RESEARCH REPORT

Eurofound

Industrial relations and social dialogue

Measuring key dimensions of industrial relations and industrial democracy

2023 update

Measuring key dimensions of industrial relations and industrial democracy (2023 update)

Eurofound

European Foundation for the Improvement of Living and Working Conditions

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Abbreviations used in the report

AIAS	Amsterdam Institute for Advanced Labour Studies
ALMP	active labour market policy
CLF	collective labour force
ECS	European Company Survey
EIGE	European Institute for Gender Equality
EIS	European Innovation Scoreboard
ETUC	European Trade Union Confederation
EurWORK	European Observatory of Working Life
EWCS	European Working Conditions Survey
EWCTS	European Working Conditions Telephone Survey
DESI	Digital Economy and Society Index
GCI	Global Competitiveness Index
GDP	gross domestic product
ICTWSS	Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts
ILO	International Labour Organization
JD-R model	job demands-resources model
JRC	Joint Research Centre
OECD	Organisation for Economic Co-operation and Development
PCA	principal component analysis
PPS	purchasing power standard
R&D	research and development
RCI	Regional Competitiveness Index
SJI	Social Justice Index
WAI	Work Ability Index
WEF	World Economic Forum

Executive summary

Introduction

This report builds on previous Eurofound studies that have developed a conceptual framework for mapping industrial relations and identified four key dimensions: industrial democracy, industrial competitiveness, social justice, and quality of work and employment. The report aims to update the 2018 Eurofound study specifically, which focused on industrial democracy. It has three main objectives: to update the indices of the four key dimensions for 2018–2021; to develop a cross-time analysis of the Industrial Democracy Index from 2008 to 2021, particularly regarding national industrial relations system trends in terms of EU convergence; and to update the industrial relations system typology of industrial democracy, to contribute to cross-country analysis of evolving trends and patterns of change from 2008 to 2021.

Key aspects of the methodological approach are the use of high-quality data (applying strict conceptual and statistical quality criteria when reviewing and fine-tuning the indicators); following the methodology for building indices developed by the European Commission's Joint Research Centre and the Organisation for Economic Co-operation and Development; and following Eurofound methodology for analysing convergence trends in industrial democracy.

Policy context

The policy context is characterised by the impact of the COVID-19 pandemic and by the war in Ukraine, which threaten ongoing economic recovery in Europe. The recent outbreak of war between Israel and Hamas is likely to further destabilise growth.

The EU institutions have adopted NextGenerationEU, a €806.9-billion temporary financial instrument designed to boost recovery through issuing common European debt, with the Recovery and Resilience Facility providing Member States with €672.5 billion for investment and reforms.

The war in Ukraine has caused a massive humanitarian crisis and led to an escalation in prices for essential goods, increasing the risk of poverty in Europe and dampening economic growth. In an effort to mitigate the consequences of the war, EU institutions have suspended the rules of the Stability and Growth Pact until the end of 2023. This has enabled euro zone countries to develop discretionary fiscal measures to curb rising energy costs, increase defence capabilities and address the refugee crisis.

EU industrial relations are underpinned by the European Pillar of Social Rights, which aims to strengthen workers' rights to decent working conditions and to a quality working environment. It restates the EU's commitment to bipartite social dialogue and the negotiation of collective agreements between the social partners. The Val Duchesse social partners summit planned for 2024 continues the promotion of social dialogue at EU level.

The role of collective bargaining under the EU model of industrial relations has been reinforced by the directive on adequate minimum wages in the EU. Its primary goal is to establish a framework to improve the adequacy of statutory minimum wages and enhance workers' effective access to minimum wage protection. It explicitly promotes collective bargaining and recognises that strong and inclusive collective bargaining systems are important for ensuring adequate minimum wage protection. The directive was followed by a Commission communication and a proposal for a Council recommendation, both aimed at promoting social dialogue and collective bargaining. The directive sets the bar in terms of collective bargaining quite high, proposing that the Member States aim for a collective bargaining coverage rate of at least 80%.

Key findings

- The updated indices of industrial democracy and industrial relations as a whole show a polarised picture, with small groups of Member States having very high or very low performance. Country differences are less marked in the other key dimensions.
- The cross-time analysis of the Industrial Democracy Index from 2008 to 2021 shows a very moderate trend of upward divergence, meaning that the EU27 mean score increased slightly, and differences between countries were mostly stable. This is the result of initial downward divergence until 2013–2017 (when the mean decreased and differences between Member States increased), which was reversed by upward convergence subsequently.
- Twelve countries show fairly stable trends around the EU27 average of the Industrial Democracy Index from 2008 to 2021 (Belgium, Croatia, Cyprus, Czechia, France, Germany, Greece, Ireland, Italy, Romania, Slovakia and Spain).

- Nine countries are converging. Of these, Bulgaria, Estonia, Latvia, Lithuania, Poland and Portugal are catching up (their scores were initially lower than the EU average but are growing more quickly and the gaps are decreasing). In the case of Denmark, the Netherlands and Slovenia, their scores were initially higher than the EU average but are declining, thus moving towards the rising EU average.
- Six countries are diverging. Of these, Austria, Finland, Luxembourg and Sweden initially had scores higher than the EU average, and their averages are growing at a faster rate than the EU average. The scores of Hungary and Malta were initially lower than the EU average and are declining.
- The updated typology of industrial democracy (2008–2021) shows four clusters of Member States.
  - The **industrial-democracy-based governance cluster** includes Austria, Denmark, Finland, Germany, the Netherlands and Sweden. These Member States are the best performers in industrial democracy and have high centralisation of collective bargaining, high degrees of coordination and routine involvement of the social partners in policymaking. This cluster shows a significant deviation from the EU27 average and follows a converging pattern. Its performance was initially higher than the EU average but is growing at a slower rate.
  - The **market-oriented governance cluster** has very low performance in industrial democracy and uncoordinated and decentralised collective bargaining systems. It includes the liberal countries (Cyprus, Ireland and Malta), the Baltic states (Estonia, Latvia and Lithuania), Bulgaria and Poland. From 2013–2017 onwards, Greece and Romania appear in this group. This cluster shows a significant deviation from the EU27 average and follows a diverging pattern. Its performance was initially lower than the EU average and is growing at a slower rate, increasing the gap over time.
  - The **state-centred governance cluster** and the **company-centred governance cluster**, which include the remaining Member States, have intermediate performance in industrial democracy. Both clusters show fairly stable trends around the EU27 average.
- These results reflect a fragmented or divided industrial relations model, with winners and losers. Nevertheless, some southern and eastern European countries are slowly recovering from the impact of the 2008–2012 economic crisis.

Policy pointers

- The analysis highlights the limitations of the existing data on industrial relations and industrial democracy and the indicators used to measure them. The available collective bargaining coverage indicator does not fully meet the quality criteria because of comparability problems. Other quality issues apply to the indicators of macro- and company-level social dialogue and of state intervention in collective bargaining.
- A joint effort should be made to gather comparable and high-quality data on collective bargaining coverage (which is of increasing political importance) and other areas related to industrial relations and industrial democracy. The indicators should be based on clear definitions agreed at European level to ensure national comparability. Data should be collected regularly to enable cross-time analyses.
- The research tools used complement analysis of the dynamics of and changes in national industrial relations systems. They should be updated regularly to contribute to more systematic monitoring and to further comparative analyses of evolving trends in industrial relations.
- The European Commission, the EU- and national-level social partners, national governments and EU agencies are invited to try to fill the gaps related to comparable and high-quality data measuring the quality and patterns of change of industrial relations in the EU27.
- The findings provide concrete evidence for policymakers in promoting the strengthening of industrial relations in Member States where it underperforms. The scores of the six Member States of the industrial-democracy-based cluster seem to prove that in a system of ‘good’ and mature industrial relations it is possible to combine efficiency, equity and voice. These countries are at the top of the overall industrial relations index, are among the top seven performers on the industrial democracy and industrial competitiveness indices, and are among the top eight on the social justice index.

Introduction

Background and objectives

Eurofound's previous four-year programme (2017–2020) committed the Agency to analysing how industrial relations systems are changing and adapting to new challenges. The purpose of the analysis was to enable a better understanding of the dynamics of industrial relations and facilitate comparisons, leading to mutual learning effects and the identification of areas in which capacity building would be helpful.

Previous Eurofound work was fully aligned with this commitment. The study *Mapping key dimensions of industrial relations* (Eurofound, 2016) aimed to develop a conceptual framework to guide comparative research and support evidence-based debates and learning processes among those involved in industrial relations. The study defined industrial relations as 'the collective and individual governance of work and employment'. This definition was further refined in 2022: 'Industrial relations are about the joint bipartite or tripartite governance of the collective and individual employment relationship' (Eurofound, 2022a). The 2016 study identified four key dimensions: industrial democracy, industrial competitiveness, social justice, and quality of work and employment. These four dimensions were found to be relevant for measuring the quality of industrial relations and, to varying degrees, for stimulating debate at national level among governments and social partners. Yet the interpretation, application and implementation of the key dimensions were found to depend on the type of actors (employer organisations, trade unions and government) and their national industrial relations systems. The study stressed the need to further develop this conceptual framework and build tools to enable the measurement of the key dimensions from a sound comparative perspective. To this end, an initial assessment of existing data sources and indicators was carried out.

This work was continued in 2016–2017 through the follow-up study *Mapping varieties of industrial relations: Eurofound's analytical framework applied* (Eurofound, 2017a). This study fine-tuned the initial list of indicators and produced a dashboard for measuring the key industrial relations dimensions. The analysis showed that a dashboard, that is, a set of indicators that measure different aspects of a single phenomenon, can be a valuable tool for analysing national industrial relations systems across the EU from a comparative perspective. The study identified complex evolving trends, with a profound impact on the industrial relations systems in some countries. The main conclusion was that more systematic monitoring and further comparative analyses were needed to support industrial relations actors at national and EU levels. Such analyses were found to be crucial to facilitate a shared understanding of challenges and coordinated strategies to mitigate potential risks for the national industrial relations systems.

Further work was carried out in the study *Measuring varieties of industrial relations in Europe: A quantitative analysis* (Eurofound, 2018a). Compared with the previous Eurofound reports, this study was more focused on industrial democracy. Eurofound's conceptual approach considers industrial democracy to be the core dimension of industrial relations, and that this approach is the most adequate model for good governance of work and employment. Accordingly, this study presented an in-depth literature review on industrial democracy, with a view to further developing Eurofound's definition and providing a systematic overview of empirical research analysing cross-country diversity and patterns of change. The study developed three complementary tools to examine the dynamics of industrial relations and compare how national industrial relations systems are changing over time: a dashboard with indicators more closely related to industrial relations actors and processes or relevant to assessing their impact on policymaking in socioeconomic fields; a set of indices to measure country performance in the four key dimensions and industrial relations as a whole; and a typology of industrial relations systems based on performance in industrial democracy and relevant characteristics of industrial relations systems.

This report builds on those previous studies. Its general objective is to revisit, revise and update the Eurofound (2018a) study, based on the conceptual framework of key industrial dimensions developed by Eurofound (2016). The study's specific objectives are:

- to revisit, revise and update the indices of the four key dimensions and industrial relations as a whole for 2018–2021, if need be, with new and more accurate indicators
- to carry out a cross-time analysis of the Industrial Democracy Index from 2008 to 2021, with a focus on upward or downward convergence or divergence trends at national level
- to update the typology of industrial relations systems based on industrial democracy (performance and relevant characteristics) in order to contribute to the cross-country analysis of current evolving trends and relevant patterns of change from 2008 to 2021

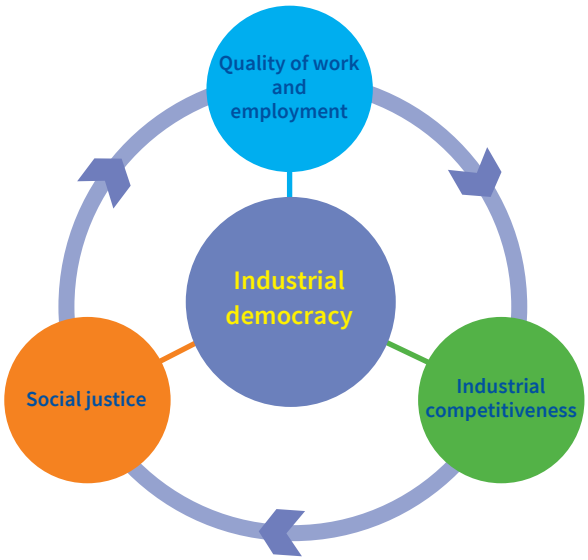
Concepts and methodology

As illustrated by Figure 1, which depicts the compass of 'good' industrial relations, Eurofound's conceptual framework relies on a pluralistic view, which states:

> *that a balanced and mutually reinforcing pursuit of efficiency (industrial competitiveness) and equity (social justice and quality of work and employment) is the most desirable industrial relations strategy for both employers and employees. To make such a strategy effective, both sides of industry need to develop their collective capacity to influence decision-making (industrial democracy).*
>
> (Eurofound, 2018a)

This implies that industrial democracy is placed at the core of Eurofound's conceptual framework.

Figure 1: Compass of good industrial relations



Source: *Eurofound (2018a, 2018b)*

Industrial democracy refers to a participatory and democratic process that encompasses all participation rights of employers and employees in the governance of employment relationships, either directly or indirectly, through trade unions, works councils, shop stewards or other forms of employee representation at any level (shop floor, establishment, company, sectoral, regional or cross-industry) (Eurofound, 2022a). The concept acknowledges the autonomy of both sides of industry as collective organisations and their collective capacity to influence decision-making. Industrial democracy plays a central role in Eurofound's conceptual framework, supporting the other three dimensions of industrial relations:

Industrial competitiveness: The ability of an economy to achieve a consistently high rate of productivity growth and good performance among its small and medium-sized enterprises.

Social justice: The fair and non-discriminatory distribution of opportunities and outcomes within a society in order to strengthen each individual's capabilities for self-determination and self-realisation.

Quality of work and employment: Employment and working conditions that provide career and employment security, support health and well-being, enable the reconciliation of working and non-working life, and offer opportunities to develop skills over a lifetime.

Key aspects of the methodological approach are as follows.

- **Use high-quality data**: Apply strict conceptual and statistical quality criteria to review and fine-tune all indicators, based on the quality assessment and assurance framework of the European Statistical System (ESS) and the literature on selecting indicators.
- **Follow a recognised methodology for building the indices and the typology**: Use the internationally recognised methodology on building indices developed by the Organisation for Economic Co-operation and Development (OECD) and the European Commission's Joint Research Centre (JRC), which recommend using different multivariable statistical techniques for testing the overall structure of the dataset against the conceptual framework and guiding the selection of indicators and the methodological choices for aggregation and weighting. The aim is to ensure that the dashboard and the indices used to measure the industrial relations systems in the EU respect Eurofound's conceptual framework and data properties. The same approach is applied to building the typology of industrial democracy.
- **Follow previous Eurofound methodology for analysing upward/downward convergence/divergence trends (Eurofound, 2018c)**: The analysis of trends in industrial democracy is performed through a two-step approach. In the first step, upward/downward convergence/divergence trends are assessed (in terms of increasing or decreasing performance of industrial democracy at EU level and increasing or decreasing disparities between Member States). In the second step, the specific patterns of individual Member States are assessed. The same approach is applied to analyse trends with regard to the evolution of the industrial democracy typology.

Policy context

The policy context is marked by the impact of the 2020 COVID-19 pandemic and the war in Ukraine, which threatens Europe's recent economic recovery. The recent outbreak of war between Israel and Hamas is likely to further destabilise growth.

To address the significant risks and challenges raised by the pandemic and the subsequent economic and social crisis, the EU institutions have adopted NextGenerationEU, an €806.9-billion temporary financial instrument designed to boost recovery through the issuance of common European debt. The Recovery and Resilience Facility serves as the cornerstone of this EU programme by providing EU countries with a total of €672.5 billion to support investment and reforms. This figure is made up of €312.5 billion in grants and €360 billion in loans. Within NextGenerationEU, supplementary financial instruments have also been made available, such as through the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) initiative and the Just Transition Fund. The 2021 Annual Sustainable Growth Strategy sets out the need to involve the social partners in the implementation and the preparation of the recovery and resilience plans (Eurofound, 2023).

The war in Ukraine has caused a massive humanitarian crisis – almost seven million Ukrainians have fled the country. The conflict and resulting sanctions have also disrupted exports from the region for commodities such as metals, food, oil and gas and have increased inflation to levels not seen in decades. Higher prices for essential goods increase the risk of poverty in EU countries. Real economic growth in the EU has fallen, and the fall has been more pronounced in those countries closer to Ukraine, such as Hungary and Poland. Germany and Italy, which are heavily dependent on Russian oil and gas, have also felt the pressure of the conflict (European Investment Bank, 2022). In response to these consequences of the war, the EU institutions decided that the rules of the Stability and Growth Pact, which were paused in March 2020, will remain suspended until the end of 2023. This suspension has enabled euro zone countries to develop discretionary fiscal measures, which have had three main objectives: curbing rising energy costs, increasing defence capabilities in euro zone countries and Ukraine, and addressing the refugee crisis. Moreover, several support initiatives have been adopted at EU level, including direct help for the Ukrainian government (European Central Bank, 2022).

The European Pillar of Social Rights since 2017 has created a reference framework to guide industrial relations in the Member States. It aims to drive fair working conditions, addressing workers' rights to decent working conditions and to a quality working environment. It restates the EU's commitment to bipartite social dialogue and the negotiation of collective agreements between the social partners. The Val Duchesse social partners summit planned for 2024 represents the ongoing support at EU level for the role of social dialogue.

Beyond these EU measures designed to support economic recovery, the role of collective bargaining under the EU model of industrial relations has been reinforced by the enactment of Directive (EU) 2022/2041 on adequate minimum wages in the European Union and by a subsequent Commission communication (*Strengthening social dialogue in the European Union: Harnessing its full potential for managing fair transitions*, COM(2023)40 final) and proposal (*Proposal for a Council recommendation on strengthening social dialogue in the European Union*, COM(2023)38 final) – the last two aiming to promote social dialogue and collective bargaining. The primary goal of the directive is to establish a framework to improve the adequacy of statutory minimum wages and enhance workers' effective access to minimum wage protection, including through collective bargaining. At the same time, the directive explicitly promotes collective bargaining and recognises that strong and inclusive collective bargaining systems play an important role in ensuring adequate minimum wage protection. The directive sets the bar quite high in terms of collective bargaining, proposing that the Member States should aim for collective bargaining coverage of at least 80%. To monitor countries' performances in this field, it is becoming crucial to gather high-quality data on collective bargaining coverage.

1 Measuring key dimensions of industrial relations

This chapter presents the main concepts, methods and results related to the first specific objective of the study: to revisit, revise and update the indices of the four key dimensions and the industrial relations as a whole, which were created in a previous Eurofound study (2018a), and were based on the conceptual framework of key dimensions of industrial relations developed by Eurofound (2016).

Concepts and methods

According to the OECD's glossary of statistical terms, an index (also referred as a synthetic index or composite indicator) measures a multidimensional concept that cannot be captured by a single indicator.[1] Individual indicators are compiled into a single index on the basis of an underlying model of the multidimensional concept that is being measured.

In this study, the multidimensional concept is the quality of the key dimensions of industrial relations systems in the EU, meaning that an index in this field makes it possible to summarise the complexity of the existing national industrial relations systems and measure their levels of quality or performance.

Two important conceptual and methodological points extensively addressed in the 2018 Eurofound study deserve to be highlighted.

- Any definition of the quality of industrial relations is **culturally relative and essentially normative** in nature. As scientific and rigorous as the definition might be, it is still debatable given that it is a normative definition. Quality is always understood and assessed on the basis of those values and social norms that are prevalent in a given society at a given time as a result of social power relationships. This implies that any definition of the quality of industrial relations draws its authority from the degree of consensus and legitimacy it attains in particular social contexts. In this respect, it should be stressed that the immediate normative basis behind the assessment of the quality of industrial relations at EU level should derive from the policy principles the EU has officially set as its core values and norms. It needs to be recalled that Eurofound's definition was agreed by its tripartite constituents in the previous studies.
- The internationally recognised *Handbook on constructing composite indicators* (Nardo et al, 2005), developed by the OECD and the JRC, strongly recommends using a solid theoretical framework and high-quality data. According to Nardo et al (2005, p. 17), the quality of an index and the soundness of the messages it conveys depend primarily on the **quality of the conceptual framework and the quality of the data used**. This means that an index based on a weak conceptual framework or on inaccurate data can lead to misleading messages, even if its construction was based on appropriate multivariate techniques.

The methodology used to calculate Eurofound's 2018 indices was based on the OECD–JRC handbook (Nardo et al, 2005). The same methodology was used in this study to revisit, revise and update these indices. Its steps can be summarised as follows:

1. adopt a theoretical framework
2. select sources and indicators
3. process data
4. normalise
5. establish the measurement framework
6. weight and aggregate indicators
7. calculate and assess the index

The subsequent sections briefly address these steps.

Step 1 – Adopt a theoretical framework

Eurofound's compass of good industrial relations (see Figure 1) is the key normative concept that lies behind Eurofound's conceptual approach and allows the measurement of the quality of industrial relations. The basic tenet of this concept is:

> *that a balanced and mutually reinforcing pursuit of efficiency (industrial competitiveness) and equity (social justice and quality of work and employment) is the most desirable industrial relations strategy for both employers and employees. To render such a strategy effective, both sides of industry need to develop their collective capacity to influence decision-making (industrial democracy).*
>
> (Eurofound, 2018a)

1 The terms 'index', 'synthetic index' and 'composite indicator' are used interchangeably in the literature. For the sake of clarity, this study always refers to index.

The conceptual framework based on the four key dimensions was found to be well grounded in the literature, and its relevance was tested at national level (Eurofound, 2016, 2018a). In particular, the indices developed by the 2018 study were considered a valuable tool for Eurofound's pursuit of enhancing comparative analyses of industrial relations systems and promoting mutual learning processes among the relevant actors at EU and national levels (Eurofound, 2018a). Accordingly, the critical review and update of these indices is based on this theoretical framework.

Step 2 – Select sources and indicators

This study has put considerable effort into selecting sources and indicators, as these are at the core of any critical review and update of the 2018 indices. Furthermore, this study follows the basic methodological tenet of the OECD–JRC handbook for building indices (Nardo et al, 2005): once a sound theoretical framework is established, the quality of an index depends to a large extent on the quality of the data. The quality assessment of the updated indicators is based on the same conceptual and statistical criteria used in the 2018 Eurofound report, which are described in Table 1. They are based on the quality assessment and assurance framework of the European Statistical System (ESS)[2] and the literature on selecting and processing indicators.

The selection of sources and indicators has been implemented through two sequential tasks.

1. An update and quality assessment of the initial set of indicators – that is, the indicators used for calculating the four key dimensions indices and the whole Industrial Relations Index in the 2018 Eurofound study – was conducted. The indicators were updated for 2018–2021. Then, following the same methodology as the 2018 Eurofound study, the updated indices were computed, and a quality assessment was conducted. The main outcome of this task was to select the indicators that meet the quality criteria established. The main problems identified by the quality assessment concern three quality criteria: accuracy and reliability, sustainability, and coherence and comparability. As a result, some indicators were discarded. Furthermore, the assessment of indicators revealed significant methodological changes in many of the sources. Therefore, it was decided to discard any comparative analysis between the indices used in the 2018 study and the updated indices. A detailed account of the work carried out can be found in Annex 1.
2. A literature review was carried out to guide the selection of new sources and new indicators. The literature review covered the four key dimensions and focused on indices. The main aim of the

Table 1: Quality assessment of the indicators – Conceptual and statistical criteria

Relevance	Indicators should have a clear conceptual link with Eurofound's dimensions of interest.
Accuracy and reliability	Indicators should be accurate and measure the phenomenon they intend to measure in a reliable way that is not confounded by other factors. Indicators should be sensitive to changes, and changes in their values should have a clear and unambiguous meaning.
Intelligibility and easy interpretation	Indicators should be sufficiently simple so as to be intuitive and unambiguously interpreted in practice. Indicators should have a clear meaning with respect to the phenomenon analysed, either positive, meaning that higher values are considered better, or negative, meaning that higher values are considered worse.
Timeliness and punctuality	Indicators should be released in accordance with an agreed schedule and soon after the period to which they refer. The time lag between the collection and reporting of data should be kept to a minimum to ensure that indicators are reporting current rather than historical information.
Sustainability	Indicates the updating frequency of indicators. If an indicator aims to monitor progress, special one-off surveys should not be included.
Coherence and comparability	Concepts, definitions, methodologies and actual data should be consistent internally and across space and time.
Accessibility and clarity	Data should be available and accompanied by adequate explanatory information (metadata).
Presence of missing data	Indicators should not present missing values by Member State or time.
Identification of double counting	Each indicator should not overlap with other indicators but should fill an essential gap in the theoretical framework or substantially increase the relevance of existing indicators.

Source: *Eurofound (2018a)*

2 The ESS quality assessment and assurance framework (Eurostat 2014, 2015) evaluates the quality of already produced statistical outputs based on principles Nos. 11–15 of the European Statistics Code of Practice (Eurostat, 2011).

literature review was to guide the selection of new indicators, with a focus on addressing conceptual gaps and replacing the indicators used in the 2018 Eurofound study that did not meet the quality criteria. The main outcome of this task was a set of new indicators to be included in the dashboard and the next steps of the calculation of the indices. The next section provides an account of the work carried out.

Steps 3–7 – Use of adequate multivariate techniques

Once an enhanced dashboard of indicators was built, steps 3–7 used the most adequate multivariate techniques to guide the selection of indicators and the methodological choices for aggregation and weighting. As indicated in the 2018 report, it is important to ensure the full transparency and replicability of the results obtained. Accordingly, not only is a section of this chapter dedicated to explaining the techniques adopted – 'Use of adequate multivariate techniques' – but all the methodological details are provided in the annexes.

Literature review and new indicators

This section is divided into four subsections, each addressing one of the key dimensions of industrial relations. All the subsections follow the same structure.

- **Eurofound definition**: The starting point is to present Eurofound's conceptual definition of the key dimension and its subdimensions.
- **Updated indicators and quality assessment**: The initial set of indicators is briefly discussed, along with the results of the quality assessment of the updated indicators. A table provides a summary of the indicators that were included in the next steps and those that were discarded.
- **Literature review**: A succinct account of the main results of the literature review on indices developed by other studies is presented.
- **Discussion and new indicators**: This concluding section presents the main discussion points, the new indicators included in the updated dashboard and the next steps for computing the updated indices.

Industrial democracy

Eurofound definition

Eurofound (2016) defines industrial democracy as 'encompassing all participation rights of employers and employees in the governance of the employment relationship, either directly or indirectly, via trade unions, works councils, shop stewards or other forms of employee representation at any level'.

In order to operationalise this definition, Eurofound (2016) breaks down industrial democracy into four subdimensions.

- **Autonomy**: The principle of the autonomy of the social partners is mainly understood as the autonomy of collective bargaining. This principle is embedded in most of the legal systems of the EU27 and in various texts of international and European organisations, such as Articles 5 and 6 of the European Social Charter, Article 11 of the Council of Europe's European Convention on Human Rights, and Conventions 87 and 98 of the International Labour Organization (ILO). The principle of the autonomy of the social partners, being anchored in both national and international legal systems, has been recognised as one of the general principles of EU law, according to Article 152 of the Treaty on the Functioning of the European Union.
- **Representation**: Concerns employees' right to seek a union or works council/working committee to represent them for the purpose of bargaining. Employee representation is rooted in the labour codes on trade unions and representation of workers in the workplace in most of the EU Member States. At macro level, it is associated with trade unions, collective bargaining, and the institutions and processes of social dialogue. At micro or company level, it is associated with various forms of workers' representation, such as trade unions and works councils.
- **Participation**: Refers to employee involvement in management decision-making at company level, either directly or indirectly. Participation at company level can be mapped along a continuum from no participation to co-determination. Intermediate levels include participation practices in which, in line with Directive 2002/14/EC establishing a general framework for informing and consulting employees in the European Community, employees receive information on or are, in a further step, consulted on decisions.
- **Influence**: Linked to bargaining power and the relative ability of the two sides of industry to exert influence over each other in the context of collective bargaining or management decision-making.

As highlighted by Sanz de Miguel et al (2020), this definition of industrial democracy has several advantages over other definitions when it comes to comparative research. From a normative point of view, the definition draws on a pluralistic approach that recognises the goals of employers and employees on an equal footing (Barbash, 1984; Meltz, 1989; Budd, 2004). In accordance with this approach, this definition relies on a shared understanding between the social partners and governments, as was discussed and accepted by the social partners and governments that are represented within Eurofound's Management Board.

Moreover, the definition is in line with the key institutional pillars of the industrial relations approach of the European social model (Marginson and Sisson, 2006). Finally, it is a multidimensional and comprehensive definition that covers both the macro and micro or company levels of industrial relations.

Updated indicators and quality assessment

The Industrial Democracy Index developed by Eurofound (2018a) identified three main empirical dimensions: (1) associational governance, (2) representation and participation rights at company level and (3) social dialogue at company level. All the conceptual dimensions of industrial democracy are covered by these empirical dimensions. Table 2 presents the structure of this index, including its subdimensions, indicators and sources. The table also provides the sources used for updating the indicators (for 2018–2021) and the results of the quality assessment of the updated indicators. In the column 'Quality assessment', red means that the indicator does not meet the quality criteria and so is discarded; yellow means that the indicator does not fully meet the quality criteria (it is included in the next steps, although alternative indicators will be tested); and green means that the indicator meets the quality criteria and is included in the next steps.

It is worth noting that indicator I4 (collective bargaining coverage) – provided by the OECD/Amsterdam Institute for Advanced Labour Studies (AIAS) Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts (ICTWSS) database – does not fully meet the quality criteria. This indicator does not provide harmonised data for all the Member States because it is calculated using different data sources and methods. Yet a harmonised estimation of the coverage of collective bargaining is crucial for any measurement of industrial democracy.

Table 2: Industrial Democracy Index 2008–2017 – Subdimensions, indicators, sources and quality assessment

Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Associational governance	I1	Trade union density	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
	I2	Employer organisation density	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
	I3	Existence of a standard (institutionalised) bipartite council of central or major union and employer organisations for purposes of wage setting, economic forecasting and/or conflict settlement	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
	I4	Collective bargaining coverage	ICTWSS	OECD/AIAS ICTWSS 2021	🟡
	I5	Routine involvement of unions and employers in government decisions on social and economic policy	ICTWSS	ICTWSS	🟢
Representation and participation rights at company level	I6	Board-level employee representation rights	ETUC, 2010, 2015	ETUC, 2017	🟢
	I7	Rights of works councils	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
	I8	Status of works councils	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
Social dialogue at company level	I9	Employee representation at the workplace (coverage)	Eurofound, ECS 2013	Eurofound, ECS 2019	🟢
	I10	Information provided to employee representative body (incidence)	Eurofound, ECS 2013	Eurofound, ECS 2019	🟢
	I11	Degree of information provided to employee representative body	Eurofound, ECS 2013	Eurofound, ECS 2019	🔴
	I12	Management holds regular meetings at which employees can express their views about the organisation	Eurofound, EWCS 2015	Eurofound, EWCTS 2021	🟢
	I13	Influence of the employee representation in decision-making at the workplace	Eurofound, ECS 2013	Eurofound, ECS 2019	🔴

Note: *ECS, European Company Survey; ETUC, European Trade Union Confederation; EWCS, European Working Conditions Survey. A green dot flags an indicator that meets the quality criteria and is included in the next steps; a red dot flags an indicator that does not meet the quality criteria and so is discarded; a yellow dot flags an indicator that does not fully meet the quality criteria, but that it is included in the next steps, along with alternative indicators.*
Source: *Authors, based on Eurofound (2018a)*

Literature review

Comparative research on industrial democracy has become a key issue in recent years (see, for example, Hyman, 2018; ETUI, 2019; Burroni and Pedaci, 2022; Cumbers et al, 2023), but its origins go back to the 19th century (Webb and Webb, 1897). The starting point for the empirical comparative analysis of industrial democracy is to establish a definition. However, the academic literature offers diverse definitions and is rather fragmented (González Menéndez and Martínez Lucio, 2014). As pointed out by Hyman (2007), it appears that there is no consensual definition of what industrial democracy means, or ought to mean. Yet most of the current approaches agree that the main feature of industrial democracy is that employees have the opportunity and the means to have a say in employers' decision-making processes at different levels (Markey and Townsend, 2013). As highlighted by Eurofound (2018a), scholars often disagree about the terminology and definitions used for the different forms and channels through which workers and employee representatives can have a say on employment and working conditions. Different terms and definitions reflect competing theoretical and methodological foundations or frames of reference and traditions in national research (Frege, 2007; Heery, 2015). At the end of the day, we can only indicate what many scholars have studied under the rubric of industrial democracy or closely related terms (such as democracy at work, voice and associational governance).

After in-depth discussions with its stakeholders in the course of previous studies, Eurofound defines industrial democracy in the following terms:

> *Industrial democracy is a participatory and democratic process which encompasses all participation rights of employers and employees in the governance of employment relationships, either directly or indirectly, via trade unions, works councils, shop stewards or other forms of employee representation at any level (shop floor, establishment, company, sectoral, regional and cross-industry)*
>
> (Eurofound, 2022a)

Acknowledging the diversity of terms, definitions and approaches on industrial democracy, this section reviews comparative studies relying on indices to measure industrial democracy or related concepts.

As shown in the subsequent sections, the indices have been developed to measure five main concepts that address topics that are partly related to the Eurofound definition of industrial democracy: industrial relations, economic democracy, associational governance, corporatism and trade union strength.

Industrial relations

According to our review, only two indices specifically measuring industrial relations have been developed so far. Each index relies on a different conceptual approach.

The first index was developed by Kim et al (2015). The authors adopt a conceptual framework that draws on pluralistic (Budd, 2004) and general system theory tenets (Dunlop, 1958). This approach is similar to Eurofound's conceptual framework on industrial relations (Eurofound, 2016, 2018a) in three aspects: (1) it recognises equally the goals of employers (efficiency) and of employees (equity); (2) it takes into consideration the inputs, processes and outcomes of industrial relations; and (3) it extends the coverage of industrial relations beyond its classic boundaries, thus including societal variables (such as inequality) and competitiveness variables (such as productivity) as endogenous to industrial relations (Meardi, 2020).

Drawing on this conceptual approach, Kim et al (2015) develop two indices, one measuring efficiency and one measuring equity. As shown in Table 3, the authors use 10 efficiency indicators and 20 equity indicators related to inputs, processes and outcomes to compute the indices. Most of the data come from official data sources such as the ILO, the OECD and the World Economic Forum (WEF). It is worth noting that some of the indicators included in both indices were used by Eurofound for the index of social justice (such as the Gini coefficient and income distribution/inequality). They also include indicators, such as those on strikes, that were deliberately disregarded in the 2018 Eurofound study, as their normative meaning was not completely clear with regard to industrial democracy. It should also be noted that the authors merge indicators associated with the governance of industrial democracy with indicators that fall under the state governance dimension (such as freedom of dismissal and expenditures on education).

