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RESILIENCE DASHBOARDS FOR THE SOCIAL AND ECONOMIC, GREEN, DIGITAL, AND GEOPOLITICAL DIMENSIONS[1]

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Contents

EXECUTIVE SUMMARY

This report presents the resilience dashboards[2] 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 Report[3]. **The resilience dashboards** are an innovative **monitoring tool** for the transition-led EU policy agenda. They provide a **holistic assessment of the ability to progress amid 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 well-being beyond GDP**.

The dashboards contain a **battery of quantitative indicators from publicly available data sources**, chosen in coherence with other Commission monitoring tools. They depict **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 further analysis and policy action**. As highlighted in the 2021 Strategic Foresight Report[4], they will also contribute to the ex-post assessment of Europe's recovery and resilience strategy.

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 with other countries outside the Union. The resilience dashboards will be **regularly updated and reviewed in a collaborative manner**.

The dashboards are complemented by **synthetic resilience indices**. These illustrate the overall relative situation of vulnerabilities and resilience capacities under each of the four dimensions and their underlying areas (see the top of **Figure 1** for the Member State and its bottom for the global level). While providing a useful overview, these synthetic measures should always be read together with the full set of indicators in the dashboards.

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

The bottom of **Figure 1** displays a comparison of the EU's synthetic resilience indices with those of other major global actors across the four dimensions. The EU as a whole shows medium-high capacities in many areas, while the situation as regards vulnerabilities can still be improved.

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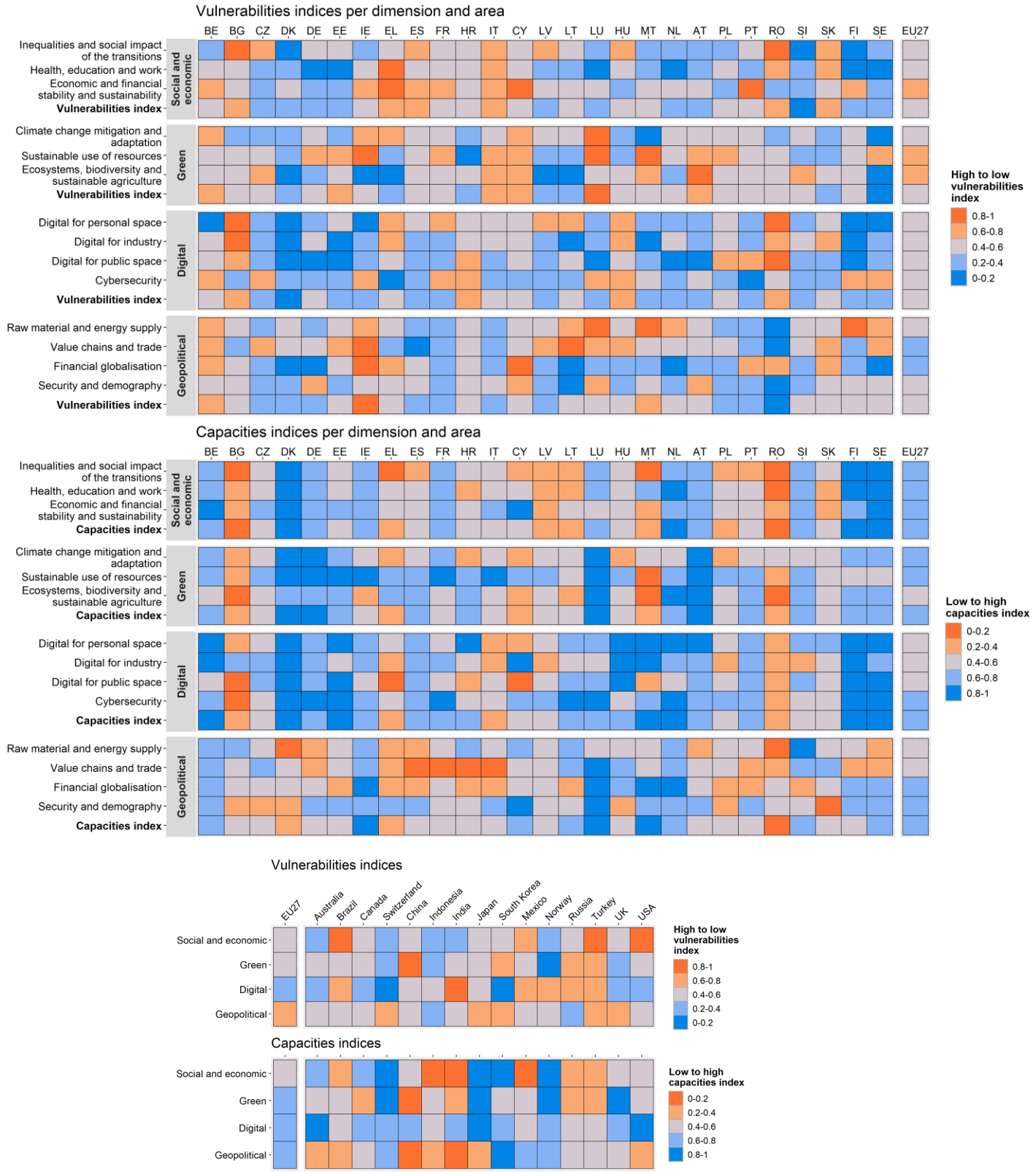
2 The dashboards are available at https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en

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

4 COM(2021) 750 final (https://ec.europa.eu/info/sites/default/files/strategic_foresight_report_2021_en.pdf)

Figure 1: Resilience across all areas and dimensions: Member State (top) and global (bottom) level



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 with other countries.

1. INTRODUCTION

The 2020 Strategic Foresight Report (SFR) presents the European Commission's strategy to embed strategic foresight into EU 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 2020 SFR 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." This establishes a clear link between the concept of resilience and ongoing societal transformations[5]. The 2020 SFR analyses resilience along four interrelated dimensions – social and economic, green, digital, and geopolitical. It 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.

The 2021 SFR highlights further that in a multipolar, hyperconnected and contested global order, the EU aims to strengthen its responsible global leadership and partnerships, defend its core values and strategic interests, and persuade the international community to pursue common goals for the benefit of the entire globe. In this context, strengthening the resilience of Member States is not only beneficial at the national level, but it also contributes to achieving the resilience of the EU as a whole.

This new focus on resilience calls for close monitoring. The 2020 SFR proposed prototype Resilience Dashboards (RDBs). Their aim is to assess the vulnerabilities and capacities of the EU and its Member States under each of the four dimensions, taking a holistic and forward-looking perspective informed by strategic foresight. Based on the first prototypes, the 2020 SFR announced further work to develop fully-fledged RDBs, in a collaborative process.

Work within the Commission took place in four working groups, with representatives of all relevant services, the European External Action Service, and the European Environment Agency. This ensured that the RDBs are designed in full coherence with, and build upon, existing and upcoming EU frameworks, monitoring tools and policies. Experts from other institutions and academia were consulted in a dedicated workshop. In April 2021, the Commission launched a consultation process with Member States and presented the dashboards in the first ministerial meeting of the EU-wide foresight network[6]. As final step, a broader consultation took place on the Commission's Strategic Foresight website in summer 2021, collecting additional inputs from Member States, EU institutions and the European social partners. In parallel, the JRC Competence Centre on Composite Indicators and Scoreboards performed a statistical audit on the dashboards[7], which has confirmed the methodological choices and the robustness of the approach.

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

6 https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight_en#eu-wide-foresight-network

7 The report on the audit is available at https://publications.jrc.ec.europa.eu/repository/handle/JRC127139 It refers to the July version of the dashboards, described in https://ec.europa.eu/jrc/sites/default/files/jrc126056_resilience_dashboards_en_0.pdf

This consultative process allowed constructing an innovative tool that can support countries to self-assess and, after further analysis and contextualisation, to identify potential policy needs and actions. In the medium term, the RDBs will help to answer the important question as to whether our policies are making societies more resilient in the short and long run. The 2021 SFR announced that the RDBs "will contribute to the ex-post assessment of Europe's recovery and resilience strategy, including vis-à-vis other key global players."

This report describes the final version of the RDBs[8], which takes into account all inputs received. Using a battery of indicators, the goal of the dashboards is to provide a holistic assessment of country capacities and vulnerabilities related to the green, digital, and fair transitions, and to strengthen the EU's resilience to various shocks and its capacity to act in the global arena.

The analysis is also extended to non-EU countries, to assess the EU's resilience in an international context. This is particularly relevant for the geopolitical dimension, which is broadly aligned with the topics of the 2021 SFR and the Strategic Compass[9].

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 other countries), depicting:

(i) vulnerabilities, i.e. features that can exacerbate the negative impact of crises and structural changes, 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 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, or in energy intensive sectors). 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 process of constructing the dashboards revealed some gaps in data availability in some areas. As many resilience-relevant indicators are under development and new data are being collected, the list of indicators should be seen as dynamic and may be revised in the future. The revisions will follow a process of collective intelligence to ensure that the RDBs will continue to remain streamlined with other EU tools and processes.

The dashboards follow a relative assessment approach and are not meant to rank countries. For each indicator, a scale of five colours indicates a country's relative situation in the latest available year (usually 2018-2020)[10], compared with the pooled values of all available data for all Member

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8 The dashboards are available at https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en The page allows viewers to navigate the tool and the underlying data.

9 https://www.europarl.europa.eu/EPRS/graphs/EPRS_Strategic_Compass_final.pdf

10 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 includes 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

States in the reference period 2007-2017. The indicators are drawn from publicly available data sources, mostly official statistics (e.g. Eurostat indicators). The dashboards will be updated yearly, as new data will become available.

Compared with the prototypes in the 2020 SFR, these new RDBs present the following methodological improvements: (i) a dynamic perspective, assessing changes of the indicators over time, where data allow; (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 under each dimension and area.

The RDBs complement other Commission tools, and provide additional benefits due to the following properties:

(i) while existing tools largely aim to assess development and progress in the EU and Member States, for instance in advancing the transitions or as regards specific policy targets, the RDBs are designed to 'distil' resilience features that drive *the ability to make progress and reach those policy targets amid challenges*;

(ii) while most existing tools tend to be sectoral or focus on single policy fields, the RDBs 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 that aimed to consider relevant megatrends (long-term driving forces that will most likely have a significant impact on the EU's future).

The RDBs also contribute to an integrated approach for measuring people's well-being 'beyond GDP'. The concept of resilience, as put forward in the 2020 SFR, relates closely to the notion of sustainable development[11]. In particular, it can be understood as a crucial link between current and future well-being: mitigating vulnerabilities and strengthening coping capacities can ensure that the well-being of future generations is not compromised by shocks, structural changes or transitions[12]. As such, the RDBs are naturally linked with the Sustainable Development Goals (SDG) and their monitoring framework[13].

The structure of this report is as follows. **Section 2** summarises the process of building the dashboards. **Section 3** explains the essentials of the methodology. **Section 4** presents the dashboards and the corresponding synthetic indices for the Member States. **Section 5** puts the four dimensions together. **Section 6** presents the global extension. Annexes are in a separate document. **Annex I** gives details on the methodology. **Annex II** presents the gap analysis. **Annex III** compares the RDBs with other monitoring frameworks. **Annex IV** presents the correlation structure of the indicators. **Annexes V-VII** provide details on the indicators and corresponding data sources.

level of these 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 stakeholders.

11 For further discussion, see Manca, A.R., Benczur, P., and Giovannini, E., 2017, Building a scientific narrative towards a more resilient EU society, https://publications.jrc.ec.europa.eu/repository/handle/JRC106265

12 The OECD's wellbeing framework (https://www.oecd.org/statistics/measuring-well-being-and-progress.htm) explicitly recognizes the role of resilience along these lines.

13 https://ec.europa.eu/international-partnerships/sustainable-development-goals_en

2. CONSTRUCTION OF THE RESILIENCE DASHBOARDS

The dashboards aim to capture vulnerabilities and capacities in the four dimensions: social and economic, green, digital and geopolitical.

- **Vulnerability**: This is a country's structural feature that points to elements of its systems (economic, social, and environmental) that can be disproportionally hit in the case of shocks and/or structural changes, or can hinder the transitions. 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 and/or undergoing the transitions. This could include, for example, people whose jobs are at a high risk of automation.
- **Capacity**: This is a country's structural feature that points to elements of its system (economic, social, and environmental) that are crucial for coping with shocks and/or structural changes, and managing transitions successfully. Examples include certain policies (e.g. active labour market policies), human and social capital (e.g. skills and digital competences), and the capacity to innovate through, for example, investment or innovative enterprises.

These capacities and vulnerabilities do not depict the dynamic reaction to a challenge, but refer to some underlying features that can enable or hinder a country to face it. The challenges can be specific or broad shocks[14], or structural changes and the transitions. 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 seize opportunities (absorption, adaptation, transformation)[15]. 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, classification of an indicator into capacities or vulnerabilities has a degree of subjectivity and is the result of expert assessment.

The dashboards are structured in broad areas that should be considered as a guide for the reader through the indicators rather than a rigid organisation. In some cases, indicators may fall under more than one area, and were included where their impact was considered most prominent.

