innovation in environment-related technologies shows the capacity and skills for breaking new grounds in terms of greening the economy, by opening new patterns of consumption and production and allowing for new ways to address environmental risks. Innovative low-carbon technologies and processes are instrumental for societal transformation needed for the green transition. Megatrend: climate change and environmental degradation. | Number of environment-related technologies patents applications per capita. The types of technologies are: climate change mitigation technologies related to buildings, energy generation, transmission or distribution; capture storage sequestration or disposal of GHG, environmental management, climate change mitigation technologies related to transport, water-related adaptation technologies, climate change mitigation technologies in the production or processing of goods, wastewater treatment or waste management. | OECD: PAT_IN D ⁴¹ , over population. | 2018 |
| Green dimension: Sustainable use of resources VULNERABILITIES | | | | | |
| Water exploitation index + | G_v05 | The water exploitation index, WEI+, aims to illustrate the pressure on the renewable freshwater resources as a consequence of water use for human purposes. High values of water exploitation represent a major threat (either by natural endowment or human action) to a healthy environment and natural capital preservation. Megatrend: aggravating resource scarcity. | The water exploitation index is estimated as the ratio of water use versus the consumption of renewable freshwater from renewable resources for a given spatial unit, e.g. river basin or country level, in a defined time period i.e. seasonal (quarter) or annual. Water scarcity is driven by (i) water demand, which is largely affected by population trends and (ii) socio-economic developments, and climate conditions, which control the availability of renewable freshwater resources and the seasonality of water supply. | Eurostat: sdg_06_60 | 2017, 2015 (EE) |

⁴¹ <https://stats.oecd.org/index.aspx?queryid=29068#>

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|-------|---|---|-----------------------------------|-----------------------|
| Domestic footprint | G_v06 | High domestic footprint represents a criticality and an obstacle in achieving the green transition. It provides an insight on the overall weight of the countries' economy on different environmental aspects. High footprint points to higher burden of the economic activity on the environment and climate. Megatrend: climate change and environmental degradation. | The Domestic Footprint quantifies the overall environmental impacts of production and consumption activities taking place within the boundary of each Member State (e.g. direct impacts). The use of resources and the emissions are translated into 16 environmental impacts (such as climate change, Eco toxicity, water scarcity etc.), and then aggregated into the environmental footprint single score. In future, we expect to have consumption footprint, which includes the domestic production in the EU and the trade with other world regions. | JRC ⁴² | 2018 |
| Domestic material consumption per capita | G_v07 | The indicator provides an assessment of the absolute level of the use of resources. High domestic material consumption implies higher environmental degradation resulting from primary production, material processing, manufacturing and waste. Megatrend: aggravating resource scarcity. | Total amount of material directly used in an economy and equals direct material input (DMI) minus exports. DMI measures the direct input of materials for the use in the economy and equals domestic extraction (DE) plus imports. For the 'per capita' calculation of the indicator the average population is used (the arithmetic mean of the population on 1st January of two consecutive years). The indicator is a smoothed 3-year average. In future it might be substituted by a total material footprint indicator of Eurostat, which contains both direct and indirect use of materials. | Eurostat: t2020_rl110 | 2019 |
| Waste generation rate | G_v08 | Too much waste produced is a vulnerability for achieving sustainable use of resources. Waste also endangers and pollutes the environment. Megatrend: climate change and environmental degradation. | Waste volume divided by domestic material consumption. | Eurostat: env_was gen, env_ac_mfa | 2018 |

⁴² https://eplca.jrc.ec.europa.eu/uploads/Science_for_policy_report_final_on_line.pdf

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|-------|--|---|--------------------------|-----------------------|
| Energy use in ICT | G_v09 | Increased energy demand due to digitalization may be the cause of "disruptive" changes within the energy sector. Although digitization can contribute to improve energy efficiency, the projections show in parallel a very rapid growth in electricity consumption, that represents a vulnerability for the green transition. Megatrend: accelerating technological change and hyperconnectivity. | Sum of net domestic energy use by ICT industries, NACE C25 Manufacture of computer, electronic and optical products and NACE C26 Manufacture of electrical equipment divided by all NACE industries. | Eurostat: env_ac_p efa04 | 2019 (LV), 2018 |
| Green dimension: Sustainable use of resources CAPACITIES | | | | | |
| Resource productivity | G_c07 | Resource productivity is a measure of the effectiveness with which resource consumption produces added value. It provides insights into whether decoupling between the use of natural resources and economic growth is taking place. It should be looked together with the level of material footprint per capita. Megatrend: aggravating resource scarcity. | Total amount of materials directly used by an economy, measured as domestic material consumption in relation to GDP. | Eurostat: t2020_rl 100 | 2019 |
| Energy productivity | G_c08 | The indicator points to the productivity of energy consumption and provides a picture of the degree of decoupling of energy use from growth in GDP. Megatrend: aggravating resource scarcity. | The indicator results from the division of the GDP by the gross available energy for a given calendar year. | Eurostat: t2020_rd 310 | 2019 |
| Circular material use rate | G_c09 | A higher degree of circularity reduces the environmental impacts of extracting primary material and corresponds to a higher ability to reemploy recycled products into the economy. Decoupling economic growth from resource use is key for the green transition. Megatrend: aggravating resource scarcity. | Share of material resources used which came from recycled products and recovered materials, thus saving extractions of primary raw materials. The circularity rate is part of the EU monitoring framework on the circular economy and it measures the contribution of recycled material to the overall material used. | Eurostat: cei_srm0 30 | 2019 |

| Variable | Label | Rationale | Definition | Source | Latest available year |
|--|-------|---|---|--|---|
| E-waste recycling rate | G_c10 | This indicator provides insights on the ability to foster a circular economy in relation to the digital transition. Waste in electrical and electronic equipment, such as computers, televisions, fridges and mobile phones, is one the fastest growing waste streams in the EU. E-waste includes precious materials that can represent an opportunity for recycling. Megatrend: accelerating technological change and hyperconnectivity. | The indicator is calculated by multiplying the 'collection rate' as set out in the Waste Electrical and Electronic Equipment (WEEE) Directive with the 'reuse and recycling rate' set out in the WEEE Directive. The 'reuse and recycling rate' is calculated by dividing the weight of the WEEE that enters the recycling/preparing for re-use facility by the weight of all separately collected WEEE (both in mass unit) in accordance with Article 11(2) of the WEEE Directive 2012/19/EU, considering that the total amount of collected WEEE is sent to treatment/recycling facilities. | Eurostat: t2020_rt130 | 2018, 2017 (CY, MT, PT), 2016 (RO), 2015 (IT) |
| Gross Value Added in Environmental goods and services sector | G_c11 | Higher GVA share in the Environmental goods and services sector (EGSS) indicates that the country has performed a larger shift towards eco-industries, which are crucial for the conservation of natural capital and efficiency in the use of resources. Goods and services produced in this sector are instrumental to achieve the green transition. Megatrend: changing nature of work. | Gross Value Added in EGSS at factor cost, as a percentage of GDP. The sectors are defined as the total for those that generate environmental products, i.e. goods and services produced for environmental protection or resource management. | Eurostat: env_ac_egss2 and nama_10_a64 | 2019 (ES, HR, NL), 2018, N.A. (CY, EL, HU, SK) |
| Green dimension: Ecosystems, biodiversity and sustainable agriculture VULNERABILITIES | | | | | |
| Farmland bird index | G_v10 | A decrease in the index means that the balance of bird species population trend is negative, representing biodiversity loss and signalling environmental stress. Biodiversity loss is an alarm indicator of excessive human activity. It can endanger the green transition as it has a negative impact on climate and disaster resilience, agriculture, and food security. Megatrend: climate change and environmental degradation. | Farmland birds index is an average population trend in a group of species suited to track trends in the condition of farmland habitats. Birds can act as 'indicator species' providing a barometer of the health of the environment. Being close to or at the top of the food chain, they reflect changes in the ecosystem rather rapidly compared to other species. Its sign is reversed in the dashboard so that a high value indicates high vulnerability. | Eurostat: env_bio2 | 2020 (FI), 2019, 2018 (FR, LU, NL, SK), 2017 (CY, ES, IT, PL), 2016 (DE, EL, IE), N.A. (BG, HR, MT, PT, RO, EU27) |

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|-------|--|---|---------------------------------------|-----------------------|
| Harmonized risk indicator 1 for pesticides | G_v11 | The use of chemical pesticides contributes to soil, water and air pollution, biodiversity loss and can harm non-target species. The Farm to Fork strategy under the European Green Deal calls for a significant reduction of the use and risk of chemical pesticides. Reduced use of and dependency on chemical pesticides improves the sustainability of the food chain. Megatrend: climate change and environmental degradation. | Harmonised Risk Indicator 1 (HRI1) is based on data on pesticide sales reported to the Commission by Member States. HRI 1 is calculated by multiplying the quantities of active substances placed on the market in plant protection products by a weighting factor. It tracks the progress of the Member State with respect to their own reference period (2011-2013 mean). | Eurostat: aei_hri | 2018 |
| Soil sealing index | G_v12 | Sprawl of built up areas leads to an increase of soil sealing (imperviousness). Depending on its degree, soil sealing reduces or even completely prevents natural soil functions and ecosystem services on the area. It is an important driver of biodiversity and habitat losses, hence a potential criticality for the green transition. Megatrend: climate change and environmental degradation. | The indicator estimates the percentage in sealed soil surfaces with impervious materials due to urban development and construction (buildings, constructions, and laying of completely or partially impermeable artificial material, such as asphalt, metal, glass, plastic or concrete). It uses data from the imperviousness High Resolution Layer (from the Copernicus Land Monitoring Service). | Eurostat: sdg_15_41 | 2018 |
| Soil erosion by water | G_v13 | Soil erosion by water is a major environmental threat, which can be exacerbated further in the future by climate change and human activity. As such, it represents a vulnerability that can endanger the conservation status of the ecosystems and biodiversity. Megatrend: climate change and environmental degradation. | It estimates the soil loss by water erosion processes and gives an indication of the area under risk of severe soil loss. It is expressed as a percentage of the total non-artificial erosive area in the country. | Eurostat: sdg_15_50 | 2016 |
| Farm income variability | G_v14 | Farming activities are often exposed to perturbations, i.e. changes in environmental or socio-economic constraints that might be difficult to anticipate. Farm income variability is deemed an important indicator of (the lack of) agricultural resilience. High farm income variability can for instance prevent investments needed for achieving sustainable agriculture practices. Megatrend: diversifying inequalities. | Variability of Gross Farm Income (GFI) per annual work unit, as a percentage change in GFI compared with the previous 3-year average. It is based on the ESTAT economic accounts for agriculture. | DG AGRI ⁴³ | 2018 |