Table 3: Efficiency Index and Equity Index indicators, Kim et al (2015)

	Efficiency Index indicators	Equity Index indicators
Inputs	Freedom of dismissal Freedom to employ temporary workers Union decentralisation Expenditures on education	Union density Ratification of ILO fundamental conventions Expenditure on ALMP Public social expenditures Centralisation of wage-setting institutions Coordination of wage-setting institutions Maternity leave index
Processes	Industrial relations (hostile versus productive) Labour–employer relations (confrontational versus cooperative)	Unit labour cost Collective bargaining coverage National tripartite board Worker participation in management Trade union rights index
Outcomes	Labour productivity Economic growth rates Strikes and lockouts Workers involved (in strikes)	Injuries (deaths) Average hours worked per person Gini coefficient Minimum relative to median wages of full-time workers Ratio of estimated female-to-male earned income Income distribution Employment rates Unemployment replacement rates

Note: *ALMP, active labour market policy.*
Source: *Kim et al (2015)*

Kim et al (2015) analysed the performance of industrial relations in 30 OECD countries based on a final ranking that combines both efficiency and equity scores. Denmark, Norway and Switzerland ranked among the top performers in 2005 (the last year computed with all the indicators), while France, Greece, Ireland, Italy and Spain occupied the five lowest positions.

The authors also conducted a cluster analysis that classified countries according to efficiency and equity. This analysis identified three main groups of countries that showed high stability at the four points of time analysed (1993, 1999, 2005 and 2011 – the latter with only 24 indicators):

- countries high on both equity and efficiency (Denmark, for instance)
- countries high on efficiency but low on equity (such as Czechia, Poland and Slovakia)
- countries moderate on equity and low on efficiency (such as France, Greece, Italy, Portugal and Spain)

The second index identified was developed by Ounnas (2022) and measures the performance of EU Member States and the United Kingdom. It is based on the four dimensions that Visser (2009) used to build his typology of industrial relations regimes: trade unions' strength, bargaining, workers' involvement at firm level and social partners' participation in policymaking. The index also includes a fifth dimension ('other'), which mixes indicators measuring employer organisations' density and collective rights. The index uses 22 indicators from the OECD/AIAS ICTWSS database and one indicator from the Economic Freedom Index; these are listed in Table 4.

All indicators measuring the dimensions of bargaining, workers' involvement at firm level and social partners' participation in policymaking were revised during the 2018 Eurofound study. Some were included in the Industrial Democracy Index (such as trade union density and bargaining coverage) and/or the typology (for example, predominant bargaining level and extension mechanisms). Others were explicitly disregarded because they lacked a straightforward normative interpretation (for example, opening clauses).

In relation to the dimension of trade unions' strength, Ounnas (2022) mixes indicators measuring membership (such as density), degree of pluralism (number of unions' confederations), government employment share and degree of labour market regulation (including labour market tightness and hiring and firing regulations). While this conceptual approach has been followed in other empirical studies that consider the regulation of the labour market to be a source of trade union structural power (Metten, 2021; see the section 'Trade unions' strength'), it clearly deviates from Eurofound's definition of industrial democracy.

The results of Ounnas's index show that Belgium, Sweden, the Netherlands, Denmark and Finland are the five best-performing countries, while Latvia, Poland, Lithuania, Malta and Estonia are ranked in the lowest

Table 4: Industrial Relations Index, Ounnas (2022) – Dimensions and indicators

Dimensions	Indicators
Trade union strength	Trade union density Number of trade union confederations Labour market tightness Government employment share Hiring and firing regulations (Economic Freedom Index)
Bargaining	Adjusted bargaining coverage Predominant bargaining level Coordination mechanisms Type of coordination Extension Favourability principle Opening clause
Workers' involvement at firm level	Existence of works council Works council type, worker/union involvement Works council rights at firm level Works council structure Union workplace representation
Participation of social partners in policymaking	Tripartite councils in policy debates/policymaking Bipartite councils
Other	Private employer organisations' density Number of employer organisation confederations Right to strike in the government sector Right to collective bargaining in the government sector

Source: *Ounnas (2022)*

five positions. As the author highlights, some of the country values are not aligned with previous Eurofound research (Eurofound, 2018a, for instance), and this is mainly owing to the trade union strength dimension. For instance, Italy and France obtain relatively high scores on the index, above Austria, Germany and Luxembourg. This is because the latter countries score relatively low on trade unions' strength – a result that can be explained by less stringent hiring and firing regulations and a smaller government sector employment share (particularly in Germany and Luxembourg).

Economic democracy

Empirical work by Cumbers et al (2023), based on the concept of economic democracy, goes beyond the collective dimension of industrial democracy covered by the industrial relations indices discussed previously. This approach captures variables dealing with industrial democracy (collective rights and collective bargaining), variables concerning individual employment rights, and state governance variables measuring topics such as decentralisation and subsidiarity, accountability or control of corruption within a single index.

As shown in Table 5, the Economic Democracy Index is made up of 12 indicators, which measure four main dimensions: workplace and individual employment rights; degree of associational economic democracy; distribution of economic decision-making powers across space and sectors; and transparency and democratic engagement. The index consists of data from 32 OECD countries (covering all EU27 countries except Cyprus, Latvia, Lithuania and Malta) and its construction follows Nardo et al (2005) and further OECD and JRC (2008) guidance. Most of the data come from official data sources such as the OECD or the International Monetary Fund. Most industrial democracy indicators are taken from the OECD/AIAS ICTWSS database.

Table 5: Economic Democracy Index, Cumbers et al (2023) – Dimensions and indicators

Dimensions	Indicators
Workplace and individual employment rights	Labour market insecurity (OECD) Long-term unemployment Employment protection – individual dismissal and temporary contracts
Degree of associational economic democracy	Trade union density (OECD) Employers' association density Credit union and financial cooperatives (International Monetary Fund)*
Distribution of economic decision-making powers across space and sectors	Net worth of financial corporations as % of GDP Attribution of tax revenues to regional and local government as % of total tax revenue Total government expenditure as % of GDP
Transparency and democratic engagement	Involvement of trade unions and employers in government decisions – social and economic policy Voice and accountability Control of corruption

** Credit union and financial cooperative branches per 100,000 adults. Calculated as (number of credit union and financial cooperatives + number of credit union and financial cooperative branches) × 100,000/adult population in the reporting country.*
Note: *GDP, gross domestic product.*
Source: *Cumbers et al (2023)*

Evidence from the Economic Democracy Index shows that, first, Nordic countries, followed by continental countries, rank highest, while southern and eastern European countries tend to rank lowest. Those results are broadly in line with the results of the Eurofound Industrial Democracy Index (Eurofound, 2018a). Second, the data show a general erosion in the levels of economic democracy and a marked decline since 2009. Third, findings reveal that the most negative trend has been the decline in workplace and individual employment rights, particularly between 2013 and 2014. The general trend in the dimension measuring the degree of associational economic democracy has also been downwards, although to a lesser extent. In contrast, the other two dimensions have shown greater stability over time (2000–2014).

Associational governance versus state governance

As the industrial relations and economic democracy indices outlined in the previous sections show, it is difficult to develop a clear understanding of industrial democracy across the EU. Industrial relations indices consistently show persistent cross-country differences (Eurofound, 2018a; Hyman, 2018; Sanz de Miguel et al, 2020). At the same time, they show a general decline in industrial democracy, which connects with those qualitative studies that identify a general shift in the balance of power in favour of employers, which has caused the position and influence of trade unions in the governance of economic and social policies to deteriorate (Baccaro and Galindo, 2018; Hyman, 2019). In this regard, Baccaro and Howell (2017) identified, relying on both quantitative and qualitative methods, a neoliberal convergent trajectory for national industrial relations systems across western Europe, understood as an increase in employer discretion through different combinations of deregulation and, in particular, changes in the functioning of institutions.

Empirical work by Meardi (2018) goes some way towards helping us to understand the current situation. The author goes beyond convergence versus divergence debates to identify trends in different forms of labour governance. In particular, the author empirically analyses trends in the associational governance and state governance of industrial relations through an index for each dimension. The indices cover six countries (France, Germany, Italy, Poland, Spain and the UK) and contain data for two years (1992 and 2012).

The Associational Governance Index is made up of three dimensions of equal weight: the organisational strength of each side of the employment relationship and their interrelation through collective bargaining. The dimensions are measured through five indicators that were already considered by the 2018 Eurofound study (in the index and typology), with some variations (for example, the indicator on the centralisation of collective bargaining did not consider opening or derogation clauses) (Eurofound, 2018a).

The State Governance Index includes four dimensions of equal weight: statutory regulation, rules of the game, support to actors and the state as employer. These dimensions are measured through 13 indicators that, as Meardi (2018) recognises, do not have a straightforward interpretation in terms of whether state intervention entails more or less employee protection (for example, statutory minimum wages can undermine collective bargaining).

Table 6 shows the structures of both indices.

Table 6: Associational Governance Index and State Governance Index, Meardi (2018) – Dimensions and indicators

Associational Governance Index dimensions and indicators	State Governance Index dimensions and indicators
Trade union strength	**Statutory regulation**
Employer organisation strength	Legislation on works councils
Collective bargaining	Existence of minimum wage
Collective bargaining coverage	Minimum relative to average wages of full-time workers
Coordination of collective bargaining	Strictness of employment protection – individual and collective dismissals
Predominant level of collective bargaining, adjusted by frequency of decentralisation, opening clauses, derogation and articulation	Strictness of employment protection – temporary contracts
	Rules of the game
	Government intervention in collective bargaining
	Legal extension of collective agreements
	Unemployment benefits replacement level
	Social expenditure as a share of GDP
	Support to actors
	Social pacts
	Presence of national tripartite commission
	State as an employer
	Public sector's share of employment
	Public sector's regulation distinctiveness

Source: *Meardi (2018)*

The author's dynamic analysis of both indices highlights, first, that there is little evidence of convergence, as the differences between the six countries were very similar in 1992 and 2012. Second, Meardi (2018) identifies a general decline in associational governance. Finally, with regard to state governance, the author does not identify systematic changes. In this regard, he points out that state intervention in the protection of employees has not declined in all countries. Moreover, there are even cases of movement towards more state regulation (the UK). As a result, Meardi raises doubts about the existence of a generalised trend of neoliberal convergence by means of which state intervention is exclusively geared towards pursuing employers' interests.

Corporatism

The role of the state or governments in industrial relations has also been analysed in the corporatism and neo-corporatism literature. Corporatism is an elastic concept that, since the late 1970s, has been defined as either a form of interest representation distinct from pluralism, statism and syndicalism, focusing on its structural prerequisites (representation monopoly, centralisation, and so on (Schmitter, 1974)), or a form of policymaking in which concertation assumes central importance (Lehmbruch, 1977; Schmitter, 1981). Since the 2000s, the neo-corporatism literature has, however, tended to integrate both definitions due to their empirical interrelation, while advancing the formulation of less rigid structural prerequisites (Baccaro, 2003).

Drawing on the corporatism literature and, in particular, on Streeck and Kenworthy (2005), Jahn (2016) develops an index based on three conceptual dimensions:

- **Structural aspects of neo-corporatism**: The extent to which organisations enjoy a representational monopoly and are highly centralised and efficient.
- **Functional aspects**: The political coordination between interest associations and the state.
- **Scope**: The societal penetration of corporatist arrangements and the actual output of corporatist arrangements (that is, to what extent agreements are coordinated and encompass varying degrees of economy-wide implementation).

Table 7: Corporatism Index, Jahn (2016) – Dimensions and indicators

Dimensions	Indicators
Structural aspects	Organisational structure of collective actors (aggregated index)* Structure of works council representation Rights of works councils
Structural aspects	Government intervention in wage bargaining Dominant level(s) at which wage bargaining takes place Routine involvement of unions and employers in government decisions on social and economic policy
Scope	Coordination of wage bargaining Mandatory extension of collective agreements by public law to non-organised firms

** The aggregated index combines data on the concentration or fragmentation of trade unions with information on the division of authority in the trade union movement. In particular, the relationship between the peak associations, affiliated unions, and local and workplace branches are of interest here. That means that this indicator covers the structural aspect of organisations. The index varies between 0 and 1.*
Source: *Jahn (2016)*

To produce the index, the author conducts a factor analysis that includes the eight variables described in Table 7. All indicators are taken from the OECD/AIAS ICTWSS database. The indices cover 42 OECD countries from 1960 to 2010.

The results of the index show, in line with common neo-corporatist literature, that the country with the highest corporatism score is Austria, followed by Sweden, Belgium, the Netherlands, Norway and Germany. They also confirm that Slovenia is the only country with corporatist patterns in central and eastern Europe, as shown by previous typologies (Bohle and Greskovits, 2007; Visser, 2009). Second, the dynamic analysis studying trends from 1960 to 2010 shows that corporatism was not steadily declining during that period. When all 42 country studies are considered in aggregate, index data show cyclical trends: an increase in corporatism in the 1970s lasting until the early 1980s and declining thereafter, and a substantial decline in corporatism in the early 1990s followed by an increase in the 2000s. However, when the trends of each country are analysed, the picture becomes more complex. Some of the countries with more marked corporatist traditions show a general decline (Sweden and, to a lesser extent, Austria), while several central and eastern European countries (such as Czechia and Lithuania) have increased their degrees of corporatism since the 1990s, in parallel with their access to the EU.

Trade unions' strength

Trade unions' strength is a key analytical dimension of most of the indices measuring industrial democracy (Eurofound, 2018a), industrial relations (Ounnas, 2022), economic democracy (Cumbers et al, 2023) or associational governance (Meardi, 2018). Research carried out by Metten (2021) provides conceptual and empirical insights into how to analyse and measure this concept.

In line with previous publications (for example, Sullivan, 2010), Metten (2021) criticises the weakness of trade union density (the share of employees who are members of a trade union in relation to the workforce of the whole economy or of a sector) for measuring trade unions' strength. The author draws on cross-country comparative analysis (with a focus on developing countries) and highlights the diversity of the definition of union membership and the regulation and functions of trade unions between countries. According to the author, this diversity implies that the level of union density in one country is not directly comparable with that in another country. The crucial point is that the level of trade union density does not provide sufficient information about the actual power of trade unions. With a view to overcoming those conceptual and methodological challenges, the author develops a novel Collective Labour Force (CLF) index, which is intended to measure different dimensions of trade unions' strength and compare them across countries.

Theoretically, Metten (2021) draws on power resources theory (Korpi, 1978; Wright, 2000), which has become the most popular conceptual framework for analysing and comparing trade unions' strategies between countries and sectors (for example, Vandaele, 2018; Keune and Pedaci, 2020; Keizer et al, 2023). Accordingly, trade unions' strength is composed of three sources of power: associational power, which results from the formation of collective organisations of workers; structural power, which results from the location of workers within the economic system; and institutional power, which encompasses statutory rules designed to support workers' representation and participation rights and their social protection rights.

After defining the conceptual approach, Metten (2021) tested variables covering the three sources of power and selected nine variables to build the CLF index (Table 8). Those variables are taken from different international sources, such as the ILO industrial relations statistics or the World Bank.

Table 8: CLF index, Metten (2021) – Power resources and variables

Power resources	Variables
Associational power	Trade union density Collective bargaining coverage Collective bargaining centralisation
Structural power	Labour force size: proportion of a country's working-age population that engages actively in the labour market Share of people working in agriculture out of total employment figures Democracy level: measure of the level of democracy or autocracy, ranked from -10 (maximum autocratic, hereditary monarchy) to +10 (maximum democratic, consolidated democracy) (Marshall and Gurr, 2018)
Institutional power	Number of ratified fundamental ILO conventions, the so-called core labour standards (ILO, 2019) Hiring and firing regulations Hours regulations: degree to which working time restrictions apply

Source: *Metten (2021)*

Using multivariate techniques, Metten (2021) computed three subindices (a subindex for each source of power) and the overall CLF index. The CLF index covers 2000–2016 and provides information on 36 developed economies, 7 economies in transition and 29 developing economies. The CLF index results show that the five best-performing countries are Belgium, Sweden, Italy, Finland and Austria. Generally, countries with comparatively high densities also record high overall union strength and are ranked among the best performers. There are, however, some surprising results. For instance, Denmark is ranked in the 15th position, thus lagging behind countries such as France (9th), Spain (11th) and Greece (12th), which record much lower union densities. While the author does not analyse these cases, it can be argued that this is the result of a lower degree of labour market regulation (understood as a source of workers' structural strength). This is the case in Denmark when comparing it with France or Spain.

Discussion and new indicators

The literature review showed that several indices have been developed to measure five concepts that are partly related to industrial democracy: industrial relations, economic democracy, associational governance, corporatism and trade unions' strength.

While all the studies offer insightful conceptual or methodological findings, the review of indicators used in those indices show that most of them do not meet the quality criteria as applied in this report for two main reasons.

- They do not have a straightforward normative interpretation – that is, they cannot be interpreted in terms of being better or worse in relation to industrial democracy (for example, strikes, opening clauses, collective bargaining coordination, extension of collective bargaining or statutory minimum wage).
- They measure either aspects conceptually covered by other key dimensions of industrial relations (for instance, the Gini coefficient or active labour market expenditure) or aspects that go beyond the concept of industrial democracy (such as democracy level – democracy versus autocracy).

Following on from the above, only a few input indicators measuring representation or participation rights meet the quality criteria and are included in the revised dashboard (Table 9).

It is also worth noting that several alternatives to indicator I4 (collective bargaining coverage) provided by the OECD/AIAS ICTWSS database were tested. These alternatives were based on survey data (the European Structure of Earnings Survey and the European Company Survey (ECS)). However, they were discarded because they showed significant quality weaknesses.

Table 9: Industrial Democracy Index – New indicators for revised dashboard, 2018–2021

Indicator	Definition	Source
Right to collective bargaining – market and/or state sector	3 = yes 2 = yes, with minor restrictions 1 = yes, with major restrictions 0 = no	OECD/AIAS ICTWSS 2021
Right to strike – market and/or state sector	3 = yes 2 = yes, with minor restrictions 1 = yes, with major restrictions 0 = no	OECD/AIAS ICTWSS 2021
Right of association	3 = yes 2 = yes, with minor restrictions 1 = yes, with major restrictions 0 = no	OECD/AIAS ICTWSS 2021
Ratification of ILO core labour standards	Number of ratified fundamental ILO conventions, the so-called core labour standards	ILO Information System on International Labour Standards (Normlex)

Source: *Authors*

Industrial competitiveness

Eurofound definition

According to Eurofound, industrial competitiveness constitutes the ability of an economy to achieve a consistently high rate of productivity growth and good performance among its economic actors, including its small and medium-sized enterprises (Eurofound, 2018a). This conceptual approach means that industrial competitiveness requires the creation of an environment of market stability and efficiency, and the promotion of research and innovation, information and communication technologies, education, training and entrepreneurship (Eurofound, 2016). The definition derives from the idea of efficiency in the use of scarce resources to be competitive but also considers the interrelated parts that can affect the complex concept of competitiveness (Budd, 2004). It is composed of four subdimensions.

- **Productivity and growth**: This subdimension links with competitiveness in terms of how efficient production (for example, human resources and capital) is used to obtain a high level of output. Quantities, prices and how the resources are combined determine the results. Indicators such as gross domestic product (GDP), wage increases and labour productivity can be assessed at national level.
- **Market stability and efficiency**: This concerns the importance of a market framework conducive to the operation of companies. Some elements to consider are safety, absence of corruption, legal provisions, and state actions to protect property rights, control inflation and establish favourable mechanisms for international trade.
- **Sophistication of resources**: Here, three types of resources are highlighted: financial resources, infrastructure and human capital. Financial resources are in the form of loans, investment options and general capital availability. Infrastructure refers to physical facilities, such as roads, ports or IT infrastructure, that support the development of activities. Human capital corresponds to people and the elements needed to improve their skills and competencies such as public education or workplace training.
- **Innovation and entrepreneurship**: This subdimension captures the development of new products, practices, technologies or ways of doing business, and includes entrepreneurship as a driver of innovation.

Updated indicators and quality assessment

The Industrial Competitiveness Index developed by Eurofound (2018a) identified two empirical subdimensions: (1) inclusive growth and innovation and (2) efficiency and sophistication of resources. Table 10 presents the structure of this index, including its subdimensions, indicators and sources. The table also provides the sources used for updating the indicators (for 2018–2021) and the results of the quality assessment of the updated indicators. In the column 'Quality assessment', red means that the updated indicator is discarded because it does not meet the quality criteria, whereas green indicates the contrary: there are no relevant quality issues and the indicator is included in the new dashboard.

Table 10: Industrial Competitiveness Index 2018 – Subdimensions, indicators, sources and quality assessment

Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Inclusive growth and innovation	I14	GDP per capita (PPS)	Eurostat	Eurostat	🟢
	I15	Real compensation of employees per hour worked	Eurostat	Eurostat	🟢
	I16	Infrastructure ranking	WEF	WEF	🟢
	I17	Percentage of R&D personnel	Eurostat	Eurostat	🟢
	I18	R&D expenditure as a percentage of GDP	Eurostat	Eurostat	🟢
	I19	Index based on the Innovators dimension of the European Innovation Scoreboard (EIS)	Eurostat	Eurostat	🟢
Efficiency and sophistication of resources	I20	Incidence of corruption	Transparency International	Transparency International	🟢
	I21	Public Services Index	Eurofound, EQLS 2011 and 2016	–	🔴
	I22	Percentage of individuals with high levels of education	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I23	Digital skills	Eurostat	Eurostat	🟢
	I24	Connectivity dimension of the Digital Economy and Society Index (DESI)	European Commission, Digital Scoreboard	European Commission, Digital Scoreboard	🟢

Note: *EQLS, European Quality of Life Survey; EU-LFS, European Union Labour Force Survey; PPS, purchasing power standard; R&D, research and development. A green dot flags an indicator that meets the quality criteria and is included in the next steps; a red dot flags an indicator that does not meet the quality criteria and so is discarded.*
Source: *Authors, based on Eurofound (2018a)*

Literature review

Industrial competitiveness can be related to the concept of national competitiveness. In this sense, the literature shows that there is no consensual definition of competitiveness, and the concept differs depending on the approach used (Capobianco-Uriarte et al, 2019; Staníčková, 2019). However, the idea of competitiveness based on productivity is one of the most influential, and there is a consensus that competitiveness is a complex and multifaceted concept involving several factors (Dudáš and Cibuľa, 2018). More holistic approaches include the relationship with spatial orientation, environmental sustainability or quality of life. Bilbao-Terol et al (2019), Staníčková (2019), Bocci et al (2021) and Rajnoha and Lesnikova (2022) have tried to include those aspects in the measurement of competitiveness.

Acknowledging the diversity of definitions and approaches related to competitiveness, this section reviews comparative studies based on indices that attempt to measure this concept and are partly related to the Eurofound definition of industrial competitiveness. As indicated in the subsequent sections, two main indices are analysed: the WEF Global Competitiveness Index (GCI) and the EU Regional Competitiveness Index (RCI).

Global Competitiveness Index

The WEF has produced an influential approach to defining and measuring national competitiveness. It defines competitiveness as the 'set of institutions, policies, and factors that determine the level of productivity of a country' (Schwab, 2017, p. 11). Based on this definition, the WEF developed the GCI to measure the different dimensions of competitiveness and provide a global score. A large number of recent empirical analyses of national competitiveness rely on this definition. The discussion in this section focuses on the methodology and indicators considered in this index.

The GCI has undergone a number of changes and updates since its creation; however, there are two recent versions that are important here: the old GCI, used in the 2017–2018 edition, and the new GCI 4.0, in operation since then (Olczyk et al, 2022). They are referred to as the GCI and the GCI 4.0, respectively, hereafter.

Three essential topics need to be considered in the analysis of the GCI: its structure, the sources and indicators used, and the weighting method.

Table 11 presents the structure of the GCI, which is composed of 3 subindices, 12 pillars distributed among the subindices and 114 indicators (Schwab, 2017). In this index, around two-thirds of the indicators come from soft data and refer to the information collected by the WEF and its local country partners via the WEF Executive Opinion Survey (Olczyk et al, 2022). The weight of the subindices is based on the stage of development of the economies analysed, derived from GDP per capita and export shares. Five development phases are considered (Schwab, 2017):

- stage 1, driven by factors
- the transition stage from stage 1 to stage 2
- stage 2, driven by efficiency
- the transition stage from stage 2 to stage 3
- stage 3, driven by innovation

Table 11: GCI (edition 2017–2018), Schwab (2017) – Subindices and pillars

Subindex	Pillars
Basic requirements	Institutions Infrastructure Macroeconomic environment Health and primary education
Efficiency enhancers	Higher education and training Good market efficiency Labour market efficiency Financial market development Technological readiness Market size
Innovation and sophistication factors	Business sophistication Innovation

Source: *Schwab (2017)*

The GCI 4.0 presents significant changes stemming from the incorporation of the fourth industrial revolution and resilience to external shocks (Schwab, 2018). Changes have been made to the structure of the index, the sources and indicators used, and the weighting method. Table 12 shows the main differences between the GCI and the GCI 4.0.

In the GCI 4.0, the indicators have been revised and the structure changes significantly. The previous subindices have been discarded, and the pillars are presented in four groups (enabling environment, human capital, markets and innovation ecosystem); however, these groups, unlike the subindices in the previous version, are not used in the calculation of the index because the pillars are aggregated directly with equal weights and without consideration for the stage of development of the country. Another change is the sources of information used: more than half of the indicators come from official statistical sources or hard data (Schwab, 2018; Galgánková, 2020).

When it comes to the results of the GCI and the GCI 4.0 for the EU Member States, the countries at the top and bottom of the competitiveness performance rankings do not change. The Netherlands, Germany and Sweden have the highest scores, whereas Croatia, Greece and Romania are the countries with the lowest scores. In the latest edition of the GCI 4.0 (Schwab, 2019), all EU27 countries score higher than the mean of the 141 countries analysed, and the four most competitive EU countries (the Netherlands, Germany, Sweden and Denmark) are among the top 10 countries globally.

Authors such as Galgánková (2020) have studied the results of the GCI across countries from 2010 to 2018, while other authors such as Dudáš and Cibuľa (2018), Petrarca and Terzi (2018), Benítez-Márquez et al (2022)

Table 12: Main differences between the GCI (edition 2017–2018) and GCI 4.0 (edition 2018)

	GCI (2017–2018 edition)	GCI 4.0 (2018 edition)
Structure	3 subindices, and 12 pillars distributed among the subindices. The subindices are: basic requirements, efficiency enhancers, and innovation and sophistication factors.	12 pillars. Subindices have been discarded. The pillars are organised in four groups: enabling environment, human capital, markets and innovation ecosystem. These groups are not used for computing the index.
Sources and indicators	114 indicators. Soft data outweigh hard data: 37 indicators based on hard data, 77 on soft data.	103 indicators. Hard data outweigh soft data; 56 indicators based on hard data, 47 on soft data.
Weighting	The weight varies from 5% to 15%. The weight depends on the subindex to which the pillar belongs and the country's stage of development.	All pillars are weighted equally (8.33%). The weight does not depend on the country's stage of development.

Source: *Adapted from Olczyk et al (2022, p. 121)*

and Olczyk et al (2022) have concentrated on examining its methodology and proposing alternatives. Their criticisms focus on the weights applied according to the development stage of a country, the large number of soft indicators used and the method of aggregation. Some of these issues were dealt with in the new GCI 4.0, which applies equal weights to all pillars and relies on a more substantial proportion of hard data.

The studies by Dudáš and Cibuľa (2018) and Olczyk et al (2022) focus on comparing the GCI and the GCI 4.0. The authors agree that the GCI 4.0 represents an improvement with regard to capturing the multidimensional concept of competitiveness. Dudáš and Cibuľa (2018) examine Slovakia's position in the GCI and the GCI 4.0. The authors conclude that the current rank seems more consistent with the reality of Slovakia and is more objective because it applies more hard data. Olczyk et al (2022) apply a sensitivity analysis with the Nelder–Mead simplex method of optimisation and analyse the different GCI versions. Their results coincide with those of Dudáš and Cibuľa (2018) about reducing the use of soft data to decrease the potential subjectivity bias; they also indicate that the weights of the GCI 4.0 could be improved by using optimal weights.

Alternative methodologies for a competitiveness index were proposed by Petrarca and Terzi (2018), Nečadová (2020) and Benítez-Márquez et al (2022). They focus on improving the GCI or assessing the new GCI 4.0. Benítez-Márquez et al (2022) recommend a principal component analysis (PCA) to calculate the latent dimension of the index and the weights. The authors argue that the PCA method would be an advance in terms of objectivity, while highlighting that the low percentage of indicators based on hard data is a significant weakness of the GCI. Nečadová (2020) calculates adjusted global competitive indices by using GCI data, different methods of aggregation (arithmetic and geometric mean) and equal weights. The author tests the susceptibility of the GCI ranking to different aggregation and weighting methods and indicates that GCI 4.0 reduces the distortions. Petrarca and Terzi (2018) recompute the GCI through a structural system equation (SEM) model with partial least squares path modelling (PLS-PM) to obtain weights derived endogenously (using parameters from the model) and considering various stages of development. The results indicate that the endogenous weights are similar to each other, so the GCI should not use different weights.

Rajnoha and Lesnikova (2022) evaluate the association between the GCI and economic performance and the relationship between GDP and sustainability and quality of life in 14 countries. The authors use GDP and selected indicators of the United Nations Sustainable Development Goals as proxies to assess the relationships. The results show positive correlations between the variables analysed. However, the methodology applied has its limitations due to the use of a simple regression analysis.

EU Regional Competitiveness Index

The EU RCI seeks to capture and measure regional competitiveness, defined by the European Commission as 'the ability of a region to offer an attractive and sustainable environment for firms and residents to live and work' (Annoni and Dijkstra, 2019, p. 3). The RCI measures the performance of regions at NUTS 2 level in the EU Member States.[3] This index is based on the key features of the GCI (edition 2017–2018), namely subindices and different weights according to the stage of development of a region. Table 13 shows the general structure of the index: 3 subindices (basic, efficiency and innovation) and 11 pillars. Around 74 indicators are used to build the index.

Table 13: RCI, Annoni and Dijkstra (2019) – Subindices and pillars

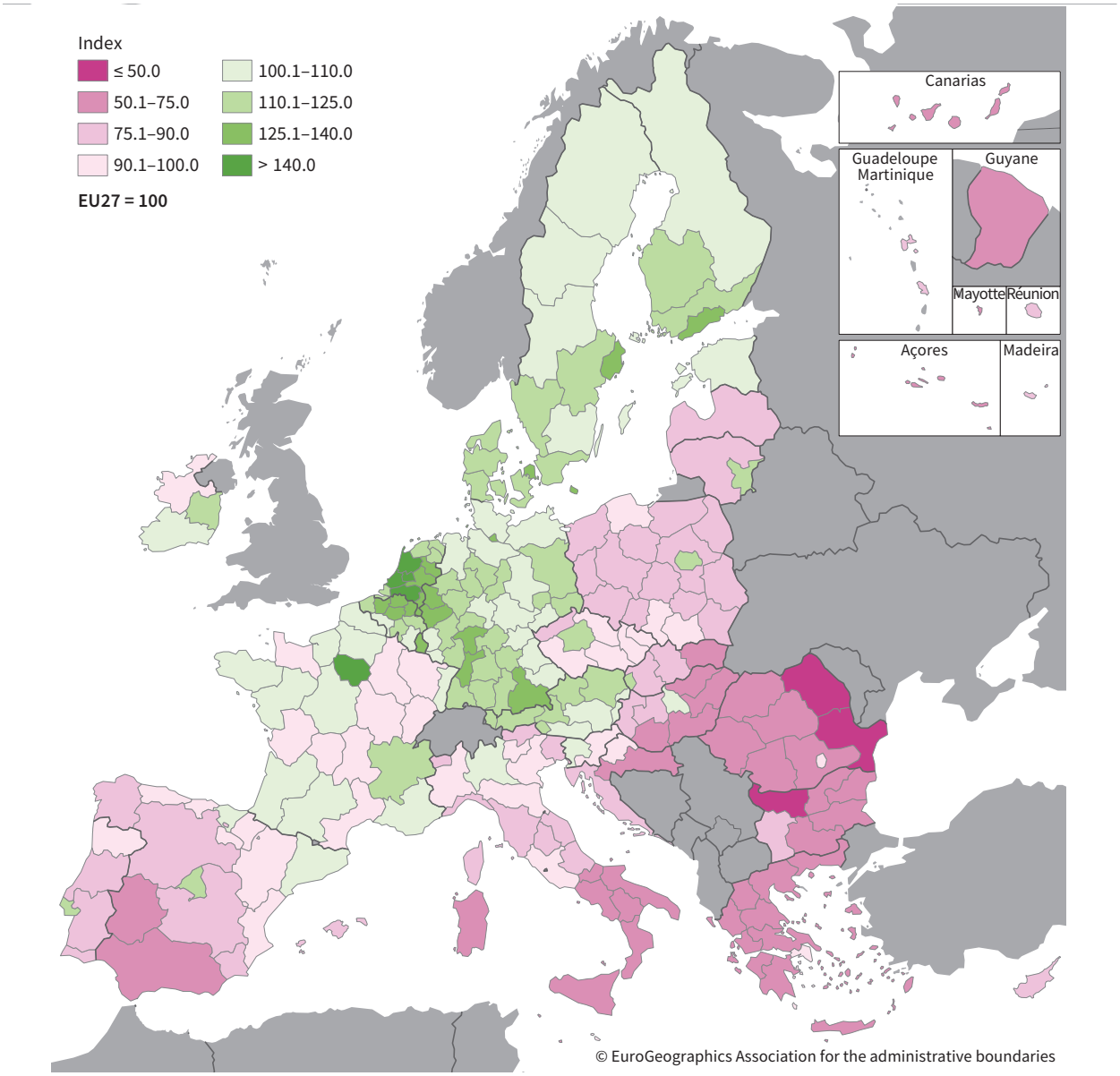
Subindex	Pillars
Basic	Institutions Macroeconomic stability Infrastructure Health Basic education
Efficiency	Higher education and lifelong learning Labour market efficiency Market size
Innovation	Technological readiness Business sophistication Innovation

Source: *Annoni and Dijkstra (2019)*

The 2022 edition of the index builds on an updated methodology, and therefore it is referred to as the RCI 2.0. The structure of the index has not changed (it maintains 3 subindices and 11 pillars). However, there are changes related to the definition of stages and weights. The RCI 2.0 uses three stages, adapting them to the thresholds used in cohesion policy today, based on the average 2018–2020 GDP per capita in purchasing power

3 NUTS (Nomenclature of Territorial Units for Statistics) is 'a geographical nomenclature subdividing the economic territory of the EU into regions at three different levels (NUTS 1, 2 and 3 respectively, moving from larger to smaller territorial units)' (Eurostat, 2023).

Figure 2: RCI 2.0 (2022 edition) scores, EU Member States



Source: *European Commission (2023)*

standards (PPS). Figure 2 shows the results of the RCI 2.0. They present a marked polycentric pattern, with strong performance of regions hosting large urban areas in the EU. The gaps between the capital city regions and the other regions in a country, however, vary among EU Member States, with more competitive countries tending to have a smaller gap between their capital city region and other regions, as well as lower internal variation (European Commission, 2023a).

Bocci et al (2021) propose an alternative methodology for measuring regional competitiveness based on the indicators of the RCI. While the concept of distinct stages of competitiveness reflected in the subindices (basic, efficiency and innovation) is preserved, the authors propose changes to the methodology. The main change is applying an endogenous weighting approach for the subindices, where weights are derived from the STATIS method.

Another adaptation of the RCI is proposed by Bilbao-Terol et al (2019). The authors include ecological aspects in the index to encompass sustainability in terms of preservation of the natural environment. Thus, the extended index is named the Regional Sustainable Competitiveness Index. This index keeps the structure of the RCI's data and its weights but adds an extra subindex (environment) with the same weight as the innovation subindex. The pillars included in this subindex are carbon dioxide (CO_2) emissions, waste and environmental expenditure, and investment.

Discussion and new indicators

The literature review provides some useful conceptual and methodological insights. Several studies flag potential subjectivity bias when most indicators come from soft data. Many studies also recommend applying different methods of sensitivity evaluation to limit the subjectivity of choices when it comes to selecting indicators or weighting and aggregation methods. In this regard, several studies cast doubt on the validity of assigning weights based on the development stages used by the WEF to build the GCI. It is worth recalling that the GCI 4.0 does not use this method. The literature also shows that dimension-reduction methodologies based on statistical techniques are useful to optimise the number of indicators used and to assess the contribution of each indicator to the index.