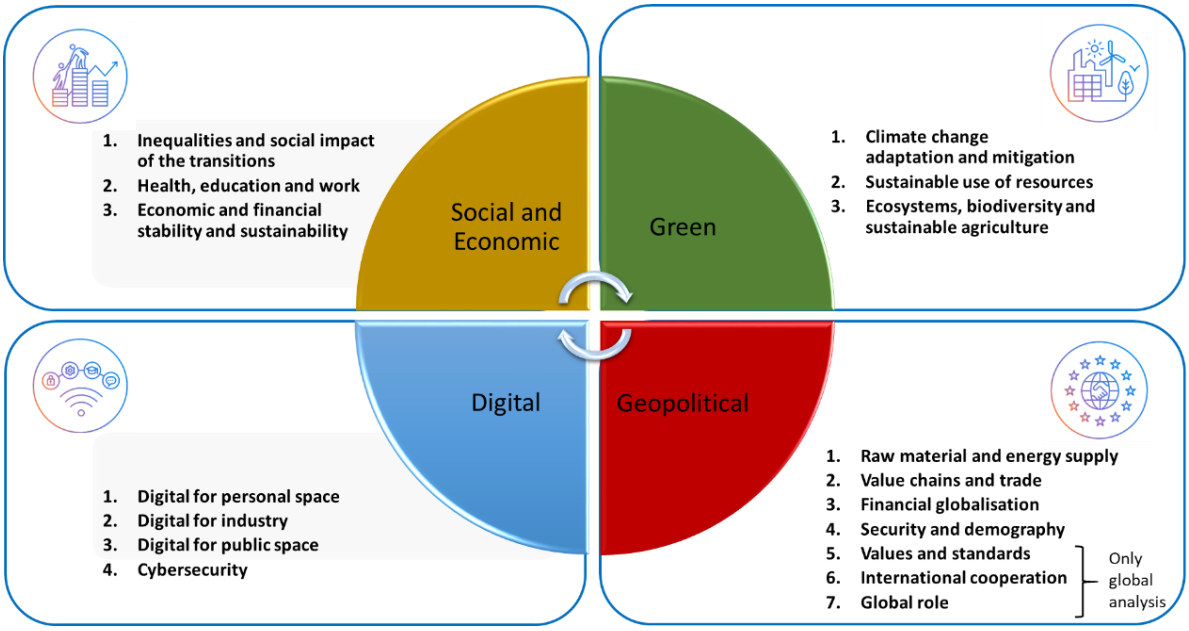
The construction of the dashboards at Member State level consisted of the following steps:

1) **Development of the structure**. This was a conceptual step assessing all relevant topics for each dimension, organised 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 2** presents the areas covered in each dimension.

[14] Examples of shocks include economic shocks (trade, financial, labour market), climate induced disasters, cyber threats and attacks, raw material and energy supply disruptions, global trade or financial market shocks, and migration.

[15] 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 2: 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 30[16].
   - 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[17], and whether it adds value compared with 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.

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

[17] Many of the indicators have a dual role: besides representing a vulnerability or a resilience capacity, they also point to important aspects of progress (and current wellbeing in particular). For example, poverty, long term unemployment, or young people not in employment, education or training from vulnerabilities, and the employment rate, or digital skills of students or adults from capacities.

- Clarity: how clear is the interpretation of the direction of change of the indicator (the higher the better or vice versa)[18], and whether it has a clear and intuitive meaning[19].
- Comparability: how much the indicator ensures meaningful cross-country comparisons, considering specific features of the country (e.g. area, economy, population).
- 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 the OECD and the World Bank[20].
- Granularity: whether data cover all Member States and span at least 5 years, to assess the evolution over time.

3. Mapping and streamlining the indicators. The indicators were mapped in broad areas and assigned to vulnerabilities or capacities. The mapping was performed considering cross-dimension linkages, and the indicators were placed in the dimension/area where they have their dominant impact. For instance, indicators pointing to social and economic consequences of the twin green and digital transitions were placed in the social and economic dimension, while the indicator on energy use in ICT was placed in the green dimension. The correlation structure of the indicators was also taken into account (see Annex IV). The 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 constrained by data availability or quality. This implies that there are gaps in each dimension. For some areas, new statistics are being developed and will be considered in future revisions. For some others, further work will be required. As such, the list of indicators will be considered dynamic and it may be reviewed regularly, allowing also the factoring in of new aspects of the transitions or other developments. Key stakeholders will be involved in future reviews.

The dashboards at Member State level 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 look at resilience of the whole EU in an international context[21]. By moving the focus beyond individual Member States, it becomes possible to indicate some of the extra strength that the EU as a whole can add.

To span geopolitical aspects comprehensively, the geopolitical dimension contains also 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 clear vulnerabilities or capacities. Instead, they often paint the global situation with the EU as one major actor.

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18 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.

19 In particular, the dashboards try to avoid using composite indicators. The only exception is the Global Cybersecurity Index (digital dimension).

20 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.

21 The following countries are considered: Australia, Brazil, Canada, Switzerland, China, Indonesia, India, Japan, South 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[22]

The dashboards present a multidimensional picture, whereby different indicators are placed next to one another, assessing the situation of countries across a number of aspects. They use the latest statistical year available for each indicator (usually 2018-2020[23]). Their main purpose is not to rank countries but to highlight strengths to nurture and areas to improve, also in view of further country-specific analysis and policy action. For example, extreme values for a small set of indicators 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. Similarly, individual indicators may link to multiple policy areas. It is thus important to look at all indicators at the same time, and to contextualise them across different policy areas.

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 multi-year reference period. An absolute assessment would require a consensus on critical levels of vulnerabilities or targeted levels of capacities[24]. For each indicator, a scale of five colours indicates each country's relative situation in the latest available year, compared with the collection of values of that indicator for all Member States and all years in the reference period 2007-2017[25]. For instance, a high capacity for a country means that the corresponding indicator value is high in a historical comparison across all Member States[26]. 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)[27]. 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 5 years (2015)[28]. 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 5 years.

The dashboards are accompanied by synthetic indices that illustrate, in each area and dimension, the overall situation of resilience capacities and vulnerabilities. These indices aggregate the relative situation of Member States and the EU across all indicators in the considered area or dimension[29]. As such, they should be read as an overall measure of resilience in relative, and not absolute, terms. In addition, as is 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.

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

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

24 Obtaining this for all the indicators would require 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.

25 The fast pace of the digital transformation necessitates to work with a shorter reference period (2015-2020). Similar reasoning applies to the uptake of electric and hydrogen vehicles, and the insurance sector solvency capital ratio. Finally, when less than four years of data is available for an indicator in 2007-2017, it is checked if the period 2015-2020 contains more data.

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

27 It is worth noting that some indicators are also present in other dashboards or monitoring tools (e.g. government debt in the Macroeconomic Imbalances Procedure). The RDBs' relative assessment can lead to a different picture with respect to the result that would be obtained using the absolute assessment of the other tool.

28 An arrow up (down) for a vulnerability corresponds to a sizable decrease (increase) in this vulnerability in the last 5 years.

29 See Annex IB for the construction and composition of the synthetic indices. 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 indicators.

4. THE RESILIENCE DASHBOARDS IN FOUR DIMENSIONS

This section presents the proposed resilience dashboards under 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 Strategic Foresight Report as "the ability to tackle economic shocks[30] 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 EU societies and economies. Key topics — such as social and economic status, equality, health, education, employment, regional disparities[31], and innovation — are thus monitored across this dimension[32].

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 gap[33].

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 realisation of providing concrete support to other people in need (voluntary work) 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,

30 Examples include trade, financial or labour market disruptions, or collective challenges with far reaching socio-economic consequences, such as COVID-19.

31 Although the Member States dashboards already include a couple of regional aspects (regional broadband gap and income disparities), it would be important to complement them with a more granular regional assessment of resilience. This is, however, beyond the scope of the current exercise.

32 This is also aligned with the approach proposed in 2019, under the Finnish Presidency of the Council of the European Union, in the conclusions on the Economy of Wellbeing, which 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.

33 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.

which — going forward — will potentially have an increasing impact on health, well-being, labour markets, and fiscal sustainability.

The first area of the dashboard is dedicated to overall **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 exclusion rate, the income quintile share ratio, and the regional dispersion in household income as a gauge for regional socio-economic vulnerabilities. Given that the green and digital transitions may have objectives that impact the social and economic domain, this dashboard includes indicators that point to such potential tensions (e.g. employment in energy-intensive sectors or jobs with high automation risk) or synergies (years of life lost due to 2.5 particulate matters, or the share of innovative enterprises). It also includes indicators that describe means to alleviate such inequalities, such as government social expenditures, the impact of social transfers on poverty, and 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**[34]. It covers the main features of education systems from early childhood to adulthood, also featuring the quality of education and the extent to which the EU'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 2.5 particulate matter) 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 sector[35]. This area highlights the vulnerabilities and capacities of banks and insurance companies to face financial shocks and threats deriving from 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.

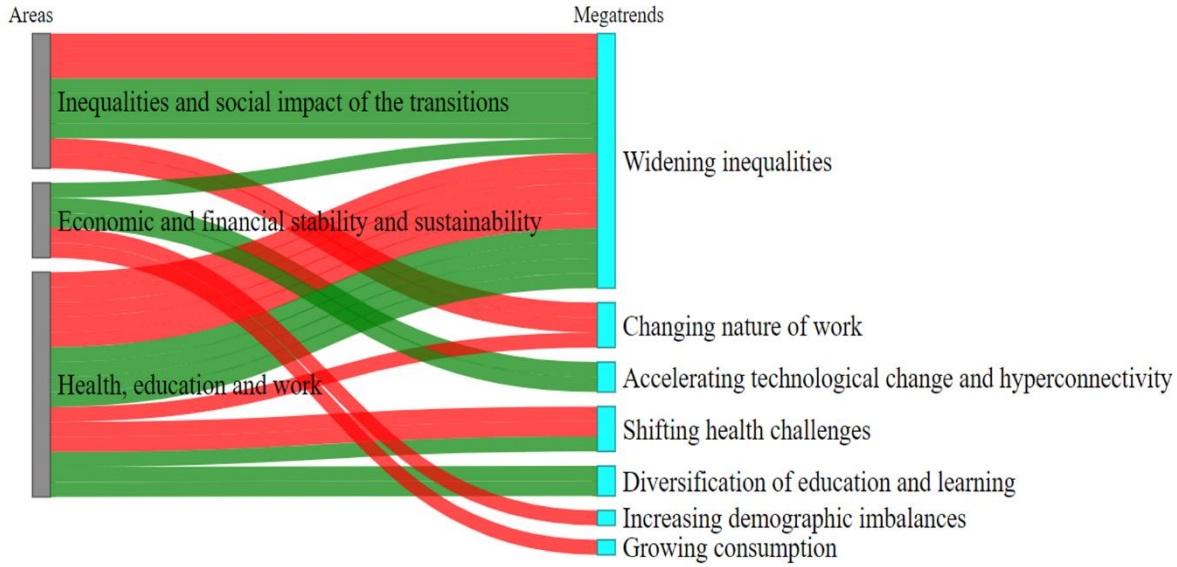
To highlight the forward-looking perspective of this dashboard, **Figure 3** presents a mapping between the social and economic dashboard indicators and ongoing megatrends, in particular

[34] The first and the second areas link closely to the indicators of the Social Pillar. Annex III presents a detailed comparison. Since this part of the social and economic resilience dashboard contains a smaller number of indicators, many potential elements (like precarious employment, the unemployment rate or its broader version, the labour market slack) are not included directly.

[35] International and global aspects (intra-EU trade and the single market, extra-EU trade, value chains, foreign direct investment, financial integration) are addressed in the geopolitical dimension.

widening inequalities, changing nature of work, health challenges, but also education, demographic imbalances, technological change and growing consumption.[36].

Figure 3: Mapping of indicators in the social and economic dashboard (left) and megatrends (right)