⁴³ https://agridata.ec.europa.eu/extensions/DashboardIndicators/DataExplorer.html?select=EU27_FLAG.1

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|-------|---|---|---|---|
| Green dimension: Ecosystems, biodiversity and sustainable agriculture CAPACITIES | | | | | |
| Soil carbon content | G_c12 | Soil carbon content is essential to improving fertility, increasing use efficiency of nutrients and water, minimizing vulnerability to extreme climatic events, decreasing susceptibility to erosion. Higher level of soil carbon represents a capacity for sustainable agriculture. Megatrend: climate change and environmental degradation. | The indicator is based on the first European harmonized geo-referenced topsoil (0–20 cm) database, which arises from the Land use/Cover Area frame statistical Survey (LUCAS). It is based on the modelled organic carbon content in relation to slope, land cover, temperature, productivity and GPS position. | JRC - LUCAS ⁴⁴ | 2020 |
| Organic farming | G_c13 | Organic farming can represent an important shift in farming activity and can act as an important capacity element to mitigate water scarcity and enhance soil quality and biodiversity. Megatrend: climate change and environmental degradation. | Total fully converted organic farming areas and under conversion to organic farming as a percentage of total utilised agricultural area. | Eurostat: org_crop ar | 2019 |
| Urban wastewater treatment | G_c14 | This indicator points to the ability to provide clean water and sanitation, with an impact on the quality of water and corresponding consequences on the health of water ecosystems and biodiversity. Megatrend: climate change and environmental degradation. | Percentage of population connected to waste water treatment systems with at least secondary treatment. Thereby, wastewater from urban sources or elsewhere is treated by a process generally involving biological treatment with a secondary settlement or other processes, resulting in a removal of organic material that reduces the biochemical oxygen demand by at least 70 % and the chemical oxygen demand by at least 75 %. | Eurostat: sdg_06_20 | 2018, 2017 (BE, EE, IE, LU, PT, SE), 2016 (DE, EL, ES), 2015 (IT), 2012 (EU27), N.A. (CY) |
| Natura 2000 protected areas | G_c15 | Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. This network contributes to maintaining biodiversity and ecosystem services that are critical to sustaining human life and well-being, mitigating climate change and its effects. Megatrend: climate change and environmental degradation. | Protected country area (terrestrial and marine) under Natura 2000, expressed as a percentage of mainland national territory. Note that there may be additional protected areas at the national level, but these are not covered. | Eurostat: env_bio1 | 2019 |

⁴⁴ <https://esdac.jrc.ec.europa.eu/content/topsoil-soil-organic-carbon-lucas-eu25>

| Variable | Label | Rationale | Definition | Source | Latest available year |
|---|------------------|--|--|--------------------------|------------------------------------|
| National expenditure on environmental protection | G _{env} | Environmental protection expenditures point to the capacity of the government and the private sector to restore the environment and reduce pollution. The indicator points to preparedness in terms of environmental protection, resource management and green growth. It includes investment in environmental protection, which is more forward-looking. Megatrend: climate change and environmental degradation. | Resources devoted by resident units to protecting the natural environment. It is calculated as a sum of uses of environmental protection (EP) services by resident units, gross fixed capital formation for EP activities, and net transfers to the rest of the world for EP. It is expressed as a share of GDP. | Eurostat: env_ac_e_pneis | 2020 (EU27), 2019 (ES), 2018 |

Table A3: List of indicators included in the draft **digital dashboard** at Member State level, with detailed definition and motivation for inclusion of the indicator in the dashboard. In the *Rationale* of each indicator, we identify and point to the most relevant megatrend, for which measurement of the given indicator can provide an added value and insight. In some cases, additional megatrends are flagged, in brackets.