This review confirms the strengths of the methodology used by Eurofound (2018a) to build the Industrial Competitiveness Index. First, the selection of indicators is based on a sound conceptual framework and the use of rigorous multivariate techniques to ensure that the indicators work well together and to verify statistically the key subdimensions identified in the conceptual framework. Second, most indicators come from hard data. Finally, different weighting and aggregation methods are tested, and the final choice relies on a sensitivity analysis that ensures the robustness of the results.

The review of other indices is also useful for revisiting the Industrial Competitiveness Index with a view to including new indicators, either to replace discarded indicators or to improve the measurement of this concept by addressing conceptual gaps. The new indicators selected are presented in Table 14, grouped under the four subdimensions established in the Eurofound (2016) conceptual framework.

The quality assessment indicated that one indicator of the Industrial Competitiveness Index 2008–2017 (Eurofound, 2018a) had to be replaced because it could not be updated: indicator I21 (Public Services Index). As available sources do not provide a similar indicator related to public services, an indicator of healthy life expectancy has been included as a proxy.

The main conceptual gap identified was the lack of indicators related to sustainable and efficient use of natural resources, which is nowadays widely recognised as a key area of industrial competitiveness and is one of the priorities for EU competitiveness established by the European Green Deal (European Union, undated). Accordingly, this gap was addressed by including two new indicators under the subdimension sophistication of resources: the circular material use rate, which indicates the share of materials recycled and fed back into the economy; and the material footprint indicator, which gives an insight into the share of raw materials required to meet the demand for products.

In the same subdimension, another important gap was the lack of indicators related to cybersecurity, which is gaining importance in an increasingly digitalised economy. For this reason, the indicator Global Cybersecurity Index was included.

In addition, other indicators have been selected to improve the measurement of industrial competitiveness in some of the areas already addressed, for instance, traditional components of economic growth (labour productivity, capital and the residual – multifactor productivity); inflation, which is highly important at present, in particular in light of the current cost of living crisis due to the war in Ukraine; and the ease of starting a business, which measures the procedures, time and cost for an entrepreneur to start a business. Most new indicators come from official sources and hard data, but there are also indicators based on the WEF Executive Opinion Survey, which captures perceptions about the protection of intellectual property and property rights.

Table 14: Industrial Competitiveness Index – New indicators for revised dashboard, 2018–2021

Subdimension	Indicator	Definition	Source
Growth and productivity	Growth in multifactor productivity	That part of GDP growth that cannot be explained by growth in labour and capital inputs.	OECD Statistics
	Real labour productivity per hour worked	Real labour productivity per hour worked of the total economy over a given time period, *t*, calculated by dividing GDP in chain-linked volumes by hours worked.	Eurostat
	Gross value added per unit of net fixed assets	Obtained by dividing gross value added (in chain-linked volumes) by net capital stock (in chain-linked volumes).	Eurostat
Market stability	Inflation volatility	The standard deviation of the yearly percentage change in the end-of-period inflation rate over the previous five years.	Eurostat
	Intellectual property protection	Measured by responses to the survey question 'In your country, to what extent is intellectual property protected?' (1 = not at all; 7 = to a great extent).	WEF GCI Executive Opinion Survey
	Property right	Measured by responses to the survey question 'In your country, to what extent are property rights, including financial assets, protected?' (1 = not at all; 7 = to a great extent).	WEF GCI Executive Opinion Survey
Sophistication of resources	Circular material use rate	The share of material recycled and fed back into the economy – thus avoiding the extraction of primary raw materials – out of overall material use.	Eurostat
	Material footprint (RMC)	Represents the amount of material in terms of raw material equivalent needed to produce the products consumed in the geographical reference area. It is calculated as raw material input minus exports in raw material equivalent (calculated at the aggregate product level, by material).	Eurostat
	Global Cybersecurity Index	Measures the commitments of countries to cybersecurity at global level. It is assessed based on five pillars: legal measures, technical measures, organisational measures, capacity development and cooperation.	International Telecommunication Union
	Healthy life expectancy	Healthy life years expected at birth as a percentage of the total life expectancy.	Eurostat
Innovation and entrepreneurship	Economic Complexity Index	Measures the productive capabilities of large economic systems, based on the diversity of countries they export to and the ubiquity of the products exported.	Observatory of Economic Complexity
	Ease of starting a business	Measures the procedures, time and cost for an entrepreneur to start and formally operate a business, and the paid-in minimum capital required.	World Bank Doing Business Index
	Scientific publications	Measures the number of publications and their citations, expressed at country level. Only articles, reviews and conference papers are considered.	WEF GCI

Note: *RMC, raw material consumption.*
Source: *Authors*

Social justice

Eurofound definition

Eurofound defines social justice as 'the fair and non-discriminatory distribution of opportunities and outcomes within a society, in order to strengthen the capabilities of each individual for self-determination and self-realisation' (Eurofound, 2018a). This definition includes four subdimensions (Eurofound, 2016).

- **Equality of opportunity**: Refers to the situation where circumstances or factors beyond an individual's control do not condition their outcomes. Hence, individuals should have similar starting points, and differences in their outcomes should come from different levels of effort and personal preferences. Regarding employment, this can be associated with the equality of opportunities to access the labour market, where the selection process is not conditioned by previous advantages.
- **Equality of outcome**: Recognises that excessive economic inequality generates negative effects on the whole society, and it must be reduced to create a fair society. Thus, this subdimension includes actions redistributing economic outcomes.
- **Fundamental rights**: Refers to the protection and promotion of the fundamental rights included in the EU legal framework, with an emphasis on those associated with labour relations and employment. The legal framework includes the Charter of Fundamental Rights of the European Union, the Council of Europe's European Social Charter, and the ILO conventions ratified by the Member States, among others.

Table 15: Social Justice Index 2018 – Subdimensions, indicators, sources and quality assessment

Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Social cohesion and non-discrimination	I25	Social Exclusion Index	Eurofound, EQLS 2011 and 2016	–	🔴
	I26	Ratio of young to non-young people employment rates	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I27	Gender Equality Index	EIGE	EIGE	🟢
	I28	Long-term unemployment rate	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I29	Share of young people who are NEET (not in employment, education or training)	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
Poverty and income inequality	I30	At risk of poverty or social exclusion rate	Eurostat	Eurostat	🟢
	I31	In-work poverty rate	Eurostat	Eurostat	🟢
	I32	Impact of social transfers (other than pensions) on poverty reduction	Eurostat	Eurostat	🟢
	I33	Income inequality (quintile share ratio – S80/S20)	Eurostat	Eurostat	🟢
Equality of opportunities	I34	Early leavers from education and training	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I35	Percentage of individuals with less than upper secondary educational attainment	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢

Note: *EIGE, European Institute for Gender Equality; EQLS, European Quality of Life Survey; EU-LFS, European Union Labour Force Survey. A green dot flags an indicator that meets the quality criteria and is included in the next steps; a red dot flags an indicator that does not meet the quality criteria and so is discarded.*
Source: *Authors, based on Eurofound (2018a)*

- **Social cohesion and non-discrimination**: Social cohesion is based on three main determinants: first, resilient social relations regarding the networks between individuals and groups in society; second, a positive emotional connectedness between individuals, institutions and countries; and third, a pronounced focus on the common good as the responsibility for others and for the community as a whole. Non-discrimination implies equal treatment without differences based on age, sex/gender, sexual orientation, race, health, nationality, religion and socioeconomic status, among other characteristics.

Updated indicators and quality assessment

The Social Justice Index identified three empirical subdimensions: (1) social cohesion and non-discrimination, (2) poverty and income inequality, and (3) equality of opportunities (Eurofound, 2018a). Table 15 presents the structure of this index, including subdimensions, indicators and sources. The table also provides the sources used for updating the indicators (for 2018–2021) and the results of the quality assessment of the updated indicators. As in previous sections, red in the column 'Quality assessment' means that the updated indicator has been discarded because it does not meet the quality criteria, and green means that the indicator meets all quality criteria and therefore is included in the new dashboard.

Literature review

The theoretical idea of social justice has been developed from different philosophical, sociological, psychological and economic approaches. The literature review of social justice shows a wide variety of ways to define and measure social justice, where the theoretical perspective adopted will determine how this concept is defined and how it is operationalised in subdimensions and indicators for its measurement (Sabbagh and Schmitt, 2016). As indicated by these authors, a common feature of social justice is that it encompasses both individual rights and collective responsibilities. At its core, it involves an often difficult balancing act between providing fair access to resources and opportunities and recognising the needs and preferences of individuals.

According to Eurofound's conceptual framework, the social justice dimension of industrial relations is related to creating a fair and equitable environment for employment, establishing inclusive and non-discriminatory policies and practices, and addressing broader social and political issues, such as the fight against discrimination, inequality and poverty.

From a conceptual point of view, the Social Justice Index (SJI) developed by the Bertelsmann Stiftung Foundation is the closest to a conceptual index for measuring social justice. In fact, the SJI was thoroughly

considered when building the 2008–2017 Eurofound Social Justice Index (Eurofound, 2018a). A review of the SJI structure and methodology is presented in the rest of this section.

The concept of social justice adopted in the SJI is based on the work of Merkel and Glieber (2009). The central idea consists of 'guaranteeing each individual *genuinely* equal opportunities for self-realization through the targeted investment in the development of individual "capabilities"' (Hellmann et al, 2019, p. 129). Based on this cornerstone, the index groups 46 indicators into six subdimensions: poverty prevention, access to education, labour market inclusion, social cohesion and non-discrimination, health, and intergenerational justice. Table 16 presents the structure of the SJI.

The first dimension considers poverty prevention, measured as the share of the population with incomes below the line of poverty for the total population, children and elderly people.

The dimension of access to education incorporates the idea of the quality of education through the results of the Programme for International Student Assessment (PISA) test, the pre-primary education expenditure, the rate of people aged 25–64 with less than upper secondary education, the ratio of women to men in those with less than upper secondary education, and an expert assessment of the state of political education in the country.

The labour market dimension contains indicators related to employment and unemployment for distinct groups of the population (such as foreign-born workers, women workers and young workers) and indicators of precarious employment.

The dimension of social cohesion and non-discrimination contains the Gini coefficient; the share of young people who are not in employment, education or training (NEET rate); the ratio of foreign-born workers to native-born workers in those with less than upper secondary education; and three qualitative variables regarding the effectiveness of policies on social inclusion, non-discrimination and integration.

The health dimension incorporates infant mortality, healthy life expectancy, perceived health status (by income quintile), number of practising physicians, out-of-pocket expenses for medical care and a qualitative indicator regarding health policy.

Finally, the dimension of intergenerational justice involves three subdimensions. The first subdimension incorporates the idea of the demographic challenge, with qualitative indicators of family and pension policy and a quantitative indicator of age dependency. The second subdimension captures the concept of environmental sustainability, with the following indicators: greenhouse gas emissions, ecological

Table 16: SJI, Bertelsmann Stiftung Foundation – Subdimensions and indicators

Subdimension	Indicator
Poverty prevention	Poverty risk, total population Poverty risk, children (< 18) Poverty risk, seniors (65+)
Access to education	Education policy* PISA performance, socioeconomic impact PISA low performers, socioeconomic impact PISA low performers, all subjects Pre-primary education expenditure Less than upper secondary education (25–64) Less than upper secondary education, women/men (25–64)
Labour market inclusion	Employment Employment, foreign born/native born Employment, women/men Older employment Unemployment Unemployment, foreign born/native born Youth unemployment Long-term unemployment Low-skilled unemployment Involuntary part-time employment Low pay incidence
Social cohesion and non-discrimination	Social inclusion policy* Gini coefficient Non-discrimination policy* Gender equality in parliaments Integration policy* Less than upper secondary education, foreign born/native born NEET (20–24)
Health	Health policy* Infant mortality, per 1,000 Healthy life expectancy Physicians, per 1,000 Out-of-pocket expenses Perceived health status, by income quintile
Intergenerational justice	Environmental policy* Renewable energy consumption Greenhouse gas emissions, per capita Ecological footprint, per capita Material footprint, per capita Pension policy* Family policy* Age dependency Public R&D spending Private R&D spending Public debt Public debt, per child

** Indicators derived from the assessment of experts.*
Notes: *PISA, Programme for International Student Assessment; R&D, research and development.*
Source: *Adapted from Hellmann et al (2019, p. 132)*

footprint, material footprint, and a qualitative indicator of environmental policy. The last dimension refers to economic and fiscal sustainability, with indicators of public and private research and development (R&D) spending, public debt, and public debt per child, all by GDP.

In the SJI, all indicators within a dimension have the same weight. The importance of each dimension varies based on its conceptual value. Accordingly, dimensions are given different weights in the computation of the index. The lowest weight is given to the social cohesion and non-discrimination, health, and intergenerational justice dimensions; double weight is given to access to education and access to the labour market; and triple weight is given to poverty prevention.

The SJI follows a full estimation maximum likelihood (FIML) approach for the imputation of missing data that cannot be replaced by values from other years. This approach assumes that data follow a multivariate normal distribution and missing data follow a random pattern.

Other relevant features of the SJI are its normalisation and aggregation methods. Data are normalised by a linear transformation on scales from 1 to 10, where the minimum and maximum are calculated using the 1.5 interquartile range method. Indicators and dimensions are aggregated using the arithmetic mean.

It is worth noting that other empirical studies (Timmons Roberts et al, 2018; Leslie et al, 2022) have incorporated new topics, such as the notion of data justice or environmental justice. Although these studies rely on a concept of social justice that differs from the one analysed here, these new topics may be important to consider. For example, the idea of data justice represents a potential aspect to be evaluated due to its relationship with Eurofound's conceptual approach to industrial relations.

Discussion and new indicators

The theoretical framework of the SJI has several points in common with Eurofound's theoretical framework. The main conceptual differences lie in the dimensions of health and intergenerational justice, which were not fully considered when the Eurofound Social Justice Index was built (Eurofound, 2018a).

The methodology of the SJI differs substantially from that of the Eurofound index in relation to normalisation, weighting and aggregation. The most crucial difference relates to weighting: the SJI establishes weighting conceptually, while Eurofound assesses different methods and selects the most robust one. The same applies to normalisation and aggregation, although they may have less important implications for the computation of the index. Overall, it can be said that Eurofound uses several methods of normalisation, weighting and aggregation to conduct a sensitivity analysis and enhance the robustness of the final index.

The literature review indicates the possibility of incorporating new indicators into the index to address conceptual gaps or improve the measurement of some aspects. Table 17 presents the list of new indicators, grouped under the four subdimensions established in Eurofound's conceptual framework (Eurofound, 2016).

Indicator I25 (Social Inclusion Index) cannot be updated, so two indicators have been selected to replace it: an index of social capital and an indicator of overall life satisfaction.

To address the conceptual gaps identified in the health and intergenerational justice dimensions, two new indicators have been included: the disability employment gap and the indicator of intergenerational justice in education. In addition, the importance of environmental sustainability has been recognised, and it is included as a component of fundamental rights, with the indicators net greenhouse gas emissions, national expenditure on environmental protection and the ecological balance, understood as the difference between the biocapacity and ecological footprint of a country.

In addition, other indicators have been selected to improve the measurement of some topics: the labour opportunities of some groups (employment of foreign workers and employment of older people), perceptions of fair opportunities to reach the desired educational level or job, perceptions of discrimination (in general and at work) and job outcomes (people in jobless households and households with very low work intensity).

Table 17: Social Justice Index – New indicators for revised dashboard, 2018–2021

Subdimension	Indicator	Definition	Source
Equality of opportunity	Employment of foreign citizens	Ratio of the employment rate of foreign citizens to the employment rate of nationals among people aged 20–64 years.	Eurostat
	Disability employment gap	Difference in employment rates between people with disabilities and people without disabilities.	Eurostat
	Employment of older people	Ratio of the employment rate of people aged 65 years and over to the employment rate of people aged 20–64 years.	Eurostat
	Diversity of the workforce	Responses to the survey question 'In your country, to what extent do companies have a diverse workforce (e.g., in terms of ethnicity, religion, sexual orientation, gender)?' (1 = not at all; 7 = to a great extent); weighted average for 2017–2018 or the most recent period available.	WEF GCI Executive Opinion Survey
	Perception of educational opportunities	Mean rating (0–10) of the statement 'Overall, everyone in [country] has a fair chance of achieving the level of education they seek.' (0 = does not apply at all; 10 = applies completely).	ESS
	Perception of job opportunities	Mean rating (0–10) of the statement 'Overall, everyone in [country] has a fair chance of getting the jobs they seek.' (0 = does not apply at all; 10 = applies completely).	ESS
Equality of outcomes	Population in jobless households	Share of people aged 18–59 who are living in households where no one works.	Eurostat
	Persons living in households with very low work intensity	Percentage of people living in households with very low work intensity, specifically people aged 0–59 living in households where the adults have worked less than 20% of their total work potential during the past year.	Eurostat
	Intergenerational mobility in education	Transition of educational attainment level from parents to current adults (population aged 25–59).	Eurostat
Fundamental rights	Ecological balance (deficit/reserve)	The difference between the biocapacity and ecological footprint of a region or country. An ecological deficit occurs when the footprint of a population exceeds the biocapacity of the area available to that population. Conversely, an ecological reserve exists when the biocapacity of a region exceeds its population's footprint.	Global Footprint Network
	National expenditure on environmental protection (% of GDP)	The resources resident units use for protecting the natural environment in a given period. It is calculated as a sum of current expenditure on environmental protection activities and investments for environmental protection activities, including net transfers to the rest of the world.	Eurostat
	Net greenhouse gas emissions	Total national emissions (from both Effort Sharing Decision (ESD) and Emissions Trading System (ETS) sectors) of the Kyoto basket of greenhouse gases – CO_2, methane (CH_4), nitrous oxide (N_2O) and the F-gases (hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride (NF_3) and sulphur hexafluoride (SF_6)) – from all sectors of the greenhouse gases emission inventories (including international aviation and indirect CO_2). Using the individual global warming potential of each gas, they are integrated into a single indicator expressed in units of CO_2 equivalents. The greenhouse gases emission inventories are submitted annually by the EU Member States to the United Nations Framework Convention on Climate Change (UNFCCC).	Eurostat
Social cohesion and non-discrimination	Perception of belonging to a group that is discriminated against	Percentage of people who describe themselves as being members of a group that is discriminated against in the country, measured as a response to the question 'Would you describe yourself as being a member of a group that is discriminated against in this country?' (Yes/No)	ESS
	Discrimination at work	Percentage of people who have been discriminated against at work, measured as a response to the question 'Have you been discriminated at work? By this, I mean been treated less favourably or unfairly because of who you are or because you have certain characteristics.' (Yes/No)	EWCTS 2021
	Equal treatment and absence of discrimination	Index of whether individuals are likely to be discriminated against in court, at jobs or by the police or other institutions based on their socioeconomic status, ethnicity, sexuality or resident status.	World Justice Project Rule of Law Index – expert survey
	Overall life satisfaction	Average rating of life satisfaction.	Eurostat
	Social capital	Score on the social capital pillar of the Legatum Prosperity Index, which assesses social cohesion and engagement, community and family networks, and political participation and institutional trust. The scale ranges from 0 (low) to 100 (high).	Legatum Institute Legatum Prosperity Index

Note: *ESS, European Social Survey.*
Source: *Authors*

Quality of work and employment

Eurofound definition

Eurofound (2002, 2016) defines quality of work and employment as the set of employment and working conditions that provide career and employment security, health and well-being, the ability to reconcile working and non-working life, and the opportunity to develop skills over the life course. This concept is composed of four subdimensions (Eurofound, 2016).

- **Career and employment security**: Encompasses several aspects. First, employment status can be associated with the type of contract and the terms of employment that influence the working conditions. Second, it can relate to workers' rights regarding equal opportunities and rights of information, consultation and participation within the organisations. Finally, it can be linked to income, social protection and other aspects that provide security to career paths.
- **Health and well-being**: Focuses on the promotion of workers' physical and mental health and social well-being. It involves assessing health problems related to work, such as stress, fatigue and musculoskeletal disorders. It considers exposure to risks related to traditional hazards, to psychosocial risks (including harassment or other forms of violence at the workplace) and to risks related to specific characteristics of the work organisation, such as intensification of work and long working hours.
- **Reconciling working and non-working life**: Recognises the need for a balance between work and private life. This includes the possibility of remaining at work while having care responsibilities or returning to work after a period of absence; the promotion of gender equality in care work; the prevention of the double workload; and the management of working time to improve the balance between work and private life (such as the length of, predictability of and workers' autonomy over working hours, organisation of working hours over the life course, and organisation of social time).
- **Skills development**: Refers to the promotion of those activities that allow workers to improve their knowledge and qualifications within the organisation, increase their training opportunities, and enhance their employment and career prospects.

Updated indicators and quality assessment

The Quality of Work and Employment Index developed by Eurofound (2018a) identified three empirical subdimensions: (1) career prospects and well-being, (2) employment security and skills development, and (3) reconciliation of working and non-working life. Table 18 presents the structure of this index, including subdimensions, indicators and sources. The table also provides the sources used for updating the indicators (for 2018–2021) and the results of the quality assessment of the updated indicators, which indicates

Table 18: Quality of Work and Employment Index 2018 – Subdimensions, indicators, sources and quality assessment

Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Career prospects and well-being	I36	Income development	Eurofound, EWCS 2010 and 2015	Eurofound, EWCTS 2021	🟢
	I37	Career prospects	Eurofound, EWCS 2010 and 2015	Eurofound, EWCTS 2021	🟢
	I38	Subjective workplace well-being	Eurofound, EWCS 2010 and 2015	–	🔴
	I39	Work negatively affects health	Eurofound, EWCS 2010 and 2015	–	🔴
Employment security and skills development	I40	Unemployment protection coverage	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I41	Involuntary temporary employment	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I42	Job security	Eurofound, EWCS 2010 and 2015	Eurofound, EWCTS 2021	🟢
	I43	Lifelong learning	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	I44	Use of skills	Eurofound, EWCS 2010 and 2015	–	🔴
Reconciliation of working and non-working life	I45	Unsocial working time	Eurostat, EU-LFS	Eurostat	🟢
	I46	Gender gap in inactive population due to family or care responsibilities	Eurostat	Eurostat	🟢
	I47	Work–life balance	Eurofound, EQLS 2010 and 2015	–	🔴

Note: *EQLS, European Quality of Life Survey; EU-LFS, European Union Labour Force Survey; EWCS, European Working Conditions Survey; EWCTS, European Working Conditions Telephone Survey. A green dot flags an indicator that meets the quality criteria and is included in the next steps; a red dot flags an indicator that does not meet the quality criteria and so is discarded.*
Source: *Authors, based on Eurofound (2018a)*

whether an indicator meets all quality criteria (green) or whether it does not and is therefore discarded (red).

Literature review

Lack of clarity and consensus among scholars regarding concepts such as job quality, quality of working life, quality of work and quality of employment is a significant challenge for analysing the comprehensive concept of quality of work and employment, as defined by Eurofound (2016). These terms are often found in the literature without a clear definition, are used to encompass subdimensions that often overlap and are sometimes used interchangeably. The literature review (Piasna et al, 2017; Steffgen et al, 2020; Warhurst et al, 2022) indicates increasing agreement that quality of work and employment should be considered a complex and multidimensional concept that has implications for workers' health and well-being, among other aspects. However, there seems to be a notable lack of consensus on how to define this concept, what specific dimensions should be included and, in the end, what are the key features of good work and employment conditions or a high-quality job (Warhurst et al, 2022).

Table 19 identifies, defines and discusses the main conceptual approaches used in the literature in summary. First, it distinguishes the concepts of work and employment, both of which are needed. Second, it highlights that some approaches are complementary (intrinsic versus extrinsic work quality and workers' subjective assessment versus objective outcomes) and by definition entail potential paradoxes. In fact, one of the prominent findings of the literature is the expansion and increasing importance of these paradoxes since the 1980s, when flexibilisation started to erode the standard employment relationship, which was based on stability, predictable career paths, regular working time schedules and social protection rights that favoured the decommodification of labour (see, for example, Boyer, 1986; Hyman, 1991; Prieto, 2014; Huws et al, 2018; Rubery et al, 2018; Chung, 2022). Finally, it identifies the job demands-resources (JD-R) model (Karasek and Theorell, 1990; Bakker and Demerouti, 2017; Schaufeli and Taris, 2014) as a conceptual framework that can explain the implications that quality of work and employment have on workers' health and well-being, achievements, and potential employment and career

Table 19: Quality of work and employment – Conceptual approaches

Approach	Definition	Discussion
Work versus employment	Work refers to the nature of tasks, the level of autonomy within the work process and related work conditions. Employment refers to employment status (employee/self-employed/hybrid) and related labour and social protection regulations.	These are different concepts and both are needed.
Intrinsic versus extrinsic work quality	Intrinsic means related to work experience (nature of tasks). The experience of work can be intrinsically rewarding or not. Extrinsic means related to work conditions (such as rights and working time) and work outcomes (such as earnings and promotion). Work can be extrinsically rewarding or not.	These are complementary concepts. They are not always clear-cut (for instance, the nature of tasks is related to aspects of work organisation, work conditions and often work outcomes). There are potential paradoxes: learning and inspiring work (rooted in passion or intrinsically rewarding) could exist with no effective rights, long hours and low income (and uninspiring work may come with effective rights, regular hours and high income). Potential paradoxes (based on autonomy, passion and so on, combined with work pressure) could lead to self-exploitation and a downward spiral.
Worker's subjective assessment versus objective outcomes	An example of a subjective assessment is the percentage of workers who consider that their work negatively affects their health. The corresponding objective outcome is the percentage of employees who have experienced work-related accidents and work-related illnesses.	These are complementary concepts. There are potential paradoxes: for example, low-paid workers can be satisfied with their income (and well-paid workers may not be).
JD-R model	The JD-R model has two components: ◦ **Job demands**: The physical, psychological, social or organisational aspects of the job that require sustained physical or psychological (cognitive and emotional) effort or skills and are thus related to psychological and physiological costs. ◦ **Job resources**: The physical, psychological, social or organisational aspects of the job that reduce job demands or their related psychological or physiological costs; stimulate learning, development and personal growth; and serve to achieve work goals.	This is an explanatory model. An imbalance between job demands and resources (job demands outweigh job resources) results in work stress and lack of intrinsic reward, leading to (potential) health problems, underachievement and employment difficulties. Balance between job demands and resources results in well-being and intrinsic reward, leading to achievement and (potential) career development and new employment opportunities.

Source: *Authors*

opportunities. Imbalances (when workers experience more job demands than job resources) result in stress and a lack of intrinsic reward, leading to health issues, underachievement and potential difficulties with employment and career advancement.

Building on this conceptual review, this section goes on to examine Eurofound's evolving approaches to measuring quality of work and employment and then reviews other empirical studies that have built or discussed indices related to this concept.

Eurofound's evolving approaches

Over the past 20 years, Eurofound has developed different approaches to measuring and analysing quality of work and employment. This work includes the development of different indices to measure job quality (Eurofound, 2002, 2012a, 2017b) and the development of original approaches that focus on sustainable work over the life course (Eurofound, 2015a).

In 2012, Eurofound developed four indices using European Working Conditions Survey (EWCS) data. These indices are related to extrinsic work quality (the Earnings Index and Prospects Index) and intrinsic work quality (the Intrinsic Job Quality Index and Working Time Quality Index) – see Table 20.

More recent research by Eurofound (2017b, 2021) reviewed these indices and established seven dimensions of job quality: physical environment, work intensity, working time quality, social environment, skills and discretion, prospects, and earnings. Figure 3 shows the indicators used for computing the index of each dimension.

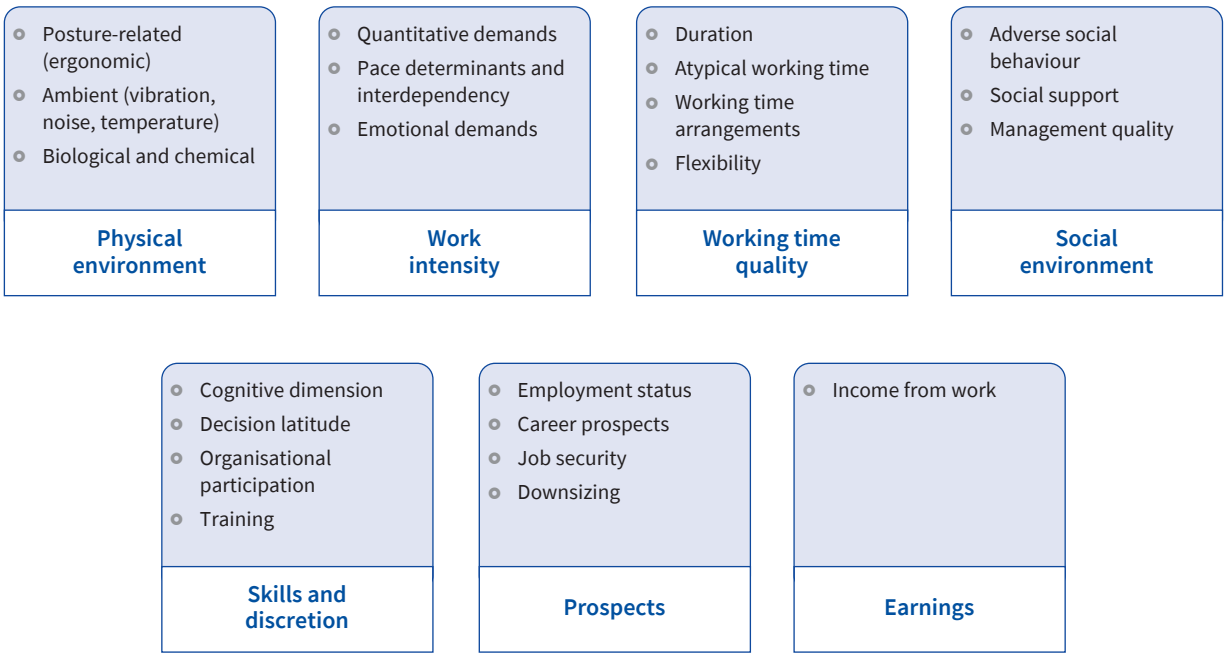
Table 20: Extrinsic and intrinsic work quality indices

Quality of work	Index	Content
Extrinsic	Earnings Index	Hourly earnings
	Prospects Index	Job security, contract quality, career progression
Intrinsic	Job Quality Index	Skills and autonomy Good social environment (social support, absence of abuse) Good physical environment (low level of physical and posture-related hazards) Healthy work intensity (avoiding high pace of work, high work pressure, conflicting emotional and value demands)
	Working Time Quality Index	Duration of working time, scheduling, autonomy over working time (including short-term flexibility)

Source: *Adapted from Eurofound (2012a, p. 20)*

In parallel, Eurofound has been developing the concept of sustainable work since 2015. One of the consequences of demographic change is the need for people to continue working for longer. In this context, '"sustainable work over the life course" means that working and living conditions are such that they support people in engaging and remaining in work throughout an extended working life' (Eurofound, 2015a, p. 2). Thus, the main novelty of this approach is incorporating the life course perspective into the analysis of quality of work and employment.

Figure 3: Dimensions and indicators of job quality



Source: *Eurofound (2021, p. 4)*

Sustainability is examined in two main domains (Eurofound, 2015a).

- **Characteristics of the job and the work environment**: This includes intrinsic work quality and quality of employment and working conditions in the context of the life course because of their potential impact on workers' health and well-being. Therefore, the seven dimensions of job quality (see Figure 4) are considered because they have an impact on the sustainability of work over the individual's life.
- **Characteristics and circumstances of the individual**: This includes aspects that influence the individual's access to work, which vary over the life course, such as time availability, care demands, health and well-being, skills and employability, and motivation.

Across these domains quality is influenced by the regulatory and policy framework and by specific organisational practices (such as management approach and work organisation).

More recently, Eurofound (2022b) has also adopted the JD-R model to revisit and update the job quality indices (Eurofound, 2017b, 2021) using data from the European Working Conditions Telephone Survey (EWCTS) 2021, an extraordinary edition of the EWCS conducted by telephone during the COVID-19 pandemic. As shown in Table 21, six dimensions are analysed: physical and social environment, job tasks, organisational characteristics, working time arrangements, job prospects and intrinsic job features. (The questionnaire did not include information about earnings, so the earnings dimension could not be analysed.) These dimensions are measured by indicators related to either job demands or job resources. As explained above, imbalances – when job demands outweigh job resources – result in strained or poor-quality jobs, while balance results in better-quality jobs.

This conceptual framework allows quality indices for each dimension and an overall index of job quality to be computed by comparing job demands with job resources. The main finding of this study is that around 30% of workers in the EU27 were in strained jobs in 2021. 'Strained jobs are associated with poorer well-being, poorer work–life balance, less ability to make ends meet, lower levels of work engagement and less trust within the workplace' (Eurofound, 2022b, p. 1). Broken down by degree of strain, the study finds that 4% of workers were in extremely strained jobs, 8% in highly strained jobs and 19% in moderately strained jobs. In line with other literature, the study indicates substantial variation in the proportion of workers in strained jobs between sectors and occupations. Important country differences were also found: in 13 of the countries surveyed, fewer than one-quarter of workers had strained jobs, while in 12 countries more than one-third were in strained jobs. Finally, the study also confirms well-known facts related to gender segregation and inequality across sectors, occupations and workplaces and highlights the persistence of gender inequalities in employment, work, and the interaction between work and private life.

Other indices on quality of work and employment

De Andrés (2018) builds an index (Indicador Sintético de Calidad de Empleo), which is based on the seven Eurofound dimensions of job quality (physical environment, work intensity, working time quality, social environment, skills and discretion, prospects and earnings) and incorporates a gender perspective across all dimensions. The study finds statistically significant differences between the index scores of women and men in 15 EU Member States. Job quality scores are higher for women than men in the Nordic countries and some western and central European countries. By contrast, scores for women are lower than those of men in some countries in southern and eastern Europe.

Table 21: Job quality dimensions and indicators of demands and resources

Dimension	Job demands	Job resources
Physical and social environment	Physical risks Physical demands Intimidation and discrimination	Social support
Job tasks	Work intensity	Task discretion and autonomy
Organisational characteristics	Dependency (self-employed only)	Organisational participation and workplace voice
Working time arrangements	Unsocial work schedules	Flexibility of working hours
Job prospects	Perceptions of job insecurity	Training and learning opportunities Career advancement
Intrinsic job features		Intrinsic rewards Opportunities for self-realisation

Source: *Eurofound (2022b, p. 29)*

Steffgen et al (2020) develop indices for quality of work and quality of employment based on the JD-R model. Data were obtained through a survey of a representative sample of employees in Luxembourg. The questionnaire was developed by the authors in three languages (French, German and Luxembourgish). The Quality of Work Index encompasses four dimensions: (1) job design (participation, feedback and autonomy), (2) work intensity (mental demands, emotional demands and time pressure), (3) social conditions (social support, competition and mobbing) and (4) physical conditions (risk of accidents and physical burden). The Quality of Employment Index has six dimensions: (1) training opportunities, (2) career advancement, (3) job security, (4) employability, (5) work–life conflict and (6) income satisfaction. The methodology includes a confirmatory factor analysis, bivariate correlations and hierarchical regression. The outcome variables are work satisfaction, burnout, general well-being, subjective physiological health problems, vigour and work performance.