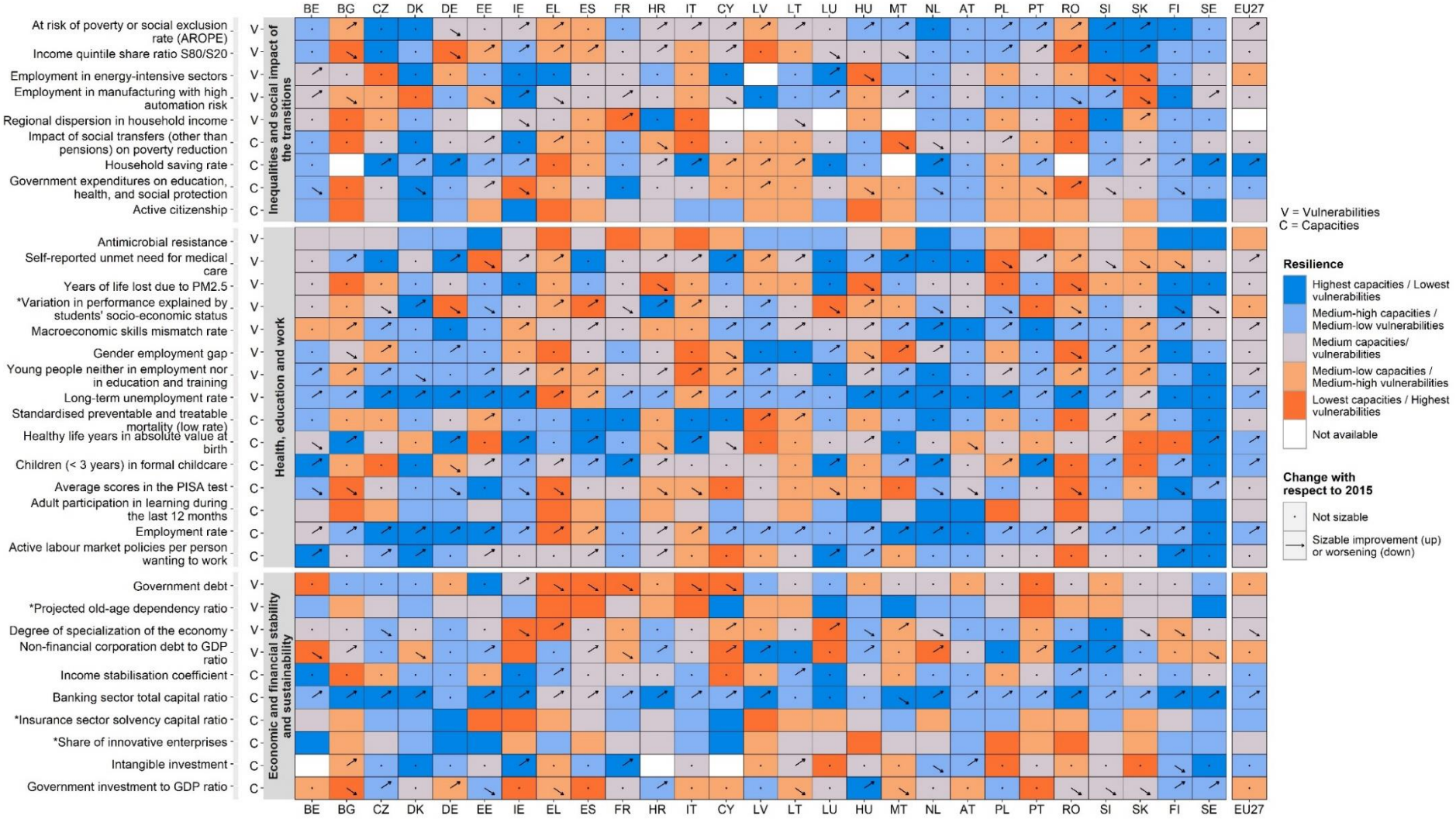


Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 4 presents the dashboard for the social and economic dimension, where the data refers to the latest available year. **Figure 5** and **Figure 6** plot the capacities and vulnerabilities indices. These figures show each country's relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

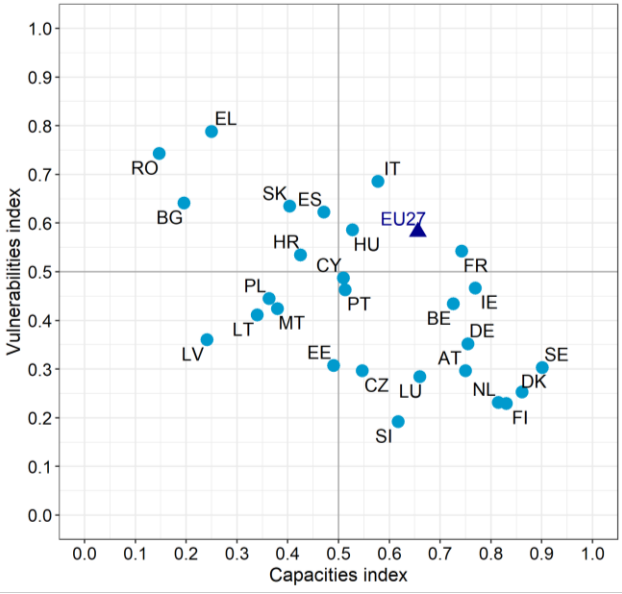
[36] https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en. The detailed mapping of each individual indicator is presented in Annex V. The megatrends are currently being updated. The mapping will be rerun with the new megatrends as soon as they all become available.

Figure 4: Social and economic dashboard - latest available year for each indicator



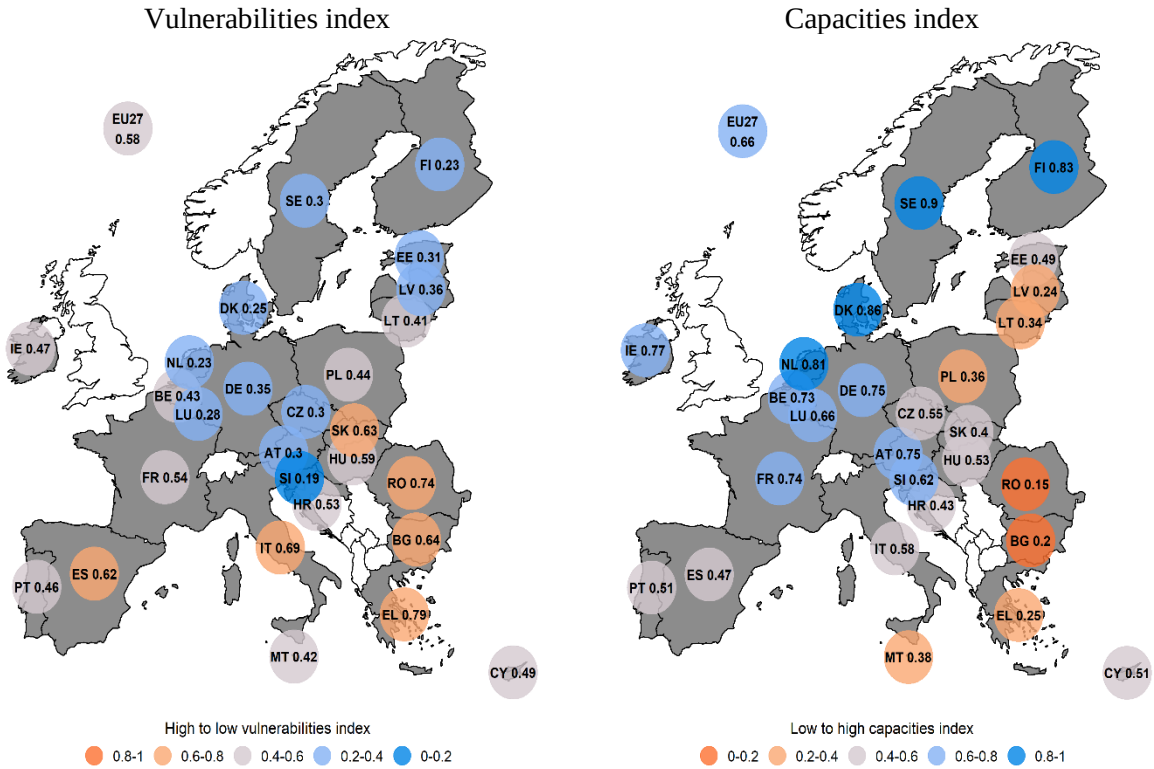
The dashboard includes a set of indicators that show the level of vulnerability and resilience capacities within a country, relative to other countries. Data typically refers to 2018-2020. Download from Eurostat as of 15 October 2021. The colours indicate the position of a country in the distribution of all available values for EU countries in the 2007-2017 reference period (2015-2020 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 5: Social and economic dashboard: vulnerabilities versus capacities synthetic indices



The synthetic indices aggregate the relative situation of the Member 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 6: Social and economic dashboard: synthetic indices



Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Member 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 country specific criticality that can hinder the transition (e.g. soil erosion by water, or CO_2 emissions from road transport), or a structural potential that can act as an engine towards its success (e.g. innovations in environmental technology or capacity to recover waste).

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[37]. The indicators are broadly aligned with the policy areas of the European Green Deal[38].

By 2050, the EU aims to become a climate-resilient society and make Europe the first climate-neutral continent[39]. 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 resilience[40].

Along these broad policy lines, the **climate change mitigation and adaptation** area embeds indicators related to emissions (overall greenhouse gas and transport CO_2 emissions, but also carbon sink capacity of forests). It includes sustainable mobility indicators, such as the usage rate of carbon-neutral vehicles (battery electric vehicles and hydrogen fleet fuelled by renewable energies) and the proportion of people that use greener 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 from extreme climate events) and the ability to adapt by sharing unevenly distributed losses (insured losses from extreme climate events), which represent relevant forward-looking aspects.

The second broad area covers aspects of the **sustainable use of resources**. It includes aspects of resource exploitation and footprint (water exploitation, consumption footprint, material consumption, and energy use[41]). It points to the ability to produce high values per unit of resources

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37 The thematic areas of the green dashboard do not cover all the aspects of the nine planetary boundaries, given that the dashboard uses country level data (see Section 2 and the Annex IA and *Steffen, Will, et al. Planetary boundaries: Guiding human development on a changing planet. Science 347.6223, 2015*).

38 Broad policy areas, as defined in the European 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.

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

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

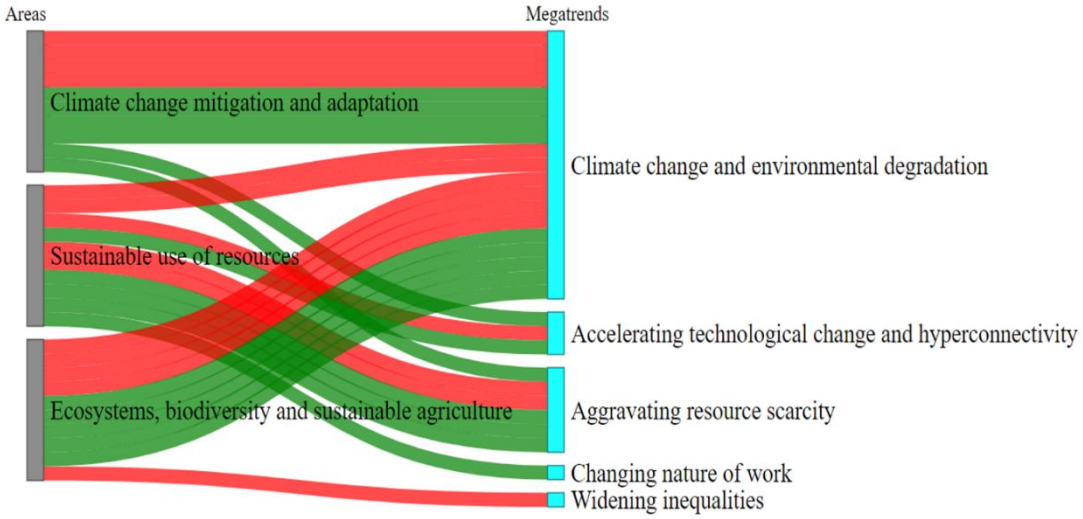
41 In particular, the selected energy use indicator reflects the needs connected to the digital transition, given that it might be of particular relevance for the near future.

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 minimising the impact of economic activity on resource depletion or environmental degradation (gross value added in the environmental goods and services sector). This sector is expected to catalyse the green 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 impact climate change adaptation, resource use, and health and well-being in general. They are also strongly connected to the goal of sustainable food systems[42]. 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 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 (the use of pesticides, treatment of wastewaters, protection of natural areas and, in general, expenditures on environmental protection).

To highlight the forward-looking perspective of this dashboard, **Figure 7** presents a mapping between the indicators included and ongoing megatrends, mostly in relation to climate change and environmental degradation and resource scarcity, but also to technological change, changing nature of work and inequalities.

Figure 7: Mapping of the indicators in the green dashboard (left) and the megatrends (right)

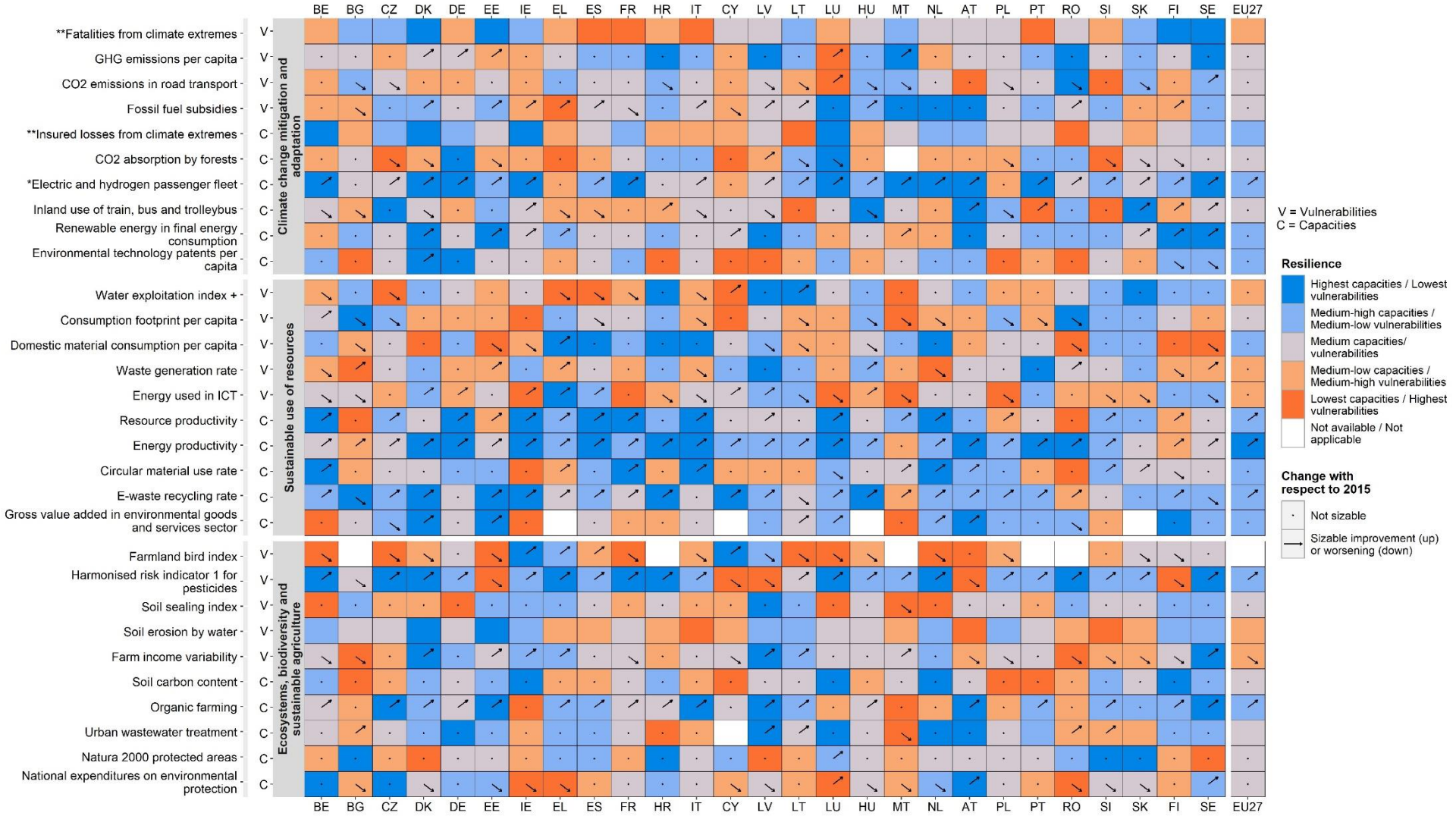


Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 8 presents the dashboard for the green dimension, where the data refers to the latest available year. **Figure 9** and **Figure 10** plot the capacities and vulnerabilities indices. These figures show each country's relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