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|--|-------|--|--|-------------------------------|---|
| Digital dimension: Digital for personal space VULNERABILITIES | | | | | |
| Enterprises without ICT training programs | D_v01 | Enterprises not providing ICT training to their employees diminish both their opportunities and the societal ability in dealing with digital challenges. Megatrend: diversification of education and learning. | Percentage of enterprises not providing training to develop/upgrade ICT skills of their personnel (10 persons employed or more). | Eurostat:isoc_ske_itn3 | 2020 |
| Employees not using telework | D_v02 | A high share of employees not able to use teleworking represents a vulnerability in case of shocks such as the COVID pandemic. Megatrend: accelerating technological change and hyperconnectivity. | Employed who do not work - usually or sometimes - from home as a percentage of total employment. | Eurostat:lfsa_ehomp | 2020 |
| Inadequacy of ICT training for teachers | D_v03 | Inadequacy of ICT training for teachers and the consequent difficulties in making the best use of digital technologies would create extra obstacles to an efficient delivery of distance learning. Megatrend: diversification of education and learning. | The share of teachers reporting a high level of need for professional development in ICT skills for teaching is used as a proxy for teachers' self-perceived ICT inadequacy. | OECD: TALIS | 2018, N.A. (CY, DE, EL, IE, LU, PL, EU27) |
| Digital dimension: Digital for personal space CAPACITIES | | | | | |
| Collaborative economy | D_c01 | Points to a new economy based on shared information through internet platforms. Megatrend: changing nature of work. | Percentage of individuals using any website or app to arrange accommodation or transport services. | Eurostat:isoc_ci_cei | 2019 |
| Digital competence of adults | D_c02 | Proxy of digital skills of adults that represent a fundamental resource to facilitate their inclusion in the digital age. Megatrend: diversification of education and learning. | Percentage of individuals who have higher than basic overall digital skills (Y25-64). | Eurostat:isoc_sk_ds_kl_i | 2019 |
| Digital competence of young people | D_c03 | Proxy of digital skills of young people that represent a fundamental resource to facilitate their future inclusion in the labour market. Megatrend: diversification of education and learning. | Percentage of young individuals who have above basic overall digital skills (Y16-19). | Eurostat:isoc_sk_ds_kl_i | 2019 |
| Use of online courses | D_c04 | Online courses are, here, used as proxy for new life-long learning tools in the on-life era. Megatrend: diversification of education and learning. | Percentage of people who have used the Internet for doing an online course (on any subject), all individuals (aged 16-74). | DESI Index: desi_3b6_courseon | Sub-index of DESI 2020 referring to 2019 |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|-------|---|---|---|--|
| Use of social networks | D_c05 | Use of social network plays a central role in the on-life future generation behaviour. Megatrend: increasing influence of new governing systems. | Percentage of individuals who have used internet, in the last 3 months, for participating in social networks (creating user profile, posting messages or other contributions to Facebook, Twitter, etc.). | DESI Index: desi_3b5_socnet | Sub-index of DESI 2020 referring to 2019 |
| Young people doing any online learning activity | D_c06 | Online learning is a sign of a Member State's capacity to use new means of education which may be used outside the classical school systems. Megatrend: diversification of education and learning. | Percentage of young people who have used the Internet for doing an online course (on any subject), all individuals (aged 16-24). | Eurostat: i_soc_ci_ac_i | 2020, 2019 (FR, IE, IT) |
| University degree in advanced digital technologies | D_c07 | Provides the (intensity of the) potential future workforce trained in advanced technologies to push their development. Megatrend: diversification of education and learning. | Available places in masters and bachelor studies in Advance Digital Technologies (artificial intelligence, high-performance computing, cybersecurity, data science) as % of total places. | PREDICT CORE | 2019 |
| Digital dimension: Digital for industry VULNERABILITIES | | | | | |
| ICT trade deficit in goods | D_v04 | A negative trade balance points to the domestic difficulty to sustain the digital transition. In particular, high dependence in digital goods could harm the development of digital technologies. Megatrend: changing nature of work. | Information and communication technology goods imports/exports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods (miscellaneous). ICT goods imports as % of total goods imports *total goods import - ICT goods exports as % of total goods exports*total goods export, divided by GDP. | World Bank: TX.VAL.IC TG.ZS.UN, TM.VAL.IC TG.ZS.UN, BX.GSR.M RCH.CD, BM.GSR.M RCH.CD, NY.GDP.M KTP.CD | 2019 |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|-------|--|---|---|--|
| ICT trade deficit in services | D_v05 | A negative trade balance in ICT services points to the domestic difficulty to provides a sound technological environment for the digital transition. In particular, high dependence in digital goods could harm the development of digital technologies. Megatrend: changing nature of work. | Computer, communications and other services imports/export include activities such as international telecommunications, postal and courier services; computer data; news-related service transactions between residents and non-residents; construction services; royalties and license fees; miscellaneous business, professional, and technical services; and personal, cultural, and recreational services. ICT services imports as % of commercial service imports*Commercial service imports - ICT services exports as % of commercial service exports*Commercial service exports, divided by GDP. | World Bank: TM.VAL.SERV.CD.WT, TM.VAL.OTHR.ZS.WT , TX.VAL.SERV.CD.WT, TX.VAL.OTHR.ZS.WT, NY.GDP.MKTP.CD | 2019 |
| ICT specialist gender gap | D_v06 | Gender gap perpetuates the loss of talent and loss of potential growth. Megatrend: changing nature of work. | Difference between the number of males and females employed in ICT divided by the total number of employed in ICT. | Eurostat:isoc_sks_it_sps | 2020 |
| Lack of cloud services | D_v07 | Enterprises lacking access to cloud services are less capable to optimize resources, hence unable to face foreseen and unforeseen changes. Megatrend: changing nature of work. | Percentage of enterprises not buying cloud computing services used over the internet (10 persons employed or more). | Eurostat:isoc_cicce_use | 2020 |
| Broadband access gap by company size | D_v08 | Difference between large and small enterprises' current broadband access signals a lack of preparedness to utilise digital technologies for SMEs and could prevent smooth access to digital markets. Megatrend: accelerating technological change and hyperconnectivity. | Difference between the percentage of large (250 persons employed or more) and small enterprises (10-49 persons employed) with broadband access. | Eurostat:isoc_bde15b_e | 2017 |
| Digital dimension: Digital for industry CAPACITIES | | | | | |
| Investment per employee, high-technology sectors | D_c08 | The level of investment in high technology sectors is a signal of a Member State's maturity and preparedness for the transition. Megatrend: changing nature of work. | Investment per person employed - thousands euro in High-technology manufacturing sector (defined as NACE categories C21, C26, C30.3). | Eurostat:sbs_na_scar2 | 2018, 2017 (FI, MT, NL, EU27), 2016 (DK, SK), 2014 (SE), N.A. (CY, IE, LU) |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|--|-------|--|--|---|--|
| Enterprises seeking ICT specialists | D_c09 | Enterprises looking for ICT specialists are better placed for coping with new challenges associated with the digital transition. Megatrend: diversification of education and learning. | Percentage of enterprises recruited or tried to recruit personnel for jobs requiring ICT specialist skills. | Eurostat:isoc_ske_itrcrn2 | 2020 |
| Gross Value Added in ICT | D_c10 | A developed ICT sector is essential for capitalising on digitalisation, keeping up with competitors in globalised markets, and establishing Europe's technological leadership. Megatrend: changing nature of work. | The value of production is measured using the Value Added concept and expressed as the weight of the ICT sector in Total Value Added. | Eurostat:isoc_bde15ag | 2018, 2013 (NL), N.A. (CY, IE, LU, PT) |
| ICT sector R&D intensity | D_c11 | Business enterprises' R&D intensity (BERD) signals the vitality of the ICT sector in the economy. Megatrend: changing nature of work. | ICT sector business enterprise R&D (BERD) expenditure as a share of total BERD. | PREDICT CORE | 2017 |
| Value of e-commerce sales | D_c12 | Proxy of countries' readiness in digital consumers habits in terms of size of ICT. Megatrend: changing nature of work. | Percentage of enterprises' total turnover from e-commerce sales (10 persons employed or more). | Eurostat:isoc_ec_ev aln2 | 2020, 2019 (FI) |
| Digital dimension: Digital for public space VULNERABILITIES | | | | | |
| Lack of 5G readiness | D_v09 | Low 5G readiness levels will limit households, public services and enterprises in catching up with the latest mobile technologies. Megatrend: accelerating technological change and hyperconnectivity. | Amount of spectrum not assigned or not ready for 5G use by the end of 2020 within the so-called 5G pioneer bands. | DESI Index: desi_1c3_5g | Sub-index of DESI 2020 referring to 2019 |
| Lack of online public services for businesses | D_v10 | Lack of business-oriented digital public services will limit the opportunities for firms to engage in the digital transition. Megatrend: increasing influence of new governing systems. | The indicator broadly reflects the share of public services needed for starting a business and for conducting regular business operations that are not available online for domestics as well as for foreign users. Services which provide only information (but have to be completed offline) receive a high score, services provided through a portal receive a lower score. | Digital Economy and Society Index: desi_5a4_psb | Sub-index of DESI 2020 referring to 2019 |
| People not having access to digital public services | D_v11 | Low level of citizen-oriented digital public services will harm the digital transition by creating obstacles to people's access to services. Megatrend: increasing influence of new governing systems. | People who have not sent filled forms to public authorities, over the internet, previous 12 months. | Digital Economy and Society Index: desi_5a1_egovu | Sub-index of DESI 2020 referring to 2019 |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|--|-------|--|--|---|-----------------------|
| Broadband access gap, urban versus rural | D_v12 | The urban-rural gap might obstacle smooth transition and exacerbate existing inequalities. Megatrend: accelerating technological change and hyperconnectivity. | Share of households with broadband access in cities minus share of households with broadband access in rural areas. | Eurostat: soc_ci_it_h | 2020, 2019 (FR, IT) |
| Digital dimension: Digital for public space CAPACITIES | | | | | |
| E-health | D_c13 | Making appointments online with a practitioner could be seen as a first proxy for the capacity of developing of new digital health platform. Megatrend: accelerating technological change and hyperconnectivity. | Share of individuals using the internet for making an appointment with a practitioner via a website. | Eurostat: soc_ci_ac_i | 2020, 2018 (FR, IT) |
| Judicial system e-tools | D_c14 | Leveraging technology in the justice system simplifies and accelerates the processing of court cases, ensures the resilience of justice, as well as facilitates access to justice for citizens and businesses. Megatrend: increasing influence of new governing systems. | This indicator uses data from the Justice Scoreboard and gives information on the availability of digital tools at the disposal of the judiciary and judicial staff, i.e. tools that allow secure teleworking arrangements, case management, secure electronic communication, etc. | Justice Scoreboard 2021 | 2020 |
| Digital dimension: Cybersecurity VULNERABILITIES | | | | | |
| Cybersecurity incidents experienced by people | D_v13 | Incidents experienced by citizens are the first signal of digital environment weaknesses, and they might prevent people from accessing digital services. Megatrend: changing security paradigm. | In the last three years, how often have you personally experienced or been a victim of each of the following situations? Average share of those who have been victim 'At least once' of: 1. Cyberattacks which prevent you from accessing online services like banking or public services; 2. Identity theft (somebody stealing your personal data and impersonating you); 3. Your social network or email account being hacked; 4. Being a victim of bank card or online banking fraud; 5. Being asked for payment in return for getting back control of your device. | Eurobarometer: EBS499 (QC9), EBS464 (QB12), EBS423 (QB8), EBS404 (QC9), EBS390 (QE10) | 2019 |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|--|-------|--|---|--|-----------------------|
| ICT security incidents in enterprises | D_v14 | Security concerns could prevent businesses from engaging in the digital transition. Megatrend: changing security paradigm. | Percentage of enterprises experienced at least once problems due to an ICT related security incident (10 persons employed or more). | Eurostat: soc_cisce_ic | 2019 |
| Digital dimension: Cybersecurity CAPACITIES | | | | | |
| Cyber-security awareness of individuals | D_c15 | Well informed citizens are the first barrier against cyber threats. Megatrend: changing security paradigm. | How well informed do you feel about the risks of cybercrime? Total 'Well informed'. | Eurobarometer: EBS499 (QC7), EBS464 (QB10), EBS423 (QB1), EBS404 (QC8), EBS390 (QE9) | 2019 |
| Global Cyber-security Index | D_c16 | Cybersecurity index tells about the overall ability of a Member State to deal with cyber threats and at large to make digital complex systems more and more secure. Megatrend: changing security paradigm. | The Global Cybersecurity Index (GCI) is a trusted reference that measures the commitment of countries to cybersecurity at a global level – to raise awareness of the importance and different dimensions of the issue. As cybersecurity has a broad field of application, cutting across many industries and various sectors, each country's level of development or engagement is assessed along five pillars – (i) legal measures, (ii) technical measures, (iii) organizational measures, (iv) capacity building, and (v) cooperation – and then aggregated into an overall score. | International Telecommunication Union (ITU) | 2018 |

Table A4: List of indicators included in the draft **geopolitical dashboard** at Member State level, with detailed definition and motivation for inclusion in the dashboard. In the *Rationale* of each indicator, we identify and point to the most relevant megatrend, for which measurement of the given indicator can provide an added value and insight. In some cases, additional megatrends are flagged, in brackets.

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|--------|--|--|--|-----------------------|
| Geopolitical dimension: Raw material and energy supply VULNERABILITIES | | | | | |
| Metal footprint per capita | GP_v01 | A country's combined direct and indirect raw material consumption in metals is an overall indicator of its economy's need for a class of raw materials with high global relevance. Megatrend: aggravating resource scarcity (expanding influence of east and south). | This variable sums direct, gross physical domestic extraction (DE) of metals from the environment within a nation's territory, and the embodied material flows associated with imports and exports. The material footprint in metals thus provides a view of a nation's material consumption that, unlike domestic material consumption, fully accounts for extraction in other countries used for local consumption, and for domestic extraction ultimately used for consumption in other countries. 3-year average. | UN-IRP. Global Material Flows Database (2018), category: metal ores; and Eurostat: demo_pjan. | 2017 |
| Supplier concentration in base metals | GP_v02 | If a large part of material supply comes from a small number of countries, there is a high likelihood of supply disturbances. Megatrend: aggravating resource scarcity (expanding influence of east and south). | It is a concentration (Herfindahl) index (sum of square of the shares of supplier countries from outside the EU). First it is calculated for iron, aluminium and the five base metals (copper, lead, nickel, tin, zinc). Then those are averaged, using the country level relative values of metal imports as weights. | Material supplier shares and import values are from the Eurostat trade series DS-016894, HS2 and HS4 level ⁴⁵ . | 2019, N.A. (EU27) |

⁴⁵ Iron: group 72. Copper: 74, excluding 7410-7419. Nickel: 75, excluding 7507-08. Aluminium: 76, excluding 7607-7616. Lead: 78, excluding 7806. Zinc: 79, excluding 7907. Tin: 80, excluding 8007.