Cascales Mira (2021) develops the European Intrinsic Job Quality Index based on intrinsic work quality features. The author uses data from the EWCS 2015, while the methodology to select indicators and compute the index relies on exploratory factorial analysis, confirmatory factor analysis and Cronbach's alpha. The typology of employment regimes is used to test the validity of this index for different EU Member States.[4] The index has 4 dimensions and 11 indicators. The dimensions are (1) workers' capacity for discretion over their work (autonomy), (2) the social environment in which the workers interact (interaction), (3) effort in terms of psychological demands (intensity) and (4) the social utility of the work conducted (meaningfulness). The aggregation method is based on the arithmetic mean of the scores of each factor extracted, with equal weight for each component.

Arranz et al (2018) calculate an employment quality index based on data from the Spanish Continuous Sample of Working Lives, which contains longitudinal information. Data cover 2005–2013. The index is composed of three dimensions: (1) wage (deflated gross daily wage, based on 2011), (2) professional prospects (qualification level of the occupation and degree of transition to occupations with higher qualification levels) and (3) employment stability (number of days that individuals have been employed). The indicators are normalised through the minimum–maximum range method, the arithmetic mean is used for aggregation, and dimensions have equal weights. A regression analysis is conducted to take into account the characteristics of workers and jobs in the analysis of results.

Bartoll and Ramos (2020) analyse the relationship between working hours mismatches and mental well-being, with a view to examining the role played by job quality in this relationship. The authors use data from the EWCS 2015 and the World Health Organization's WHO-5 Well-being Index. The analysis is conducted through a multilevel linear regression. The study finds evidence of a negative relationship between working hours mismatches and mental well-being for overemployed and underemployed workers, with significant gender differences. A relevant finding is that the negative effects long working hours have on mental health are moderated by workers' degree of voluntariness and workers' degree of control (that is, autonomy) with regard to working time.

Varianou-Mikellidou et al (2020) research the relationship between the Work Ability Index (WAI), work-related factors and individual characteristics in Cyprus's workforce, with a focus on age. The authors apply a questionnaire based on the EWCS to examine four areas (individual sociodemographic characteristics, company characteristics, work demands and working environment, and work organisation) alongside an abridged version of the WAI questionnaire. In addition, the Pittsburgh Sleep Quality Index questionnaire was applied to deepen knowledge of sleep and some work-related factors. The methodology is based on cross-tabulations, X^2 tests and regression analyses. The study finds that workers' perceptions of their health is one of the main factors that affect WAI scores, which also depend on other individual characteristics (age, gender and sleep quality) and work-related factors, such as work experience, position in the company and reporting an accident. Regarding work demands and work environment, the study finds that workers' perceptions that work affects their health is the main factor that has an impact on WAI scores. In addition, other work-related factors have an influence (feeling safe, job satisfaction, manual handling, matching work hours and family needs, lack of recognition, angry clients or patients, age discrimination, work conflicts and flexible working hours). For workers aged 50 and over, ergonomic jobs also appear to be a significant factor that affects WAI scores. Finally, company characteristics and work organisation indicators are not statistically significant, and therefore cannot explain WAI scores.

4 Social-democratic model: Denmark, Finland, the Netherlands and Sweden; continental model: Austria, Belgium, France, Germany and Luxembourg; Mediterranean model: Cyprus, Greece, Italy, Malta, Portugal and Spain; transition model: Bulgaria, Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia; and liberal model: Ireland and the UK.

Discussion and new indicators

The literature review shows that the concept of quality of work and employment adopted by Eurofound (2016) is not only comprehensive and well-grounded in the literature, but also allows for the incorporation of new theoretical approaches and empirical insights that address recent developments (such as incorporating a life course perspective or more nuanced definitions of intrinsic and extrinsic work quality features). The review also confirms the validity of combining hard data (related to outcomes) and soft data (related to workers' subjective perceptions) and proves that the EWCS is the main EU source for gathering high-quality and comparable soft data. The need to strengthen the gender dimension emerges as one of the main ways to improve the index of quality of work and employment, considering that all empirical studies point to the tenacity of gender inequalities and the complex interaction of these inequalities with other strands of discrimination and inequality (in other words, the need for an intersectional approach that takes into account age, health, race and socioeconomic status, among other factors). The review also shows the need to include more nuanced indicators for measuring workers' health and well-being, an aspect that is currently gaining importance for any analysis of quality of work.

As for the methodology, the review confirms the validity of the Eurofound (2018a) approach to building an index that summarises the complex and multidimensional concept of quality of work and employment and the importance of computing and analysing the subdimension indices. The literature also demonstrates that indices and dashboards are complementary tools. Empirical analyses from Eurofound and others draw on high-quality dashboards of normative indicators to explore more specific and nuanced research questions related to the quality of work and employment (for example, the extent of gender inequalities across all subdimensions). Alternatively, these empirical analyses adopt theoretical explanatory models to compute more refined indicators – for instance, the JD-R model, which is used to calculate the share of workers who experience more job demands than job resources and are therefore in strained or poor-quality jobs.

The selection of new indicators for the dashboard is guided by these conceptual and methodological conclusions. It also provides alternatives to replace the four indicators included in the 2018 Eurofound study that cannot be updated: I38 (subjective workplace well-being), I39 (work negatively affects health), I44 (use of skills) and I47 (work–life balance).

Table 22 presents the new indicators, grouped under the four subdimensions established in Eurofound's conceptual framework (2016).

Three new indicators have been added to the dimension of career and employment security. The indicators aim to meet the conceptual need to strengthen the gender dimension and to measure gender inequalities in work and employment: the gender gap in earnings, the gender gap in full-time-equivalent employment rates, and the overall gender gap in work. They are taken from the Gender Equality Index developed by the European Institute for Gender Equality (EIGE).

Four new indicators have been included with the aim of reinforcing the measure of health and well-being and incorporating the notion of sustainable work over the life course: exposure to physical health risk factors, exposure to mental health risk factors, work-related health problems and the comprehensive indicator of the share of workers in strained jobs (based on the Eurofound (2022b) study using the JD-R explanatory model).

Concerning work–life balance, the new indicator measures the frequency of problems related to three distinct dimensions: whether employees (1) keep worrying about work when they are not working, (2) feel too tired after work to do some of the household jobs that need to be done and (3) find it difficult to concentrate on their jobs because of family responsibilities. This index uses EWCTS 2021 data and has been computed following the methodology of the work–life balance indicator described by Eurofound (2018d, p. 42).

Finally, two new indicators have been included to improve the measurement of the subdimension of skills development.

Table 22: Quality of Work and Employment Index – New indicators for dashboard, 2018–2021

Subdimension	Indicator	Definition	Source
Health and well-being	Exposure to physical health risk factors	Employees who report risk factors that can adversely affect physical health, as a percentage of total employment. Physical health risk factors are tiring or painful positions; repetitive hand or arm movements; handling of heavy loads; chemicals, dust, fumes, smoke or gases; strong visual concentration; slips, trips and falls; use of machines or hand tools (excluding vehicles); use of vehicles (in the course of work, excluding on the way to and from work); and other significant risk factors for physical health.	Eurostat
	Exposure to risk factors for mental well-being	Employees who report exposure to risk factors that can adversely affect mental well-being, as a percentage of total employment. Mental well-being risk factors are severe time pressure or overload of work; violence or threat of violence; harassment or bullying; poor communication or cooperation within the organisation; having to deal with difficult customers, patients, pupils, and so on; job insecurity, lack of autonomy or lack of influence over the workplace or work processes; and other significant risk factors for mental well-being.	Eurostat
	Work-related health problems	Employees who report a work-related health problem, as a percentage of total employment. The concept of work-related health problems is based on a self-assessment of survey respondents with regard to their work-related state of health. It includes not only health problems caused by work but also those made worse by work.	Eurostat
	Job quality (overall)	Percentage of strained employees (employees with more job demands than job resources).	EWCTS 2021
Reconciliation of working and non-working life	Work–life balance	Summary indicator that measures the frequency of problems related to work–life balance on three distinct dimensions by asking respondents whether they kept worrying about work when they were not working, felt too tired after work to do some of the household jobs that need to be done, and found it difficult to concentrate on their job because of their family responsibilities.	EWCTS 2021
Skills development	Training	Percentage of employees who have received any of the following types of training to improve their skills over the past 12 months: training paid for or provided by the employer or on-the-job training (from co-workers or supervisors).	EWCTS 2021
	Learning new things	Percentage of employees whose jobs involve learning new things often or always.	EWCTS 2021
Career and employment security	Gender gap in full-time-equivalent employment rate	Absolute value of the ratio between the full-time-equivalent employment rate for women and the full-time-equivalent employment rate for women and men minus 1. For reasons of interpretability, this indicator is reversed by taking its complementary value. This yields values from 1 (full gender equality) to 0 (full gender inequality).	EIGE, Gender Equality Index 2022
	Gender gap in work	The overall score of the domain of work in the Gender Equality Index. This domain measures the extent to which women and men benefit from equal access to employment and good working conditions. There are two subdomains: participation (employment in full-time equivalents and duration of working life) and segregation and quality of work (sectoral segregation is measured through the participation of women and men in the sectors of education, human health and social work activities; quality of work is measured using flexible working time arrangements and job prospects).	EIGE, Gender Equality Index 2022
	Gender gap in mean monthly earnings (in PPS)	Absolute value of the ratio between the mean of monthly earnings for women and the mean of monthly earnings for women and men minus 1. For reasons of interpretability, this indicator is reversed by taking its complementary value. This yields values from 1 (full gender equality) to 0 (full gender inequality).	EIGE, Gender Equality Index 2022

Source: *Authors*

Use of adequate multivariate techniques

This section provides a step-by-step explanation of the statistical techniques used to guide the selection of indicators and the choices regarding weighting and aggregation. It covers steps 3–7 of the OECD–JRC methodology. The starting point is the updated dashboard of normative indicators, which includes the updated indicators of the 2008–2017 Industrial Relations Index that meet the quality criteria and the new indicators presented in the previous section.

Step 3 – Process data

To select the final list of indicators to calculate the Industrial Relations Index, the dashboard has to be processed. The main issue is time aggregation for 2018–2021. The aggregation followed the same method as the 2018 Eurofound study: indicators were aggregated using the arithmetic mean, except in those cases with a measurement unit in relative terms (percentage, index or rate), for which it has been proved that the geometric mean is a better option.

Step 4 – Normalise

This process is needed to ensure the comparability of the indicators to be included in any index. It converts indicators with different measurement units and ranges of variation – for instance, real compensation of employees per hour worked, measured in euro, and the at risk of poverty or social exclusion rate, measured as a percentage – into harmonised indicators.

The normalisation methods used were those used in the 2018 Eurofound study.

- **Standardisation**: For each indicator, the value for each country is subtracted from the average for all countries and then divided by the standard deviation between countries. The distribution of the new indicators has a mean of 0 and a standard deviation of 1.
- **Min–max normalisation based on the observed ranges**: For each indicator, the value for each country is subtracted from the minimum value registered, then divided by its observed range and, finally, multiplied by 100. As a result of this process, all the indicators normalised have an identical range (0–100).
- **Min–max normalisation based on the theoretical ranges**: For each indicator, the value for each country is subtracted from the minimum value that the indicator can register theoretically, then divided by its range and, finally, multiplied by 100. In the case of indicators without a clear theoretical minimum or maximum, we take the corresponding minimum or maximum observed across countries, increased by 1 standard deviation. As a result of this process, all the indicators normalised have an identical range (0–100).

To improve the comparability of subdimensions and dimensions, the subdimensions' scores should also be normalised. In this case, the method of normalisation adopted was the min–max based on the observed ranges expanded by ±1 standard deviation.

Step 5 – Establish the measurement framework

The measurement framework of the Industrial Relations Index is defined as the final set of indicators used to compute the index and their structure in dimensions and subdimensions. This set was obtained from the dashboard on industrial relations (presented previously) by applying the following statistical methods.

- **Correlation analysis**: This is needed to explore the interrelations between indicators in order to keep those with significant positive correlations and to avoid those with negative correlations.
- **PCA**: This is based on dimension reduction by forming new variables (the principal components) out of linear combinations of the variables in the multivariate set. It is used to explore the underlying structure of the data, particularly how variables change in relation to each other and how they are associated.
- **Cronbach's alpha coefficient**: This is a coefficient of reliability based on the correlations between indicators. A high coefficient, or equivalently a high reliability, means that the indicators considered measure the latent phenomenon well.

The multivariate analysis was used to analyse the overall structure of the dashboard and to identify the measurement framework of the Industrial Relations Index – that is, the set of indicators that, based on their internal relationship, work well together – thus statistically verifying a structure of subdimensions in line with the key areas identified in the conceptual framework. Annex 2 presents the results of the PCA and Cronbach's alpha coefficient for each key dimension.

As Table 23 shows, the 4 key dimensions are structured as 11 empirical subdimensions that are aligned with the Eurofound (2016) conceptual framework and measure the quality of industrial relations through 53 indicators.

Table 23: Measurement framework of the Industrial Relations Index, 2018–2021

Dimension	Subdimension	No.	Indicator	Source
Industrial democracy	Associational governance	I1	Trade union density	OECD/AIAS ICTWSS 2021
		I2	Employer organisation density	OECD/AIAS ICTWSS 2021
		I3	Collective bargaining coverage	OECD/AIAS ICTWSS 2021
		I4	Routine involvement of unions and employers in government decisions on social and economic policy	ICTWSS
		I5	Right of association – government sector	OECD/AIAS ICTWSS 2021
	Social dialogue at company level	I6	Employee representation at the workplace (coverage)	Eurofound, ECS 2019
		I7	Information provided to employee representative body (incidence)	Eurofound, ECS 2019
		I8	Management holds regular meetings at which employees can express their views about the organisation	Eurofound, EWCTS 2021
	Workers' rights	I9	Board-level employee representation rights	ETUC, 2017
		I10	Rights of works councils	OECD/AIAS ICTWSS 2021
		I11	Right to strike – market sector	OECD/AIAS ICTWSS 2021
		I12	Ratification of ILO core labour standards	ILO Information System on International Labour Standard (Normlex)
Industrial competitiveness	Inclusive growth and innovation	I13	GDP per capita (PPS)	Eurostat
		I14	Real compensation of employees per hour worked	Eurostat
		I15	Incidence of corruption	Transparency International
		I16	Percentage of individuals with high level of education	Eurostat, EU-LFS
		I17	Digital skills	Eurostat
		I18	Connectivity dimension of the Digital Economy and Society Index (DESI)	European Commission, Digital Scoreboard
		I19	Intellectual property protection	WEF GCI Executive Opinion Survey
		I20	Inflation volatility	Eurostat
	Efficiency and sophistication of resources	I21	Infrastructure ranking	WEF
		I22	Percentage of R&D personnel	Eurostat
		I23	R&D expenditure as a percentage of GDP	Eurostat
		I24	Index based on the Innovators dimension of the European Innovation Scoreboard (EIS)	Eurostat
		I25	Circular material use rate	Eurostat
		I26	Scientific publications	WEF GCI
		I27	Global Cybersecurity Index	International Telecommunication Union
		I28	Economic Complexity Index	Observatory of Economic Complexity
Social justice	Poverty and income inequality	I29	At risk of poverty or social exclusion rate	Eurostat
		I30	In-work poverty rate	Eurostat
		I31	Impact of social transfers (other than pensions) on poverty reduction	Eurostat
		I32	Income inequality (quintile share ratio – S80/S20)	Eurostat

Dimension	Subdimension	No.	Indicator	Source
Social justice	Social cohesion and non-discrimination	I33	Ratio of young to non-young people employment rates	Eurostat, EU-LFS
		I34	Gender Equality Index	EIGE
		I35	Long-term unemployment rate	Eurostat, EU-LFS
		I36	Share of young people who are NEET (not in employment, education or training)	Eurostat, EU-LFS
		I37	Equal treatment and absence of discrimination	World Justice Project Rule of Law Index – expert survey
	Equality of opportunities in education	I38	Early leavers from education and training	Eurostat, EU-LFS
		I39	Percentage of individuals with less than upper secondary educational attainment	Eurostat, EU-LFS
		I40	Perception of educational opportunities	ESS
Quality of work and employment	Employment security and skills	I41	Unemployment protection coverage	Eurostat, EU-LFS
		I42	Involuntary temporary employment	Eurostat, EU-LFS
		I43	Job security	Eurofound, EWCTS, 2021
		I44	Lifelong learning	Eurostat, EU-LFS
		I45	Training	Eurofound, EWTCS 2021
		I46	Gender gap in mean monthly earnings (PPS)	EIGE
	Job quality	I47	Income development	Eurofound, EWCTS 2021
		I48	Career prospects	Eurofound, EWCTS 2021
		I49	Work–life balance	Eurofound, EWCTS 2021
		I50	Job quality (overall)	Eurofound, EWCTS 2021
	Working time and gender gaps	I51	Unsocial working time	Eurostat
		I52	Gender gap in full-time equivalent employment rate	EIGE
		I53	Gender gap in work	EIGE

Note: *EU-LFS, European Union Labour Force Survey.*
Source: *Authors*

Step 6 – Weight and aggregate indicators

The aggregation process requires a decision to be taken about the relative importance of each indicator, subdimension and dimension, which is to say, the weights to be used. In this regard, there are several methods that could be applied. According to the literature, any decision is essentially a value judgement of the importance of each element integrated in the index. In this study, the four dimensions have been weighted equally (0.25 for each), but, regarding indicators and subdimensions, three weighting methods were tested (as in Eurofound (2018a)).

- **Method 1**: Within each dimension, all subdimensions have the same weight, and this is obtained by dividing the weight of the dimension (0.25) by the number of subdimensions that it covers. The same approach is followed to obtain the weight of each indicator (the weight of the corresponding dimension is divided by the number of indicators that it covers) so that all indicators in the same subdimension have the same weight.
- **Method 2**: Within each dimension, all indicators have the same weight, and this is obtained by dividing the weight of the dimension (0.25) by the number of indicators that it covers. The weight of each subdimension is calculated by adding the weights of all the indicators that it includes.
- **Method 3**: The weights of the indicators are based on their interrelations and are retrieved from the PCA explained in the previous section. Then, the weight of each subdimension is calculated by adding the weights of all the indicators that it includes.

The indicators were aggregated using the arithmetic mean to create the subdimension indices. These scores were normalised using expanded min–max normalisation based on the observed ranges (±1 standard deviation).

In the next levels of aggregation (subdimensions grouped into dimensions and dimensions grouped to form the overall index), two options were tested: geometric and harmonic means. The main aim of this approach is to work with alternatives that reduce the

compensability effect. Using geometric or harmonic aggregation entails that compensability is lower for dimensions with low values, so a country with a low score for one dimension will need a much higher score on the others to improve its global score. The methods of normalisation, weighting and aggregation chosen are detailed in the next section.

Step 7 – Calculate and assess the index

The computation of the Industrial Relations Index was carried out following the multimodelling approach applied in the construction of the Gender Equality Index (EIGE, 2017). The approach involved the calculation of multiple versions of the indices considering the alternatives mentioned in previous sections. They covered different types of normalisations (three alternatives considered), weights (three alternatives) and aggregation methods (four alternatives, two at subdimension level and two at dimension level). That meant 36 potential formulae, from which the one to compute the Industrial Relations Index was selected. The formula chosen was the option that provided the most robust results among the 36 options tested.

The selection process for the most robust formula first involved the calculation of the median of the 36 options by Member State. Next, the differences between each option by country and the median score were computed. The most robust formula was the one that minimised these differences and lay closest to the median.

As a result of this procedure, the Industrial Relations Index was calculated through the combination presented in Table 24, which shows that the indicators were normalised through the min–max method, based on the theoretical ranges, and the weighting method applied was based on equal weights for the indicators in each subdimension (method 2). Regarding the aggregation, indicators were grouped, with the arithmetic mean creating the index for each subdimension. These scores were normalised using the expanded min–max method, based on the observed ranges. They were then grouped using the harmonic mean to build the index for each dimension and, finally, they were aggregated using the geometric mean to obtain the overall index, the Industrial Relations Index.

Table 24: Methods used to calculate the Industrial Relations Index, 2018–2021

Normalisation	Min–max theoretical at indicator level Expanded min–max observed (±1 standard deviation) at subdimension level
Weighting	Equal weights indicators (method 2)
Aggregation	Arithmetic aggregation at indicator level Harmonic aggregation at subdimension level Geometric aggregation at dimension level

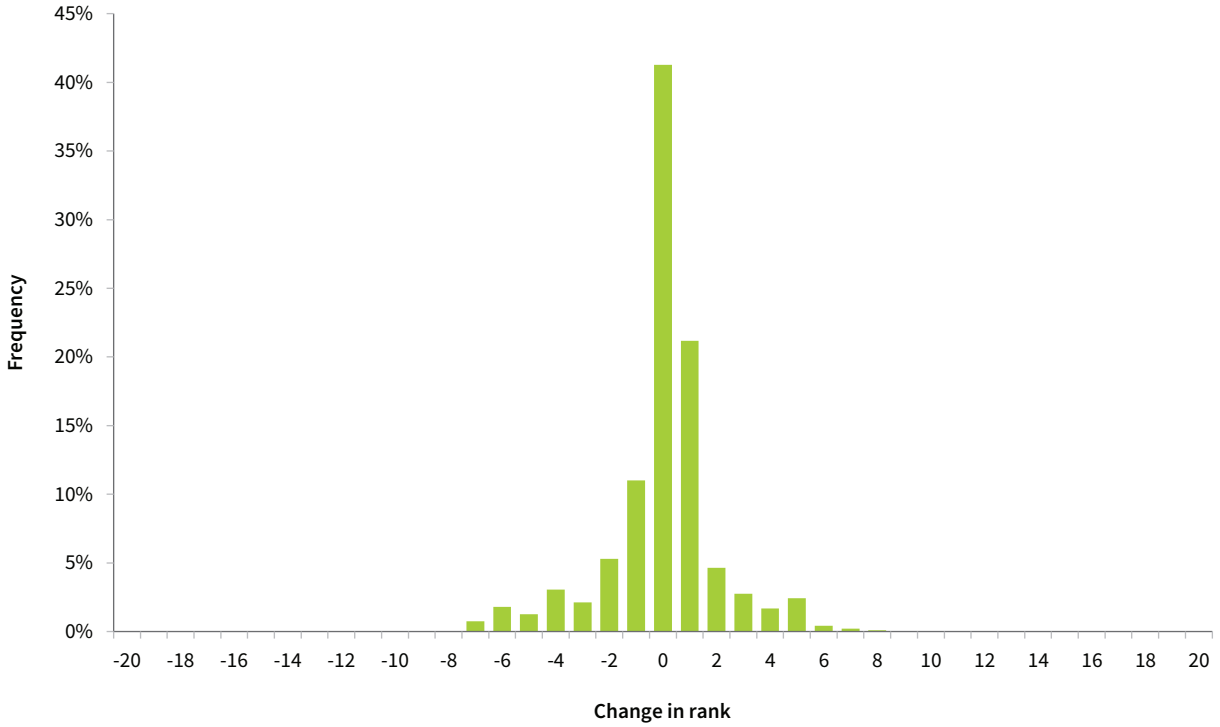
Source: *Authors*

The Industrial Relations Index is composed of 4 dimension indices, 11 subdimension indices and 53 indicators, all of them with a range of 0–100. The higher the score, the better the performance of the industrial relations system. This hierarchical structure in dimensions and subdimensions provides not only an overall index, but also a set of indices to identify the most important features in the national industrial relations systems and their strengths and weaknesses.

Robustness and consistency

The multimodelling approach, based on the use of a number of methodology options that respect both the theoretical framework and the data properties, achieves two aims. First, it reduces the subjectivity in the selection of the formula used to compute the Industrial Relations Index because the formula is obtained using a statistical model chosen from among a set of alternatives. Second, the multimodelling approach provides the most robust index, meaning that its scores depend more on the values of the indicators used in its computation than on the formula used.

Figure 4: Industrial Relations Index – Distribution of differences in country ranks between chosen formula and other formulae



Source: *Authors*

The quality assessment of the Industrial Relations Index carried out shows its robustness and consistency. Figure 4 presents the distribution of the differences between the Industrial Relations Index country ranking and the ranking provided by the other 35 formulae tested. The graph summarises the robustness of the Industrial Relations Index in respect of the options considered. It shows a clear peak around zero, which represents no differences in country ranks, which is a sign of robustness. Overall, 41% of cases have not shifted positions and keep the same country rank, while in 32% of cases the shift in rank is of one position and in 10% of cases the shift is of two positions.

Finally, the structure of the Industrial Relations Index was assessed using the correlation matrix of the index, its dimensions, its subdimensions and its indicators. The matrix proves the structure is sound by showing the contribution of all subdimensions to their respective dimensions and also the significant correlations that the dimensions and subdimensions have with the Industrial Relations Index, with the exception of one subdimension belonging to the social justice dimension.[5]

All these results prove that the Industrial Relations Index is a robust and consistent tool that allows for an analytical and comparative analysis of the industrial relations systems over time and between the Member States; it may possibly serve as a guide for supporting policymakers and the social partners at EU and national levels.

Assessment of changes

This section concludes with an assessment of the process of revisiting, revising and updating the four key dimensions indices, with a focus on changes in their structure (subdimensions and indicators).

The updated indices have been substantially changed with the inclusion of new indicators: out of the 53 indicators included in these indices, 18 indicators are new. The dimension that underwent the most changes with regard to the indicators is quality of work and employment.

In two dimensions (industrial competitiveness and social justice) changes in the structure are limited. Some initial indicators were discarded due to quality issues, and some new indicators have been included. However, there were no significant changes to the overall structure of these indices. It is worth noting that the reliability of the indices for both dimensions

5 The correlation matrix is available from the authors on request.

can be assessed by exploring their correlation with other well-established indices (the GCI and the SJI). In both cases, the correlation is very high (similar to the correlation in the 2018 Eurofound study). These high correlations are an external validation of the accuracy of the results obtained.

The dimension quality of work and employment has changed substantially in structure. The new subdimensions appear to be more closely related to current debates about emerging axes of inequality and discrimination. The new subdimension of job quality reflects the divide between good-quality and poor-quality jobs, related to income development, career prospects, work–life balance and overall job quality. All these aspects are based on workers' own assessments of job quality through the EWCS. The inclusion of new indicators related to gender gaps (participation and part-time work) addresses an important conceptual gap. Interestingly, high levels of unsocial working time are related to these gender gaps. To some extent, this may reflect gender differences in access to and use of flexible working time and gender segregation in certain jobs with different working time conditions.

The dimension of industrial democracy also shows some significant changes. While some meaningful indicators from the ECS were discarded due to quality issues, the quality assessment of the indicator collective bargaining coverage revealed serious comparability problems. It is estimated using different data sources and methods and, therefore, does not provide harmonised data for all EU countries. However, this indicator could not be replaced because alternative indicators based on surveys (the European Structure of Earnings Survey and the ECS) also showed significant weaknesses. On the positive side, new indicators measuring workers' legal rights have been included. These new indicators fill a conceptual gap regarding the legal dimension of industrial democracy: the updated index also measures workers' legal rights at macro level. In addition, it can be positively highlighted that there are no significant changes in the overall structure of the index, a fact that confirms its consistency despite relevant methodological changes in the sources of information. The updated index maintains the same structure, being based on three subdimensions: associational governance, social dialogue at company level and workers' rights (now including both macro and micro levels).

Main empirical results

Industrial relations

Figure 5 presents the scores for the Industrial Relations Index and its four key dimensions in the EU27 for 2018–2021. The left side of the figure shows Member States by their rank in industrial relations and uses a colour scale to show relative performance in each dimension (from green, indicating high, to red, indicating low).

The index shows that there are 12 countries with scores above the EU27 average: all the Nordic (Denmark, Finland and Sweden) and continental countries (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) plus Czechia, Ireland and Slovenia.

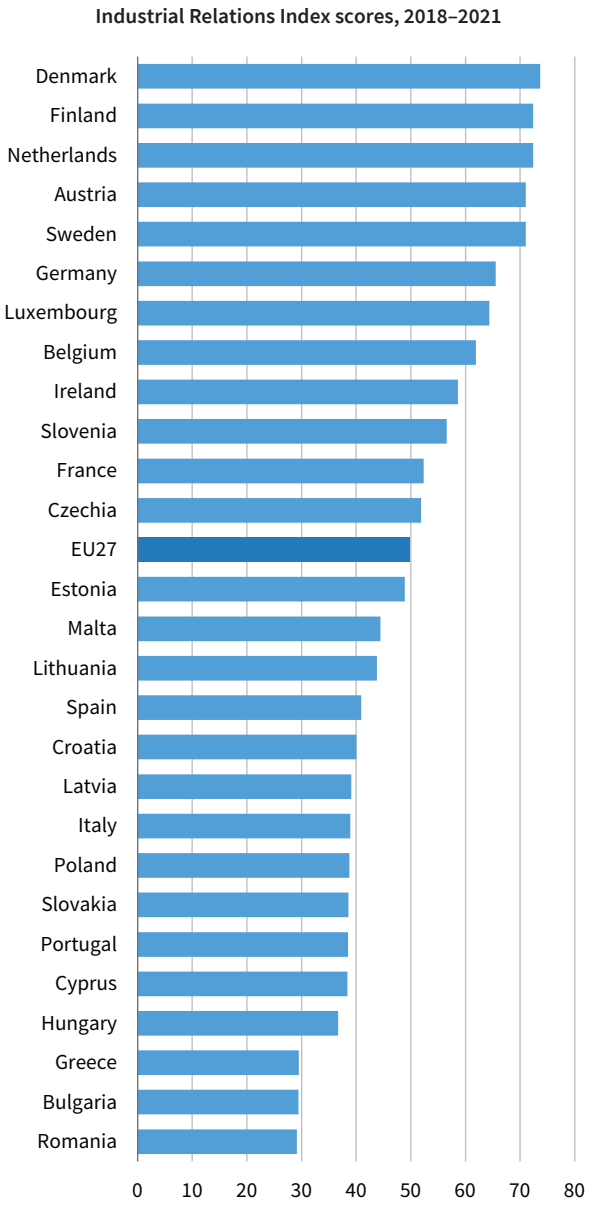
The scores are rather polarised. Austria, Denmark, Finland, the Netherlands and Sweden are the five best-performing countries (scoring above 70), while Bulgaria, Greece and Romania are ranked in the lowest three positions (scoring below 30).

The results obtained show a picture of relative balance among the four dimensions at the top and at the bottom of the ranking: countries that rank very high in the Industrial Relations Index perform in a balanced way in all four dimensions and so do countries that rank rather low on the Industrial Relations Index. To a certain extent, this is required for building a consistent index where all dimensions correlate. Moreover, the use of the geometric mean for aggregating dimensions into the global index allows for limited compensation. Therefore, a more imbalanced picture is expected among the countries that are closer to the EU27 average.

In this regard, it is worth noting the countries with prominent imbalances such as Estonia and Malta. They score comparatively high in quality of work and employment but rather low in the remaining three dimensions, particularly in industrial democracy. Spain can also be included in this group, as it scores comparatively high in industrial democracy and very low in social justice and quality of work and employment. Czechia and France also show marked imbalances due to very low scores in quality of work and employment but rather high scores in other dimensions (industrial democracy and industrial competitiveness in France and social justice in Czechia).

Figure 5: Industrial Relations Index scores, EU and Member States, 2018–2021

	Industrial relations	Industrial democracy	Industrial competitiveness	Social justice	Quality of work and employment
Denmark	73.7	81.0	72.9	72.1	69.2
Finland	72.4	77.1	73.7	74.3	65.0
Netherlands	72.4	78.2	75.4	71.3	65.3
Austria	71.1	77.6	70.5	66.5	70.1
Sweden	71.1	86.7	72.4	66.8	60.9
Germany	65.6	64.0	70.6	59.9	68.2
Luxembourg	64.3	70.7	65.4	52.4	70.7
Belgium	61.9	63.7	71.9	58.5	54.7
Ireland	58.6	49.8	58.5	66.9	60.6
Slovenia	56.6	61.4	48.2	62.3	55.6
France	52.4	64.0	66.2	51.2	34.7
Czechia	51.9	58.0	48.2	59.4	43.7
EU27	**49.9**	**53.6**	**49.9**	**50.5**	**48.1**
Estonia	48.9	33.4	49.4	54.9	63.1
Malta	44.5	36.0	40.1	46.5	58.1
Lithuania	43.8	41.0	39.2	46.8	48.9
Spain	40.9	58.5	45.6	29.4	35.7
Croatia	40.0	54.9	33.6	45.6	30.5
Latvia	39.1	33.1	33.2	44.6	47.8
Italy	38.9	49.9	50.9	30.4	29.8
Poland	38.8	36.0	34.5	53.5	33.9
Slovakia	38.6	48.2	34.6	48.3	27.5
Portugal	38.5	38.3	45.0	33.2	38.6
Cyprus	38.4	44.8	37.2	47.0	27.8
Hungary	36.7	29.9	35.3	37.0	46.5
Greece	29.5	37.1	35.5	25.2	22.8
Bulgaria	29.5	35.6	18.7	30.0	37.5
Romania	29.2	39.3	20.8	28.4	31.2



Source: *Authors*

Industrial democracy

Figure 6 presents the scores for the Industrial Democracy Index and its three subdimensions in the EU27 for 2018–2021.

The index shows that there are 13 countries with scores above the EU27 average: all the Nordic countries (Denmark, Finland and Sweden) and continental countries (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) plus Croatia, Czechia, Slovenia and Spain. Again, the index shows a picture of polarisation, with marked differences between the five best-performing countries (Austria, Denmark, Finland, the Netherlands and Sweden), which have scores above 70, and the three countries ranked in the last three positions and scoring below 35 (Estonia, Hungary and Latvia).

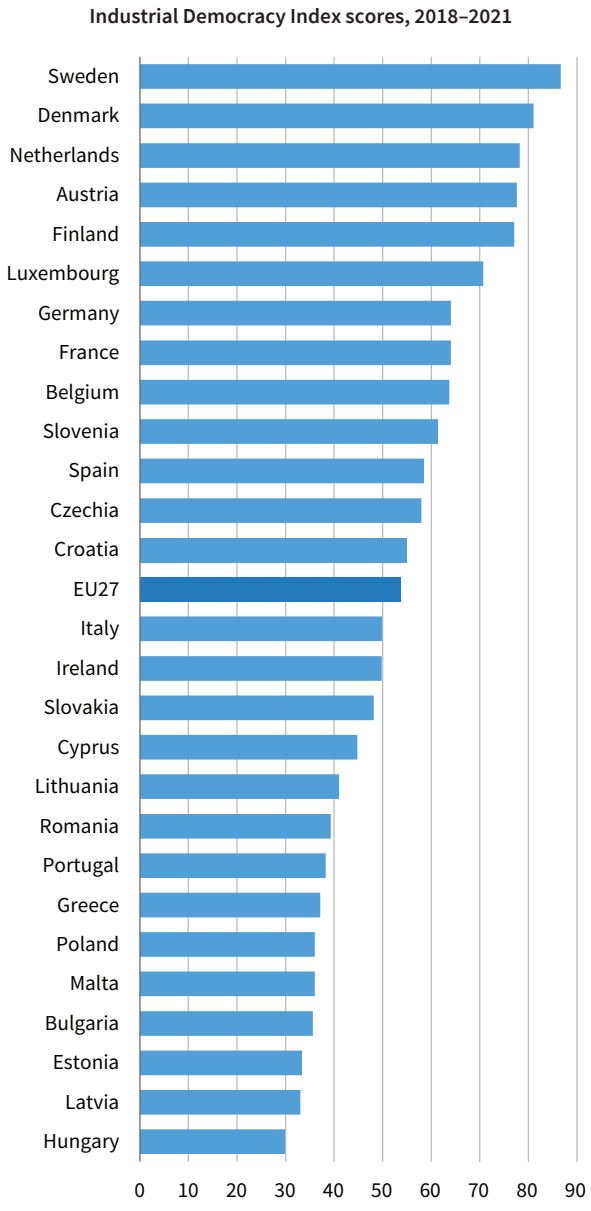
The results obtained in the three subdimensions show a picture of relative balance for countries placed in the highest and lowest positions (except for Hungary in respect of workers' rights). This is related to the

correlation of the subdimensions and the use of the harmonic mean for aggregating subdimensions into dimensions, which allows for limited compensation.