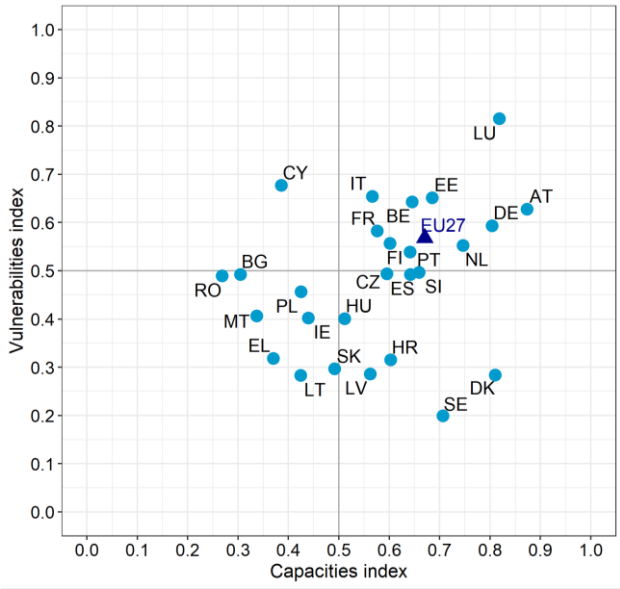
[42] https://ec.europa.eu/info/sites/info/files/research_and_innovation/green_deal/updt-gdc_stakeholder_engagement_topic_07-1_biodiversity_and_ecosystems.pdf

Figure 8: Green dashboard - latest available year for each indicator



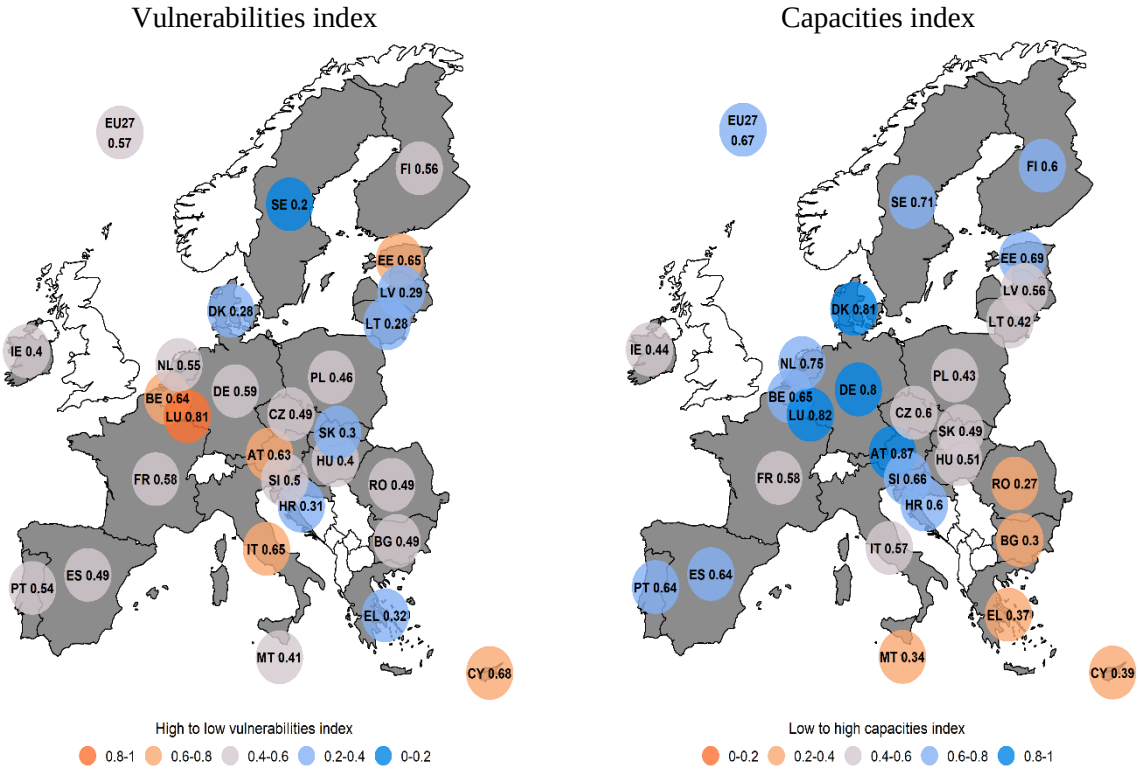
The dashboard includes a set of indicators that show the level of vulnerability and resilience capacities within a country, relative to other countries. Data typically refers to 2018-2020. Download from Eurostat as of 15 October 2021. The colours indicate the position of a country in the distribution of all available values for EU countries in the 2007-2017 reference period (2015-2020 for indicators with an asterisk, and a single cumulative value for the 1981-2019 period for indicators with a double 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 9: Green dashboard: vulnerabilities versus capacities synthetic indices



The synthetic indices aggregate the relative situation of the Member 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 10: Green dashboard: synthetic indices



Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Member 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 and the Digital Decade[43], 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, cuts across all 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, as highlighted in the 2021 SFR. The internet of things, smart home technology, the use of big data, and increasingly efficient technologies based on artificial intelligence will all become the new normal.

The dashboard aims at representing the important aspects of our society that will be most affected by the digital transition, acknowledging that some effects are difficult to predict and that interconnections and potential spillovers will 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 (see also Annex II). In doing so, it should be ensured that the dashboard is aligned with other EU instruments and processes related to digitalisation (e.g. the DESI index and the 2030 Digital Compass program), avoiding contradictions and duplications.

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 onlife paradigm is already part of our society, and it is essential to keep monitoring the evolution of new means for education and reskilling/upskilling, new working methods (teleworking), and the role of social media in shaping people's future online behaviour.

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

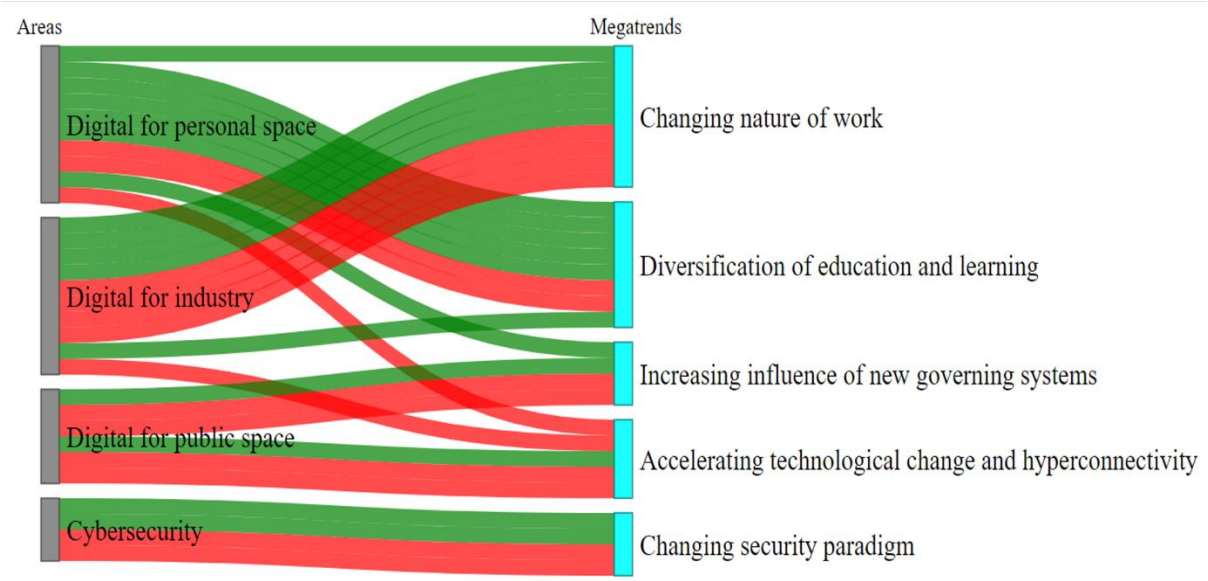
Digitalisation of the **public space** is expected to be the new playing field, one that will be able to reduce existing digital divides. Both infrastructures (e.g. 5G) and availability — or the lack of it — of e-government services are considered.

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

[43] https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en

To highlight the forward-looking perspective of this dashboard, **Figure 11** presents a mapping between the indicators included and ongoing megatrends related to the changing nature of work, diversifying the education system, accelerating technological change and hyperconnectivity, a changing security paradigm, and the increasing influence of new government systems.

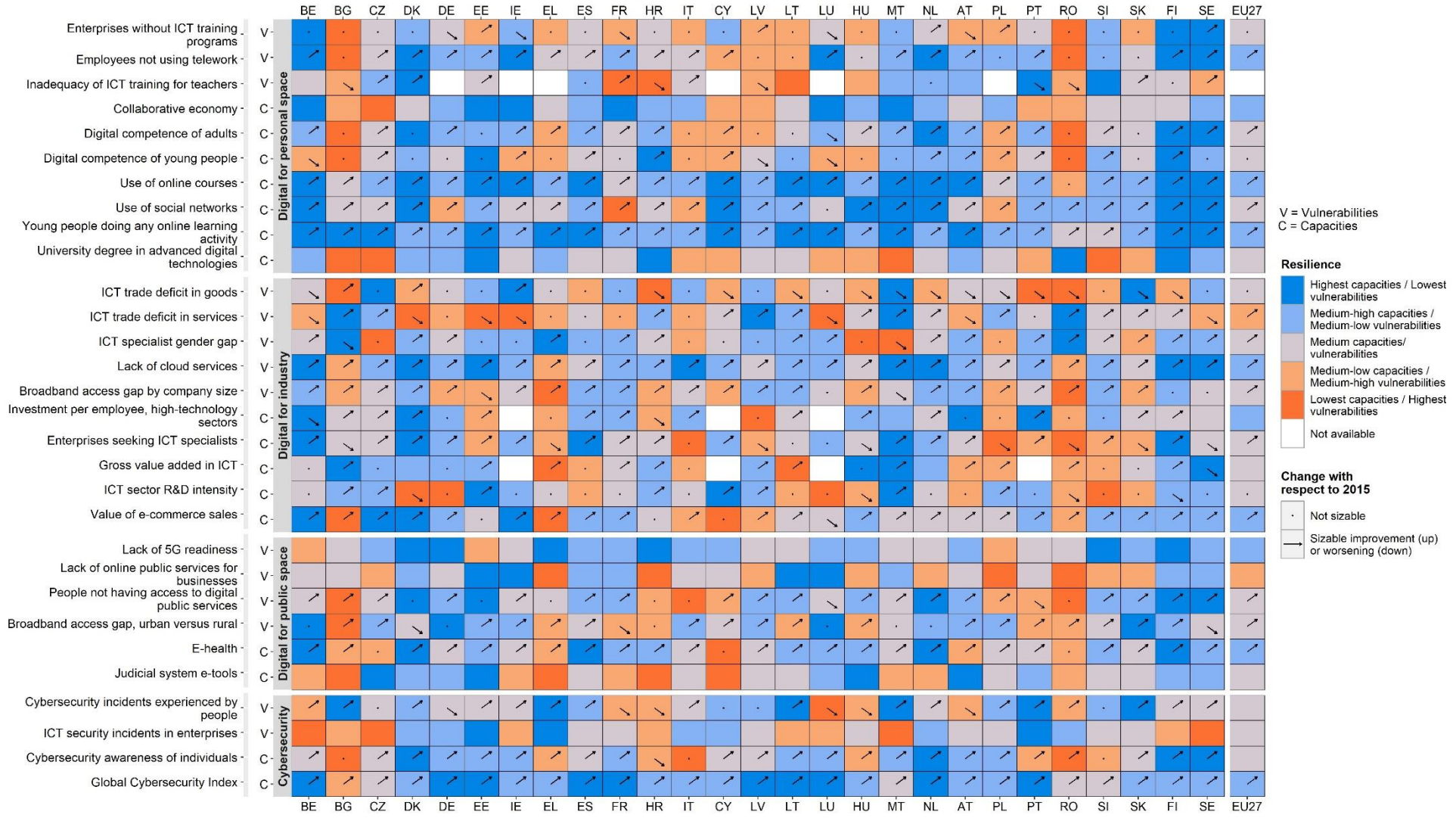
Figure 11: Mapping of the indicators in the digital dashboard (left) and the megatrends (right)