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|--------|---|---|--|-----------------------|
| Import dependence in energy materials | GP_v03 | High import dependence in energy materials indicates high vulnerability to external shocks and foreign suppliers. Megatrend: aggravating resource scarcity (expanding influence of east and south). | It is calculated from energy balances as net imports divided by the gross available energy. It includes all imports, from EU and non-EU sources ⁴⁶ . | Eurostat: nrg_ind_id | 2019 |
| Supplier concentration in energy carriers | GP_v04 | If a large part of energy carrier supply comes from a small number of countries, there is a high likelihood of supply disturbances. Megatrend: aggravating resource scarcity (expanding influence of east and south) | It is a concentration (Herfindahl) index (sum of square of the shares of supplier countries from outside the EU). First it is calculated for gas, oil, and solid fossil fuels. Then those are averaged, using the Member State level relative gross inland consumption values, in tons of oil equivalent. | Eurostat: nrg_bas_s, nrg_ti_xx, nrg_te_xx and nrg_cb_xx for oil, solid fossil fuels (sff) and gas | 2019, N.A. (EU27) |
| Geopolitical dimension: Raw material and energy supply CAPACITIES | | | | | |
| Intra-EU trade in recyclable raw materials | GP_c01 | Contributing to and taking advantage of the EU-level flow of recyclable materials helps to mitigate supply risks and vulnerabilities. Megatrend: aggravating resource scarcity, expanding influence of east and south. | Intra-EU imports plus exports of all recycled raw materials over GDP (current price). | Eurostat: env_wastrd and nama_10_gdp | 2020 |
| Supplier diversification for base metals, rate of change | GP_c02 | An increase in supplier diversification indicates a reduction in supply risk using international trade, hence a resilience capacity at work. Megatrend: aggravating resource scarcity, expanding influence of east and south. | The negative of the rate of change (10 years) of the supplier concentration for base metals. | Material supplier shares and import values are from the Eurostat trade series DS-016894, HS2 and HS4 level. See supplier concentration for product categories. | 2019, N.A. (EU27) |

⁴⁶ Distinguishing between intra- and extra-EU imports would be difficult for this variable as the units of measurement for gross available energy and energy trade data are different. The corresponding EU-27 indicator nevertheless shows the external import dependence in energy materials of the EU with respect to non-EU countries because intra-EU flows cancel from total imports minus exports. Moreover, the intra-EU energy trade indicator serves to indicate how much EU countries manage to diversify using the internal market.

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|--------|--|---|---|-----------------------|
| Metal footprint per capita, rate of decline | GP_c03 | A decreasing metal footprint indicates achievements in reducing vulnerability to supply shocks. Megatrend: aggravating resource scarcity (expanding influence of east and south). | Per capita metal footprint, negative of the compound annual growth rate of 3-year averages (10 years). | UN-IRP. Global Material Flows Database (2018) and Eurostat: demo_pjan | 2017 |
| Intra-EU trade in energy | GP_c04 | Contributing to and taking advantage of the EU-level trade in energy helps to mitigate supply risks and vulnerabilities. Megatrend: aggravating resource scarcity (expanding influence of east and south). | Exports plus imports over GDP. HS2 code 27 (mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes). Partner code: intra-EU27. | Eurostat trade series DS-016894, HS2 level, and nama_10_gdp. | 2019 |
| Supplier diversification for energy carriers, rate of change | GP_c05 | An increase in supplier diversification indicates a reduction in supply risk using international trade, hence a resilience capacity at work. Megatrend: aggravating resource scarcity, expanding influence of east and south. | The negative of the rate of change (10 years) of the supplier concentration for energy materials. | Eurostat: nrg_bas_s, nrg_ti_xx, nrg_te_xx and nrg_cb_xx for oil, solid fossil fuels (sff) and gas | 2019, N.A. (EU27) |
| Geopolitical dimension: Value chains and trade VULNERABILITIES | | | | | |
| Concentration of value chain partners | GP_v05 | In the context of global value chains, a high concentration of export partners and foreign suppliers for the home country's exports makes the home country more vulnerable to potential trade and political disruptions. Megatrend: expanding influence of east and south. | Average of the Herfindahl index of each Member State's extra-EU import and export partners for imported and re-exported content. Exports are weighted by GDP of the exporting country. Re-exported exports are weighted by GDP of the re-exporting country. | OECD: TIVA_2018_C2 and SNA_TABLE1; TIVA_2018_C5 and SNA_TABLE1 | 2015, N.A. (EU27) |
| Extra-EU import partner concentration | GP_v06 | Concentration of imports from a narrow range of countries makes a country more vulnerable to potential trade and political disruptions from the partner countries. Megatrend: expanding influence of east and south. | Herfindahl index of each Member State's extra-EU import partners. | Eurostat - Comext | 2020 |
| Extra-EU export partner concentration | GP_v07 | Concentration of exports to a narrow range of countries makes a country more vulnerable to potential trade and political disruptions in the partner countries. Megatrend: expanding influence of east and south. | Herfindahl index of each Member State's extra-EU export partners. | Eurostat - Comext | 2020 |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|--|--------|---|--|--|----------------------------------|
| Geopolitical dimension: Value chains and trade CAPACITIES | | | | | |
| Backward participation in GVC | GP_c06 | Backward participation in Global Value Chains (GVC) refers to importing foreign inputs to produce goods and services to export. A higher share of backward participation in GVCs reflects greater integration, higher connectedness and a higher capacity of economies to harness the benefits of global cooperation. Megatrend: expanding influence of east and south. | Backward participation (P, C) in Global Value Chains represents the foreign value-added from a “partner” country P embodied in the gross exports of country C, as a percentage of country C’s total gross exports. It is calculated for total industry only. | OECD: TIVA_2018_C1 | 2015 |
| Forward participation in GVC | GP_c07 | Participation in Global Value Chains (GVC) provides an estimation of how much an economy is connected to global value chains for its foreign trade. Forward participation in GVC measures to what extent domestically produced inputs are exported to partners who process and re-export them. A higher share of forward participation in GVCs reflects a higher capacity of economies to harness the benefits of global cooperation. Megatrend: expanding influence of east and south. | Forward participation in GVCs (P, C) represents the domestic value-added from country C embodied in the gross exports of foreign partner country P, as a percentage of country C’s total gross exports. It is calculated for total industry only. | OECD: TIVA_2018_C1 | 2015 |
| Trade openness – intra-EU | GP_c08 | Trade openness (intra-EU) is an indicator of the degree of market integration within the EU. It is a powerful channel to react to global shocks and contributes to greater economic stability. It also reflects the capacity to harness the benefits of the internal market. Megatrend: expanding influence of east and south. | Trade openness is measured as the sum of a country's exports and imports as a share of that country's GDP (in %), considering EU partners only. | Eurostat: bop_c6_a and nama_10_gdp | 2020, 2019 (LU), N.A. (MT) |
| Trade openness – extra-EU | GP_c09 | Trade openness (extra-EU) is an indicator of the degree of global integration. It is a powerful channel to react to global shocks and contributes to greater economic stability. It also reflects the capacity to harness the benefits of global cooperation. Megatrend: expanding influence of east and south. | Trade openness is measured as the sum of a country's exports and imports as a share of that country's GDP (in %), considering non-EU partners only. | Eurostat: bop_c6_a and nama_10_gdp | 2020, 2019 (LU), N.A. (MT) |

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|--|--------|--|--|---|--|
| Geopolitical dimension: Financial globalisation VULNERABILITIES | | | | | |
| Inward FDI partner concentration | GP_v08 | Concentration of incoming FDI to few international partners exposes the domestic economy to shocks and actions of those few partners. Megatrend: expanding influence of east and south. | Herfindahl index of the shares of inward Foreign Direct Investment - FDI stocks of extra-EU countries. | OECD: FDI_CTRY_IND_S UMM | 2019, 2018 (DE, HU), N.A. (BG, CY, HR, MT, RO, EU27) |
| Outward FDI partner concentration | GP_v09 | Concentration of outgoing FDI into few international partners increases the vulnerability to shocks from specific destination countries. Megatrend: expanding influence of east and south. | Herfindahl index of the shares of EU countries' Foreign Direct Investment - FDI stocks in extra-EU countries. | OECD: FDI_CTRY_IND_S UMM | 2019, N.A. (BG, CY, HR, MT, RO, EU27) |
| Net external debt in % GDP | GP_v10 | Countries with high international indebtedness may face difficulties to smooth shocks by additional borrowing. They are also more sensitive to short-term swings in international capital market conditions. Megatrend: expanding influence of east and south. | External debt is the country's total current net debt that is owed to non-residents. | Eurostat: tipsii20 | 2020 |
| Net International Investment Position | GP_v11 | Countries with a high (negative) net international investment position (NIIP) are more vulnerable to international capital flows and financial distress. At the same time, a positive net international investment position also constitutes an important buffer to absorb distress. Megatrend: expanding influence of east and south. | NIIP provides an aggregate view of the net financial position (assets minus liabilities) of a country vis-à-vis the rest of the world. The difference between an economy's external financial assets and liabilities is the economy's net IIP, which may be positive or negative. The variable is defined in a way that higher values indicate a higher vulnerability. | Eurostat: tipsii10. | 2020 |
| Geopolitical dimension: Financial globalisation CAPACITIES | | | | | |
| Value added share of foreign enterprises | GP_c10 | A high share of foreign-controlled enterprises in value-added indicates the attractiveness of the domestic economy, and the contribution of foreign enterprises to domestic development ⁴⁷ . Megatrend: expanding influence of east and south. | Share of value-added of foreign enterprises from the total business economy. | Eurostat: fats_gla_08 and sbs_na_sca_r2 | 2018, 2017 (EL), 2014 (PT) |

⁴⁷ A too high share of foreign-controlled enterprises may point to issues with the competitiveness of local corporations. With the exception of Ireland, however, these shares do not exceed 25%.