However, there are some countries with clear imbalances. Cyprus, Italy and Malta score comparatively high in associational governance, while having a rather low performance in the other two subdimensions, particularly in workers' rights. Similarly, Portugal scores high in associational governance and, to a lesser extent, in workers' rights, but has a very low performance in social dialogue at company level. Bulgaria, Lithuania and, especially, Romania also show imbalances, as they score comparatively high in social dialogue at company level and very low in workers' rights. Finally, Hungary and Slovakia score comparatively high in workers' rights and low (very low in the case of Hungary) in associational governance.

Figure 6: Industrial Democracy Index scores, EU and Member States, 2018–2021

	Industrial democracy	*Associational governance*	*Social dialogue at company level*	*Workers' rights*
Sweden	86.7	80.4	82.7	100.0
Denmark	81.0	80.8	74.5	87.0
Netherlands	78.2	71.4	71.5	96.5
Austria	77.6	82.4	57.6	95.5
Finland	77.1	69.5	79.5	87.0
Luxembourg	70.7	69.3	76.5	68.6
Gerrmany	64.0	50.8	63.8	95.5
France	64.0	50.2	75.0	83.5
Belgium	63.7	83.6	68.7	47.2
Slovenia	61.4	57.9	49.0	83.5
Spain	58.5	58.1	50.1	67.5
Czechia	58.0	53.8	50.0	74.0
Croatia	54.9	48.8	45.4	79.9
EU27	**53.6**	**54.5**	**54.4**	**61.9**
Italy	49.9	67.6	50.1	37.5
Ireland	49.8	48.9	50.8	50.1
Slovakia	48.2	38.6	47.8	70.5
Cyprus	44.8	66.4	38.1	35.1
Lithuania	41.0	41.4	61.0	32.7
Romania	39.3	31.2	78.9	37.5
Portugal	38.3	62.9	17.3	65.7
Greece	37.1	40.7	27.0	44.8
Poland	36.0	30.3	35.9	47.5
Malta	36.0	63.0	28.3	27.1
Bulgaria	35.6	40.4	60.4	24.5
Estonia	33.4	32.7	47.0	28.0
Latvia	33.1	32.5	36.6	31.6
Hungary	29.9	17.8	45.4	73.4



Source: *Authors*

Industrial competitiveness

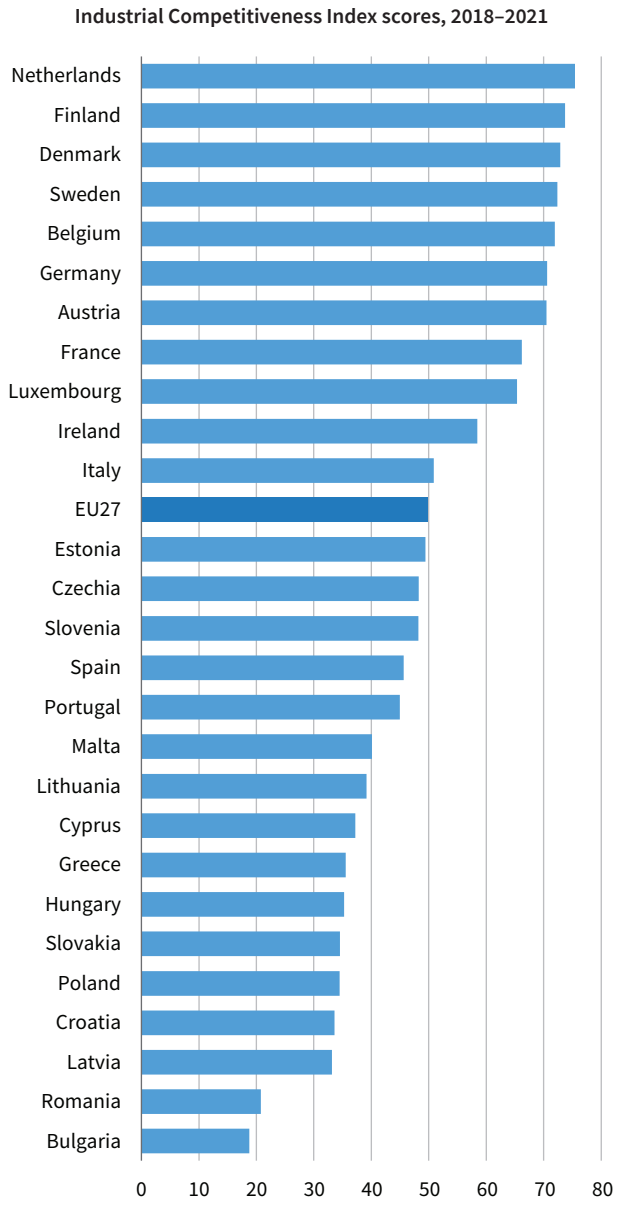
Figure 7 presents the scores for the Industrial Competitiveness Index and its two subdimensions in the EU27 for 2018–2021.

The index shows that there are 11 countries with scores above the EU27 average: all the Nordic countries (Denmark, Finland and Sweden) and continental countries (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) plus Ireland and Italy. Denmark, Finland and the Netherlands are ranked in the three highest positions, while Bulgaria and Romania are ranked in the lowest positions and score around 20, considerably less than other countries below the EU27 average.

The results obtained in the two subdimensions show a high level of balance. Italy appears to be the most imbalanced country, as it scores substantially lower in inclusive growth and innovation than in efficiency and sophistication of resources. Malta is also rather imbalanced, but with a substantially lower score in efficiency and sophistication of resources than in inclusive growth and innovation.

Figure 7: Industrial Competitiveness Index scores, EU and Member States, 2018–2021

	Industrial competitiveness	*Inclusive growth and innovation*	*Efficiency and sophistication of resources*
Netherlands	75.4	73.3	77.7
Finland	73.7	76.0	71.6
Denmark	72.9	80.9	66.3
Sweden	72.4	71.2	73.6
Belgium	71.9	64.9	80.7
Germany	70.6	62.1	81.7
Austria	70.5	65.7	76.0
France	66.2	61.2	72.1
Luxembourg	65.4	81.5	54.5
Ireland	58.5	74.2	48.2
Italy	50.9	41.3	66.3
EU27	**49.9**	**49.6**	**51.9**
Estonia	49.4	46.4	52.9
Czechia	48.2	41.3	57.9
Slovenia	48.2	43.7	53.7
Spain	45.6	47.5	43.9
Portugal	45.0	44.8	45.1
Malta	40.1	54.3	31.8
Lithuania	39.2	38.4	40.0
Cyprus	37.2	40.1	34.8
Greece	35.5	29.6	44.4
Hungary	35.3	29.0	44.9
Slovakia	34.6	33.2	36.1
Poland	34.5	30.5	39.8
Croatia	33.6	29.7	38.8
Latvia	33.2	36.6	30.3
Romania	20.8	24.1	18.3
Bulgaria	18.7	18.5	19.0



Source: *Authors*

Social justice

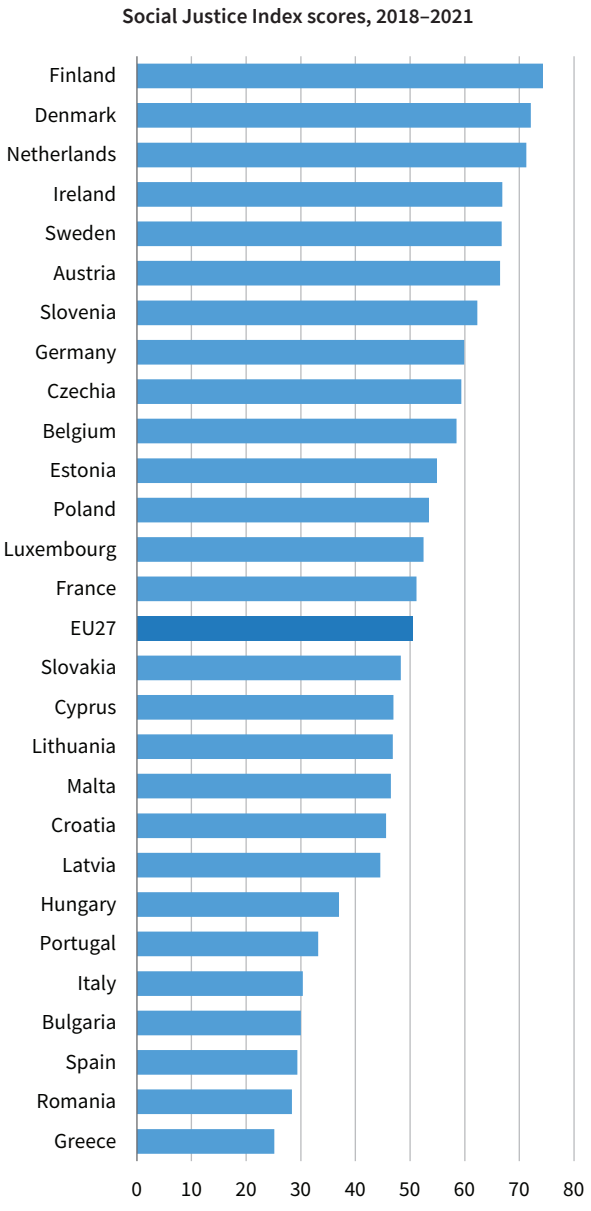
Figure 8 presents the scores for the Social Justice Index and its three subdimensions in the EU27 for 2018–2021.

The index shows that there are 14 countries with scores above the EU27 average: all the Nordic (Denmark, Finland and Sweden) and continental countries (Austria, Belgium, France, Germany, Luxembourg and the Netherlands) plus Czechia, Estonia, Ireland, Poland and Slovenia. Denmark, Finland and the Netherlands are the three best-performing countries, while Greece, Romania and Spain are in the three lowest positions.

The results obtained in the three subdimensions show a rather balanced picture, although some countries show imbalances. Croatia, Estonia, Latvia and Lithuania score comparatively high in equality of opportunities in education, but rather low in the other two subdimensions. Malta also shows an imbalanced picture, as it scores comparatively high in social cohesion and non-discrimination, and very low in equality of opportunities in education. Slovakia and Czechia have very high scores in poverty and income inequality and equality of opportunities in education, but comparatively low performances in social cohesion and non-discrimination (especially in the case of Slovakia).

Figure 8: Social Justice Index scores, EU and Member States, 2018–2021

	Social justice	*Poverty and income inequality*	*Social cohesion and non-discrimination*	*Equality of opportunities in education*
Finland	74.3	81.8	70.0	72.9
Denmark	72.1	72.2	73.8	69.5
Netherlands	71.3	66.7	84.1	61.3
Ireland	66.9	74.3	62.3	66.2
Sweden	66.8	65.9	66.2	69.0
Austria	66.5	67.6	65.0	67.5
Slovenia	62.3	81.2	48.9	73.0
Germany	59.9	53.5	64.9	61.8
Czechia	59.4	81.2	42.9	82.8
Belgium	58.5	73.3	52.6	54.2
Estonia	54.9	46.0	54.1	76.6
Poland	53.5	61.6	42.0	74.2
Luxembourg	52.4	50.6	51.7	56.4
France	51.2	64.4	48.0	43.9
EU27	**50.5**	**55.7**	**48.3**	**58.1**
Slovakia	48.3	79.9	32.1	70.3
Cyprus	47.0	59.8	38.2	52.1
Lithuania	46.8	37.8	45.5	74.0
Malta	46.5	51.7	58.5	31.5
Croatia	45.6	48.5	36.5	68.8
Latvia	44.6	32.3	48.7	70.1
Hungary	37.0	63.9	24.5	52.1
Portugal	33.2	42.1	41.1	20.7
Italy	30.4	34.9	30.6	25.7
Bulgaria	30.0	25.0	27.9	49.6
Spain	29.4	34.1	43.0	17.2
Romania	28.4	18.2	35.3	49.1
Greece	25.2	36.1	15.9	58.3



Source: *Authors*

Quality of work and employment

Figure 9 presents the scores for the Quality of Work and Employment Index and its three subdimensions in the EU27 for 2018–2021.

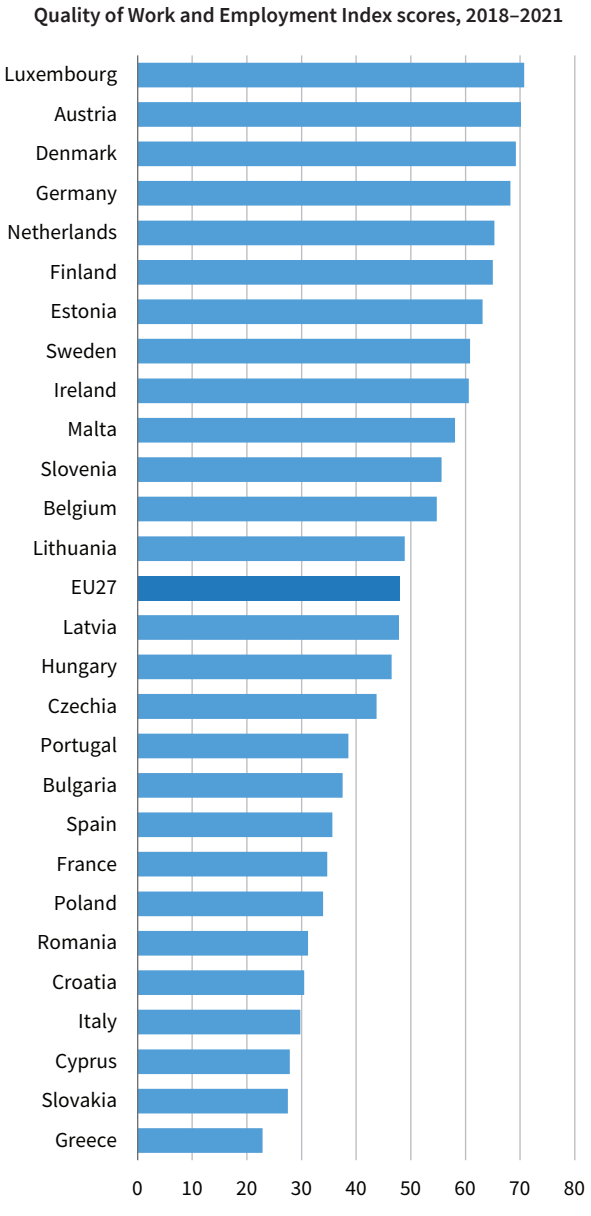
The index shows that there are 13 countries with scores above the EU27 average: all the Nordic countries (Denmark, Finland and Sweden) and almost all continental countries (Austria, Belgium, Germany, Luxembourg and the Netherlands, but not France) plus Estonia, Ireland, Lithuania, Malta, and Slovenia.

Austria, Denmark and Luxembourg are the three best-performing countries, while Cyprus, Greece and Slovakia are ranked in the three lowest positions.

The results obtained in the three subdimensions show a rather balanced picture, although some countries show imbalances. Romania appears to be the most imbalanced country: it has the highest score in job quality, but scores rather low in working time and gender gaps and very low in employment security and skills (the second worst score). To a lesser extent,

Figure 9: Quality of Work and Employment Index scores, EU and Member States, 2018–2021

	Quality of work and employment	Employment security and skills	Job quality	Working time and gender gaps
Luxembourg	70.7	71.4	72.5	67.3
Austria	70.1	74.3	79.9	55.0
Denmark	69.2	64.4	72.1	76.4
Germany	68.2	77.1	68.7	54.9
Netherlands	65.3	67.0	78.2	51.3
Finland	65.0	80.4	50.9	64.3
Estonia	63.1	61.4	66.2	62.7
Sweden	60.9	60.7	50.2	85.7
Ireland	60.6	80.7	48.0	52.9
Malta	58.1	60.8	61.4	50.0
Slovenia	55.6	48.7	68.9	57.4
Belgium	54.7	54.7	48.9	65.3
Lithuania	48.9	43.9	44.0	78.0
EU27	**48.1**	**48.0**	**50.9**	**56.9**
Latvia	47.8	40.9	49.1	68.6
Hungary	46.5	37.8	53.8	64.7
Czechia	43.7	38.3	47.0	53.9
Portugal	38.6	37.0	30.7	67.4
Bulgaria	37.5	25.3	64.8	63.0
Spain	35.7	31.9	34.7	48.9
France	34.7	54.9	18.4	61.6
Poland	33.9	34.5	27.4	47.5
Romania	31.2	20.4	81.6	40.9
Croatia	30.5	22.2	42.3	49.1
Italy	29.8	30.0	31.3	27.5
Cyprus	27.8	19.3	38.8	55.7
Slovakia	27.5	27.7	20.1	52.9
Greece	22.8	29.5	25.5	14.3



Source: *Authors*

the imbalance is also significant in Bulgaria, which scores rather low in employment security and skills but scores comparatively high in the other subdimensions. Finland and Ireland score very high in employment security and skills but comparatively low in the other subdimensions. Belgium, France and Sweden have rather high scores in working time and gender gaps (Sweden has the highest score), but rather low scores (with France having the lowest score) in job quality. Portugal and, to a lesser extent, Lithuania, Latvia and Hungary are also noteworthy, as they score comparatively high in working time and gender gaps but show low performances in the remaining two subdimensions.

As expected, countries ranking high or low in the index show quite a balanced performance in all three subdimensions. However, among the countries performing above the EU27, it should be noted that Austria, Germany and the Netherlands score comparatively low in working time and gender gaps but perform very well in the other two subdimensions.

2 Measuring trends and patterns of change in industrial democracy

This chapter presents the main concepts, methods and results related to the second specific objective of the study: to carry out a cross-time analysis of the Industrial Democracy Index from 2008 to 2021, with a focus on upward or downward convergence or divergence trends at national level.

Industrial Democracy Index – Dynamic analysis

Methodology

To carry out a longitudinal analysis of the industrial democracy dimension, an updated dashboard of all normative indicators was built, covering 2008–2021. This dashboard uses data from the OECD/AIAS ICTWSS 2021 database (see Annex 1 for further details).

When building this dashboard, the first decision to be made was about time aggregation. Three possibilities for year ranges were tested, taking into account contextual factors (specifically, the economic crisis) and data availability in the most recent years.

1. **2008–2012, 2013–2017 and 2018–2021**: This is the most coherent option, as it maintains the two year ranges analysed in the previous study (during the crisis versus post-crisis) and adds a third one based on the most recent data. The problem with this option is that the most recent data (2018–2021) correspond mainly to the years 2018 and 2019. Data for 2021 are available for only two indicators (management holds regular meetings at which employees can express their views about the organisation and ratification of ILO core labour standards).
2. **2008–2012, 2013–2016 and 2017–2021**: In this case, the data are distributed in a more balanced way between the second and third year ranges. The first year range remains the same in order to consider the impact of the economic crisis.
3. **2008–2011, 2012–2015 and 2016–2021**: This option balances the data perfectly between the three year ranges. The main problem is that it does not enable the impact of the economic crisis (2008–2012) to be considered.

To test the three alternatives, a PCA was carried out. The results of the Kaiser–Meyer–Olkin test are very similar for the three options tested (all above 0.7). Moreover, it is worth highlighting that for options 1 and 2, the indicators are grouped into the same three subdimensions as in the 2018 Eurofound study (Eurofound, 2018a). For option 3, the structure of industrial democracy in terms of subdimensions is slightly different.

In light of these results, it was decided to follow the first option for time aggregation, thus considering three year ranges: 2008–2012, 2013–2017 and 2018–2021. Since this option entails an imbalance in terms of the number of years covered in each period, two weighting alternatives were tested:

- weighting values of each year range according to the number of years actually covered, and then applying a PCA
- applying an unweighted PCA

The results of both options were fully consistent. Accordingly, we applied the unweighted PCA.

Trends, 2008–2021

Table 25 shows the scores on the Industrial Democracy Index in each year range for the Member States and the absolute variations. Variations of more than 1 standard deviation above the EU27 mean are shown in green and those of more than 1 standard deviation below the mean are in shown in red. The Member States that record the highest decreases in industrial democracy performance (more than 1 standard deviation below the mean) for the whole period are Greece, Hungary, Malta, Romania and Slovenia. In the cases of Greece and Slovenia, the decreases are spread equally over the two subperiods analysed (2008–2012 to 2013–2017 and 2013–2017 to 2018–2021), while in the cases of Hungary, Malta and Romania, they are concentrated in the first subperiod (2008–2012 to 2013–2017). As explained in more detail below, different trends in each of the three industrial democracy subdimensions explain the overall negative trend recorded in these countries (for example, the big decrease in associational governance in Greece and the pronounced worsening of workers' rights in Malta).

The Member States with the most marked improvement during the whole period (more than 1 standard deviation above the mean) are Czechia, France, Lithuania, Poland and Slovakia. In France and Slovakia, the increase is mainly concentrated in the first subperiod (2008–2012 to 2013–2017). In Czechia, Lithuania and Poland, the highest increase is recorded in the second subperiod (2013–2017 to 2018–2021). In all these countries except France and Lithuania, this positive trend is mainly explained by an improvement in the indicator measuring the social partners' routine involvement in social dialogue.

Table 25: Industrial Democracy Index scores and absolute variation, by Member State and year range, 2008–2021

	Scores			Absolute variation		
	2008–2012	2013–2017	2018–2021	2008–2012 to 2013–2017	2013–2017 to 2018–2021	2008–2012 to 2018–2021
Austria	76.63	77.13	77.59	0.50	0.46	0.96
Belgium	59.52	60.92	63.72	1.39	2.81	4.20
Bulgaria	35.01	36.00	35.64	1.00	-0.36	0.64
Croatia	55.83	55.10	54.88	-0.73	-0.22	-0.94
Cyprus	44.81	45.28	44.77	0.47	-0.51	-0.04
Czechia	49.25	51.83	57.97	2.58	6.14	8.72
Denmark	83.41	83.64	81.02	0.22	-2.62	-2.40
Estonia	29.54	32.56	33.40	3.02	0.85	3.87
Finland	76.44	77.42	77.09	0.98	-0.33	0.65
France	54.32	62.27	64.01	7.95	1.75	9.69
Germany	61.32	63.10	64.05	1.77	0.95	2.73
Greece	45.50	40.51	37.12	-4.99	-3.39	-8.38
Hungary	38.11	29.05	29.87	-9.06	0.82	-8.24
Ireland	51.99	50.15	49.78	-1.84	-0.37	-2.22
Italy	47.87	48.10	49.88	0.23	1.78	2.01
Latvia	30.32	32.79	33.08	2.47	0.29	2.76
Lithuania	33.67	34.83	41.04	1.15	6.22	7.37
Luxembourg	68.49	68.64	70.71	0.15	2.07	2.22
Malta	45.24	36.92	36.03	-8.32	-0.89	-9.21
Netherlands	79.15	79.13	78.20	-0.01	-0.93	-0.94
Poland	28.12	30.99	36.05	2.87	5.06	7.93
Portugal	33.69	35.24	38.29	1.56	3.05	4.60
Romania	51.05	38.62	39.33	-12.42	0.70	-11.72
Slovakia	41.41	50.45	48.17	9.03	-2.28	6.75
Slovenia	70.59	65.88	61.41	-4.71	-4.47	-9.18
Spain	62.71	60.66	58.49	-2.05	-2.17	-4.22
Sweden	81.21	85.44	86.67	4.23	1.23	5.46
EU27	**53.16**	**53.06**	**53.64**	**-0.09**	**0.58**	**0.48**

Note: *Red indicates values more than 1 standard deviation below the EU27 mean; green indicates values more than 1 standard deviation above the EU27 mean.*
Source: *Authors*

Table 26 shows the scores on the subdimensions of the Industrial Democracy Index for the first (2008–2012) and third (2018–2021) year ranges and the absolute variation by country. Variations above 1 standard deviation from the EU27 mean are highlighted in green and those below 1 standard deviation from the mean are shown in red.

There is significant variability between the subdimensions across countries. Few countries improve in more than one subdimension, and there are several

Table 26: Industrial Democracy Index scores, by subdimension and Member State, 2008–2021

	Associational governance			Social dialogue at company level			Workers' rights		
	2008–2012	2018–2021	Absolute variation 2008–2012 to 2018–2021	2008–2012	2018–2021	Absolute variation 2008–2012 to 2018–2021	2008–2012	2018–2021	Absolute variation 2008–2012 to 2018–2021
Austria	81.45	82.39	0.94	56.87	57.57	0.70	94.20	95.54	1.34
Belgium	83.07	83.56	0.49	71.15	68.71	-2.44	40.30	47.16	6.86
Bulgaria	37.20	40.44	3.25	60.16	60.44	0.28	25.23	24.48	-0.76
Croatia	48.00	48.77	0.77	47.81	45.39	-2.42	83.26	79.94	-3.32
Cyprus	67.31	66.43	-0.88	42.31	38.07	-4.25	32.63	35.10	2.47
Czechia	36.57	53.79	17.22	49.43	49.99	0.56	86.53	74.04	-12.49
Denmark	80.61	80.82	0.21	84.25	74.47	-9.78	86.53	87.02	0.49
Estonia	25.83	32.74	6.91	55.37	47.04	-8.33	25.23	28.02	2.78
Finland	69.46	69.46	0.00	77.37	79.54	2.17	86.53	87.02	0.49
France	45.84	50.22	4.38	68.28	75.05	6.77	58.92	83.48	24.56
Germany	48.74	50.76	2.02	58.80	63.84	5.04	95.02	95.54	0.52
Greece	53.92	40.74	-13.18	36.16	26.97	-9.19	45.45	44.79	-0.65
Hungary	27.35	17.79	-9.56	33.99	45.35	11.36	91.34	73.45	-17.89
Ireland	52.07	48.92	-3.14	55.46	50.80	-4.66	49.57	50.11	0.53
Italy	66.02	67.63	1.61	41.88	50.10	8.21	38.71	37.46	-1.25
Latvia	26.96	32.48	5.52	40.52	36.56	-3.96	29.36	31.56	2.20
Lithuania	33.36	41.37	8.02	62.55	61.04	-1.51	25.23	32.69	7.45
Luxembourg	68.54	69.29	0.74	66.76	76.48	9.73	69.78	68.60	-1.19
Malta	55.14	62.96	7.82	34.66	28.30	-6.36	45.45	27.09	-18.35
Netherlands	72.29	71.41	-0.88	72.99	71.51	-1.48	96.73	96.46	-0.27
Poland	18.65	30.27	11.62	42.49	35.93	-6.56	45.45	47.49	2.04
Portugal	48.87	62.89	14.03	15.75	17.34	1.59	63.05	65.74	2.69
Romania	56.69	31.19	-25.50	68.89	78.86	9.97	38.71	37.46	-1.25
Slovakia	26.68	38.58	11.90	59.02	47.77	-11.25	77.60	70.50	-7.10
Slovenia	67.73	57.93	-9.81	62.32	49.04	-13.28	83.26	83.48	0.22
Spain	62.86	58.09	-4.77	58.25	50.11	-8.14	66.32	67.55	1.23
Sweden	71.93	80.42	8.49	78.41	82.66	4.25	100.00	100.00	0.00
EU27	**53.08**	**54.49**	**1.42**	**55.63**	**54.41**	**-1.22**	**62.24**	**61.92**	**-0.32**

Note: *Red indicates values below the EU27 mean by more than 1 standard deviation; green indicates values above the EU27 mean by more than 1 standard deviation.*
Source: *Authors*

with a pronounced improvement in one dimension but a high decrease in another. The following patterns can be identified.

- **A pronounced increase in one subdimension (above 1 standard deviation) combined with a more moderate change in the other two subdimensions**: This applies to Italy, Lithuania, Luxembourg, Poland and Portugal. In Poland and Portugal, the positive trends are recorded in the associational governance subdimension (mainly because of an increase in the indicator measuring the social partners' routine involvement in social dialogue). In Italy and Luxembourg, the improvements are recorded in the subdimension measuring social dialogue at company level (mainly because of an increase in the indicator measuring whether management holds regular meetings at which employees can express their views about the organisation). In Lithuania, the improvement is recorded in the subdimension measuring the scope of workers' rights.
- **A pronounced improvement in two subdimensions (above 1 standard deviation), combined with a more moderate change in the third dimension**: France records a significant increase in social dialogue at company level and in workers' rights.
- **A large decrease in one subdimension (below 1 standard deviation) combined with more moderate changes in the remaining two**: This applies to Denmark, Estonia and Spain, which have marked decreases in the subdimension of social dialogue at company level, and to Malta, where there is a pronounced deterioration in terms of workers' rights.
- **A large decrease in two subdimensions (below 1 standard deviation) combined with some stability in the third dimension**: This mainly applies to Greece and Slovenia, which have large decreases (more than 9 points) in associational governance and social dialogue at company level and stability in workers' rights.
- **A markedly positive trend in one subdimension (above 1 standard deviation), which contrasts with a markedly negative trend in another (below 1 standard deviation)**: This applies in Czechia (positive trend in associational governance and negative trend in workers' rights), Romania (positive trend in social dialogue at company level and negative trend in associational governance) and Slovakia (positive trend in associational governance and negative trend in social dialogue at company level).
- **A clearly positive trend in one subdimension (above 1 standard deviation) but a pronounced negative in the other two (below 1 standard deviation)**: Hungary improves in social dialogue at company level but regresses in associational governance and workers' rights.

Industrial Democracy Index upward/downward convergence/divergence analysis

In the context of rising concerns about economic and social disparities among the EU Member States, since 2017 Eurofound has committed itself to investigating whether or not socioeconomic trends are converging or diverging across the Member States (Eurofound, 2018c). The cross-time analysis carried out in this study follows this methodological approach (see Annex 3 for further details).

First, the general trends of convergence or divergence are assessed at EU level in terms of a reduction or increase in the EU mean of the Industrial Democracy Index and in the level of disparities between Member States in respect of the index (measured by the standard deviation). Accordingly, four possible trends are defined, as shown in Table 27.

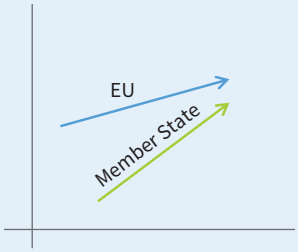
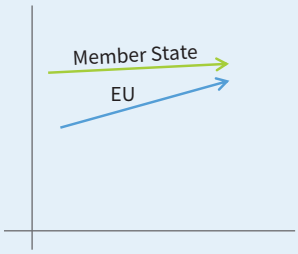
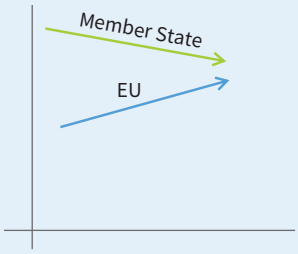
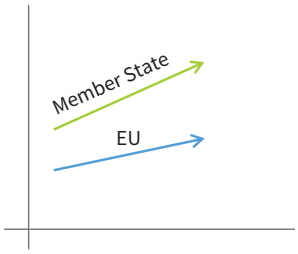
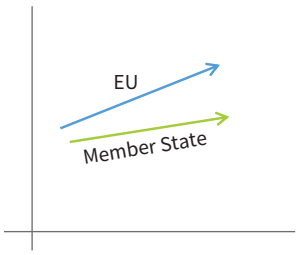
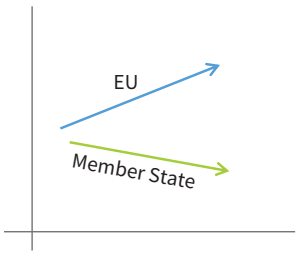
Second, the trends of convergence or divergence of individual Member States in comparison with the EU27 mean are assessed. To understand the dynamics of convergence or divergence at Member State level, all the possible convergence and divergence patterns are defined, as shown in Table 28.

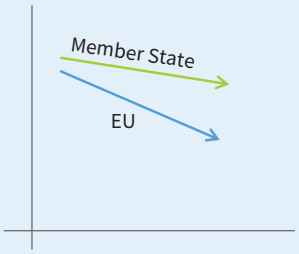
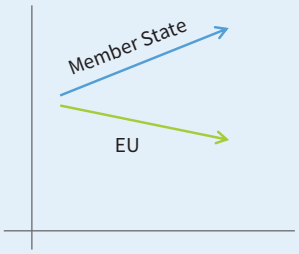
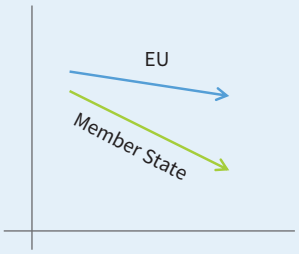
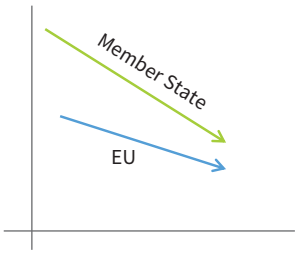
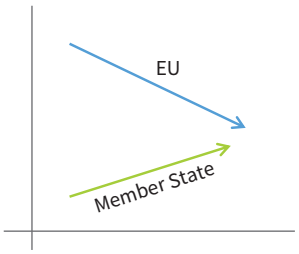
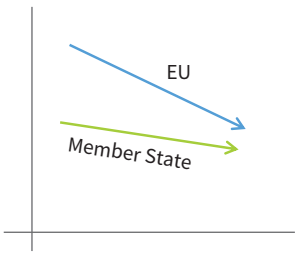
Table 27: General trend at EU level – Upward/downward convergence/divergence

Trend	Definition
Upward convergence	Increase in performance of the EU27 mean with a decrease in disparities between Member States (EU27 mean is growing and the standard deviation is decreasing)
Upward divergence	Increase in performance of the EU27 mean with an increase in disparities between Member States (EU27 mean is growing and the standard deviation is increasing)
Downward divergence	Decrease in performance of the EU27 mean with an increase in disparities between Member States (EU27 mean is falling and the standard deviation is increasing)
Downward convergence	Decrease in performance of the EU27 mean with a decrease in disparities between Member States (EU27 mean is falling and the standard deviation is decreasing)

Source: *Eurofound (2018c)*

Table 28: Upward/downward convergence/divergence patterns

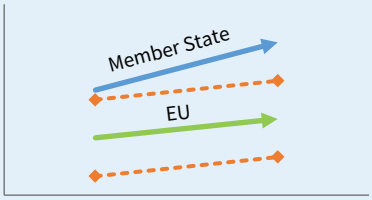
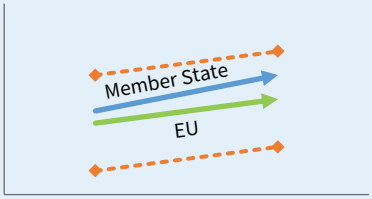
General trend	Pattern	Description	Visualisation
Upward convergence	Catching up	The performance of a Member State is initially lower than the EU average but grows more quickly and reduces the gap.	
	Flattening	The performance of a Member State is initially higher than the EU average but grows at a slower rate.	
	Inversion	The performance of a Member State is initially higher than the EU average but then performance declines, moving towards the EU average, which is rising.	
Upward divergence	Outperforming	The performance of a Member State is initially higher than the EU average and grows at a faster rate.	
	Slower pace	The performance of a Member State is initially lower than the EU average and grows at a slower rate, thus increasing the gap over time.	
	Diving	The performance of a Member State is initially lower than the EU average and declines while the EU average increases.	