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

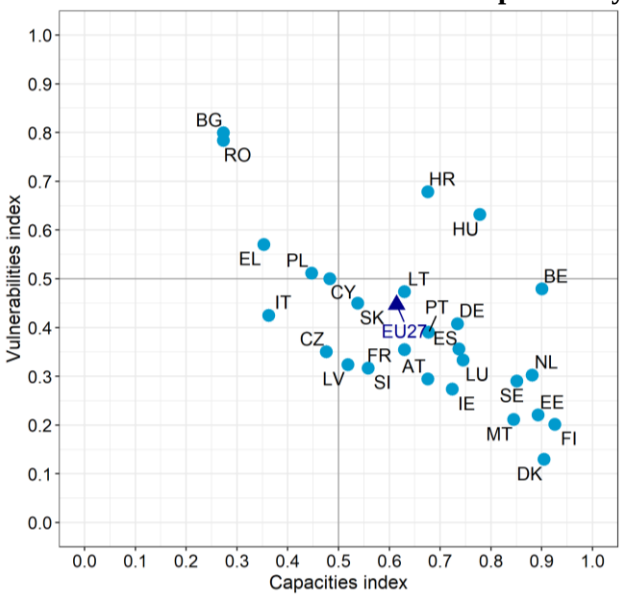
Figure 12 presents the dashboard for the digital dimension, where the data refers to the latest available year. **Figure 13** and **Figure 14** plot the capacities and vulnerabilities indices. These figures show each country's relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

Figure 12: Digital dashboard - latest available year for each indicator



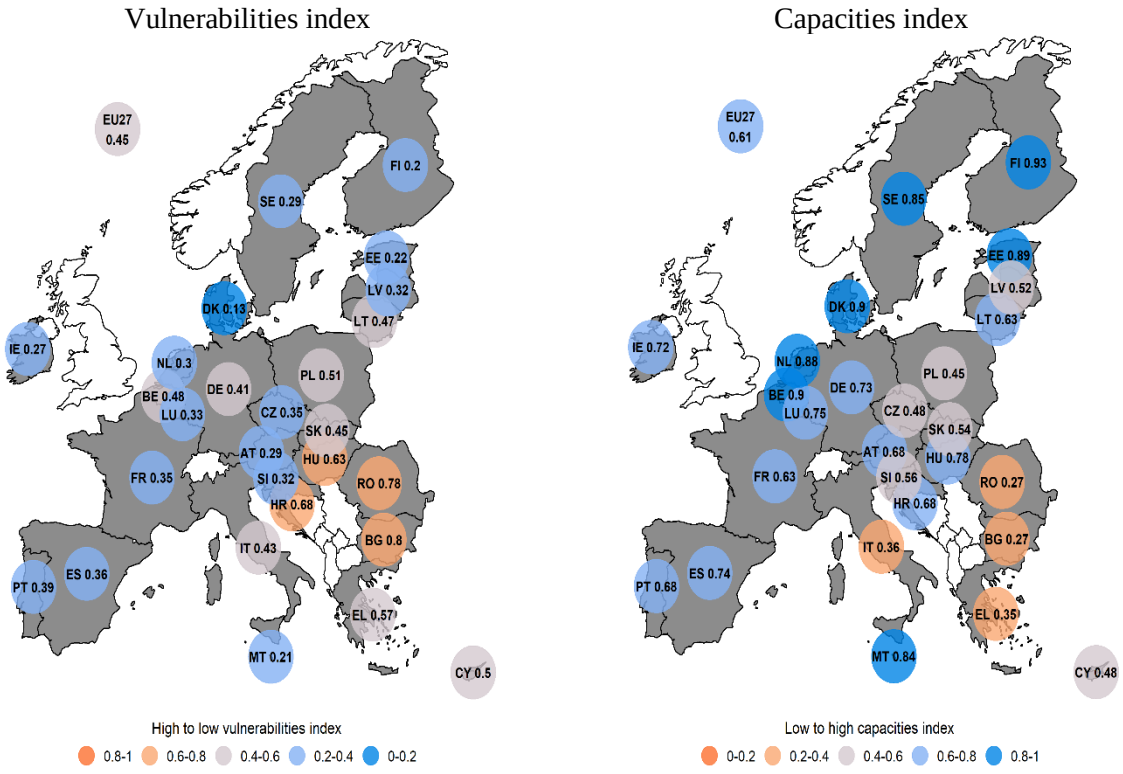
The dashboard includes a set of indicators that show the level of vulnerability and resilience capacities within a country, relative to other countries. Data typically refers to 2018-2020. Download from Eurostat as of 15 October 2021. The colours indicate the position of a country in the distribution of all the available values for EU countries in the 2015-2020 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 13: Digital dashboard: vulnerabilities versus capacities synthetic indices



The synthetic indices aggregate the relative situation of the Member 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 14: Digital dashboard: synthetic indices



Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Member 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 resilience[44], the notion of geopolitical resilience is more specific[45]: 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 powers[46]. The 2021 SFR makes a further case for "the benefits of well-managed interdependence and open strategic autonomy based on shared values, cohesion, strong multilateral governance and rules-based cooperation."

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 that 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 supplier concentration in base metals or energy carriers, and capacities such as intra-EU trade in energy, or the rate of change in supplier diversification in base metals or energy carriers.

The second area on **value chains and trade** looks at the concentration of trading partners, which could unveil vulnerabilities in value chains and trade. It also monitors the trade openness of Member States with each other (reflecting the role of the single market) and with third countries, and participation levels in global value chains (GVC). These are important capacities to counteract trade disturbances and to reap the benefits from global economic cooperation[47]. 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.

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44 COM(2012) 586 final, *The EU approach to Resilience – learning from food security crises*, 3/10/2012; JOIN/2017/021 final, *A Strategic Approach to Resilience in the EU's external action*, 7/6/2017.

45 In the 2017 Joint Communication *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 Report'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*.

46 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*).

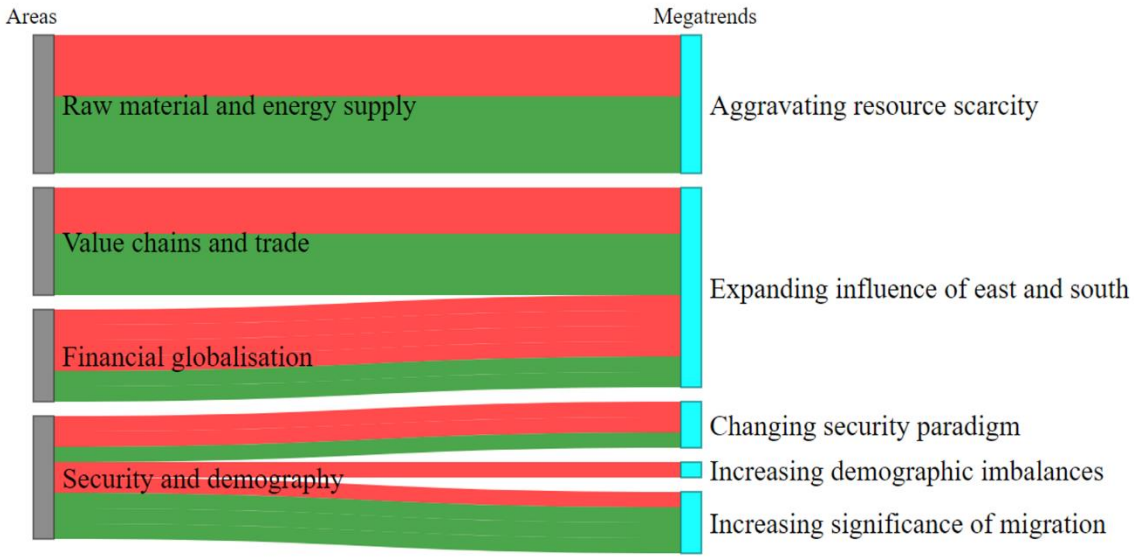
47 A low degree of openness does not indicate a general weakness of an economy: a measure of openness can also be small if an economy is large and hence more self-sustained.

Financial globalisation treats vulnerabilities to global financial shocks such as the concentration of foreign direct investment partner countries, net borrowing/lending, and the net international investment position. It also comprises financial integration (with respect to other EU and third countries) and the value added share of foreign enterprises as capacities.

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 trends[48] such as the fertility rate in Member States and the integration of migrants in the labour market.

To highlight the forward-looking perspective, **Figure 15** presents a mapping 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 significance of migration, changing security paradigm and increasing demographic imbalances.

Figure 15: Mapping of the indicators in the geopolitical dashboard (left) and the megatrends (right)

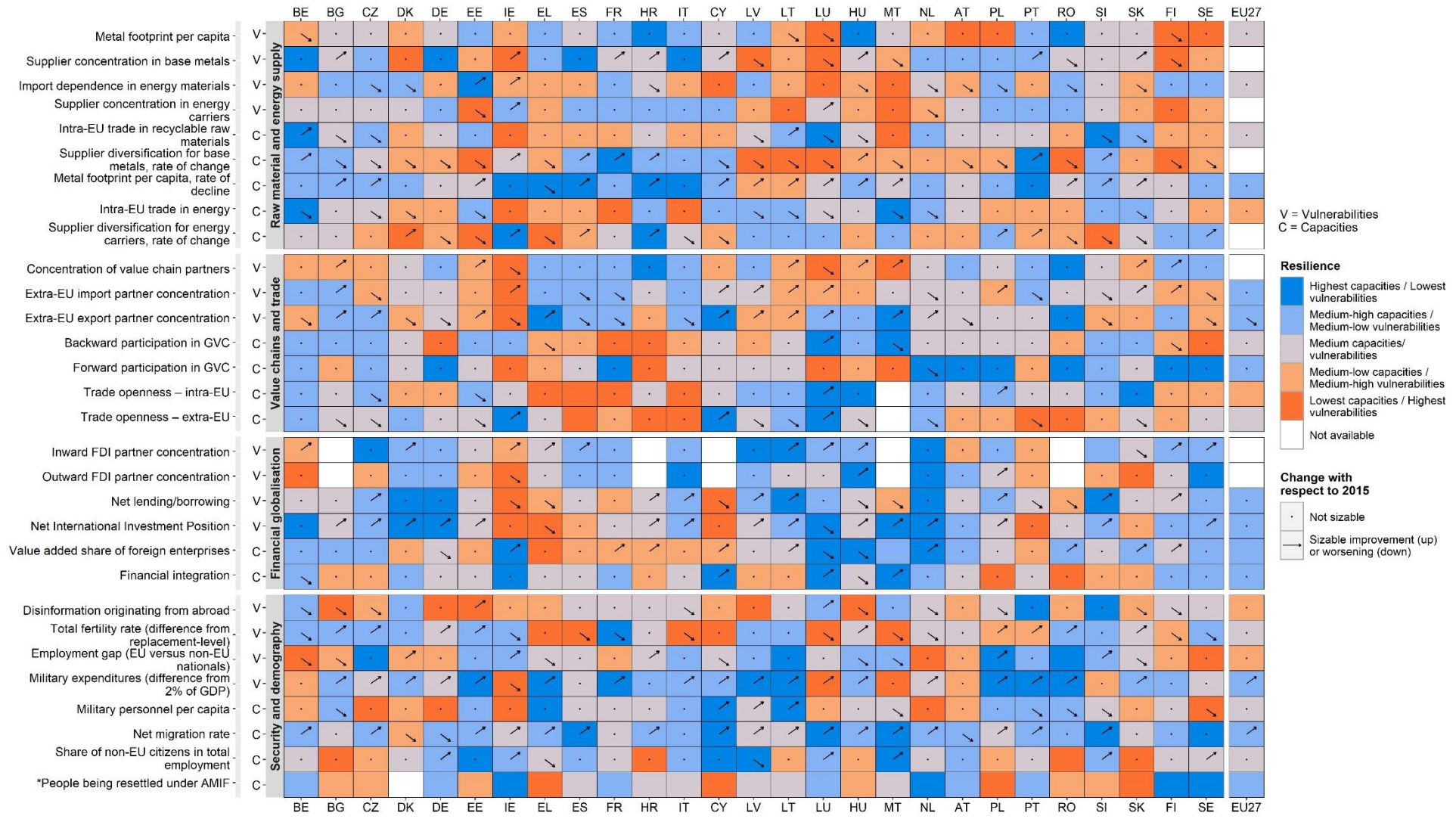


Green lines are for capacities, red for vulnerabilities. For the one-to-one correspondence, see information in Annex V.

Figure 16 presents the dashboard for the geopolitical dimension, where the data refer to the latest available year. **Figure 17** and **Figure 18** plot the capacities and vulnerabilities indices. These figures show each country's relative position in terms of overall resilience and the relationship between vulnerabilities and capacities.