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|--------|---|---|---|-----------------------|
| Financial integration | GP_c11 | Benefits of financial integration within and beyond the EU include higher investment and growth, and more efficient capital integration and risk-sharing within the EU. It is thus a key opportunity. Megatrend: expanding influence of east and south. | The variable is the average of the intra and extra EU financial integration of each Member State. Financial integration is the sum of external assets and external liabilities, divided by GDP. The term external refers to other EU countries for intra-EU, and non-EU countries for extra-EU integration. | JRC-ECFIN Finflows database ⁴⁸ and Eurostat: nama_10_gdp. | 2019 |
| Geopolitical: Security and demography VULNERABILITIES | | | | | |
| Disinformation originating from abroad | GP_v12 | Disinformation is considered a major challenge for democracies. It is understood as misleading content towards the generation of either profits, or pursuing political goals. This indicator refers to false information coming from foreign governments, which is a geopolitical vulnerability. Megatrend: changing security paradigm. | Expert responses to the question 'How routinely do foreign governments and their agents use social media to disseminate misleading viewpoints or false information to influence domestic politics in this country?' Its sign is reversed, so a high value indicates high vulnerability. | V-dem database, variable v2smfordom_osp | 2019 |
| Total fertility rate (difference from replacement-level) | GP_v13 | Among the causes of population ageing, a total fertility rate (TFR) below the replacement level plays a key role. Countries with a TFR under the replacement level will be exposed to both an increasing health care demand and social security costs which project them towards a non-sustainable path. At the same time, countries with a declining population may see their global weight decline over time. Megatrend: increasing demographic imbalances. | This indicator is calculated as the difference from 2.1, which represents the replacement rate, and the actual country fertility rate. | Eurostat: demo_frate | 2019 |

⁴⁸ <https://data.jrc.ec.europa.eu/dataset/807d5d4f-2d73-4f17-81db-7ba2171bab83>

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|--------|--|--|---|----------------------------------|
| Employment gap (EU versus non-EU nationals) | GP_v14 | The higher the gap in labour market participation between native and non-native (with a non-EU origin) people, the lower the integration of non-EU migrants. This can represent a challenge for internal stability. A more integrated society is also more resilient. Megatrend: increasing significance of migration. | Difference of the employment rate of natives with respect to non-EU migrants (the employment rate natives minus the employment rate of non-EU migrants). The employment rate is defined as the share of the total working-age population who are employed. | Eurostat: lfsa_ergan | 2020, 2019 (BG), 2018 (RO) |
| Military expenditures (difference from 2% of GDP) | GP_v15 | This gap is a baseline measure of EU and member state weaknesses in the military field. Megatrend: changing security paradigm. | Military expenditures per GDP, subtracted from 2% of GDP. | World Bank, World Development Indicators: MS.MIL.XPND.GD.ZS | 2019 |
| Geopolitical dimension: Security and demography CAPACITIES | | | | | |
| Military personnel per capita | GP_c13 | The number of military personnel indicates an important geopolitical capacity to prevent and react to threats. Megatrend: changing security paradigm. | Armed forces personnel are active duty military personnel, including paramilitary forces if the training, organization, equipment, and control suggest they may be used to support or replace regular military forces. Personnel numbers are normalised by population. | World Bank, World Development Indicators: MS.MIL.TOTL.P1, normalised by SP.POP.TOTL | 2018 |
| Net migration rate | GP_c14 | Net migration rate shows the overall contribution of migration to the population and human capital in the country. A positive net migration rate also shows the attractiveness of a country to non-EU citizens. Megatrend: increasing significance of migration (increasing demographic imbalances). | Net migration rate is calculated as the difference between immigration from minus emigration to non EU-27 countries, relative to the population of the host country. | Eurostat: migr_imm3ctb, migr_emi3nxt, demo_pjan ⁴⁹ | 2019 |

⁴⁹ Since the EU27 (2020) aggregate is not (yet) reported in the data source, it is calculated as follows. The immigration measure (migr_imm3ctb) after 2013 is computed by adding UK as country of birth to the non-EU28 entry from Eurostat; while for the time before 2013, it is calculated by subtracting HR as country of birth and adding the UK to the non-EU27 (2007-2013). The emigration measure (migr_emi3nxt) after 2013 is computed by adding the UK as the country of next residence to the non-EU28; while for the time before 2013, it is calculated by adding the UK and subtracting HR from the non-EU27 (2007-2013).

| Variable | Label | Rationale | Full definition | Source | Latest available year |
|---|--------|--|--|---|--------------------------------|
| Share of non-EU citizens from total employment | GP_c15 | This indicator shows the contribution of migration to increase the labour force. It also measures the ability of a country to attract and integrate non-EU citizens. As such, it signals a dynamic labour market that mirrors an inclusive society. Megatrend: increasing significance of migration (increasing demographic imbalances). | It is calculated as the share of employed non-EU citizens over total employment, in the age bracket 15-64. | Eurostat: lfsa_egan | 2020, 2019 (BG), 2018 (RO) |
| People being resettled under AMIF | GP_c16 | Well managed migration systems also encompass safe and lawful channels for the admission of people in need of protection in line with EU values. Megatrend: increasing significance of migration. | This indicator measures the number of people that have been resettled through the fund as a share of the recipient country's population. | DG HOME as declared by the Member State under Asylum, Migration and Integration Fund (AMIF): Migration-resettlement. Population is from Eurostat, demo_pjan | 2020, N.A. (DK ⁵⁰) |

⁵⁰ DK does not participate in AMIF. Data in Accounts 2020 include expenditures from October 16· 2019 until October 15, 2020. The data used is the cumulated number of people in 2015-2020.

ANNEX VI: DETAILS ON THE INDICATORS IN THE GLOBAL DASHBOARD

Table A5: List of indicators included in the **global dashboard**, divided by dimensions with detailed definition, source and the latest available year.

| Variable | Label | Definition | Source | Latest available year |
|--|----------|--|------------------------------|---|
| Social and economic dimension VULNERABILITIES | | | | |
| Income quintile share ratio S80/S20 | SE_G_v01 | The ratio of total income received by the 20% of the population with the highest income (top quintile) to that received by the 20% of the population with the lowest income (bottom quintile). | World Bank | 2019 (BR, ID, TR), 2018 (CH, MX, NO, RU, US), 2017 (CA, UK), 2016 (EU27, CN, KR), 2014 (AU), 2013 (JP), N.A. (IN) |
| Gender employment gap | SE_G_v02 | Difference between the employment rate of men and women of working age 15 +. | World Bank | 2019 |
| Obesity rate of young children | SE_G_v03 | Prevalence of obesity among children and adolescents within the age 5-9 years old, BMI > +2 standard deviations above the median | World Health Organization | 2016 |
| Projected old-age dependency ratio | SE_G_v04 | Old-age dependency ratio is the ratio of population 65+ per population 15-64. | United Nations | 2020, 2015 (EU27) |
| Government gross debt | SE_G_v05 | Central government debt, total (% of GDP) | IMF - World Economic Outlook | 2020 |
| Social and economic dimension CAPACITIES | | | | |
| Government expenditure on education, as % of GDP | SE_G_c01 | General government expenditure on education (current, capital, and transfers) is expressed as a percentage of GDP. It includes expenditure funded by transfers from international sources to government. | World Bank | 2017, 2016 (KR), 2015 (ID), 2014 (US), 2013 (IN), N.A. (CA, CN, TR) |
| Domestic general government health expenditure, as % of GDP | SE_G_c02 | Public expenditure on health from domestic sources as a share of the economy as measured by GDP | World Bank | 2018 |
| Gross graduation ratio from first degree programmes (ISCED 6 and 7) in tertiary education | SE_G_c03 | Number of female and male graduates from first degree programmes (at ISCED 6 and 7) expressed as a percentage of the population of the theoretical graduation age of the most common first degree programme. | World bank | 2019 (CN, IN), 2018, 2017 (KR, MX, NO), 2014 (UK), 2012 (BR, US), N.A. (JP) |
| Life expectancy at birth | SE_G_c04 | Life expectancy at birth is defined as how long, on average, a newborn can expect to live, if current death rates do not change. | OECD | 2019 (EU27), 2018, 2017 (JP) |
| Employment rate | SE_G_c05 | Employment to population ratio is the proportion of a country's population that is employed (age 15+) | World Bank | 2020 |
| Gross domestic expenditure on R&D (GERD) | SE_G_c06 | Gross (total) domestic expenditure on scientific research and experimental development (R&D) expressed as a percentage of Gross Domestic Product (GDP). | UNESCO | 2019 (CA), 2018, 2017 (AU, CH, TR) |
| Government investment to GDP ratio | SE_G_c07 | It is defined as gross fixed capital formation (GFCF) of the government sector as a percentage of GDP. | OECD | 2020 (EU27, CA, NO, UK), 2019, 2018 (BR, JP, RU), 2016 (CN), N.A. (IN) |

| Variable | Label | Definition | Source | Latest available year |
|---|---------|--|---|-----------------------|
| Green dimension VULNERABILITIES | | | | |
| GHG emissions per GDP | G_G_v01 | Total GHG emissions are calculated as the sum of emissions of direct GHGs. The indicator does not include emissions and removals related to land use, land-use change and forestry. It is expressed as a ratio with respect to the GDP (Tonnes of carbon dioxide equivalents (mTCO ₂ e) per billion current US dollars) | CAIT Climate data explorer | 2018 |
| CO₂ emissions from transport per capita | G_G_v02 | Total CO ₂ emission from fossil fuel combustion in the following activities: domestic aviation (commercial, private, agricultural, military, etc.), road, rail pipeline transport, domestic navigation and other non-specified transport. It is normalised by total population. | CAIT Climate data explorer | 2018 |
| Fossil fuel subsidies | G_G_v03 | Total post-tax consumer subsidies expressed as a % of GDP, that allow the consumer prices for energy to be below supply costs plus the efficient levels of taxation. | International Monetary Fund ⁵¹ | 2017 |
| Water stress | G_G_v04 | This indicator tracks how much freshwater is being withdrawn by all economic activities, compared to the total renewable freshwater resources available. It also takes into account environmental flow requirements. | UN SDG | 2018, 2017 (EU27) |
| Domestic material consumption per capita | G_G_v05 | DMC reports the amount of materials that are used in a national economy on the production side. It presents the amount of material that needs to be handled within an economy, which is either added to material stocks of buildings and transport infrastructure or used to fuel the economy as material throughput. Per-capita DMC describes the average level of material use in an economy as an environmental pressure indicator. | UN SDG | 2017 |
| Pesticide use | G_G_v06 | Pesticides Use database includes data on the use of major pesticide groups (Insecticides, Herbicides, Fungicides, Plant growth regulators and Rodenticides) and of relevant chemical families. Data report the quantities (in tonnes of active ingredients) of pesticides used in or sold to the agricultural sector for crops and seeds. It is normalised by the country total cropland area. | FAOSTAT | 2018 |
| Green dimension CAPACITIES | | | | |
| Renewable energy in final energy consumption | G_G_c01 | Total renewable energy (inclusive of solar, wind, geothermal, hydropower, bioenergy and marine sources) as a share of final (not primary) energy consumption. Energy mix includes electricity, transportation and cooking/heating fuels. | UN SDG | 2018 |