General trend	Pattern	Description	Visualisation
Downward divergence	Defending better	The performance of a Member State and the EU average are falling, but the Member State's performance is falling at a slower rate.	
	Escaping	The performance of a Member State is initially higher than the EU average and grows while the EU average falls.	
	Falling away	The performance of a Member State is initially lower than the EU average and both are falling, but the Member State's performance is falling at a faster rate.	
Downward convergence	Underperforming	The performance of a Member State is initially higher than the EU average and both are falling, but the Member State's performance falls at a faster rate.	
	Recovering	The performance of a Member State is initially lower than the EU average but grows while the EU average falls.	
	Reacting better	The performance of a Member State is initially lower than the EU average and both are falling, but the Member State's performance is falling at a slower rate.	

Source: *Eurofound (2018c)*

Once the convergence or divergence patterns of the Member States are identified, the next step is to assess the magnitude of these patterns. Comparing the individual trends of Member States against the EU average alone does not take into account whether the deviation is significant or not.

Table 29: Examples of significant versus non-significant patterns

General trend	Pattern	Description	Figure
Upward divergence	Significant outperforming	The performance of a Member State is initially higher than the EU average and grows at a faster rate. The performance of the Member State is above 1 standard deviation from the EU average.	
	Non-significant outperforming	The performance of a Member State is initially higher than the EU average and grows at a faster rate. The performance of the Member State is below 1 standard deviation from the EU average.	

Note: *The orange lines indicate the interval of the EU average ± 1 standard deviation.*
Source: *Authors, based on Eurofound (2018c)*

To detect when a Member State's performance deviates significantly from the average, levels and changes for each year are converted to *z*-scores. The performance of Member States is then assessed by comparing the resulting *z*-scores against a set of predefined thresholds, which are set as standard deviation multiples. Given the property of normal distribution, 68% of the observations will fall within the interval from -1 to +1. Those Member States that fall within that confidence interval are considered to have quite stable performance. Those Member States crossing the -1 and +1 bands, on the other hand, are moving from the group of average performers towards the group of countries that are either significantly below or above average performance. To illustrate this point, Table 29 provides examples of significant and non-significant deviations for a diverging outperforming pattern.

Main empirical results

Upward/downward convergence/divergence patterns in EU27

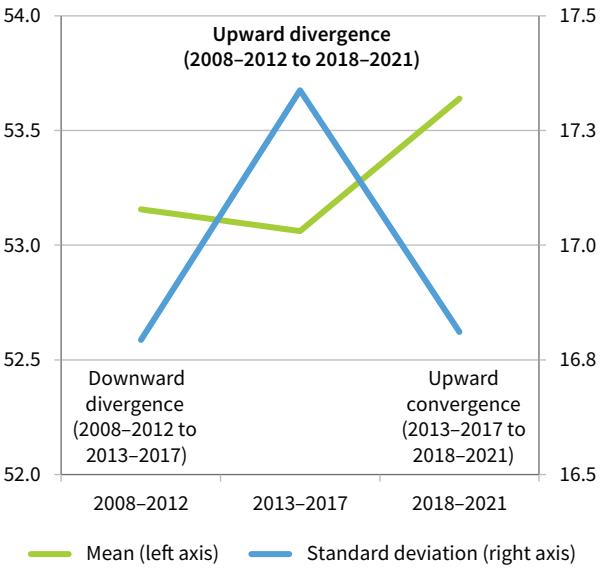
Table 30 shows the EU27 mean and standard deviation of the Industrial Democracy Index for the three year ranges analysed: 2008–2012, 2013–2017 and 2018–2021. In the first subperiod (from 2008–2012 to 2013–2017), we find downward divergence: the mean decreases (albeit very moderately), while the differences between countries increase (the standard deviation increases). In the second subperiod (from 2013–2017 to 2018–2021), the situation reverses, changing to upward convergence: the mean increases and the disparity between countries decreases. This improvement is enough to compensate for the decrease in the mean in the first subperiod but is not enough to compensate for the increase in the standard deviation. As a result, upward divergence is found when the whole period is considered (2008–2021), although very moderate (the mean increases by only about 0.5 points and the standard deviation is almost constant) – illustrated in Figure 10.

Table 30: Industrial Democracy Index – Mean and standard deviation, EU27, 2008–2021

		Mean	Standard deviation
Industrial Democracy Index	2008–2012	53.2	16.8
	2013–2017	53.1	17.3
	2018–2021	53.6	16.8
2008–2012 to 2013–2017	Absolute variation	-0.09	0.54
	Relative variation	0.00	0.03
	Trend	**Downward divergence**	
2013–2017 to 2018–2021	Absolute variation	0.58	-0.53
	Relative variation	0.01	-0.03
	Trend	**Upward convergence**	
2008–2012 to 2018–2021	Absolute variation	0.48	0.02
	Relative variation	0.01	0.00
	Trend	**Upward divergence**	

Source: *Authors*

Figure 10: Industrial Democracy Index – Mean and standard deviation, EU27, 2008–2021



Source: *Authors*

Upward/downward convergence/divergence patterns in the Member States

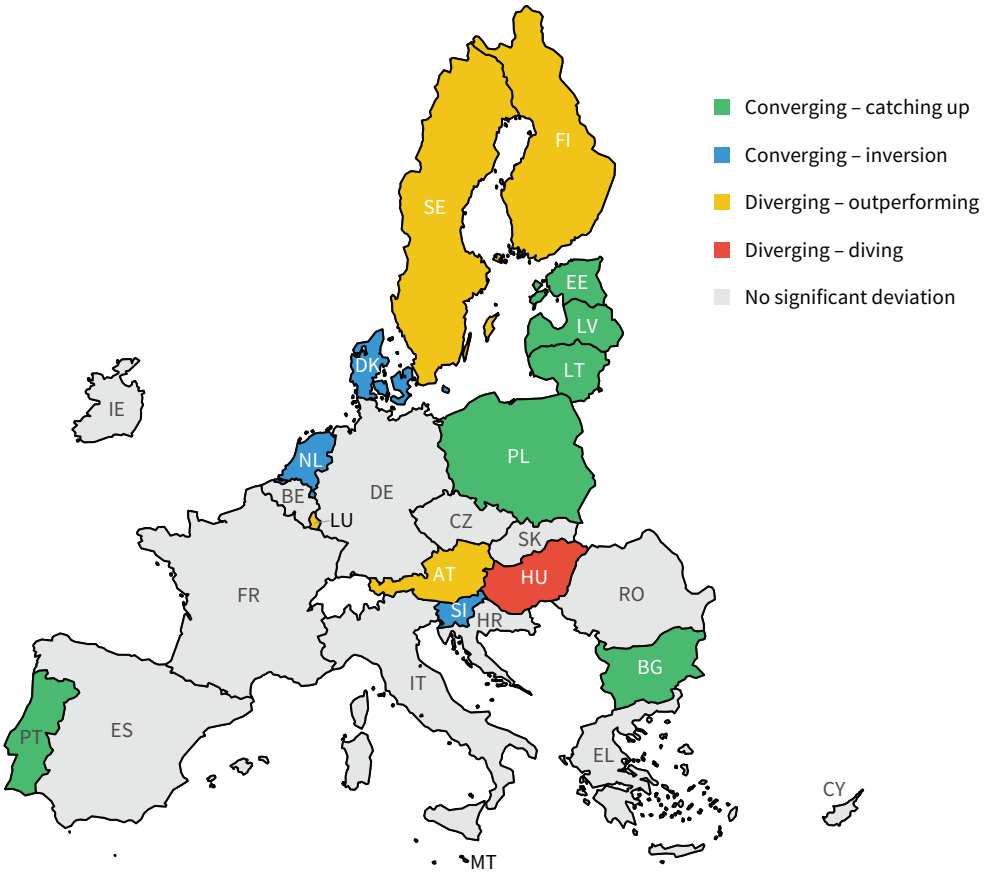
The main findings of the analysis on convergence/divergence patterns by Member State for 2008–2021 are shown in Table 31. It also indicates whether there are significant deviations from the EU27 average. As explained previously, country values above or below the confidence interval (EU27 average ± 1 standard deviation) at any point in time indicate a significant deviation. Conversely, if country values fall within this interval over the whole period analysed, the trend can be considered fairly stable around the EU27 average. These results are illustrated in Figure 11 (detailed results are provided in Annex 5, Figure A2).

Table 31: Industrial democracy convergence patterns in the Member States, 2008–2021

General trend	Pattern	Significant deviation over the whole period	Significant deviation for a year range	No significant deviation
Upward convergence	Catching up	Bulgaria Estonia Latvia Poland	Lithuania (2008–2012) Portugal (2008–2012)	Italy Slovakia
	Inversion	Denmark Netherlands	Slovenia (2008–2012)	Croatia Spain
Upward divergence	Outperforming	Austria Finland Sweden	Luxembourg (2018–2021)	Belgium Czechia France Germany
	Diving		Hungary (2013–2021) Malta (2018–2021)	Cyprus Greece Ireland Romania

Source: *Authors*

Figure 11: Industrial Democracy Index – Convergence and divergence patterns, EU Member States, 2008–2021



Source: *Authors*

Fifteen countries show a significant deviation from the EU average at least at some time over the whole period of 2008–2021. As indicated below, they are either converging towards the EU average or diverging away from it.

The nine countries that are converging follow two patterns.

- **Six countries are catching up**: Bulgaria, Estonia, Latvia, Lithuania, Poland and Portugal. Their performance was initially lower than the EU average but is growing more quickly and the gaps are decreasing. In spite of this positive converging trend, Bulgaria, Estonia, Latvia and Poland remain below the confidence interval over the whole period (although Bulgaria is very close). Lithuania and Portugal started (2008–2012) significantly below the EU average but have since moved into the confidence interval.
- **Three countries follow an inversion pattern**: Denmark, the Netherlands and Slovenia. Their performance was initially higher than the EU average but is declining, thus moving towards the EU average, which is rising. In spite of this negative trend, Denmark and the Netherlands remain significantly above the confidence interval over the whole period. Slovenia started (in 2008–2012) significantly above the EU average but has since moved into the confidence interval.

The six countries that are diverging also follow two patterns.

- **Four countries are outperforming**: Austria, Finland, Luxembourg and Sweden. Their performance was initially higher than the EU average and was growing at faster rates. Austria, Finland and Sweden remained significantly above the EU27 average over the whole period. Luxembourg was initially within the confidence interval (but very close to the upper band) and moved slightly above it in 2018–2021.

- **Two countries are diving**: Hungary and Malta. Their performance was initially lower than the EU average and it is declining, while the EU average is rising. Both countries were initially within the confidence interval but fell significantly below it over time (Hungary since 2013–2017 and Malta in 2018–2021).

The remaining 12 countries do not show a significant deviation from the EU average in the period analysed: Belgium, Croatia, Cyprus, Czechia, France, Germany, Greece, Ireland, Italy, Romania, Slovakia and Spain. Their trends can be considered fairly stable around the EU27 average.

3 Typology of national industrial relations systems

This chapter presents the main concepts, methods and results related to the third specific objective of the study: to update the typology of national industrial relations systems based on industrial democracy (performance and relevant characteristics) in order to contribute to the cross-country analysis of current evolving trends and relevant patterns of change from 2008 to 2021.

To complement the revision of the indices and the analyses of convergence and divergence, a typology of national industrial relations systems has been developed following the same conceptual and methodological approach as that adopted in the previous Eurofound study (Eurofound, 2018a).

While the main purpose of an index is to measure performance, a typology is a heuristic tool that helps to increase the understanding of cross-country diversity or similarity by grouping countries that share similar trends. A key criterion for building any typology is to have a clear conceptual understanding of its main purpose, what will be described and how it will be described. In this case, the main purpose of the typology is to enable a better understanding of country-specific diversity in industrial relations systems. For this reason, the typology aims to describe differences or similarities in the dimensions of industrial democracy by grouping countries with similar characteristics together. This means putting the emphasis on levels of performance in industrial democracy and on other information related to industrial relations actors, institutions and processes (Eurofound, 2018a).

Regarding how it will be described, the typology relies, as in the 2018 Eurofound study, on two kinds of indicators. First, it includes the 12 indicators of the Industrial Democracy Index, which allow the measurement of performance or quality in different aspects related to this dimension. Second, it includes contextual indicators that do not have a straightforward normative interpretation but help to provide a more nuanced picture of the state of play of industrial democracy in Europe. As in the 2018 Eurofound study, these contextual indicators address two aspects in particular: collective bargaining institutions or structures and the role played by the state in collective bargaining and wage regulation.

Clusters – Main characteristics

Methodology

The methodological steps for building a typology for this study follow the same OECD–JRC methodology as that used in the previous study (Eurofound, 2018a). The starting point is to have a clear purpose (why create a typology) and to rely on a sound conceptual approach to guide the selection of contextual indicators according to their relevance.

The second step is to apply the same strict conceptual and statistical quality criteria used to assess the normative indicators included in the dashboard (with the exception of the criterion that refers to clear normative interpretation). This step was challenging because of some conceptual problems in the available sources.

Table 32 shows the contextual indicators used in the 2018 Eurofound study, the updated sources and the results of the quality assessment. In the column 'Quality assessment', green means that the indicator meets the quality criteria, while yellow indicates quality concerns.

The assessment of indicators C4 (state intervention in collective bargaining) and C5 (extension mechanisms) revealed serious problems concerning accuracy, reliability and comparability criteria. These problems were further confirmed by the inconsistency of results when these two indicators were included in the cluster analysis. Accordingly, it was decided to discard both

Table 32: Industrial democracy contextual indicators 2018, sources and quality assessment

No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
C1	Degree of centralisation of collective bargaining	Eurofound	Eurofound	🟢
C2	Degree of collective wage coordination	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
C3	Statutory minimum wages	Eurofound	Eurofound	🟢
C4	State intervention in collective bargaining	ICTWSS	OECD/AIAS ICTWSS 2021	🟡
C5	Extension mechanisms	Eurofound	Eurofound	🟡

Note: *A green dot flags an indicator that meets the quality criteria and is included in the next steps; a yellow dot flags an indicator that does not fully meet the quality criteria, but that it is included in the next steps, along with alternative indicators.*
Source: *Authors, based on Eurofound (2018a)*

indicators. This, however, has serious implications for the usefulness of the updated typology – and, in general, for comparative research on industrial democracy. The relevance of both indicators is widely recognised in the literature analysing the diversity of industrial relations systems and patterns of change. It should be a priority to address the problems detected.

The next step in building the typology was to normalise the contextual indicators following the same method used as that used for the indicators in the index. Then, a PCA was carried out to explore the structure of the complete set of indicators, including the 3 contextual indicators and the 12 normative indicators used for computing the Industrial Democracy Index. Finally, a cluster analysis was applied. Further details about the quality assessment and the results of the multivariate techniques are presented in Annex 4.

Main empirical results

Dimensions and indicators

Based on the methodology previously described, three main empirical dimensions can be identified for mapping varieties of industrial democracy.

- **Associational governance**: This includes the five normative indicators that were included in this subdimension of the Industrial Democracy Index, which measure social partners' densities, collective bargaining coverage and whether the social partners are involved in the governance of employment relationships through bipartite bodies and social pacts. In addition, it includes the three contextual indicators that measure the coordination of collective bargaining, the predominant level at which collective agreements are concluded (the degree of centralisation) and the existence of a statutory minimum wage. These contextual indicators correlate closely with the normative indicators, adding information relevant for understanding collective bargaining coverage and concertation.
- **Social dialogue at company level**: This is the same subdimension as that included in the Industrial Democracy Index. It is made up of three indicators that measure the coverage of employee representative structures at workplace level, the incidence of information provision by management and the extent to which regular consultations are held.
- **Workers' rights**: This is the same subdimension as that included in the Industrial Democracy Index. It is made up of four indicators that measure the strength of indirect participation at company level, board-level employee representation rights, the right to strike in the private sector and the number of ratified fundamental ILO conventions.

Clusters

The next step in the analysis was to cluster the EU27 countries according to the three empirical dimensions mapping diversity in industrial democracy.

The hierarchical cluster analysis shows a clear division between two main groups: the Nordic, continental and southern European countries, on the one hand, and the liberal, central and eastern European countries, on the other hand (see Annex 4, Figure A1). A more fine-grained analysis indicates four clusters that generally show a high degree of stability over the whole period analysed (2008–2021). Only Greece and Romania change classification over time.

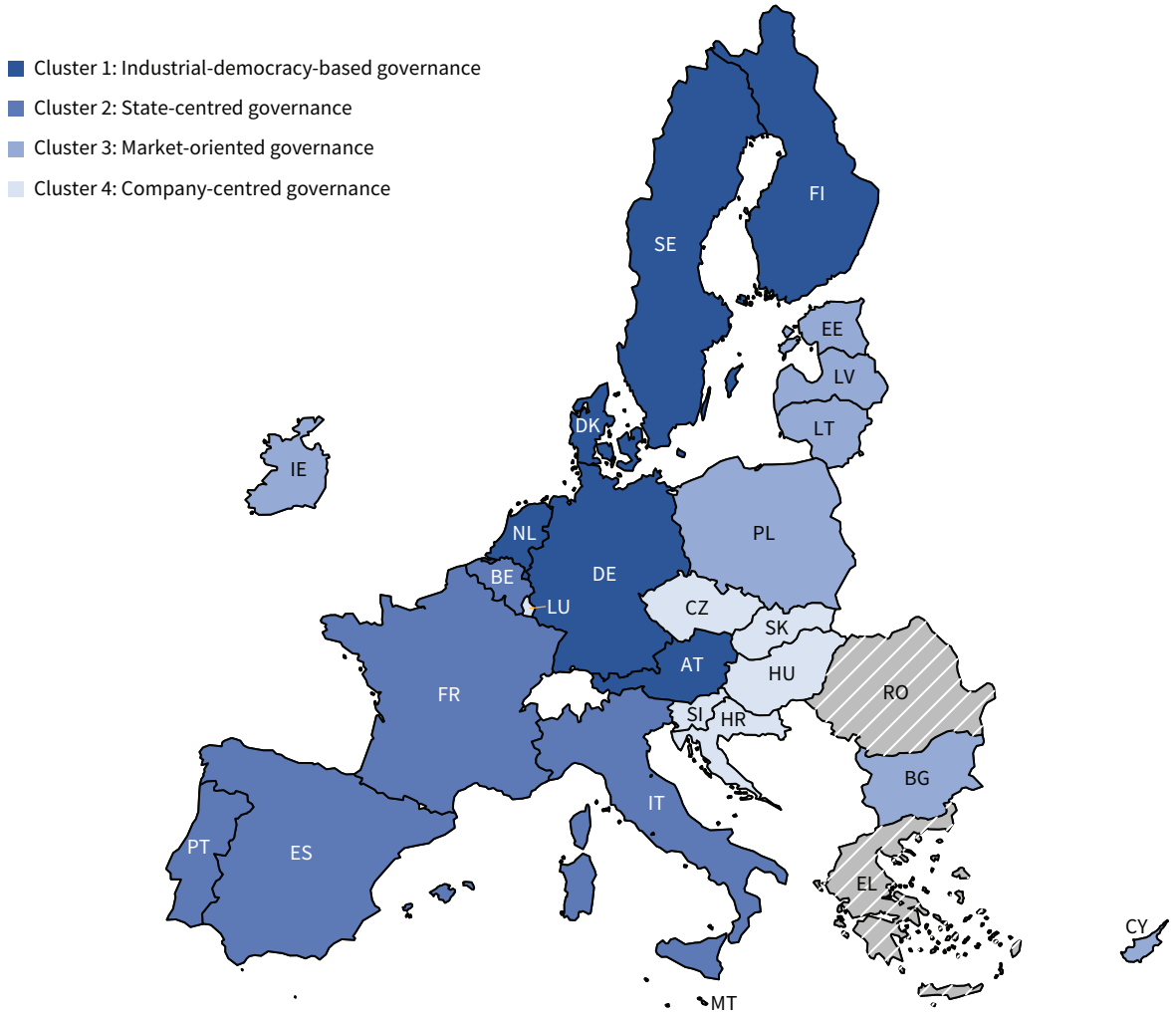
The main results of the analysis are presented in Table 33 (distribution of countries by cluster), Figure 12 (map of Member States by cluster) and Table 34 (main statistical results by cluster).

Table 33: Industrial democracy clusters, EU27, 2008–2021

Cluster	Characteristic	Countries
1	Industrial-democracy-based governance	Austria, Denmark, Finland, Germany, the Netherlands, Sweden
2	State-centred governance	Belgium, France, Greece (2008–2012), Italy, Portugal, Romania (2008–2012), Spain
3	Market-oriented governance	Bulgaria, Cyprus, Estonia, Greece (2013–2021), Ireland, Latvia, Lithuania, Malta, Poland, Romania (2013–2021)
4	Company-centred governance	Croatia, Czechia, Hungary, Luxembourg, Slovakia, Slovenia

Source: *Authors*

Figure 12: Industrial democracy clusters, EU27, 2008–2021



Note: *Greece and Romania were in Cluster 2 in 2008–2012 and moved to Cluster 3 in 2013–2021.*
Source: *Authors*

Table 34: Industrial democracy typology – Scores and absolute variation by cluster, EU27, 2008–2021

Dimension	Indicator	2018–2021					Absolute variation (2008–2012 to 2018–2021)				
		CL1	CL2	CL3	CL4	EU27	CL1	CL2	CL3	CL4	EU27
Associational governance	I1 Union density	41	24	21	18	25	-4	-3	-4	-6	-4
	I2 Employer organisation density	80	74	57	61	66	-1	3	-1	-1	-1
	I3 Collective bargaining coverage	81	90	25	43	54	-3	-2	-6	-4	-8
	I4 Routine involvement of social partners	80	60	58	58	63	5	9	2	5	5
	I5 Right of association	100	100	93	94	96	0	0	2	-4	-1
	C1 Collective bargaining centralisation	80	80	42	47	59	0	5	-5	0	-3
	C2 Collective bargaining coordination	71	50	9	17	32	-3	1	-4	-1	-5
	C3 Statutory minimum wages	44	13	3	0	14	-11	4	-1	0	-2

Dimension	Indicator	2018–2021					Absolute variation (2008–2012 to 2018–2021)				
		CL1	CL2	CL3	CL4	EU27	CL1	CL2	CL3	CL4	EU27
Social dialogue at company level	I6 Employee representation	56	48	35	42	43	-13	-5	-8	-8	-9
	I7 Information to employee representative body	96	81	86	87	87	0	-3	1	-5	-1
	I8 Meetings	75	64	62	65	66	11	16	9	16	13
Workers' rights	I9 Board representation	100	40	15	100	57	0	11	-4	0	0
	I10 Rights of works councils	89	67	38	61	60	0	5	5	-7	-1
	I11 Right to strike	100	100	100	86	97	0	0	0	-7	-2
	I12 Ratified ILO standards	95	91	82	89	88	0	5	-5	-6	-2
Industrial Democracy Index											
Subdimensions	Associational governance	73	64	43	48	54	2	5	3	2	1
	Social dialogue at company level	72	52	46	52	54	0	1	-3	-1	-1
	Workers' rights	94	60	36	75	62	0	10	1	-7	0
Industrial Democracy Index		**77**	**55**	**39**	**54**	**54**	**1**	**4**	**1**	**0**	**0**

Note: *CL, cluster.*
Source: *Authors*

Cluster 1 – Industrial-democracy-based governance

This cluster includes the Nordic countries (Denmark, Finland and Sweden) as well as Austria, Germany and the Netherlands. These countries are the best performers in the three dimensions of the Industrial Democracy Index.

Regarding associational governance, this cluster has high density rates of employer organisations, high collective bargaining coverage, centralised levels of collective bargaining, high degrees of coordination and high levels of routine involvement of the social partners in policymaking. The cluster is more internally heterogeneous with regard to trade union density (substantially lower in Austria, Germany and the Netherlands) and state intervention in industrial relations: in Germany and the Netherlands, there is a statutory minimum wage that is generally applicable, while in the remaining countries of this cluster, minimum wages are established through collective bargaining (Denmark, Finland and Sweden) or there are no minimum wage provisions at all (Austria).

This cluster shows the best performance in terms of social dialogue at company level: Denmark, Finland, the Netherlands and Sweden are among the six countries with the highest scores in this dimension, while Germany and Austria have the seventh and ninth highest scores, respectively.

This cluster also includes the countries that have granted the most extensive legal rights to workers at different levels (such as works councils and the right to strike).

Cluster 2 – State-centred governance

This cluster includes some southern European countries (Italy, Portugal and Spain) plus Belgium and France. Greece and Romania are also included, but only for 2008–2012.

It is similar to the state-centred associational governance cluster identified in the 2018 Eurofound study.

It is characterised by relatively strong associational governance, although lower than that in Cluster 1. In particular, the cluster shows the highest collective bargaining coverage, with centralised but quite uncoordinated collective bargaining processes and institutions. The countries in this cluster t have comparatively low trade union density (the figures are closer to those for eastern European countries, except in the cases of Belgium and Italy); however, this is compensated for by state intervention in industrial relations (all the countries in Cluster 2 except Italy have a statutory minimum wage).

This cluster also includes several countries that perform poorly in social dialogue at company level, which is particularly evident in Greece (2008–2012), Italy, Portugal and Spain.

In terms of workers' rights, this cluster scores lower than Cluster 1 but higher than Cluster 3. While mandatory works councils exist at company level, they are granted less wide-ranging legal rights than those in Cluster 1; board-level employee representation rights are also more limited. However, Cluster 2 comprises countries that, similarly to Cluster 1, provide the most

comprehensive rights to strike in Europe. These countries have also ratified comparatively large numbers of ILO conventions in terms of core labour standards (very close to the numbers for Cluster 1 countries).

Cluster 3 – Market-oriented governance

This cluster comprises most of the same countries that were in the voluntarist associational governance and market-oriented governance clusters in the 2018 study. It groups liberal countries (Cyprus, Ireland and Malta), the Baltic states (Estonia, Latvia and Lithuania), Bulgaria and Poland, which is roughly in line with the neoliberalist model of Bohle and Greskovits (2012). Greece and Romania also appear in this cluster for 2013–2021, mainly as a result of deteriorations in the associational governance dimension.

Cluster 3 comprises countries with comparatively weak levels of associational governance. Bulgaria, Estonia, Greece (2013–2021), Ireland, Latvia, Lithuania, Poland and Romania (2013–2021) are among the 10 countries with the lowest scores in this dimension in the last subperiod analysed (from 2013–2017 to 2018–2021). All these countries also have uncoordinated and decentralised collective bargaining systems.

Another defining feature of this cluster is its very low performance in the industrial democracy subdimension of workers' rights. These countries are among the 12 worst performers in this subdimension and have in common the voluntary character of their liberal systems of employee participation, in which works councils or employee representative bodies are voluntary (even when these are mandated by law, there are no legal sanctions for non-compliance). Moreover, board-level employee representation rights are not available in most of the countries of this cluster. The cluster also includes the countries with the lowest numbers of ratified fundamental ILO conventions in terms of core labour standards.

This cluster has the lowest scores in social dialogue performance at company level. However, there are three countries (Bulgaria, Lithuania and Romania) with scores above the EU27 average.

Cluster 4 – Company-centred governance

This cluster encompasses those Member States previously included in the company-centred governance cluster in the 2018 Eurofound study (Croatia, Hungary and Slovakia), together with Czechia, Luxembourg and Slovenia.

These countries share most of their features with those in Cluster 3 in terms of associational governance: low union density, decentralised and uncoordinated wage bargaining, and low coverage rates of collective agreements. However, compared with Cluster 3, the state plays a more prominent role in employment relations, particularly through the statutory regulation of works council and board-level employee representation rights. Notably, this cluster includes some of the countries with the most restrictive regulations in Europe in terms of strike rights (Czechia, Hungary and Luxembourg).

Clusters – Upward/downward convergence/divergence analysis

Analysis between clusters

The analysis of convergence/divergence trends between the four clusters examines changes over time in the scores on the Industrial Democracy Index by cluster in relation to the EU27 average. It replicates the method of the between-country analysis in Chapter 2: first, the general trend is examined, then the specific patterns by cluster are identified and their magnitudes are assessed.

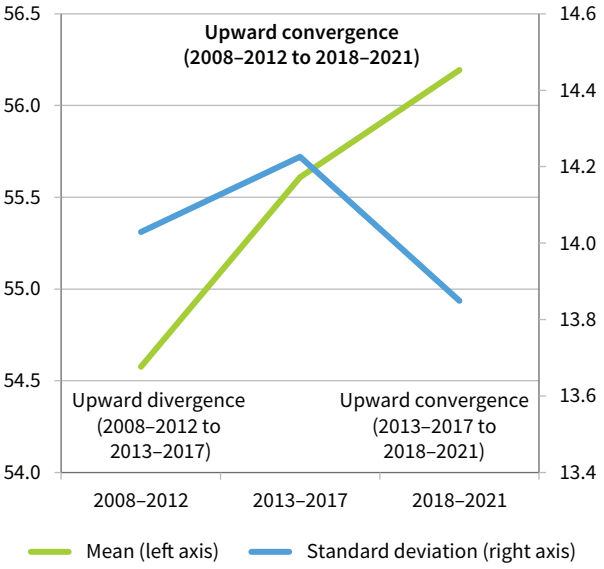
Table 35 shows the detailed results for the EU27, illustrated in Figure 13. In the first subperiod (from 2008–2012 to 2013–2017), we find upward divergence: the mean increases and the differences between clusters also increase. The situation improves in the second subperiod (from 2013–2017 to 2018–2021), changing to upward convergence: the mean increases and the disparity between clusters decreases. This improvement is enough to compensate for the negative trend in the first subperiod and therefore upward convergence is found when the whole period of 2008–2021 is considered: the mean increases by 1.6 points and the standard deviation decreases by 0.2 points.

Table 35: Industrial Democracy Index – Mean and standard deviation by cluster, EU27, 2008–2021

		Mean	Standard deviation
Industrial Democracy Index	2008–2012	54.6	14.0
	2013–2017	55.6	14.2
	2018–2021	56.2	13.8
2008–2012 to 2013–2017	Absolute variation	1.03	0.20
	Relative variation	0.01	0.01
	Trend	**Upward divergence**	
2013–2017 to 2018–2021	Absolute variation	0.58	-0.38
	Relative variation	0.01	-0.03
	Trend	**Upward convergence**	
2008–2012 to 2018–2021	Absolute variation	1.62	-0.18
	Relative variation	0.03	-0.01
	Trend	**Upward convergence**	

Source: *Authors*

Figure 13: Industrial Democracy Index – Mean and standard deviation by cluster, EU27, 2008–2021



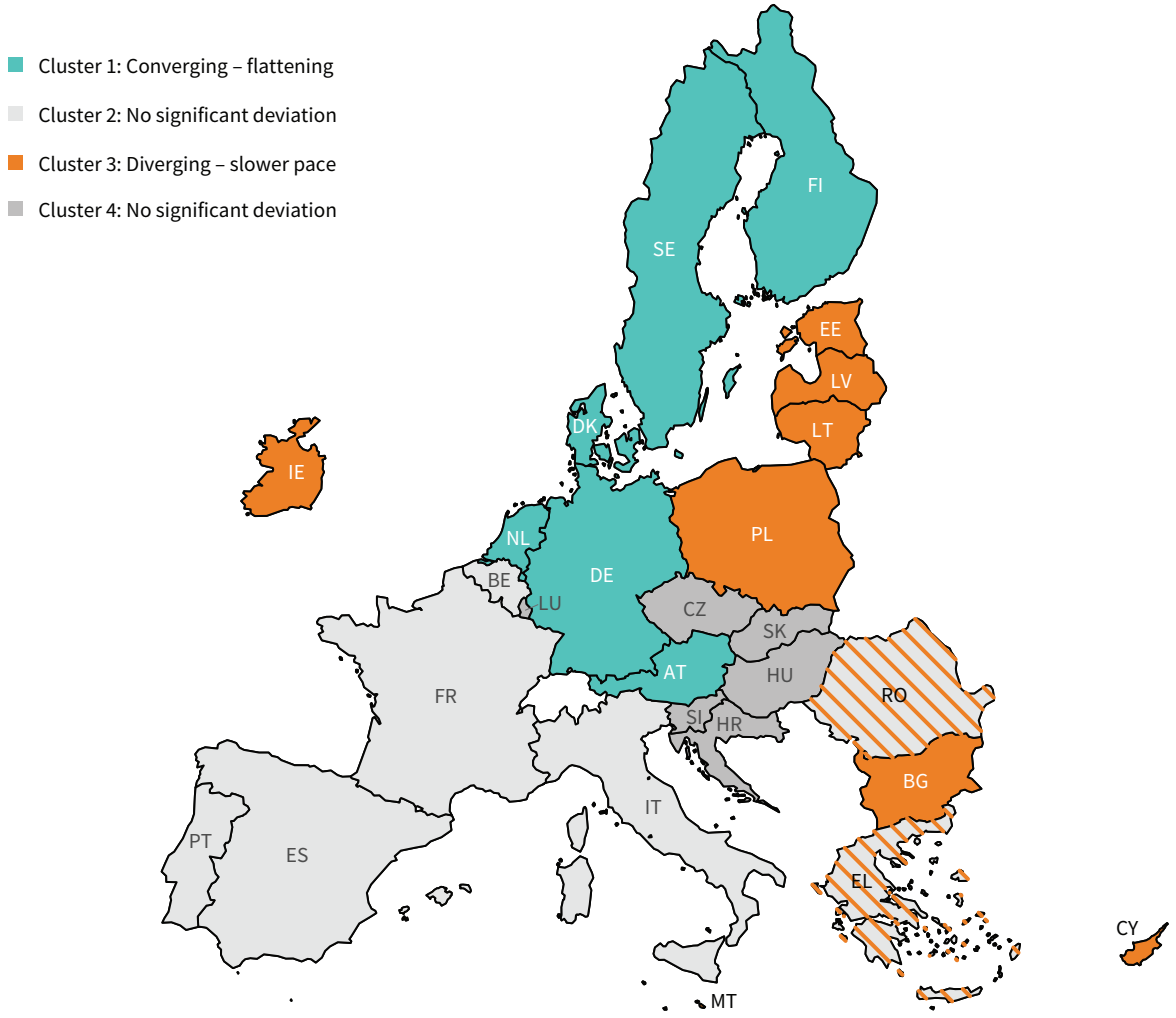
Source: *Authors*

Figure 14 shows the convergence and divergence patterns between clusters for the whole period analysed (2008–2021). Further details are provided in Annex 5, Figure A3.

Two clusters show significant deviations from the EU average, following different trends.

- Cluster 1 is converging towards the EU average following a flattening pattern. Its performance was initially higher than the EU average but is growing at a slower rate. In spite of this, this cluster remains significantly above the EU27 average over the whole period analysed. The cluster includes the countries that are the best performers in the Industrial Democracy Index, and they are characterised by a balanced and comprehensive industrial democracy dimension.
- Cluster 3 is diverging and follows a slower pace pattern. Its performance was initially lower than the EU average, and it is growing at a slower rate, increasing the gap over time. The cluster has been significantly below the EU27 average over the whole period analysed. The cluster is characterised by market-oriented governance and includes countries with rather low scores in the three dimensions of the Industrial Democracy Index.

Figure 14: Industrial Democracy Index – Convergence and divergence patterns by cluster, EU27, 2008–2021



Note: *Greece and Romania were in Cluster 2 in 2008–2012 and moved to Cluster 3 in 2013–2021.*
Source: *Authors*

Clusters 2 and 4 do not show significant deviations from the EU average. Their trends can be considered fairly stable around the EU27 average.