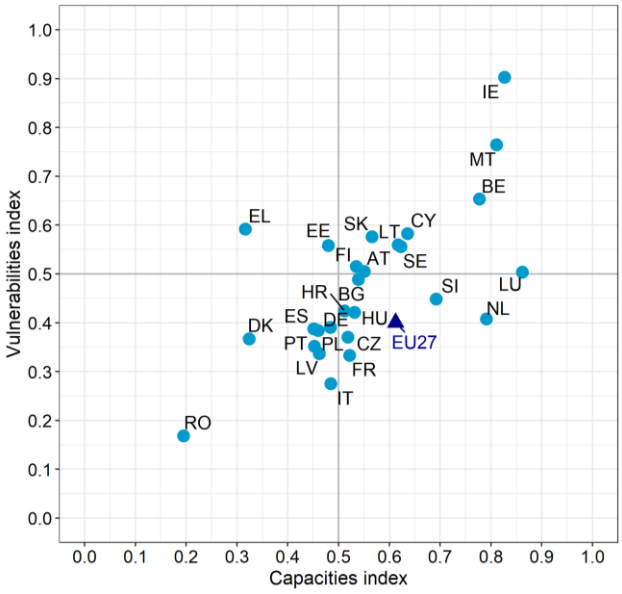
[48] Demography strongly overlaps with the social and economic dimension as well. It is included in the geopolitical dimension to emphasise the challenges of a declining global population share of the EU, and of migration. This is also aligned with the 2021 SFR.

Figure 16: Geopolitical dashboard - latest available year for each indicator



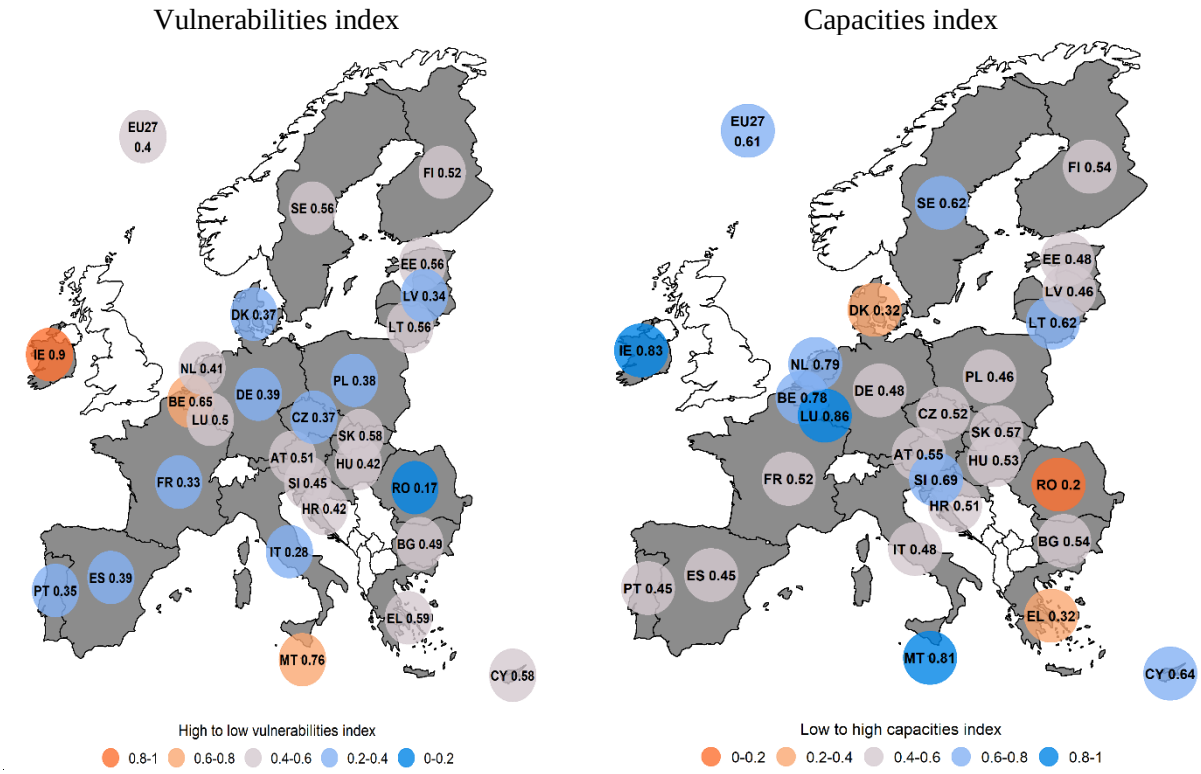
The dashboard includes a set of indicators that show the level of vulnerability and resilience capacities within a country, relative to other countries. Data typically refers to 2018-2020. Download from Eurostat as of 15 October 2021. The colours indicate the position of a country in the distribution of all available values for EU countries in the 2007-2017 reference period (2015-2020 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 17: Geopolitical dashboard: vulnerabilities versus capacities synthetic indices



The synthetic indices aggregate the relative situation of the Member 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 18: Geopolitical dashboard: synthetic indices



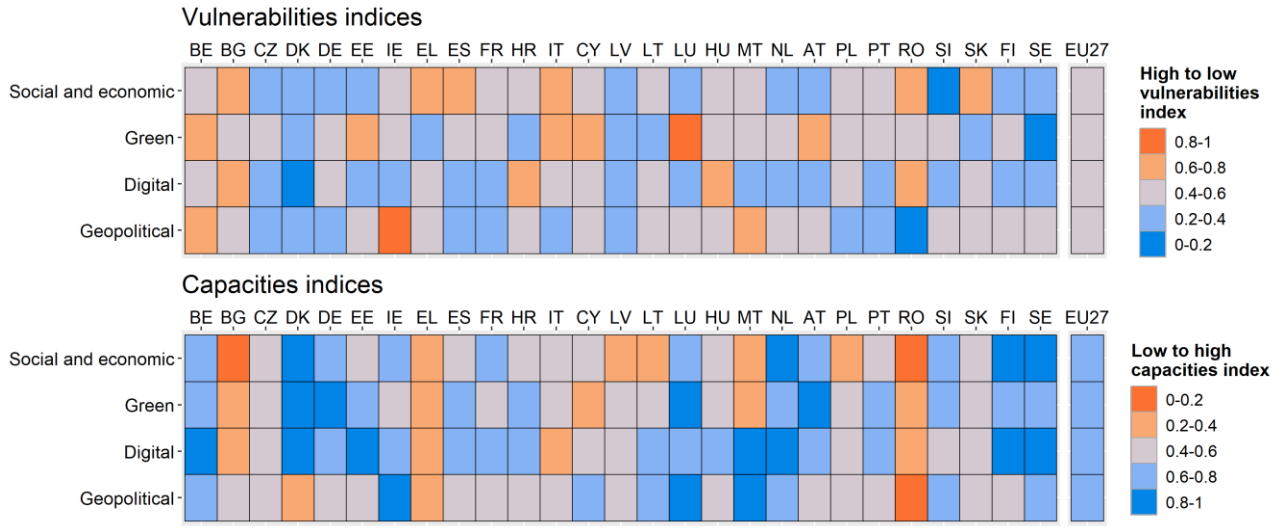
Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across dimensions. Note that the synthetic indices aggregate the relative situation of the Member States and 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 State and can show similarities or significant differences in general.

To uncover such relationships, **Figure 19** 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 Member States where the situation varies heavily across dimensions going from dark blue to dark orange.

Figure 19: Synthetic indices across all dimensions



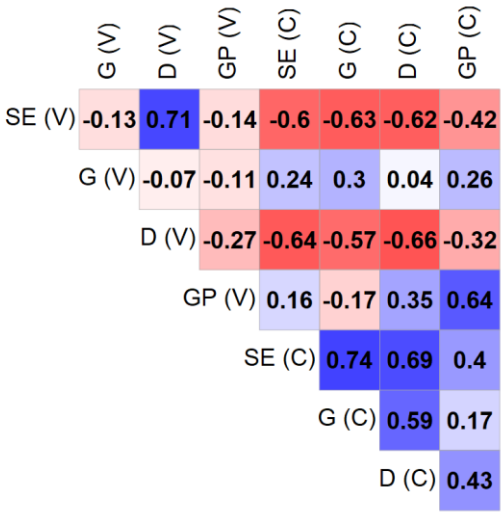
Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across dimensions. The synthetic indices aggregate the relative situation of the EU and its Member States across 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 20**). 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 sizeable positive correlation between the social and economic and the digital dimension, and a moderate negative correlation of the geopolitical dimension with the digital dimensions.

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 (less strongly for the geopolitical). Green vulnerabilities are positively but only weakly,

correlated with green, social and economic and geopolitical capacities. Finally, geopolitical vulnerabilities show a strong positive correlation with geopolitical capacities, and a positive though weaker correlation with digital capacities.

Figure 20: Correlations among the synthetic indices



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

It is worth emphasising the relationship between vulnerabilities and capacities of the same dimension. The geopolitical dimension has a positive and high internal correlation. It means that the 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 and similarly 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.

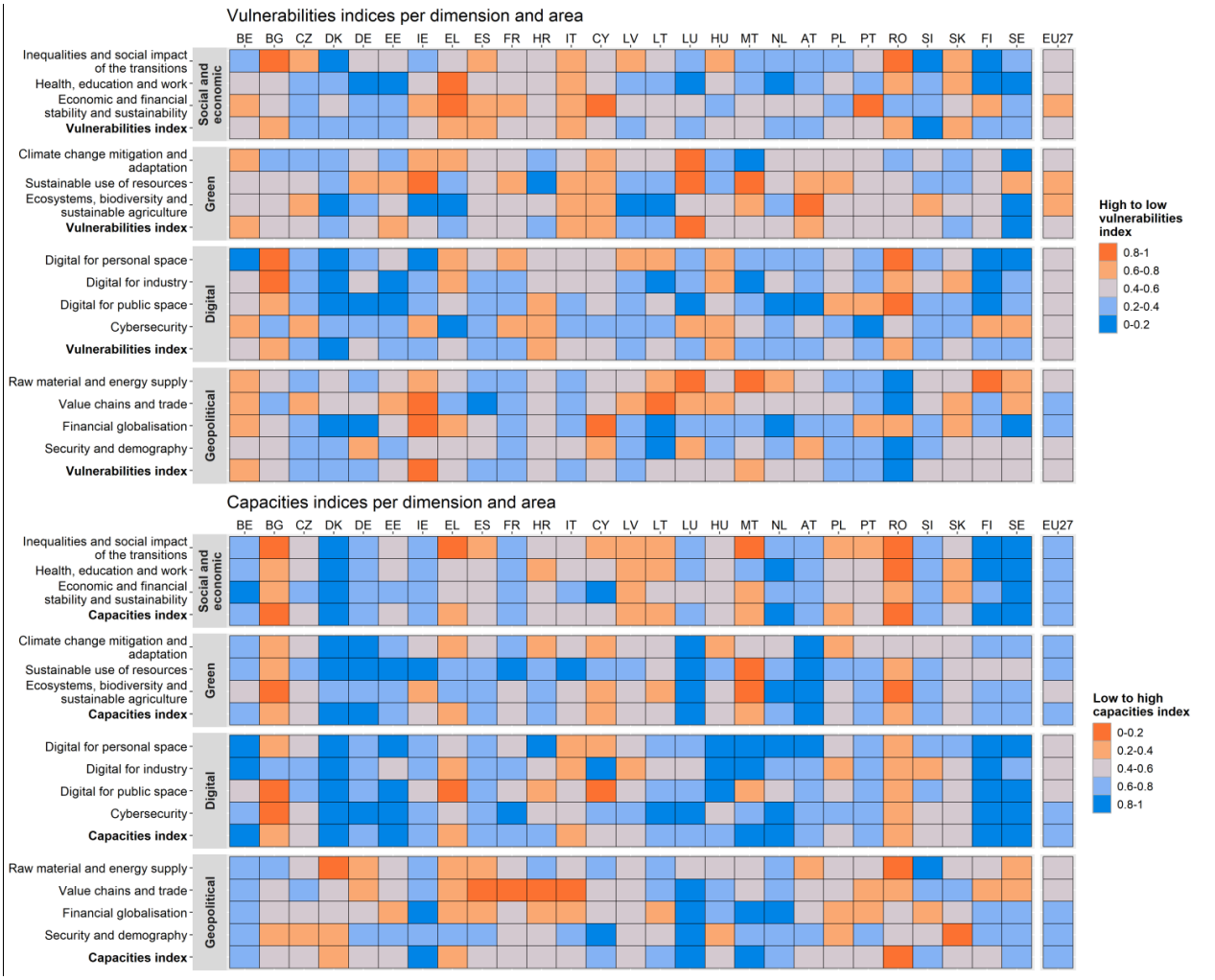
In addition, **Figure 21** presents the synthetic indices for each area within each dimension. Annex IV also presents the correlation structures of the synthetic indices across areas for each dimension. Like the dashboards, the synthetic indices reveal some heterogeneity with respect to vulnerabilities and capacities in the different areas and dimensions.

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

Figure 21: Synthetic indices across all areas and all dimensions.



Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across 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 22**) mirrors the approach developed at the Member State level. Using data from various global sources[49], it aims to assess the vulnerabilities and capacities of the EU and other global actors in the same four dimensions. Besides the world's largest countries in terms of their population and economy, Switzerland and Norway are also included given that they are the two largest EFTA countries.

Consistency in the definitions and data with respect to the indicators at the Member State level was a key selection criterion. For a few aspects, the indicators are slightly different, enabling the inclusion of some areas that would otherwise not be covered (e.g. education, innovation and digital aspects) or better capturing global heterogeneities (e.g. greenhouse gas emissions). Still, the analysis was feasible only for a subset of the indicators included in the analysis at Member State level. Moreover, it was not always possible to balance the areas (hence we dropped them from the figures), or aspects of vulnerabilities and capacities[50].