⁵¹ <https://www.imf.org/en/Topics/climate-change/energy-subsidies>

| Variable | Label | Definition | Source | Latest available year |
|--|---------|--|---------------------------------|--|
| Environmental technology patents per capita | G_G_c02 | Number of environment-related technologies patent applications per capita. The types of technologies are: climate change mitigation technologies related to buildings, energy generation, transmission or distribution; capture storage sequestration or disposal of GHG, environmental management, climate change mitigation technologies related to transport, water-related adaptation technologies, climate change mitigation technologies in the production or processing of goods, wastewater treatment or waste management. | OECD: PAT_IND, over population. | 2018 |
| Resource productivity | G_G_c03 | This indicator is an inverse of domestic material consumption per unit of GDP, aggregated over several available types of raw materials. | UN SDG | 2017 |
| Energy productivity | G_G_c04 | Energy productivity is the inverse of the SDG 'Energy intensity'. It is defined as the energy supplied to the economy per unit value of economic output. Total energy supply, as defined by the International Recommendations for Energy Statistics, as made up of production plus net imports minus international marine and aviation bunkers plus-stock changes | UN SDG | 2018 |
| Share of recovered municipal waste | G_G_c05 | Percentage of waste that is recuperated via recycling, composting or incineration with energy recuperation. | OECD | 2019 (CH, EU27, NO, TR), 2018, 2017 (AU), 2012 (CN, MX), N.A. (BR, ID, IN, RU) |
| Protected key freshwater areas | G_G_c06 | Proportion of important sites for freshwater biodiversity that are covered by protected areas shows temporal trends in the mean percentage of each important site for freshwater biodiversity (i.e., those that contribute significantly to the global persistence of biodiversity) that is covered by designated protected areas. | UN SDG | 2019, 2018 (EU27) |
| Protected key terrestrial areas | G_G_c07 | Proportion of important sites for terrestrial biodiversity that are covered by protected areas shows temporal trends in the mean percentage of each important site for terrestrial biodiversity (i.e., those that contribute significantly to the global persistence of biodiversity) that is covered by designated protected areas. | UN SDG | 2019, 2018 (EU27) |
| Digital dimension VULNERABILITIES | | | | |
| People not having access to digital public services | D_G_v01 | Percentage of individuals who have not used the Internet for visiting or interacting with public authority web sites, previous 12 months (Y16-74). Inverse of normalised score of percentage of individuals using the Internet for visiting or interacting with public authority web sites in the last 12 months. | I-DESI 2020 (5a1) | 2018,N.A. (ID, IN) |
| Low mobile cellular subscriptions | D_G_v02 | Mobile cellular telephone subscriptions are subscriptions to a public mobile telephone service that provide access to the PSTN using cellular technology. (Inverted value per 100 people). | World Bank: WB IT.CEL.SETS.P2 | 2019 |

| Variable | Label | Definition | Source | Latest available year |
|---------------------------------------|---------|---|---|---|
| Broadband gap, regional | D_G_v03 | Share of households with broadband access in the best connected regions minus share of households with broadband access in the lowest connected regions. Alternative to rural-urban broadband gap. | OECD: REGION_SOCIAL | 2019,2018 (JP, KR, RU, US), 2017 (AU, CA), 2013 (BR, TR), N.A. (CN, ID, IN, MX) |
| Shortcoming of fixed broadband | D_G_v04 | Fixed broadband subscriptions refer to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbit/s per 100 Persons. Shortcoming of fixed broadband is taken as 100 minus fixed broadband subscriptions. Alternative to Lack of cloud services from Member State dashboard. | World Bank: IT.NET.BBND.P2 | 2019 |
| ICT trade deficit in goods | D_G_v05 | Information and communication technology goods imports and exports include computers and peripheral equipment, communication equipment, consumer electronic equipment, electronic components, and other information and technology goods (miscellaneous) (ICT goods imports (% of total goods imports)*total goods imports-ICT goods exports (% of total goods exports)*total goods exports)/GDP. | World Bank: TX.VAL.ICTG.ZS.UN, TM.VAL.ICTG.ZS.UN, BX.GSR.MRCH.CD, BM.GSR.MRCH.CD, NY.GDP.MKTP.CD | 2019 |
| ICT trade deficit in services | D_G_v06 | Computer, communications and other services imports/export include such activities as international telecommunications, and postal and courier services; computer data; news-related service transactions between residents and nonresidents; construction services; royalties and license fees; miscellaneous business, professional, and technical services; and personal, cultural, and recreational services. (ICT services imports (% of commercial service imports))*(Commercial service imports (current US\$)) - ICT services exports (% of commercial service exports))*(Commercial service exports (current US\$))/GDP. | World Bank: TM.VAL.SERV.CD.WT, TM.VAL.OTHR.ZS.WT, TX.VAL.SERV.CD.WT, TX.VAL.OTHR.ZS.WT, NY.GDP.MKTP.CD | 2019 |
| Digital dimension CAPACITIES | | | | |
| Digital competence of adults | D_G_c01 | Percentage of individuals who have above basic overall digital skills (Y16-74). Normalised score (min-max) | I-DESI 2020 (2a2) | 2018, N.A. (ID, IN) |
| ICT graduates | D_G_c02 | The number of tertiary graduates in ICT as a proportion of all graduates. Normalised score (min-max). | I-DESI 2020 (2b2) | 2018, N.A. (ID, IN) |
| Use of social networks | D_G_c03 | Percentage of all individuals using the internet for accessing social networking sites in the last three months (Y16-74). Normalised score (min-max). | I-DESI 2020 (3b2) | 2018, N.A. (ID, IN) |

| Variable | Label | Definition | Source | Latest available year |
|---|----------|---|---|---|
| Gross value added in ICT | D_G_c04 | Calculated as the Value added of the ICT sector as a share of GDP. The ICT operational definition takes into account the standard distinction between manufacturing and services, but does not include the following sectors: Manufacture of magnetic and optical media (268) and ICT trade industries (465) ICT services industries are grouped in two sub-sectors: Telecommunication (61) and Computer and related activities (582, 62, 631, 951). | PREDICT CORE | 2017, N.A. (ID, MX, TR) |
| Global Cybersecurity Index | D_G_c05 | The Global Cybersecurity Index (GCI) is a trusted reference that measures the commitment of countries to cybersecurity at a global level – to raise awareness of the importance and different dimensions of the issue. As cybersecurity has a broad field of application, cutting across many industries and various sectors, each country's level of development or engagement is assessed along five pillars – (i) legal measures, (ii) technical measures, (iii) organizational measures, (iv) capacity building, and (v) cooperation – and then aggregated into an overall score. | International Telecommunication Union (ITU) | 2018, N.A. (ID) |
| Secure Internet servers | D_G_c06 | The number of distinct, publicly-trusted TLS/SSL certificates found in the Netcraft Secure Server Survey per 1 million people. New capacity indicator to better cover the cybersecurity area. | World Bank: IT.NET.SECR.P6 | 2020 |
| Geopolitical dimension VULNERABILITIES | | | | |
| Import dependence in metals | GP_G_v01 | Net imports (import-export) in metal ores divided by domestic material consumption. For the EU it includes only imports from non-EU sources. | UN-IRP. Global Material Flows Database (2018), category: metal ores | 2017, N.A. (EU27) |
| Import dependence in energy materials | GP_G_v02 | It is calculated from energy balances as net imports divided by gross available energy. For the EU it includes only imports from non-EU sources. | OECD World Energy | 2019, 2018 (EU27 CN, ID, IN, RU) |
| Partner concentration in trade | GP_G_v03 | Herfindahl index of the average of import and export partners. The EU as a whole is considered as a single trade partner. Only extra-EU trade partners are included for the EU. | UN Comtrade | 2020, 2019 (AU, BR, ID, KR, NO, RU, TR) |
| Net International Investment Position | GP_G_v04 | The net international investment position (NIIP) provides an aggregate view of the net financial position (assets minus liabilities) of a country vis-à-vis the rest of the world. The difference between an economy's external financial assets and liabilities is the economy's net IIP, which may be positive or negative. The variable is defined in a way that higher values indicate a higher vulnerability. | International Monetary Fund | 2019 |
| Disinformation originating from abroad | GP_G_v05 | Expert responses to the question "How routinely do foreign governments and their agents use social media to disseminate misleading viewpoints or false information to influence domestic politics in this country?" " Its sign is reversed in the dashboard so that a high value indicates high vulnerability. | V-dem database, variable v2smfordom_osp | 2019, N.A. (RU) |