Analysis of Member States within clusters

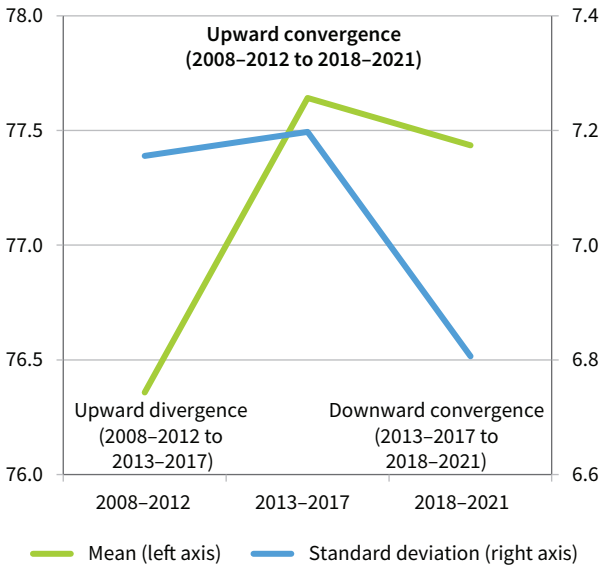
To analyse the dynamics of the Member States grouped in each cluster, a convergence analysis of the countries within each cluster was carried out. Greece and Romania were excluded from this analysis because they move from one cluster to another over the period analysed. The analysis replicates the analysis carried out previously: first, the general trend of each cluster is examined, then the specific patterns of Member States within each cluster are identified and their magnitudes are assessed (further details can be found in Annex 5, Figures A3–A6).

Cluster 1 – Industrial-democracy-based governance

Results for Cluster 1 are presented in Figures 15 and 16, following the model used previously.

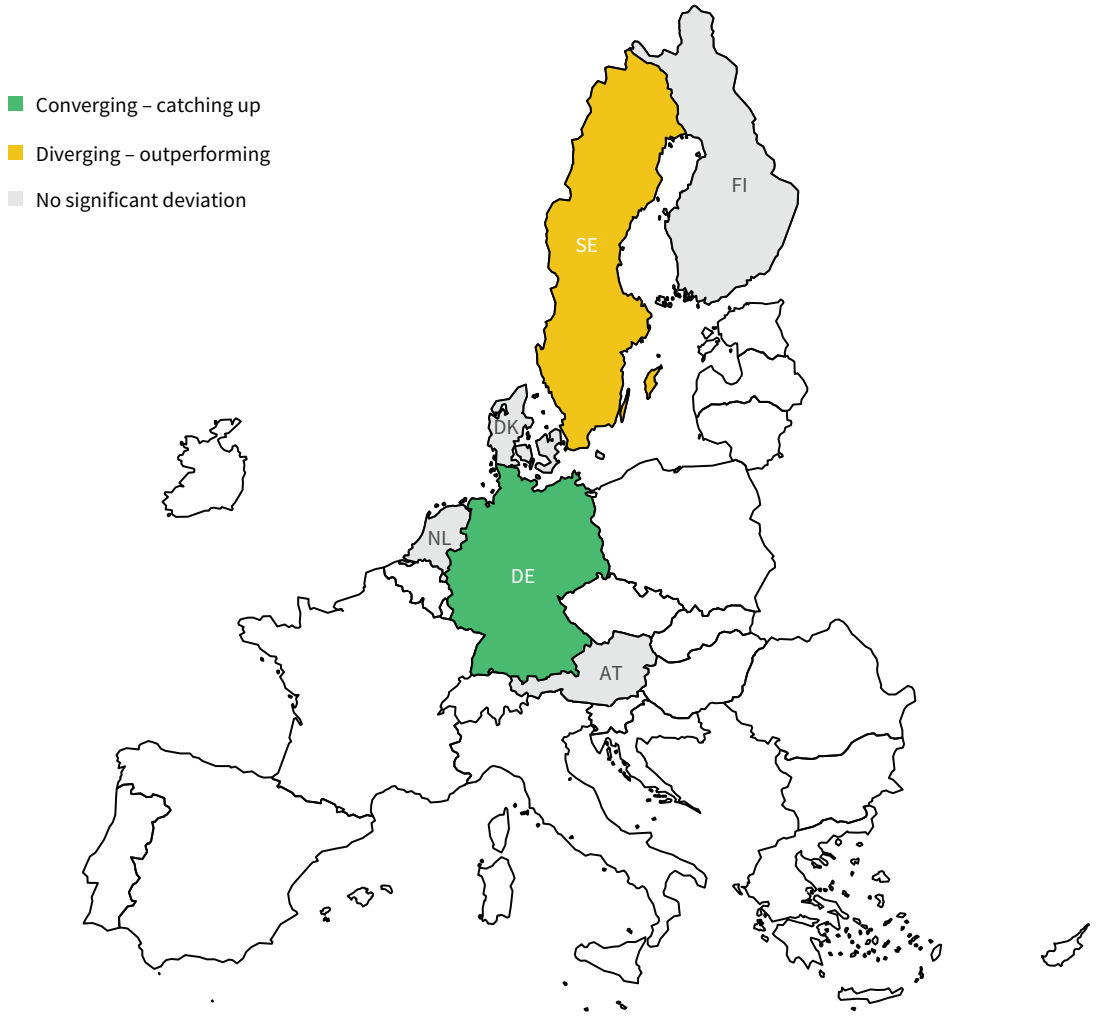
This cluster shows upward divergence in the first subperiod (both the cluster mean and the differences

Figure 15: Cluster 1 – Mean and standard deviation on Industrial Democracy Index, 2008–2021



Source: *Authors*

Figure 16: Cluster 1 – Industrial Democracy Index – Convergence and divergence patterns, 2008–2021



Note: *White indicates Member States not in the cluster.*
Source: *Authors*

between countries increase). In the second subperiod, the situation changes to downward convergence (both the cluster mean and the differences between countries decrease). When the whole period is considered (2008–2021), upward convergence is found: the mean increases by 1.1 points and the standard deviation decreases by 0.4 points.

Two countries significantly deviate from the cluster mean and follow different trends.

- Germany is converging towards the cluster mean and catching up. Its score was initially lower than the cluster mean, but it grows more quickly, reducing the gap. In spite of this positive trend, this country remained significantly below the cluster mean over the whole period.
- Sweden is diverging and outperforming. Its performance was initially higher than the cluster mean and grows at a faster rate. This country started within the confidence interval but is above it in the last year range (2018–2021).

Four countries (Austria, Denmark, Finland and the Netherlands) fall within the confidence interval over the whole period. Their trends can be considered fairly stable around the cluster mean.

Cluster 2 – State-centred governance

Results for Cluster 2 are presented in Figures 17 and 18, following the model used previously.

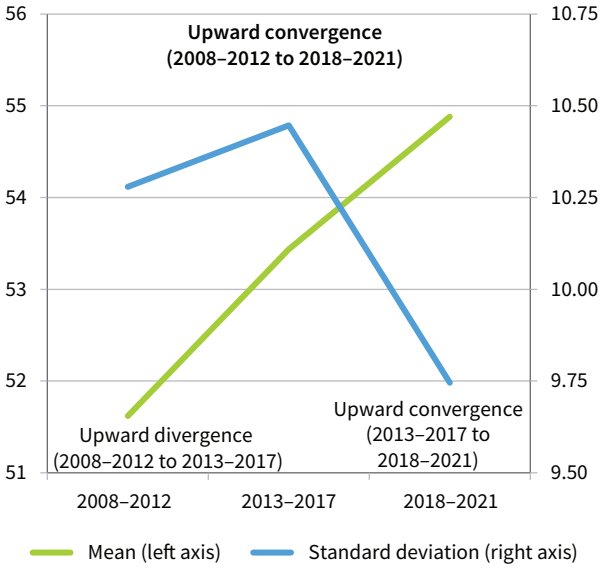
This cluster shows upward divergence in the first subperiod (both the cluster mean and the differences between countries increase). In the second subperiod, the situation improves, changing to upward convergence (the cluster mean increases and the differences between countries decrease). When the whole period is considered (2008–2021), upward convergence is found: the mean increases by 3.3 points and the standard deviation decreases by 0.5 points.

Two countries significantly deviate from the cluster mean. They are both converging towards the cluster mean but are following different patterns.

- Portugal is catching up. Its performance was initially lower than the cluster mean but is growing more quickly, reducing the gap. In spite of this positive trend, this country remains significantly below the cluster mean over the whole period.
- Spain is following an inversion pattern. Its performance was initially higher than the cluster mean, but it is declining and moving towards the cluster mean, which is rising. This country started (in 2008–2012) with a score significantly above the confidence interval but has since moved into this interval.

Three countries (Belgium, France and Italy) fall within the confidence interval throughout the whole period. Their trends can be considered fairly stable around the cluster mean.

Figure 17: Cluster 2 – Mean and standard deviation on Industrial Democracy Index, 2008–2021



Source: *Authors*

Figure 18: Cluster 2 – Industrial Democracy Index – Convergence and divergence patterns, 2008–2021

Note: *White indicates Member States not in the cluster.*
Source: *Authors*

Cluster 3 – Market-oriented governance

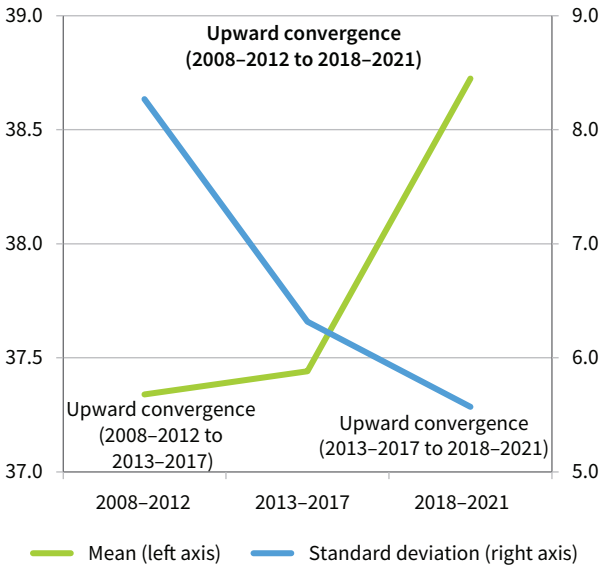
The results for Cluster 3 are presented in Figures 19 and 20, following the model used previously.

In contrast to other clusters, Cluster 3 shows upward convergence in the two subperiods analysed: the mean increases and the differences between countries decrease. Considering the whole period (2008–2021), the mean increases by 1.4 points and the standard deviation decreases by 2.7 points.

Three countries significantly deviate from the cluster mean. They are all converging, although they follow two patterns.

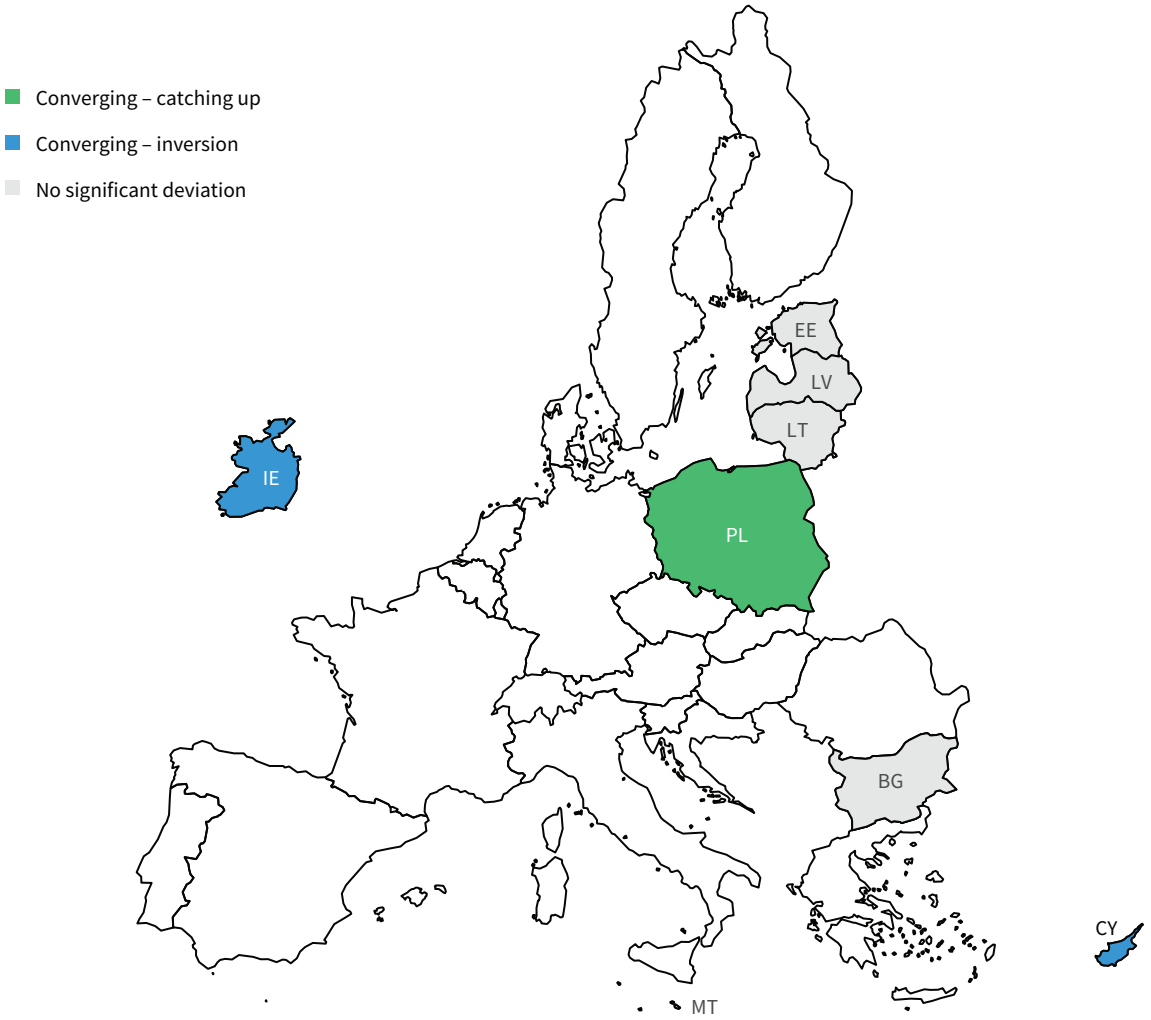
- Ireland and Cyprus follow an inversion pattern. Their performance was initially higher than the cluster mean but declines, moving towards the cluster mean, which is rising. In spite of this, Ireland stands out as a country whose score remains significantly above the cluster mean over the whole period. The evolution of Cyprus's performance is similar, although less marked. This country's score is very close to the upper band of the confidence interval over the whole period and is just slightly above it in 2013–2017.

Figure 19: Cluster 3 – Mean and standard deviation on Industrial Democracy Index, 2008–2021



Source: *Authors' calculations*

Figure 20: Cluster 3 – Industrial Democracy Index – Convergence and divergence patterns, 2008–2021



Note: *White indicates Member States not in the cluster.*
Source: *Authors*

- Poland is catching up. Its performance was initially lower than the cluster mean but is growing more quickly, reducing the gap. Its score was slightly below the confidence interval in 2008–2012 but has since moved into this interval.

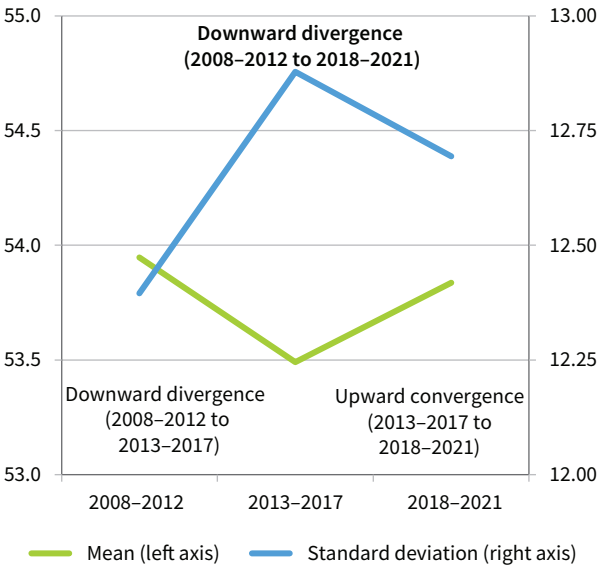
The scores of five countries (Bulgaria, Estonia, Latvia, Lithuania and Malta) fall within the confidence interval throughout the whole period. Their trends can be considered fairly stable around the cluster average. Overall, this cluster shows the most homogeneous country patterns.

Cluster 4 – Company-centred governance

The results for Cluster 4 are presented in Figures 21 and 22, following the model used previously.

In this cluster, we find downward divergence in the first subperiod (the cluster mean decreases and differences between countries increase), followed by upward convergence in the second subperiod (the cluster mean increases and the differences between countries decreases). When the whole period is considered

Figure 21: Cluster 4 – Mean and standard deviation on Industrial Democracy Index, 2008–2021



Source: *Authors*

Figure 22: Cluster 4 – Industrial Democracy Index – Convergence and divergence patterns, 2008–2021

Note: *White indicates Member States not in the cluster.*
Source: *Authors*

(2008–2021), a trend of downward divergence is found, although very moderate: the mean decreases by only 0.11 points and the standard deviation increases by only 0.30 points.

Three countries deviate significantly from the cluster mean and exhibit different patterns.

- Luxembourg is diverging, following an escaping pattern. Its score was initially higher than the cluster mean and is growing while the cluster mean is falling, increasing the gap. Its score is significantly above the cluster average over the whole period.
- Hungary is diverging and falling away. Its score was initially lower than the cluster mean and is falling at a faster rate, increasing the gap. This country's score is significantly below the cluster mean over the whole period.
- Slovenia is converging and underperforming. Its score was initially higher than the cluster mean and is falling at a faster rate, decreasing the gap. This country starts (in 2008–2012) with a score significantly above the cluster mean but moves into the confidence interval after that.

The scores of three countries (Croatia, Czechia and Slovakia) fall within the confidence interval throughout the whole period. Their trends can be considered fairly stable around the cluster average.

4 Conclusions

This study, through a combination of research strategies, including a literature review, has updated the 2018 Eurofound study that advanced the development of a conceptual framework for analysing the four key dimensions of industrial relations – industrial democracy, industrial competitiveness, social justice, and quality of work and employment.

The study has developed three tools to compare how national industrial relations systems are faring and, possibly, changing:

- an updated dashboard and updated indices for the four key dimensions (2018–2021)
- an updated dashboard and updated Industrial Democracy Index (2008–2021)
- an updated typology of industrial relations systems in 2008–2021, based on the Industrial Democracy Index and other characteristics of industrial democracy

In these three tools, the update has encompassed the inclusion of new indicators to cover data gaps arising from conceptual omissions or lack of high-quality data.

Utility and impact of the research tools

The 2018 Eurofound study highlighted that each research tool has a different purpose and is suited to a certain kind of analysis. It also noted their effectiveness when it comes to contributing to a better understanding of current trends and relevant challenges. These tools can only be tested if they are widely used in future debates among Eurofound's stakeholders at EU and national levels.

The literature review shows that the research tools have fuelled new research strands on industrial democracy, and they have also supported social partners and policymakers.

- Among scholars, the index and the typology have been taken up as points of reference in several academic publications, being used to develop either indices focused on new concepts such as economic democracy (Cumbers et al, 2023) or new industrial relations typologies (Ounnas, 2022). Moreover, the previous Eurofound typology has been used to guide empirical research and select country case studies (Godino and Molina, 2022).
- Among EU agencies, the conceptual and methodological approach behind the Industrial Democracy Index has been replicated by the European Agency for Safety and Health at Work (EU-OSHA) with a view to developing a new index measuring the quality of social dialogue in the field of occupational safety and health (EU-OSHA, 2022).
- Among the social partners, the Industrial Relations Index has been used in a recent EU project carried out by the European Trade Union Confederation (ETUC) on platform work (the Platform Reps project), among others. In the framework of this project, 12 country reports have been produced, which start with a summary of the quality of social dialogue according to the Industrial Relations Index (see, for example, ETUC (2023)). The Industrial Democracy Index was also applied by the European Trade Union Institute (ETUI) in the framework of its own research on workplace democracy (Parker, 2023).

The updated research tools provided in this report will hopefully be useful for and complementary to new analyses of industrial relations at national level.

Main findings: New patterns of change in industrial relations

Despite the limitations and partial weaknesses of the available data, the results of the research tools reflect new patterns of change in the national systems of industrial democracy and industrial relations.

The updated indices of industrial democracy and industrial relations as a whole over 2018–2021 show a rather polarised picture, with small groups of countries with very high or very low performance. The country differences are less marked in the other key dimensions.

The cross-time analysis of the Industrial Democracy Index from 2008 to 2021 shows a very moderate trend of upward divergence (the EU27 mean increases by only 0.5 points and differences between countries are almost stable). This is the result of two opposite and rather marked trends: an initial downward divergence reversed by upward convergence since 2013–2017.

Twelve countries show fairly stable trends around the EU27 average of the Industrial Democracy Index from 2008 to 2021 (Belgium, Croatia, Cyprus, Czechia, France, Germany, Greece, Ireland, Italy, Romania, Slovakia and Spain). The other 15 countries show a significant deviation from the EU27 average, following converging or diverging trends.

- Nine countries are converging. Bulgaria, Estonia, Latvia, Lithuania, Poland and Portugal are catching up (their performance was initially below the EU average but is growing more quickly, thus decreasing the gap). Denmark, the Netherlands and Slovenia follow an inversion pattern (their performance was initially higher than the EU average but it is declining, thus moving towards the rising EU average).

- Six countries are diverging. Austria, Finland, Luxembourg and Sweden are outperforming (their performance was initially higher than the EU average and is growing at a faster rate). Hungary and Malta are diving (their performance was initially lower than the EU average and is declining, while the EU average is rising).

The updated typology of industrial democracy (2008–2021) shows four clusters of countries.

- **The industrial-democracy-based governance cluster** includes Austria, Denmark, Finland, Germany, the Netherlands and Sweden. These countries are the best performers in industrial democracy, they have high levels of centralised collective bargaining and high degrees of coordination, and the social partners are routinely involved in policymaking. This cluster deviates significantly from the EU average and follows a converging and flattening pattern. Its performance was initially higher than the EU average but is growing at a slower rate.
- **The market-oriented governance cluster** has very low performance in industrial democracy. It has the lowest level of collective bargaining coverage as well as uncoordinated and decentralised collective bargaining systems. It includes liberal countries (Cyprus, Ireland and Malta), the Baltic states (Estonia, Latvia and Lithuania), Bulgaria and Poland. From 2013–2017 onwards, Greece and Romania also appear in this group. This cluster deviates significantly from the EU27 average and follows a diverging pattern. Its performance was initially lower than the EU average and is growing at a slower rate, increasing the gap over time.
- **The state-centred governance cluster** includes some southern European countries (Italy, Portugal and Spain) plus Belgium and France. In addition, Greece and Romania also appear in this group in 2008–2012. This cluster shows an intermediate performance in industrial democracy. It has the highest levels of collective bargaining coverage and highly centralised but quite uncoordinated collective bargaining systems. All countries except Italy have statutory minimum wages. This cluster does not deviate significantly from the EU27 average.
- **The company-centred governance cluster** includes Croatia, Czechia, Luxembourg, Hungary, Slovakia and Slovenia. This cluster has intermediate performance in industrial democracy. It has rather low collective bargaining coverage and uncoordinated and decentralised collective bargaining systems. In this cluster, the statutory regulation of workers' rights prevails with regard to works councils and board-level representation, but some countries have the most restrictive regulations in the EU in terms of strike rights (Czechia, Hungary and Luxembourg). This cluster does not deviate significantly from the EU27 average.

These results continue to reflect a fragmented or divided industrial relations model, with winners and losers from the euro zone and the so-called competition union (Hyman, 2018; Cumbers et al, 2023). Nevertheless, the study also shows that some southern and eastern European countries are recovering from the impact of the 2008 economic crisis.

Policy pointers

The analysis draws attention to the limitations of the existing data and indicators for the exploration of industrial relations and industrial democracy. In particular, the available indicators of collective bargaining coverage do not fully meet the quality criteria because of comparability problems. Other quality issues apply to the indicators of social dialogue at macro and company levels and of state intervention in collective bargaining.

A joint effort should be made to gather comparable and high-quality data on collective bargaining coverage (which is of increasing political relevance) and other areas related to industrial relations and industrial democracy. The indicators should be based on clear definitions agreed at European level to ensure national comparability. Data should be collected regularly to enable cross-time analyses.

The research tools used complement analysis of the dynamics of and changes in the national industrial relations systems. The research tools should be updated regularly to contribute to more systematic monitoring and to further comparative analyses of evolving trends in industrial relations.

The European Commission, the EU- and national-level social partners, the national governments and EU agencies are invited to fill the gaps related to comparable and high-quality data measuring the quality and patterns of change of industrial relations in the EU27.

The findings provide concrete evidence for policymakers in promoting the strengthening of industrial relations in Member States where it underperforms. The scores of the six Member States of the industrial-democracy-based cluster seem to prove that in a system of 'good' and mature industrial relations it is possible to combine efficiency, equity and voice. These countries are at the top of the overall industrial relations index, are among the top seven performers on the industrial democracy and industrial competitiveness indices, and are among the top eight on the social justice index.

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Annexes

Annex 1 – Update and quality assessment of the initial set of indicators

The critical review of the 2018 Eurofound report (Eurofound, 2018a) began by performing the following sequential tasks:

1. update the normative indicators that were included in the 2018 report to calculate the four key dimensions indices and the overall Industrial Relations Index for 2018–2021
2. calculate the updated indices for 2018–2021, replicating the methodology used in the 2018 report
3. implement the quality assessment of the updated set of indicators, applying the conceptual and statistical criteria used in the 2018 report

Table A1 shows the structure of the indices developed in the 2018 report and the results of the quality assessment. In the column 'Quality assessment', red means that the indicator does not meet the quality criteria and is discarded, yellow means that the indicator does not fully meet the quality criteria (it is included in the next steps, although alternative indicators will be tested) and green means that the indicator meets the quality criteria and is included in the next steps.

Table A1: Outcomes of the quality assessment of the indicators included in the Eurofound (2018a) Industrial Relations Index measurement framework

Dimension	Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Industrial democracy	Associational governance	I1	Trade union density	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
		I2	Employer organisation density	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
		I3	Existence of a standard (institutionalised) bipartite council of central or major union and employer organisations for purposes of wage setting, economic forecasting and/or conflict settlement	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
		I4	Collective bargaining coverage	ICTWSS	OECD/AIAS ICTWSS 2021	🟡
		I5	Routine involvement of unions and employers in government decisions on social and economic policy	ICTWSS	ICTWSS	🟢
	Representation and participation rights	I6	Board-level employee representation rights	ETUC, 2010, 2015	ETUC, 2017	🟢
		I7	Rights of works councils	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
		I8	Status of works councils	ICTWSS	OECD/AIAS ICTWSS 2021	🟢
	Social dialogue at company level	I9	Employee representation at the workplace (coverage)	Eurofound, ECS 2013	Eurofound, ECS 2019	🟢
		I10	Information provided to employee representative body (incidence)	Eurofound, ECS 2013	Eurofound, ECS 2019	🟢
		I11	Degree of information provided to employee representative body	Eurofound, ECS 2013	Eurofound, ECS 2019	🔴
		I12	Management holds regular meetings at which employees can express their views about the organisation	Eurofound, EWCS 2015	Eurofound, EWCTS 2021	🟢
		I13	Influence of the employee representation in decision-making at the workplace	Eurofound, ECS 2013	Eurofound, ECS 2019	🔴

Dimension	Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Industrial competitiveness	Inclusive growth and innovation	I14	GDP per capita (PPS)	Eurostat	Eurostat	🟢
		I15	Real compensation of employees per hour worked	Eurostat	Eurostat	🟢
		I16	Infrastructure ranking	WEF	WEF	🟢
		I17	Percentage of R&D personnel	Eurostat	Eurostat	🟢
		I18	R&D expenditure as a percentage of GDP	Eurostat	Eurostat	🟢
		I19	Index based on the Innovators dimension of the European Innovation Scoreboard (EIS)	Eurostat	Eurostat	🟢
	Efficiency and sophistication of resources	I20	Incidence of corruption	Transparency International	Transparency International	🟢
		I21	Public Services Index	Eurofound, EQLS 2011 and 2016	–	🔴
		I22	Percentage of individuals with high levels of education	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I23	Digital skills	Eurostat	Eurostat	🟢
		I24	Connectivity dimension of the Digital Economy and Society Index (DESI)	European Commission, Digital	European Commission, Digital Scoreboard	🟢
Social justice	Social cohesion and non-discrimination	I25	Social Exclusion Index	Eurofound, EQLS 2011 and 2016	–	🔴
		I26	Ratio of young to non-young people employment rate	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I27	Gender Equality Index	EIGE	EIGE	🟢
		I28	Long-term unemployment rate	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I29	Share of young people who are NEET (not in employment, education or training)	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
	Poverty and income inequality	I30	At risk of poverty or social exclusion rate	Eurostat	Eurostat	🟢
		I31	In-work poverty rate	Eurostat	Eurostat	🟢
		I32	Impact of social transfers (other than pensions) on poverty reduction	Eurostat	Eurostat	🟢
		I33	Income inequality (quintile share ratio – S80/S20)	Eurostat	Eurostat	🟢
	Equality of opportunities	I34	Early leavers from education and training	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I35	Percentage of individuals with less than upper secondary educational attainment	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢

Dimension	Subdimension	No.	Indicator	Source (Eurofound, 2018a)	Updated source	Quality assessment
Quality of work and employment	Career prospects and well-being	I36	Income development	Eurofound, EWCS 2010 and 2015	Eurofound, EWCTS 2021	🟢
		I37	Career prospects	Eurofound, EWCS 2010 and 2015	Eurofound, EWCTS 2021	🟢
		I38	Subjective workplace well-being	Eurofound, EWCS 2010 and 2015	–	🔴
		I39	Work negatively affects health	Eurofound, EWCS 2010 and 2015	–	🔴
	Employment security and skills development	I40	Unemployment protection coverage	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I41	Involuntary temporary employment	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I42	Job security	Eurofound, EWCS 2010 and 2015	Eurofound, EWCTS 2021	🟢
		I43	Lifelong learning	Eurostat, EU-LFS	Eurostat, EU-LFS	🟢
		I44	Use of skills	Eurofound, EWCS 2010 and 2015	–	🔴
	Reconciliation of working and non-working life	I45	Unsocial working time	Eurostat, EU-LFS	Eurostat	🟢
		I46	Gender gap in inactive population due to family/care responsibilities	Eurostat	Eurostat	🟢
		I47	Work–life balance	Eurofound, EQLS 2010 and 2015	–	🔴

Note: *EQLS, European Quality of Life Survey; EU-LFS, European Union Labour Force Survey.*
Source: *Authors, based on Eurofound (2018a)*

Main problems identified in the quality assessment

The main problems identified by the quality assessment concern three quality criteria:

- accuracy and reliability
- sustainability
- coherence and comparability

Accuracy and reliability

The quality assessment evidenced concerns related to the accuracy and reliability of the indicators from the 2019 ECS for employee representatives (I10, I11 and I13).

- The survey had a small number of responses, with five countries with fewer than 15 responses (Czechia, Greece, Ireland, Latvia and Malta). Data for these five countries were not considered reliable and therefore are treated as missing data. Values were replaced by the average of the available data within each indicator.
- In addition, data for indicator I13 (influence of the employee representation in decision-making at the workplace) did not seem accurate (high levels of influence in countries with low performance in other industrial democracy indicators and low levels of influence in those with high performance in other indicators). These inconsistencies were confirmed by the correlation analysis. This also raised concerns about the accuracy of the other two indicators.

Taking into account these problems, it was decided to maintain only one of the three indicators, the indicator that in principle is considered the most accurate and fits better with the rest of indicators (I10, information provided to employee representative body (incidence)).

Sustainability

Sustainability problems refer mainly to the indicators based on the European Quality of Life Survey:

- I21, Public Services Index
- I25, Social Exclusion Index
- I47, work–life balance

The latest edition of the survey was conducted in 2016 and there are concerns about the continuation of this survey in the future. Therefore, alternative indicators should be explored.

A second sustainability problem is changes in the ICTWSS database. The database, initially developed by Professor Jelle Visser at the University of Amsterdam, was jointly revised by the OECD and AIAS in 2021. The new version does not include one of the indicators included in the 2018 Eurofound report:

- I5, routine involvement of unions and employers in government decisions on social and economic policy

Due to its relevance, this indicator is included in the analysis, although it is not clear whether it will be included in future releases of the database. The indicator is retrieved from the latest version of the ICTWSS database (November 2019, version 6.1).

Finally, problems were also found regarding the extraordinary edition of the EWCTS 2021, because the questionnaire did not include the questions used for calculating the following indicators:

- I38, subjective workplace well-being
- I39, work negatively affects health
- I44, use of skills

For this reason, the dataset uses the values of the EWCS 2015. However, this problem seems to be related to the special circumstances of the EWCTS 2021. It is likely that this will be solved in the next ordinary EWCS edition.

Coherence and comparability

Almost all indicators have comparability problems regarding the 2018 study (Eurofound, 2018a). The most important problems are related to changes in the methodologies of the following:

- the ICTWSS database (OECD/AIAS ICTWSS 2021 versus previous ICTWSS) – I1–I4, I7 and I8
- infrastructure ranking (WEF) – I16
- index based on the Innovators dimension of the EIS (Eurostat) – I19
- digital skills (Eurostat) – I23
- the connectivity dimension of the DESI (European Commission, Digital Scoreboard) – I24
- the European Union Labour Force Survey (Eurostat) – I28, I41 and I45
- the at risk of poverty or social exclusion rate (Eurostat) – I30

There are also problems concerning the comparability of the EWCS (EWCTS 2021 versus EWCS 2015) and less important problems concerning other indicators.

Main outcomes of the quality assessment

The main outcomes of the quality assessment can be summarised as follows.

- Eight indicators are excluded from the analysis. Two indicators in the dimension industrial democracy present accuracy and reliability issues: I11 and I13. The other six indicators cannot be updated. They belong to the dimensions of industrial competitiveness (I21), social justice (I25) and quality of work and employment (I38, I39, I44 and I47).
- The comparability assessment indicates that the scores of the 2018–2021 indices cannot be directly compared with the scores of the 2008–2017 indices.

The lack of comparability between the updated 2018–2021 indices and the 2008–2017 indices was found to be especially problematic for the industrial democracy dimension, because one of the specific objectives of the current study was to analyse upward/downward convergence/divergence trends from 2008 to 2021. The next section describes how this challenge was addressed.

Industrial democracy dataset 2008–2021 – Further quality assessment

To build a comparable dataset for 2008–2021, it was necessary to retrieve all indicators of the industrial democracy dimension using the values of the OECD/AIAS ICTWSS 2021 database for 2008–2021 and further assess the quality of this dataset. The indicators are as follows:

- I1, trade union density
- I2, employer organisation density
- I3, existence of a standard (institutionalised) bipartite council of central or major union and employer organisations for purposes of wage setting, economic forecasting and/or conflict settlement
- I4, collective bargaining coverage
- I7, rights of works councils
- I8, status of works councils

The assessment took into account the well-known shortcomings of existing comparative data on industrial democracy. All indicators were found to meet the quality criteria with the exception of collective bargaining coverage, which does not fully meet the comparability criteria. Therefore, the indicator was included in the dashboard, although alternative indicators based on statistical surveys (the European Structure of Earnings Survey and the ECS) were also tested. Table A2 presents the quality assessment of this indicator.