The global **social and economic** dashboard 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. While it was possible to map important concepts of inequalities such as the income quintile share ratio or the gender employment gap, some gaps at the global level remain. Aspects of social capital and cohesion, household savings, or indicators measuring performance in education lack the required statistical coverage (in terms of years and/or countries). As a remedy, an indicator depicting the proportion of graduates from tertiary education in the corresponding age group is included, which is not considered in the analysis at Member State level. 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 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 others. Overall, all three areas defined for the Member State dashboard (climate change adaptation and mitigation; sustainable use of resources; ecosystems, biodiversity, and sustainable agriculture) are implicitly present in the global dashboard and balanced in terms of vulnerabilities and capacities. The dashboard covers indicators on emissions (general greenhouse gas emissions and transport-related CO_2 emissions)[51], 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

[49] To ensure compatibility of indicators across countries, data are mostly from the OECD, World Bank, IMF, or the UN. See Annex VI for full details.

[50] Data unavailability or cross-country comparability issues limit the indicators included in this extension.

[51] For the comparison in the global setting, GHG total emissions are rescaled by GDP instead of population, as the latter is strongly driven by important differences in the size of the population. Still, CO_2 emissions from transport per capita are highly correlated with total GHG emissions per capita (a correlation of 0.82); hence, they still provide a proxy for emissions per capita.

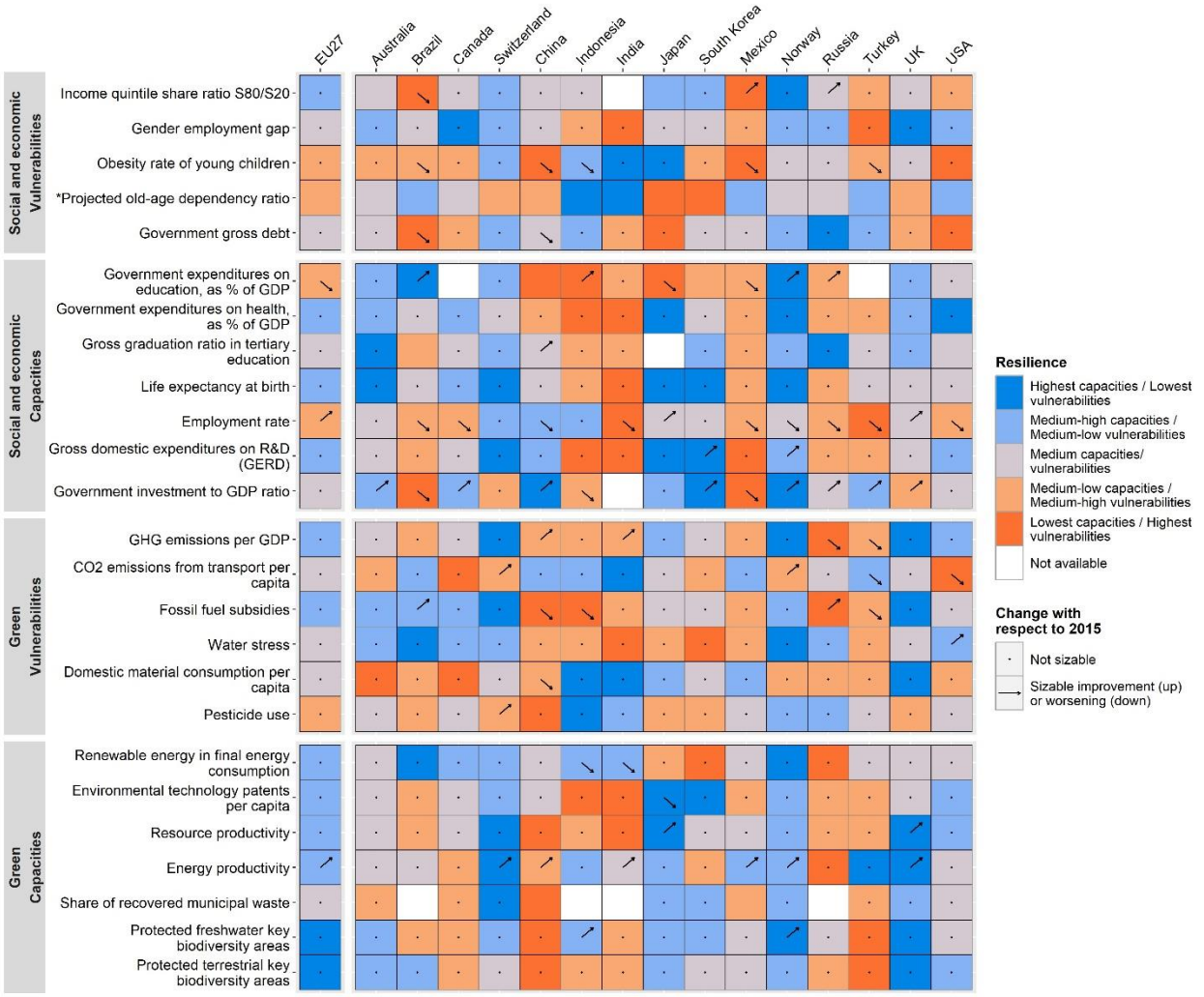
potentially harmful practices, such as subsidising fossil fuels and the extensive use of pesticides in agriculture. Despite the poorer cross-country coverage (four big countries are missing), an indicator on the share of recovered municipal waste is included, because of the strong relevance of the circular economy for the green transition.

In the **digital dimension,** all areas (digital for personal space; digital for industry; digital for public space; cybersecurity) are represented with a good overall balance of capacities and vulnerabilities[52]. Similar 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 deficit in services). For some others, the lack of data led to including other indicators to proxy the general concept behind the variables of interest (e.g. mobile subscriptions 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 include young people's digital skills (partly substituted by ICT graduates) and access of firms to digital public services.

The **geopolitical dimension** consists of a subset of the indicators used in the dashboard at Member State level. 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 additional strength coming from the EU level in some areas where collective action and coordination matter. For example, while individual 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 EU level. This draws attention to the fact that the resilience of the EU as a whole can be higher than that coming from the aggregation of Member State indicators.

[52] 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). Its normalised values give a complete coverage though based on imputation.

Figure 22: The global resilience dashboards for the social and economic and green dimensions



The global dashboards include a set of indicators that show 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 data sources as of 15 October 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 (2015-2020 for indicators indicated with an asterisk). An upward pointing arrow for a vulnerability indicates a substantial reduction (improvement). Please note that the colour of the EU may differ from that in the Member State level dashboard, as they rely on different reference distributions even if the indicators are very similar. See Annex I for further details on the methodology, and Annex VI on the indicators.

Figure 22 continued: The global resilience dashboards for the digital and geopolitical dimensions

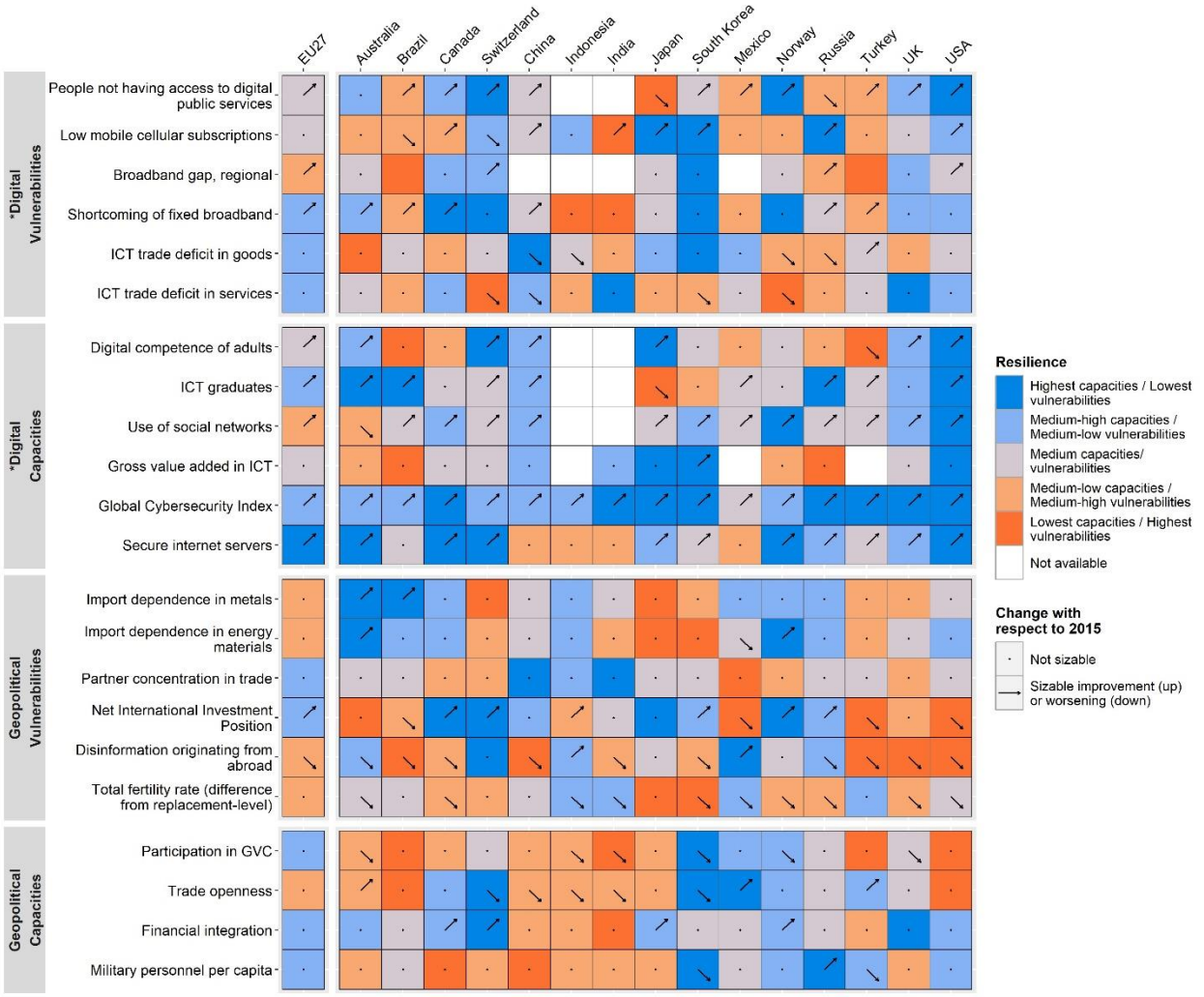


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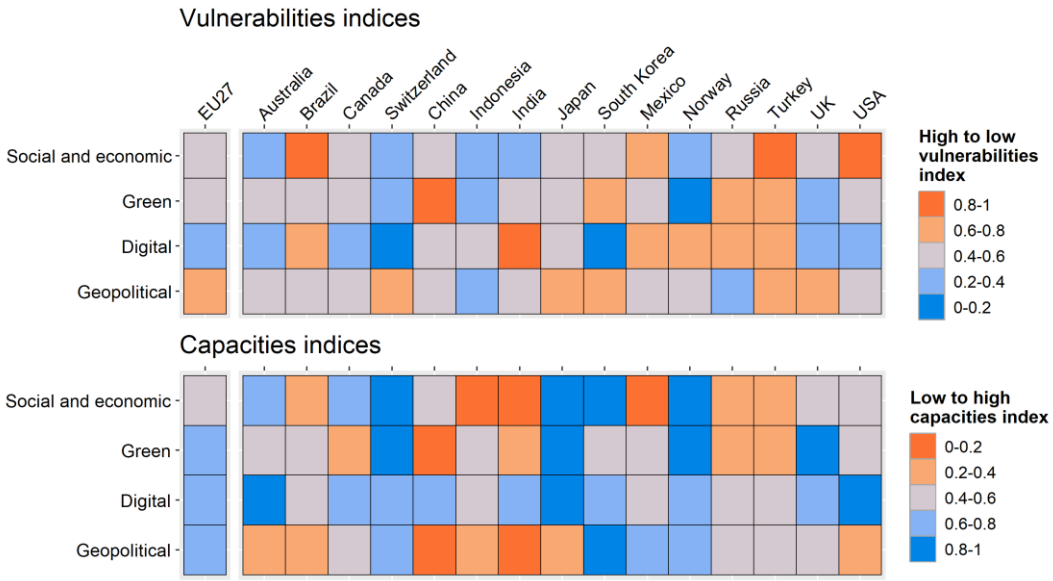
Figure 23 displays the synthetic resilience indices across the thematic areas for the EU and other major global actors. The EU as a whole shows decent capacities in many dimensions while the situation for vulnerabilities can still be improved.

In particular, the EU shows medium vulnerabilities in both the social and economic and the green dimensions, similar to Canada or Japan Together with other countries such as Australia, Canada, the UK, and the US, the EU has a relatively low vulnerabilities index in the digital area, where only Switzerland and South Korea outperform the EU. Geopolitical vulnerabilities are relatively high in the EU, similar to those of Japan or the UK, but worse than of the US and China.

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 financial integration and participation in global value chains (in the geopolitical dimension). Following the US, Japan and Australia, the EU fares well also in digital capacities, similarly to Canada, Switzerland, China, India South Korea, Norway, and the UK. Finally, EU capacities are medium in the social and economic dimension, similar to China, the US and the UK. This is mainly due to medium-low or medium capacities in education measures, government investment and the employment rate[53].

Figure 23: The global synthetic indices for the four dimensions



The synthetic indices of the global dashboards 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. Differently from the dashboards, the colours for the indices are assigned by splitting the full [0,1] range of the synthetic index into five equal intervals. This ensures comparison of colours across dimensions.