| Variable | Label | Definition | Source | Latest available year |
|---|----------|---|---|-----------------------|
| Total fertility rate (difference from replacement-level) | GP_G_v06 | This indicator is calculated as the difference between 2.1, which represents the replacement rate, and the actual country fertility rate. | World Bank, World Development Indicators: SP.POP.TOTL | 2019 |
| Geopolitical dimension CAPACITIES | | | | |
| Participation in GVC | GP_G_c01 | Backward participation (P, C) in Global Value Chains represents the foreign value-added from a “partner” country P embodied in the gross exports of country C, as a percentage of country C’s total gross exports. Forward participation in GVCs (P, C) represents the domestic value-added from country C embodied in the gross exports of foreign partner country P, as a percentage of country C’s total gross exports. Both backward and forward participation in GVC are calculated for total industry only. The final indicator is the average of backward and forward participation in GVC. Due to the data source, intra-EU value chains are also taken into account. | OECD: TIVA_2018_C1 | 2015 |
| Trade openness | GP_G_c02 | Trade openness is measured as the sum of a country's exports and imports of commodities, as a share of that country's GDP (in %). It considers the EU as a single entity. | UN Comtrade | 2019 |
| Financial integration | GP_G_c03 | The variable is the sum of external assets and external liabilities, divided by GDP, for each country. The term external refers to all other countries, with the EU as a single entity. Cross-border asset holdings within the EU are thus excluded. | JRC-ECFIN Finflows database and Eurostat: nama_10_gdp. ⁵² | 2019 |
| Military personnel per capita | GP_G_c04 | Armed forces personnel are active duty military personnel, including paramilitary forces if the training, organization, equipment, and control suggest they may be used to support or replace regular military forces. Personnel numbers are normalised by population. | World Bank, World Development Indicators: MS.MIL.TOTL.P1, normalised by SP.POP.TOTL | 2018 |

⁵² <https://data.jrc.ec.europa.eu/dataset/807d5d4f-2d73-4f17-81db-7ba2171bab83>

ANNEX VII: DETAILS ON THE INDICATORS IN THE GLOBAL AREAS OF THE GEOPOLITICAL DIMENSION

Table A6: List of indicators included in the **global areas of the geopolitical dimension**, divided by the three areas; with detailed definition, source and the latest available year. Stars (*) indicate that the EU value refers to the median value across Member States.

| Variable | Label | Definition | Source | Year | EU value | EU Member State coverage |
|--|----------|--|--|------------|-------------------------|--|
| Area 5A: Dissemination of values and standards – values | | | | | | |
| Human rights* | GP_5A_01 | Number of international human rights instruments ratified by each country. | OHCHR- United Nations Human Rights office of the high commissioner | 2011, 2021 | Median of Member States | Full coverage |
| Gender inequality index* | GP_5A_02 | A composite measure reflecting inequality in achievements between women and men in three dimensions: reproductive health, empowerment and the labour market. High values indicate high inequality; hence the colour coding is such that high values become dark orange, while lower values are yellow or blue. | UNDP | 2005, 2019 | Median of Member States | Full coverage |
| World press freedom index* | GP_5A_03 | The Index ranks 180 countries and regions according to the level of freedom available to journalists. It is a snapshot of the media freedom situation based on an evaluation of pluralism, independence of the media, quality of legislative framework and safety of journalists in each country and region. High values indicate low freedom; hence the colour coding is such that high values become dark orange, while lower values are yellow or blue. | RFS- reporters without borders | 2013, 2021 | Median of Member States | Full coverage |
| Control of corruption* | GP_5A_04 | Subindex of The Worldwide Governance Indicators (WGI): Control of Corruption. It reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. | World Bank | 2005, 2019 | Median of Member States | Full coverage |
| Voice and accountability* | GP_5A_05 | Subindex of The Worldwide Governance Indicators (WGI): Voice and accountability. It reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. | World Bank | 2005, 2019 | Median of Member States | Full coverage |
| Civil society participation index* | GP_5A_06 | Q16.4 (Civil society participation) of the Bertelsmann Transformation Index. | Bertelsmann Transformation Index | 2006, 2020 | Median of Member States | Based on: BG, CZ, EE, HR, HU, LT, LV, PL, RO, SI, SK |
| Importance of democracy* | GP_5A_07 | Share of population that consider living in a democracy "very important" and "absolutely important". | World Value Survey | 2020 | Median of Member States | Based on: CY, DE, EL, RO |

| Variable | Label | Definition | Source | Year | EU value | EU Member State coverage |
|--|----------|--|--|------------|-------------------------|--|
| Area 5B: Dissemination of values and standards -- standards | | | | | | |
| Labour standards: Social protection benefits* | GP_5B_01 | Share of population covered by at least one social protection benefit (across both men and women). | ILO | 2020 | Median of Member States | missing: MT |
| Labour standards: Low pay rate* | GP_5B_02 | Share of employees whose hourly earnings at all jobs were less than two-thirds of median hourly earnings. High values indicate a high share of employees with low earnings; hence the colour coding is such that high values become dark orange, while lower values are yellow or blue. | ILO | 2018 | Median of Member States | Based on: AT, CZ, DE, DK, EL, FI, HU, PL, PT, SK |
| Environmental standards: GHG emissions | GP_5B_03 | GHG emissions (including LUCF) in MtCO ₂ e. The colour coding is reverted, to indicate the highest emission values with dark orange, while lower values are yellow or blue. | CAIT Climate Data Explorer | 2010, 2018 | EU total | From source |
| Environmental standards: Water stress* | GP_5B_04 | Level of water stress: freshwater withdrawal as a proportion of available freshwater resources (%) High levels of water stress are indicated with dark orange, while lower values are yellow or blue. | FAO | 2005, 2018 | Median of Member States | Full coverage |
| Environmental standards: Energy transition index* | GP_5B_05 | Global index that tracks the performance of energy systems at the country level. It also incorporates macroeconomic, institutional, social, and geopolitical considerations that provide enabling conditions for an effective energy transition. | World Economic Forum | 2012, 2021 | Median of Member States | Full coverage |
| Product safety standards: product withdrawals | GP_5B_06 | Number of mandatory and voluntary consumer product recalls for any product which were issued by a governmental body and were made publicly available. | OECD | 2012, 2020 | EU total calculated | Missing: LU, CY |
| Global Food Security Index* | GP_5B_07 | Index of the overall food security environment, scores range between 0 and 100. The Global Food Security Index (GFSI) considers the issues of food affordability, availability, quality and safety, and natural resources and resilience across a set of 113 countries. The index is a dynamic quantitative and qualitative benchmarking model constructed from 59 unique indicators that measure the drivers of food security across both developing and developed countries. | The Global Food Security Index (overall score) - the Economist Intelligence Unit | 2012, 2020 | Median of Member States | Missing: CY, EE, HR, LT, LU, LV, MT, SI |
| Share of national imports from world imports | GP_5B_08 | Share of imports from world imports (%) | Eurostat (EXT_LT_INTROLE) | 2011, 2018 | EU total | from source |
| Share of inward FDI from global FDI | GP_5B_09 | Share of inward FDI from total global inward FDI flows (%) | OECD | 2010, 2020 | EU value | from source |

| Variable | Label | Definition | Source | Year | EU value | EU Member State coverage |
|-----------------------------------|----------|---|--------|------|-------------------------|--------------------------|
| FDI restrictiveness index* | GP_5B_10 | The OECD's FDI restrictiveness index measures statutory restrictions on foreign direct investment in 22 economic sectors across 69 countries. High values of the index reflecting high restrictions have been colour coded with dark orange, while lower values are yellow or blue. | OECD | 2020 | Median of Member States | Missing: BG, CY, MT |

| Variable | Label | Definition | Source | Year | EU value | EU Member States coverage |
|---|----------|---|--|------------|--|--|
| Area 6A: International cooperation | | | | | | |
| Development aid | GP_6A_01 | Flows of development aid by donor country in millions of USD. | OECD | 2011, 2019 | calculated as EU total + European institutions | Missing: HR for 2011 |
| Share of patents with foreign partners | GP_6A_02 | Share of patents with foreign partners from all patents in the country. | OECD | 2011, 2017 | EU value | from source |
| FDI stock to Africa | GP_6A_03 | Stocks in FDI in African countries by top 10 investors: EU (FR, NL, IT), US, UK, CN, SG, MUS, CH, SA. (in Billions of USD) | UNCTAD, 2021 Investment Report | 2015, 2019 | EU total calculated | Based on: FR, IT, NL |
| Trade with Africa | GP_6A_04 | Imports of individual economies in thousands United States dollars from Africa. | UNCTAD | 2011, 2019 | EU total calculated | Full coverage |
| Lending to Africa: debt outstanding | GP_6A_05 | Share of creditors' lending in total external debt stocks in African countries. | World Bank, total stock DT.DOD.DECT.CD | 2010, 2019 | EU total calculated | Missing: BG, EE, HR, IT, LV, RO, SI, SK |
| Area 6B: Soft power | | | | | | |
| Diplomatic posts* | GP_6B_01 | Combined number of staff at embassies, consulates, permanent missions and other representations. EU Member State data is missing for BG, CY, LT (only 2016), LV (only 2016), MT, RO. Numbers include also intra-EU diplomatic presence. | Lowy Diplomacy Index | 2016, 2019 | Median of Member States | Missing for 2016: BG, CY, HR, LT, LV, MT, RO; for 2019: BG, CY, HR, MT, RO |
| Trust in global institutions: UN* | GP_6B_02 | Share of population with a very favourable or a somewhat favourable opinion of the UN. Based on BG, DE, ES, FR, IT, PL, SE, CZ, EL, HU, LT, NL, SK also for 2019. | Glocalities | 2007, 2019 | Median of Member States | Based on for 2007: BG, DE, ES, FR, IT, PL, SE; for 2019: BG, CZ, DE, |

| | | | | | | |
|------------------------------------|----------|---|---------------------------------|------------|-------------------------------|---|
| | | | | | | EL, ES, FR, HU, IT, LT, NL, PL, SE, SK |
| Passport Index* | GP_6B_03 | Ranking of passports by their mobility score (i.e. the number of possible visa-free cross-border movements). Rank one refers to the country with the best mobility score and hence the colour coding is such that the best ranked countries (low values) are dark blue while lower ranked countries (high values) are yellow or orange. | Global passport index | 2015, 2021 | Median of Member States | Full coverage |
| Nobel prize winners | GP_6B_04 | Number of Nobel prize winners in physics, chemistry and medicine from 1901 until 2020. | Nobel Foundation | 1901-2020 | EU total calculated | |
| Olympic medals | GP_6B_05 | Number of Olympic medals won in the Summer Olympic games 2016. | International Olympic Committee | 2016 | EU total calculated | |
| FIFA ranking | GP_6B_06 | FIFA ranking (men) from May 2021. Rank one refers to the country with the best FIFA position and hence the colour coding is such that the best ranked countries (low values) are dark blue, while higher values (lower rank) are yellow or dark orange ⁵³ . | FIFA Coca Cola World Ranking | 2021 | Rank of 3rd best Member State | |
| International arrivals | GP_6B_07 | Number of international arrivals. | World Bank (ST.INT.ARVL) | 2019 | EU value | From source |
| Museum visits | GP_6B_08 | Number of museum visitors by country within the top 70 museums. | WIKIPEDIA | 2019 | EU total calculated | |
| World heritage sites | GP_6B_09 | Number of world heritage sites per country. | UNESCO | 2019 | EU total calculated | |
| Net trade in cultural goods | GP_6B_10 | International net trade (exports - imports) in cultural goods as a share of global GDP. | UNESCO and World Bank for GDP | 2010, 2019 | EU value calculated | Full coverage |

⁵³ The UK value refer to the best UK country's rank.

| Variable | Label | Definition | Source | Year | EU value | EU Member States coverage |
|---|----------|---|---|------------------|---------------------|---|
| Area 7A: Economic importance | | | | | | |
| Stock market capitalization | GP_7A_01 | Market capitalisation of listed companies in USD. For UK, data was proxied using capitalisation-weighted index, comprising around 1000 of more than 2,000 companies traded on the London Stock Exchange, aiming to represent at least 98% of the full capital value of all UK companies that qualify as eligible for inclusion. | World Bank WDI; and Datastream for UK | 2010, 2018 | EU value | From source |
| GDP in current USD (share from global) | GP_7A_02 | Share of GDP from global, in current USD. The share for each country is obtained from the OECD's latest long-term projections (Economic Outlook 103, July 2018). The EU total is an extrapolated value based on available data for 22 countries. For 2000 and 2019, the extrapolation factor is the proportion between the EU22 Member States and the EU27 Member States from the corresponding World Bank WDI series. For 2040, the factor is obtained by extrapolating the 2000 and 2019 values, assuming the same change between 2019 and 2040 as the one observed between 2000 and 2019. The denominator, world total, is obtained using a similar correction between the available countries and the World Bank world total. | OECD Economic Outlook and World Bank WDI | 2000, 2019, 2040 | EU value calculated | Extrapolated based on: AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HU, IE, IT, LT, LU, LV, NL, PL, PT, SI, SK, SE |
| GDP in PPP (share from global) | GP_7A_03 | Share of national GDP from global GDP in current PPP. The share for each country is obtained from the OECD's latest long-term projections (Economic Outlook 103, July 2018). See further details under variable GP_7A_02. | OECD Economic Outlook and World Bank WDI | 2000, 2019, 2040 | EU value calculated | Extrapolated based on: AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HU, IE, IT, LT, LU, LV, NL, PL, PT, SI, SK, SE |
| GDP per capita (in constant PPP) | GP_7A_04 | GDP per capita in constant PPP, from the OECD's latest long-term projections (Economic Outlook 103, July 2018). For the EU, first the total constant PPP GDP and total population are obtained, similarly as for GP_7A_03 and GP_7A_04. For population, the correction factor was based on UN population data and projections. | OECD Economic Outlook, World Bank WDI and UN, Department of Economic and Social Affairs | 2000, 2019, 2040 | EU value calculated | Extrapolated based on: AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HU, IE, IT, LT, LU, LV, NL, PL, PT, SI, SK, SE |

| | | | | | | |
|--|----------|--|-------------------------------------|------------|--|--|
| Trade: Exports (share from global) | GP_7A_05 | Share of national exports from global exports. | Eurostat | 2012, 2018 | EU Total | From source |
| Share of outward FDI from global FDI | GP_7A_06 | Share of outward FDI from total global outward FDI flows. | OECD | 2010, 2020 | EU value | From source |
| International role of currencies | GP_7A_07 | Currency shares in foreign exchange reserves with disclosed currency composition (at current exchange rates). | ECB | 2020 | Euro area | |
| Import dependence in cereals | GP_7A_08 | The cereal imports dependency ratio shows how much of the available domestic food supply of cereals has been imported and how much comes from the country's own production. It is defined as (cereal imports - cereal exports)/(cereal production + cereal imports - cereal exports). Negative values indicate that the country is a net exporter of cereals. Three year average. High values reflect high dependence and have been colour coded with dark orange, while lower values indicate lower dependence and are coloured yellow or blue. | FAO | 2009, 2015 | EU value calculated using Member State level imports, exports production data. Missing for 2009. | |
| Net food trade | GP_7A_09 | Exports-imports in all food products as a percent of GDP. Food consists of: food and live animals; beverages and tobacco; animal and vegetable oils, fats and waxes; oilseeds and oleaginous fruit (SITC sections 0, 1, 4 and division 22), WTO aggregates. | WTO | 2010 | EU Total | Full coverage |
| Area 7B: Innovation | | | | | | |
| Expenditures on R&D (share from global) | GP_7B_01 | Expenditures on R&D as a share from global expenditures on R&D. | OECD | 2010, 2019 | EU value | From source |
| Share of patents from global patents | GP_7B_02 | Number of national patent applications filed under the PCT (priority year) as a share from total global patent applications. | OECD | 2010, 2017 | EU value | From source |
| Number of researchers | GP_7B_03 | Total number of researchers in FTEs. | OECD | 2010, 2018 | EU value | From source |
| Number of top 1000 universities | GP_7B_04 | Number of universities among the 1000 top rated universities worldwide. | Center of world university rankings | 2021 | EU Total | |
| Foreign university students | GP_7B_05 | Total number of tertiary students from abroad (inbound students) studying in a given country minus the number of students at the same level of education from that country studying abroad (outbound students), as a percentage of total tertiary enrolment. | UNESCO | 2014, 2018 | EU value calculated | for 2014: missing: EL, ES, LT, LU, NL; for 2018: full coverage |

| Area 7C: Demography | | | | | | |
|---|----------|---|--|---------------------------------|---------------------------------------|--|
| Share of migrants | GP_7C_01 | International migrant stock as % of population (intra EU migrants have been excluded for EU). | UN, Department of Economic and Social Affairs | 2010, 2020 | EU value calculated | Full coverage |
| Share of population in the world | GP_7C_02 | Population shares from global, past, present and projections. | UN, Department of Economic and Social Affairs | 2000, 2020, 2040 | EU total calculated | Full coverage |
| Life expectancy* | GP_7C_03 | Life expectancy at birth in number of years, fact and projections. | UN, Department of Economic and Social Affairs | 2000-2005, 2015-2020, 2040-2045 | Median of Member States | Full coverage |
| Area 7D: Space and hard power | | | | | | |
| Expenditures on space programs (% of total) | GP_7D_01 | Expenditure on space programs in current millions of USD. | OECD: The Space Economy in Figures (2019) | 2019 | Approximated from 2017 relative sizes | 2019: FR, IT, DE; 2017: missing BG, CY, HR, LT, LV, MT, SK |
| Expenditures on space programs (% GDP) | GP_7D_02 | Expenditure on space programs (as % of GDP). | OECD: The Space Economy in Figures (2019) | 2019 | Approximated from 2017 relative sizes | 2019: FR, IT, DE; 2017: missing BG, CY, HR, LT, LV, MT, SK |
| Satellite launches | GP_7D_03 | Number of successful satellite launches by country. | Center for Strategic and International Studies | 1957-1990, 1991-2015, 2016-2021 | EU total calculated | |
| Military expenditures | GP_7D_04 | Military expenditures include all current and capital expenditures on armed forces, including peacekeeping forces; defense ministries and other government agencies engaged in defense projects; paramilitary forces, if these are judged to be trained and equipped for military operations; and military space activities. Excluded are civil defense and current expenditures for previous military activities, such as for veterans' benefits, demobilization, conversion, and destruction of weapons. (in USD) | WB using SIPRI | 2010, 2019 | EU total | From source |
| Number of military personnel | GP_7D_05 | Total number of armed forces personnel (in Thsds.). | WDI | 2010, 2018 | EU total | From source |

| | | | | | | |
|---|----------|---|-------------------------------|----------------------|---------------------|---------------|
| Military personnel in international missions | GP_7D_06 | Number of military personnel deployed to international missions. | CIA Factbook for 2020, NATO | 2020 | EU total calculated | Full coverage |
| Exports of weapons | GP_7D_07 | Value of weapons exported. Weapons include aircrafts, air defence systems, anti-submarine warfare weapons, armoured vehicles, artillery, engines, missiles, sensors, satellites, and ships, expressed in millions of USD. SIPRI Trend Indicator Values (TIVs), 3 year averages. | SIPRI Arms Transfers Database | 2009-2011, 2018-2020 | EU total calculated | Full coverage |