[53] Note that the colour of the EU employment situation is different between the Member States and the global dashboards. Though the two indicators refer to a different age group (due to data availability), the main reason for the different colour is that the countries in the global sample do tend to have higher employment rates than the EU.

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 state 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 or the level of capacities. The strategy is instead to indicate the global landscape, shedding lights on the EU situation compared to other countries[54]. There are a couple of more direct measures as well: for example, the share of trade directed to the EU from total trade can indicate the scope of influence of EU 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 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, net trade in food and agricultural products, or import dependence in cereals. 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. Finally, there indicators on **hard and space power**, such as expenditures on space programmes, military expenditures/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 EU-level indicators, or the median value of the 27 Member States[55]. **Figure 24**, **Figure 25** and **Figure 26** indicate the relative size or situation across the countries, using a similar colouring scheme as in the fully developed dashboards[56]. 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.

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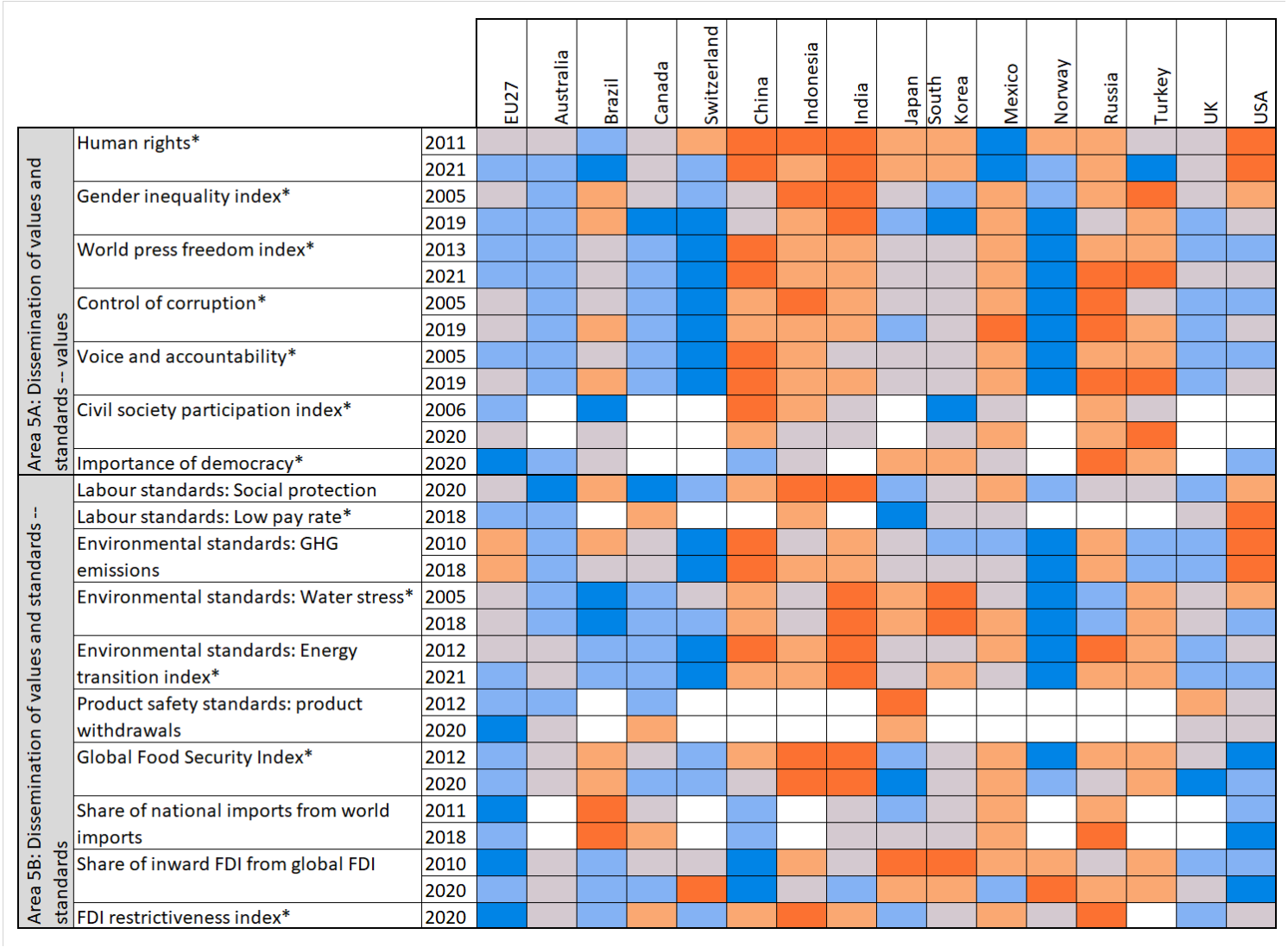
54 There are a number of potential approaches to quantify these aspects and to compare them across countries. For example, it may be possible to trace the adoption of various EU standards in third countries (as suggested in the 2020 book *The Brussels Effect: how the European Union rules the world*, by Anu Bradford), and compare it with the adoption of other standards (e.g. of the US or China). One can also invoke qualitative expert assessments: for example, EU 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.

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

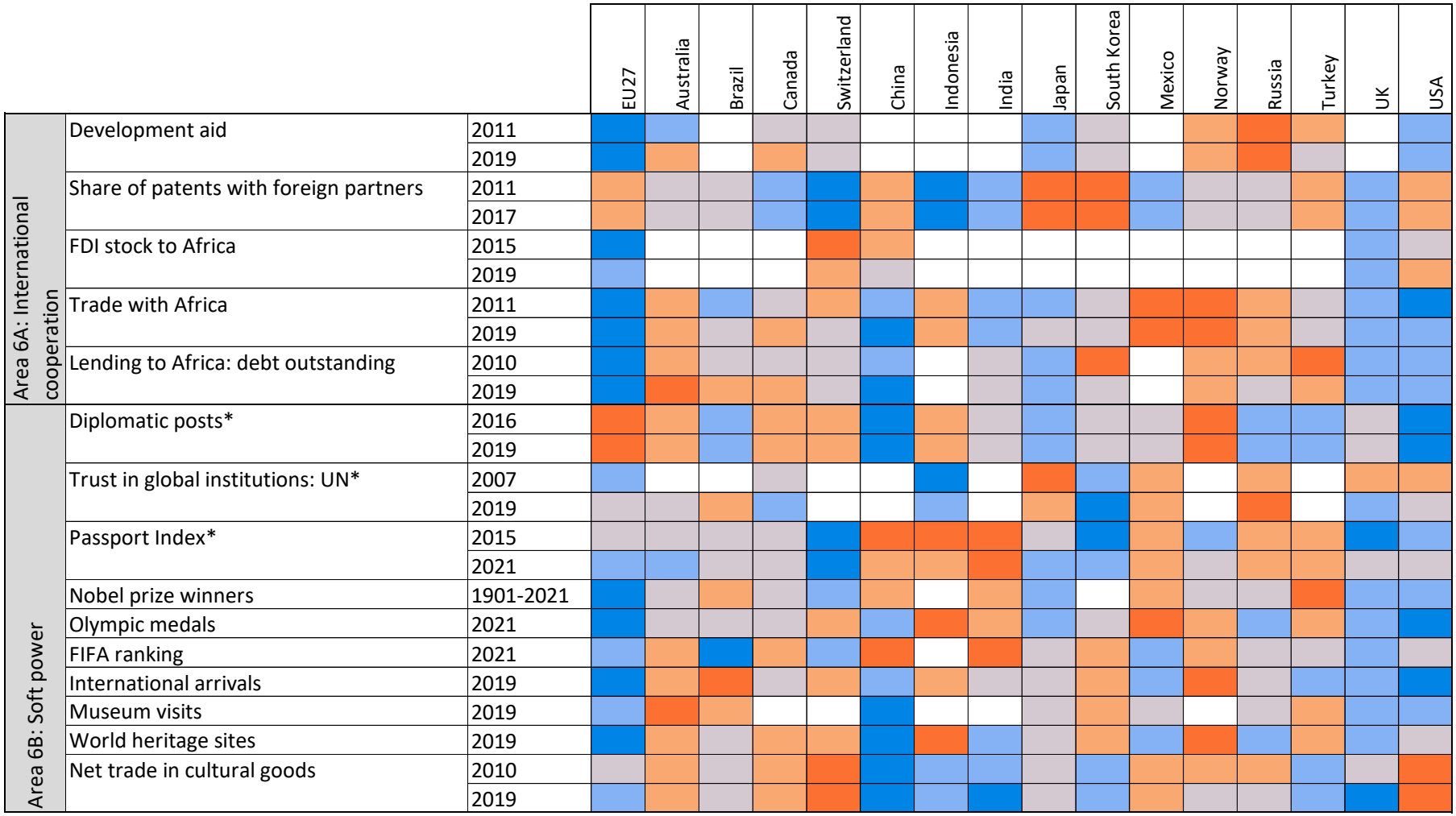
56 The colours use the same percentile cut-offs as in the normal dashboards, but the reference distribution contains only the values in the reported years or periods (1, 2 or 3). Colours are such that the countries with the highest values (upper 12.5% of the data) are dark blue, followed by lower values (12.5% to 37.5% of the data) in blue. Countries in the central part of the data are coloured grey. Dark orange indicates values that are in the bottom 12.5% while light orange is 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 24: Dissemination of values and standards



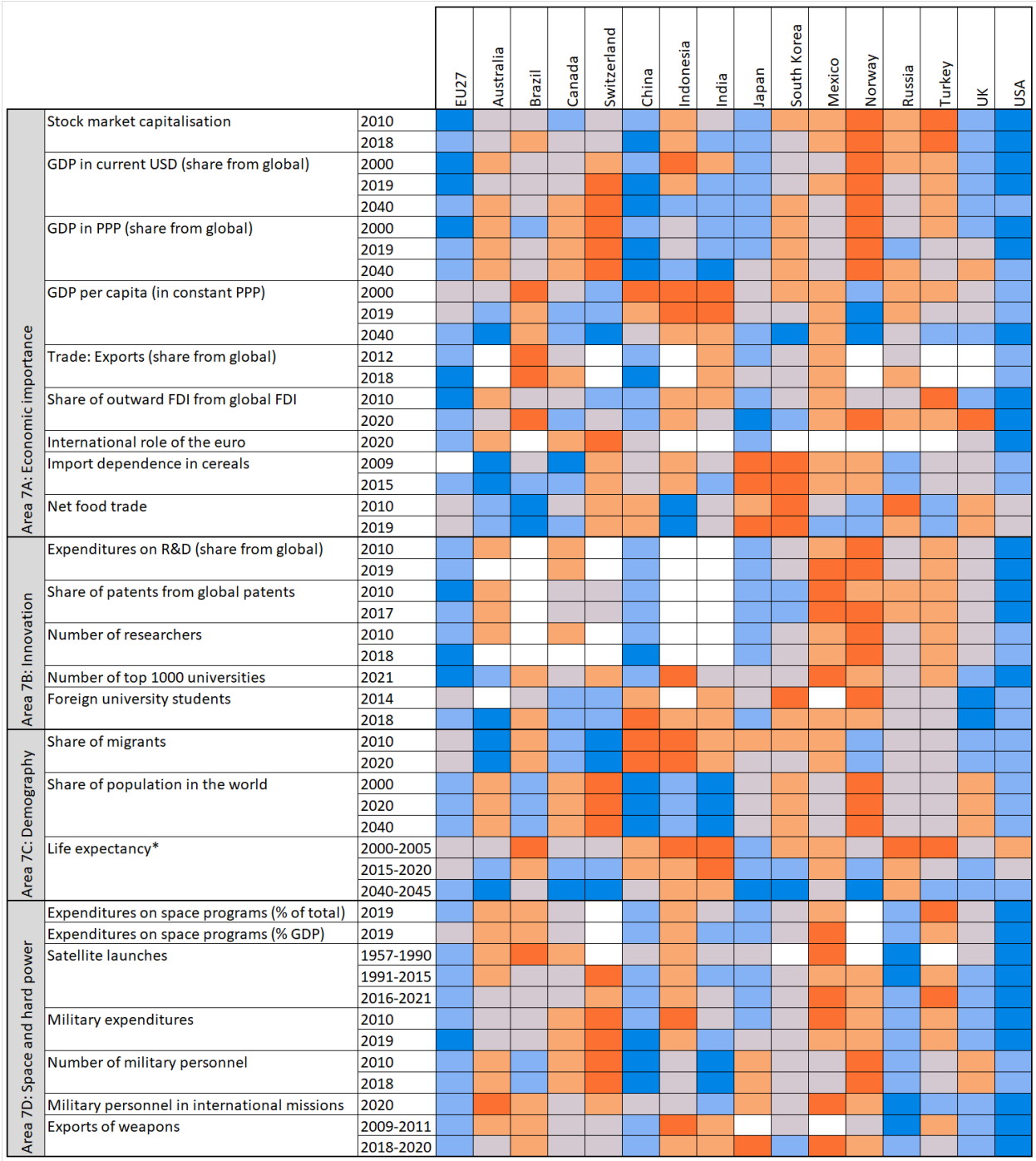
Cell colours indicate the relative position of a country-year cell among all countries considered in the reported years, from dark orange (worst) to dark blue (best). A white cell denotes a missing value. Asterisks indicate that the EU value refers to the median value across Member States.

Figure 25: International cooperation and soft power



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. Asterisks indicate that the EU value refers to the median value across Member States.

Figure 26: Global positions and comparisons



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. Asterisks indicate that the EU value refers to the median value across Member States.