Table A2: Quality assessment of indicator I4, 2008–2021

No.	Indicator and source	Definition	Assessment	Quality assessment
I4	Collective bargaining coverage (OECD/AIAS ICTWSS 2021)	Adjusted bargaining coverage rate: the proportion of all wage earners with the right to bargain. Calculated as follows: *WCB* × 100 / (*WSEE* – *WSTAT*), resulting in values ranging from 0 to 100. where *WCB* is the employees covered by collective bargaining, *WSEE* is employed wage and salary workers and *WSTAT* is the employees excluded from collective bargaining.	The indicator does not provide harmonised or comparable data. It is estimated through different data sources and methods: • administrative records in Czechia, Hungary, the Netherlands, Poland, Portugal and Spain • direct estimation based on the analysis of administrative records in Denmark, Finland and Sweden • interpretation of the collective bargaining legislation (which most of the time leads to considering a coverage rate close to 100%) in Austria, Belgium, France and Italy • coverage rates based on the European Structure of Earnings Survey in Bulgaria, Latvia and Luxembourg • estimations from national experts and/or Professor Jelle Visser in Croatia, Cyprus, Greece, Ireland, Lithuania, Malta, Romania, Slovakia and Slovenia (OECD, 2022)	

Source: *Authors, based on OECD and Visser (2022) and OECD (2022)*

Annex 2 – Principal component analysis results

Tables A3–A6 provide the results for each dimension.

Table A3: PCA results – Industrial democracy

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		**0.720**
Bartlett's Test of Sphericity	Approx. χ^2	361.472
	df	66
	Sig.	2.49E-42

Reliability statistics

Cronbach's alpha	**0.754**
Cronbach's alpha based on standardised items	0.793
No. of items	12

Total variance explained

Component	Initial Eigenvalues		
	Total	% of variance	Cumulative %
1	4.122	34.3	34.3
2	1.622	13.5	47.9
3	1.293	10.8	58.6
4	1.123	9.4	68.0
5	0.897	7.5	75.5
6	0.746	6.2	81.7
7	0.618	5.1	86.8
8	0.499	4.2	91.0
9	0.383	3.2	94.2
10	0.328	2.7	96.9
11	0.228	1.9	98.8
12	0.143	1.2	100.0

Principal components extraction

Component	Rotation sums of squared loadings			Variance explained/ Total
	Total	% of variance	Cumulative %	
1	3.075	25.6	25.6	43.7%
2	2.151	17.9	43.5	30.6%
3	1.811	15.1	58.6	25.7%
				100.0%

Rotated component matrix

	Component		
	1	2	3
I1 Trade union density	**0.736**	0.168	0.054
I2 Employer organisation density	**0.708**	0.394	0.190
I3 Collective bargaining coverage	**0.781**	0.266	0.134
I4 Routine involvement of unions and employers in government decisions on …	**0.659**	-0.166	0.109
I5 Right of association – government sector	**0.533**	0.292	-0.188
I6 Employee representation at the workplace (coverage)	0.320	**0.736**	0.046
I7 Information provided to employee representative body (incidence)	-0.218	**0.761**	0.269
I8 Management holds regular meetings in which employees can express their views	0.272	**0.609**	-0.094
I9 Board-level employee representation rights	0.151	0.294	**0.777**
I10 Rights of works councils	0.420	0.436	**0.531**
I11 Right to strike – market sector	0.175	0.131	**-0.690**
I12 Ratification of ILO core labour standards	0.499	-0.006	**0.512**

Notes: *df, degrees of freedom; sig.,* p*-value.*
Source: *Authors*

Table A4: PCA results – Industrial competitiveness

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		**0.788**
Bartlett's Test of Sphericity	Approx. χ^2	353.890
	df	120
	Sig.	6.44E-25

Reliability statistics

Cronbach's alpha	**0.923**
Cronbach's alpha based on standardised items	0.932
No. of items	16

Total variance explained

Component	Initial Eigenvalues		
	Total	% of variance	Cumulative %
1	8.339	52.1	52.1
2	1.746	10.9	63.0
3	1.250	7.8	70.8
4	1.189	7.4	78.3
5	0.795	5.0	83.2
6	0.650	4.1	87.3
7	0.589	3.7	91.0
8	0.404	2.5	93.5
9	0.306	1.9	95.4
10	0.248	1.6	97.0
11	0.176	1.1	98.1
12	0.105	0.7	98.7
13	0.081	0.5	99.2
14	0.056	0.3	99.6
15	0.041	0.3	99.8
16	0.026	0.2	100.0

Principal components extraction

Component	Rotation sums of squared loadings			Variance explained/ Total
	Total	% of variance	Cumulative %	
1	5.306	33.2	33.2	52.6%
2	4.779	29.9	63.0	47.4%
				100.0%

Rotated component matrix

	Component	
	1	2
I13 GDP per capita (PPS)	**0.853**	0.189
I14 Real compensation of employees per hour worked	**0.759**	0.527
I15 Incidence of corruption	**0.835**	0.472
I16 Percentage of individuals with high level education	**0.815**	-0.040
I17 Digital skills	**0.709**	0.475
I18 Connectivity dimension of the Digital Economy and Society Index	**0.537**	0.090
I19 Intellectual property protection	**0.806**	0.433
I20 Inflation volatility	**0.471**	0.226
I21 Infrastructure ranking	0.320	**0.861**
I22 Percentage of R&D personnel	0.555	**0.713**
I23 R&D expenditure as a percentage of GDP	0.389	**0.795**
I24 Innovators index based on EIS	0.470	**0.480**
I25 Circular material use rate	0.029	**0.734**
I26 Scientific publications	0.049	**0.887**
I27 Global Cybersecurity Index	0.309	**0.387**
I28 Economic Complexity Index	0.307	**0.427**

Notes: *df, degrees of freedom; sig.,* p-*value.*
Source: *Authors*

Table A5: PCA results – Social justice

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**0.757**
Bartlett's Test of Sphericity	Approx. χ^2	195.266
	df	66
	Sig.	1.03E-14

Reliability statistics

Cronbach's alpha	**0.829**
Cronbach's alpha based on standardised items	0.889
No. of items	12

Total variance explained

Component	Initial Eigenvalues		
	Total	% of variance	Cumulative %
1	5.586	46.6	46.6
2	1.889	15.7	62.3
3	1.343	11.2	73.5
4	0.842	7.0	80.5
5	0.577	4.8	85.3
6	0.506	4.2	89.5
7	0.391	3.3	92.8
8	0.352	2.9	95.7
9	0.181	1.5	97.2
10	0.157	1.3	98.5
11	0.109	0.9	99.4
12	0.066	0.6	100.0

Principal components extraction

Component	Rotation sums of squared loadings			Variance explained/ Total
	Total	% of variance	Cumulative %	
1	3.680	30.7	30.7	41.7%
2	3.171	26.4	57.1	36.0%
3	1.967	16.4	73.5	22.3%
				100.0%

Rotated component matrix

	Component		
	1	2	3
I29 At risk of poverty or social exclusion rate	**0.882**	0.270	0.125
I30 In-work poverty rate	**0.820**	0.187	0.275
I31 Impact of social transfers (other than pensions) on poverty reduction	**0.790**	0.382	0.061
I32 Income inequality (quintile share ratio S80/S20)	**0.902**	0.122	0.166
I33 Ratio of young to non-young people employment rate	0.269	**0.807**	-0.008
I34 Gender Equality Index	0.329	**0.683**	-0.432
I35 Long-term unemployment rate	0.222	**0.646**	0.206
I36 Share of young people who are NEET (not in employment, education or training)	0.452	**0.637**	0.260
I37 Equal treatment and absence of discrimination	-0.038	**0.829**	0.140
I38 Early leavers from education and training	0.527	-0.071	**0.561**
I39 Percentage of individuals with less than upper secondary attainment	0.253	0.073	**0.844**
I40 Perception of opportunities of education	0.123	0.515	**0.708**

Notes: *df, degrees of freedom; sig.,* p-*value.*
Source: *Authors*

Table A6: PCA results – Quality of work and employment

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		**0.690**
Bartlett's Test of Sphericity	Approx. χ^2	157.391
	df	78
	Sig.	2.68E-07

Reliability statistics

Cronbach's alpha	**0.772**
Cronbach's alpha based on standardised items	0.797
No. of items	13

Total variance explained

Component	Initial Eigenvalues		
	Total	% of variance	Cumulative %
1	4.565	35.1	35.1
2	1.892	14.6	49.7
3	1.684	13.0	62.6
4	1.298	10.0	72.6
5	0.910	7.0	79.6
6	0.746	5.7	85.3
7	0.540	4.2	89.5
8	0.388	3.0	92.5
9	0.358	2.8	95.2
10	0.183	1.4	96.6
11	0.163	1.3	97.9
12	0.155	1.2	99.1
13	0.117	0.9	100.0

Principal components extraction

Component	Rotation sums of squared loadings			Variance explained/ Total
	Total	% of variance	Cumulative %	
1	3.415	26.3	26.3	41.9%
2	2.651	20.4	46.7	32.6%
3	2.075	16.0	62.6	25.5%
				100.0%

Rotated component matrix

	Component		
	1	2	3
I41 Unemployment protection coverage	**0.797**	0.212	0.107
I42 Involuntary temporary employment	**0.794**	0.464	0.039
I43 Job security	**0.701**	0.233	0.173
I44 Lifelong learning	**0.661**	0.160	0.474
I45 Training	**0.599**	-0.044	-0.024
I46 Gender gap in mean monthly earnings (PPS)	**-0.610**	0.347	0.157
I47 Income development	0.189	**0.707**	-0.021
I48 Career prospects	-0.041	**0.881**	-0.069
I49 Work–life balance	0.367	**0.391**	0.026
I50 Job quality (overall)	0.104	**0.775**	0.229
I51 Unsocial working time	0.010	0.074	**0.746**
I52 Gender gap in full-time equivalent employment rate	0.024	-0.106	**0.915**
I53 Gender gap in work	0.555	0.378	**0.574**

Notes: *df, degrees of freedom; sig.,* p-*value.*
Source: *Authors*

Annex 3 – Methodology for analysing convergence trends

Following the Eurofound methodological approach (Eurofound, 2018c), the analysis of convergence in industrial democracy is performed using a two-step approach. In the first step, the pattern of convergence or divergence is assessed at EU level (in terms of reduction or increase in the level of disparities between Member States). In the second step, the convergence or divergence dynamics of individual Member States are assessed.

Step 1 – Analysing upward or downward convergence or divergence patterns in the EU27

As the concept of upward convergence aims to measure a reduction in disparities between Member States, Eurofound (2018c) uses sigma-convergence, measured using the standard deviation and the coefficient of variation.

The population standard deviation is the square root of the sum of squared deviations from the average divided by the number of observations; it is an absolute measurement of pure variability and is expressed in the same units as the data:

$$\sigma_t = \sqrt{\frac{\sum_{j=1}^{n}(x_{j,t} - \mu_t)^2}{n}}$$

The coefficient of variation shows the ratio of the standard deviation to the mean and is a standardised measure of volatility:

$$CV_t = \frac{\sigma_t}{\mu_t}$$

The main disadvantage of the population standard deviation is that it is expressed in the same units as the data. For this reason, it is not the most appropriate measure for comparing the variability among different datasets. Using the coefficient of variation solves this problem, because it is a standardised measure. However, the interpretation of the coefficient of variation is not as clear as the interpretation of the standard deviation. As the coefficient of variation is standardised by the average, a decrease in the coefficient of variation between two points in time does not always reflect a reduction in variability, nor does an increase in the coefficient of variation reflect an increase in variability.

In this study, the population standard deviation is used as a measure of volatility because all variables use the same range (from 0 to 100).

The mean and the standard deviation are computed on unweighted averages of Member States' performance in industrial democracy to analyse the process of convergence between countries.

The reduction of disparities between Member States is measured through the computation of sigma-convergence. However, the concept of upward convergence also encompasses improvements in the performances of Member States in terms of policy objectives. Industrial democracy improvements are measured through absolute and relative changes over time. The absolute change is the simple difference in the indicator over two periods, while the relative change expresses the absolute change as a percentage of the indicator in the earlier period:

$$Absolute\ change\colon \Delta x_{t,i} = x_t - x_i \qquad Relative\ change\colon \Delta x_{t,i} = \frac{x_t - x_i}{x_i}$$

Step 2 – Analysing upward or downward convergence or divergence patterns of the Member States

The analysis of convergence through the methods in step 1 is simple and will provide a good summary of convergence or divergence trends at EU level. However, the picture will fail to describe the heterogeneity of the situations in the Member States, which are hidden within a single indicator. To have a full understanding of convergence or divergence trends in the EU, the dynamics of the Member States must be also analysed.

Investigating these dynamics is a much more complex exercise than just looking at the change in the levels of indicators across time. This study investigates the convergence and divergence of Member States in two main phases. First, the trend in each Member State is broken down into patterns of convergence or divergence in relation to the EU average. Second, an analysis of the magnitude of these patterns is performed to identify the most relevant trends.

Finally, the study analyses the type of pattern and its magnitude. The aim is to illustrate and compare the dynamics of each Member State in relation to other Member States and the EU average.

Convergence occurs if the distance between a Member State's score and the EU average decreases over time; divergence occurs if the distance between the trends increases. To understand the dynamics of convergence at Member State level, all the possible convergence/divergence patterns that can occur between a Member State's performance and the EU average across two points in time, t and i, must be mapped. Given an indicator X (ID scores in this case), with $f(X)_{MS}$ being the trend line of a Member State and $\mu(X)_{EU}$, being the EU average trend line, the possible combinations of convergence/divergence patterns of these two trends between times t and i depend on the following four quantities:

- the gradient (absolute change) of the trend of the Member State: ∇f_{MS}
- the gradient (absolute change) of the EU average: $\nabla \mu_{EU}$
- the initial position of $f_{MS(t)}$ in comparison with $\mu_{(t)}$
- the difference in their squared distance between times t and i:

$$\Delta_{t,i}\sigma^2 = (f_{MS}(X)_t - \mu(X)_t)^2 - (f_{MS}(X)_i - \mu(X)_i)^2$$

The combination of these quantities maps 12 convergence/divergence patterns when comparing a Member State trend with the EU average trend. These patterns are described in Table A7. Three additional scenarios of constant upward and downward movement, without convergence/divergence trends, can be identified, but these are not reported here.

Table A7: Convergence and divergence patterns

General trend	Pattern	Description	Formula
Upward convergence	Catching up	The performance of a Member State is initially lower than the EU average but grows more quickly and reduces the gap.	$\nabla\mu_{EU} > 0$ $\nabla f_{MS} > 0$ $f_{MS\,(t)} < \mu_{(t)}$ $\Delta_{t,i}\sigma^2 < 0$
	Flattening	The performance of a Member State is initially higher than the EU average but grows at a slower rate.	$\nabla\mu_{EU} > 0$ $\nabla f_{MS} > 0$ $f_{MS\,(t)} > \mu_{(t)}$ $\Delta_{t,i}\sigma^2 < 0$
	Inversion	The performance of a Member State is initially higher than the EU average but then performance declines, moving towards the EU average, which is rising.	$\nabla\mu_{EU} > 0$ $\nabla f_{MS} < 0$ $f_{MS\,(t)} > \mu_{(t)}$ $\Delta_{t,i}\sigma^2 < 0$
Upward divergence	Outperforming	The performance of a Member State is initially higher than the EU average and grows at a faster rate.	$\nabla\mu_{EU} > 0$ $\nabla f_{MS} > 0$ $f_{MS\,(t)} > \mu_{(t)}$ $\Delta_{t,i}\sigma^2 > 0$
	Slower pace	The performance of a Member State is initially lower than the EU average and grows at a slower rate, thus increasing the gap over time.	$\nabla\mu_{EU} > 0$ $\nabla f_{MS} > 0$ $f_{MS\,(t)} < \mu_{(t)}$ $\Delta_{t,i}\sigma^2 > 0$
	Diving	The performance of a Member State is initially lower than the EU average and declines while the EU average increases.	$\nabla\mu_{EU} > 0$ $\nabla f_{MS} < 0$ $f_{MS\,(t)} < \mu_{(t)}$ $\Delta_{t,i}\sigma^2 > 0$

General trend	Pattern	Description	Formula
Downward divergence	Defending better	The performances of a Member State and the EU average are falling, but the Member State is falling at a slower rate.	$\nabla\mu_{EU} < 0$ $\nabla f_{MS} < 0$ $f_{MS\,(t)} > \mu_{(t)}$ $\Delta_{t,i}\sigma^2 > 0$
	Escaping	The performance of a Member State is initially higher than the EU average and grows while the EU average falls.	$\nabla\mu_{EU} < 0$ $\nabla f_{MS} > 0$ $f_{MS\,(t)} > \mu_{(t)}$ $\Delta_{t,i}\sigma^2 > 0$
	Falling away	The performance of a Member State is initially lower than the EU average and both are falling, but the Member State's performance is falling at a faster rate.	$\nabla\mu_{EU} < 0$ $\nabla f_{MS} < 0$ $f_{MS\,(t)} < \mu_{(t)}$ $\Delta_{t,i}\sigma^2 > 0$
Downward convergence	Underperforming	The performance of a Member State is initially higher than the EU average and both are falling, but the Member State's performance is falling at a faster rate.	$\nabla\mu_{EU} < 0$ $\nabla f_{MS} < 0$ $f_{MS\,(t)} > \mu_{(t)}$ $\Delta_{t,i}\sigma^2 < 0$
	Recovering	The performance of a Member State is initially lower than the EU average but grows while the EU average falls.	$\nabla\mu_{EU} < 0$ $\nabla f_{MS} > 0$ $f_{MS\,(t)} < \mu_{(t)}$ $\Delta_{t,i}\sigma^2 < 0$
	Reacting better	The performance of a Member State is initially lower than the EU average and both are falling, but the Member State's performance is falling at a slower rate.	$\nabla\mu_{EU} < 0$ $\nabla f_{MS} < 0$ $f_{MS\,(t)} < \mu_{(t)}$ $\Delta_{t,i}\sigma^2 < 0$

Source: *Eurofound (2018c)*

Annex 4 – Methodology for updating the typology

The methodological steps for updating the typology are the same as those implemented in the 2018 study (Eurofound, 2018a) to build the initial typology. They follow the OECD–JRC methodology and other relevant literature and can be summarised as follows.

The starting point was the typology used in the 2018 Eurofound report (Eurofound, 2018a). It was based on a clear objective and a sound conceptual approach to what had to be described and was thus able to guide the initial selection of contextual indicators according to relevance.

The results demonstrated consistency with this conceptual approach. As stressed in the 2018 report, the typology was considered a valuable tool for examining the dynamics of industrial relations and comparatively analysing how national industrial relations systems are changing.

Accordingly, the first step was to build a comparable dataset of the five contextual indicators included in this typology for 2008–2021. This was done using the most up-to-date datasets – the OECD/AIAS ICTWSS 2021 and the European Observatory of Working Life (EurWORK) 2021 database on wages, working time and collective disputes.

The second step was to apply the same conceptual and statistical criteria used for assessing the quality of normative indicators, except for the criterion that refers to clear normative interpretation.

As shown in Table A8, the quality assessment has identified problems with two indicators:

- C4, state intervention in collective bargaining (OECD/AIAS ICTWSS 2021)
- C5, extension mechanisms (EurWORK 2021 database on wages, working time and collective disputes)

The assessment of both indicators (in particular, state intervention in collective bargaining) revealed serious problems concerning accuracy, reliability and the comparability criteria. The indicators are classified as yellow, meaning they do not fully meet the quality criteria.

These problems were confirmed by the inconsistency in the results when these two indicators were included in the cluster analysis. Even taking the shortcomings of available comparative data for analysing industrial democracy fully into account, it was considered that these two indicators could not be included in any EU27 comparative analysis. Accordingly, it was decided to discard both indicators.

Table A8: Quality assessment of contextual indicators C3 and C4

No.	Indicator and source	Definition	Assessment	Quality assessment
C4	State intervention in collective bargaining. (OECD/AIAS ICTWSS 2021)	0 indicates that the government did not intervene. 1 indicates that the government influences wage bargaining by providing an institutional framework of consultation and information exchange, conditional agreement to extend private sector agreements and/or a conflict resolution mechanism that links the settlement of disputes across the economy and/or allows the intervention of state arbitrators or parliament. 2 indicates that the government influences wage bargaining outcomes indirectly through price ceilings, indexation, tax measures, minimum wages and/or pattern setting through public sector wages. 3 indicates that the government participates in wage bargaining (tripartite bargaining as in social pacts). 4 indicates that the government imposes private sector wage settlements, places a ceiling on bargaining outcomes or suspends bargaining.	State intervention in collective bargaining is not clearly defined by a single law, as in the case of the extension mechanisms. The OECD/AIAS ICTWSS relies on various sources: • EurWORK, 2000–2019 country updates • Eurofound database on wages, working time and collective disputes, version 2.1 • Hassel (2006), with additional information from Addison (1981), Armingeon (1982, 1994) and Flanagan et al (1983) (mainly for conceptual coding) (OECD and Visser, 2022) Internal peer reviewers (Professor Óscar Molina and Professor Raúl Ramos) and industrial relations experts within the research team disagreed on the values given to southern European countries.	

No.	Indicator and source	Definition	Assessment	Quality assessment
C5	Extension mechanisms (Eurofound)	How common is the extension of collective wage agreements (as a legal act) by binding decisions of public authorities (juridical awards, ministerial decisions, etc.) to non-organised employers? (single-choice question) 1 indicates that extension is virtually automatic. 2 indicates that extension is widespread (i.e. used in many industries, but not necessarily in all). 3 indicates that extension is rather exceptional, for a number of reasons (e.g. because of the absence of sector agreements, very high thresholds – supermajorities of 60% or more, public policy criteria, etc. – and/or the resistance of employers). 4 indicates that extension is not used at all.	Data are taken from the EurWORK database on wages, working time and collective disputes, version 4.0, November 2022. The revision of the data identified some changes in the current 4.0 version of the variable from the 2018 version, which were problematic in terms of comparability (e.g. in Latvia, in the 2018 version, it was coded as 'extension is virtually automatic' for 2008–2017; in the current version, it is coded as 'extension is rather exceptional' for 2008–2017).	

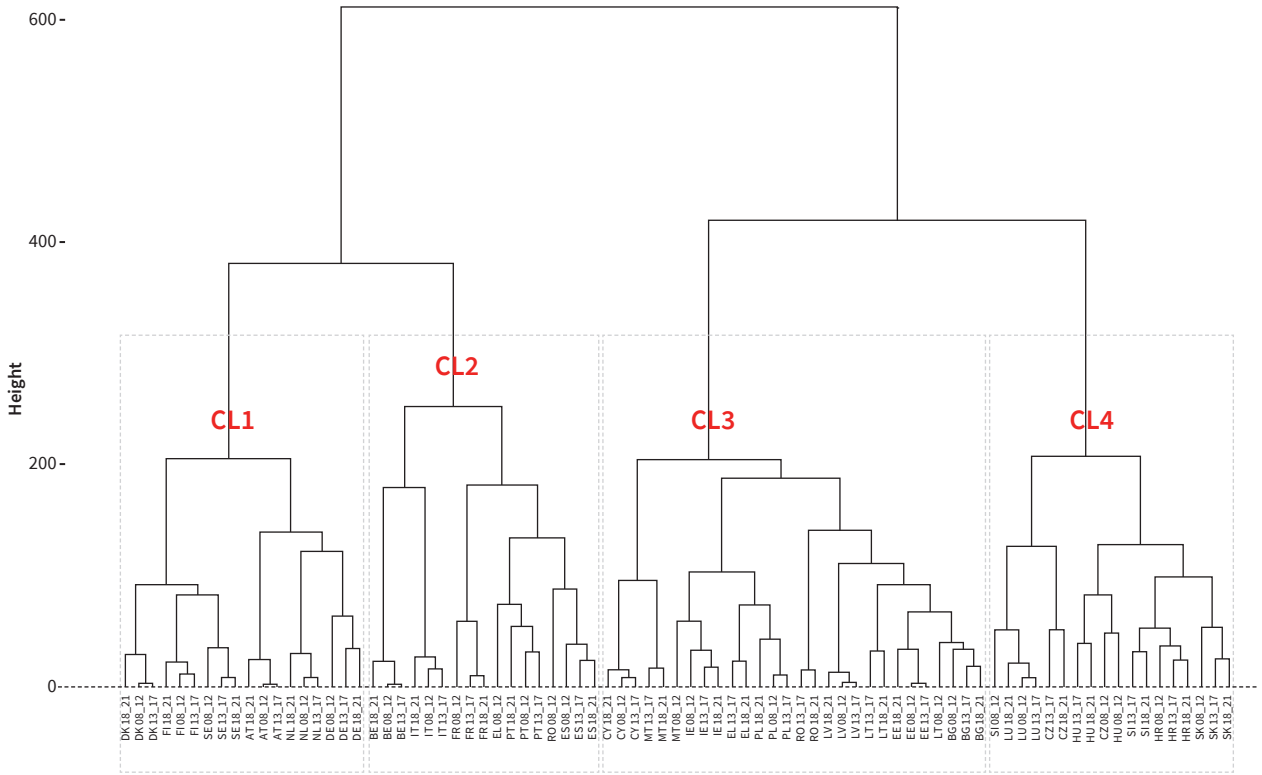
Source: *Authors, based on OECD and Visser (2022) and OECD (2022)*

The final steps for updating the typology were as follows.

- Contextual indicators were normalised following the same method used for computing the updated indices.
- PCA analysis was carried out to explore the structure of the set of indicators (both contextual and index indicators). Results are shown in Table A9.
- A cluster analysis following the Ward method was applied. Figure A1 shows the dendrogram produced by this analysis.

Figure A1: Hierarchical cluster analysis of industrial democracy, EU27, 2008–2021

Euclidean distance, Ward, $k = 4$



Source: *Authors*

Table A9: PCA results – Industrial democracy typology, 2008–2021

KMO and Bartlett's Test

Kaiser–Meyer–Olkin Measure of Sampling Adequacy		**0.768**
Bartlett's Test of Sphericity	Approx. χ^2	688.360
	df	105
	Sig.	1.55E-86

Reliability statistics

Cronbach's alpha	**0.851**
Cronbach's alpha based on standardised items	0.868
No. of items	15

Total variance explained

Component	Initial Eigenvalues		
	Total	% of variance	Cumulative %
1	5.919	39.5	39.5
2	1.708	11.4	50.8
3	1.311	8.7	59.6
4	1.243	8.3	67.9
5	0.993	6.6	74.5
6	0.803	5.4	79.8
7	0.671	4.5	84.3
8	0.574	3.8	88.2
9	0.543	3.6	91.8
10	0.329	2.2	94.0
11	0.308	2.1	96.0
12	0.234	1.6	97.6
13	0.186	1.2	98.8
14	0.100	0.7	99.5
15	0.076	0.5	100.0

Principal components extraction

Component	Rotation sums of squared loadings			Variance explained/ Total
	Total	% of variance	Cumulative %	
1	4.984	33.2	33.2	55.8%
2	2.070	13.8	47.0	23.2%
3	1.884	12.6	59.6	21.1%
				100.0%

Rotated component matrix

	Component		
	1	2	3
I1 Trade union density	**0.688**	0.190	-0.086
I2 Employer organisation density	**0.763**	0.249	0.217
I3 Collective bargaining coverage	**0.890**	0.061	0.159
I4 Routine involvement of unions and employers in government decisions on …	**0.516**	-0.068	0.071
I5 Right of association – government sector	**0.472**	0.251	-0.143
C1 Degree of centralisation of collective bargaining	**0.863**	0.095	0.132
C2 Degree of collective wage coordination	**0.816**	0.370	0.110
C3 Existence of a statutory minimum wage	**0.657**	0.249	0.018
I6 Employee representation at the workplace (coverage)	0.360	**0.679**	0.098
I7 Information provided to employee representative body (incidence)	-0.125	**0.820**	0.284
I8 Management holds regular meetings in which employees can express their views …	0.265	**0.670**	-0.084
I9 Board-level employee representation rights	0.198	0.199	**0.796**
I10 Rights of works councils	0.558	0.259	**0.562**
I11 Right to strike – market sector	0.267	0.061	**-0.682**
I12 Ratification of ILO core labour standards	0.411	0.022	**0.486**

Notes: *df, degrees of freedom; sig.,* p*-value.*
Source: *Authors*

Annex 5 – Industrial Democracy Index: Upward/downward convergence/divergence results

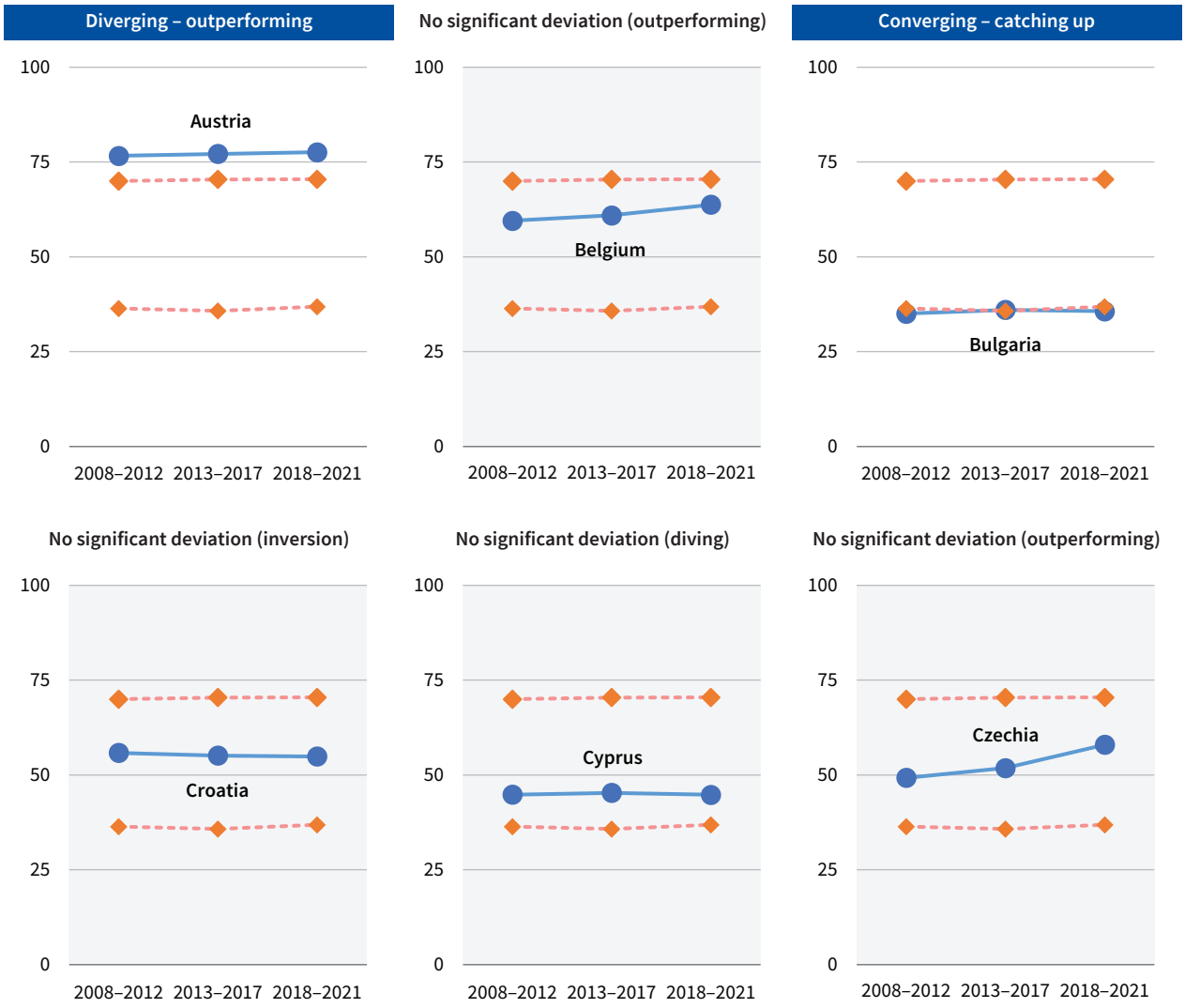
This annex presents the detailed results of the upward/downward convergence/divergence analysis. The following trends in the Industrial Democracy Index over 2008–2021 were analysed:

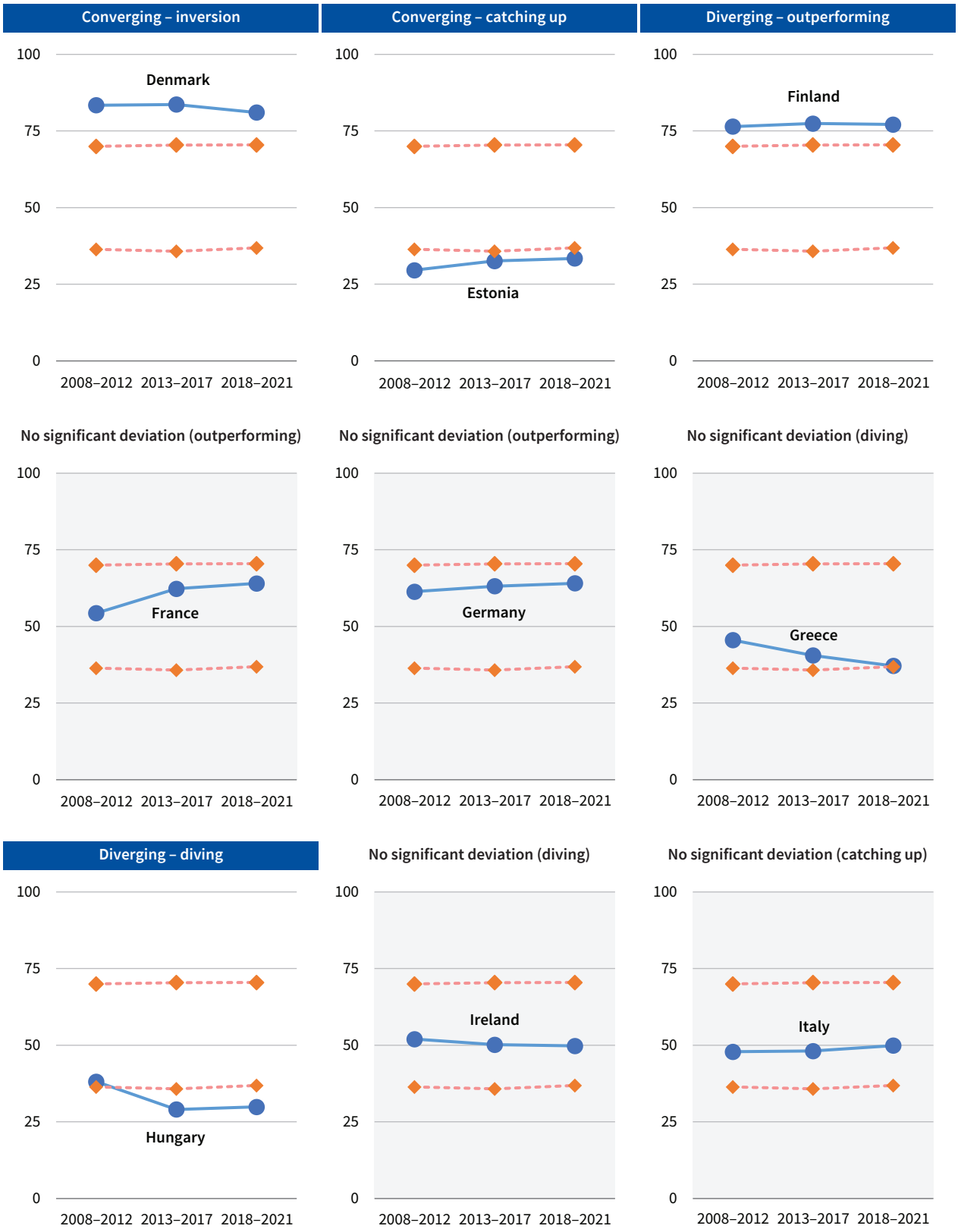
- convergence and divergence patterns in the EU27 Member States (against the EU27 average)
- convergence and divergence patterns in the EU27 clusters (against the EU27 average)
- convergence and divergence patterns in the Member States within each cluster (against each cluster average)

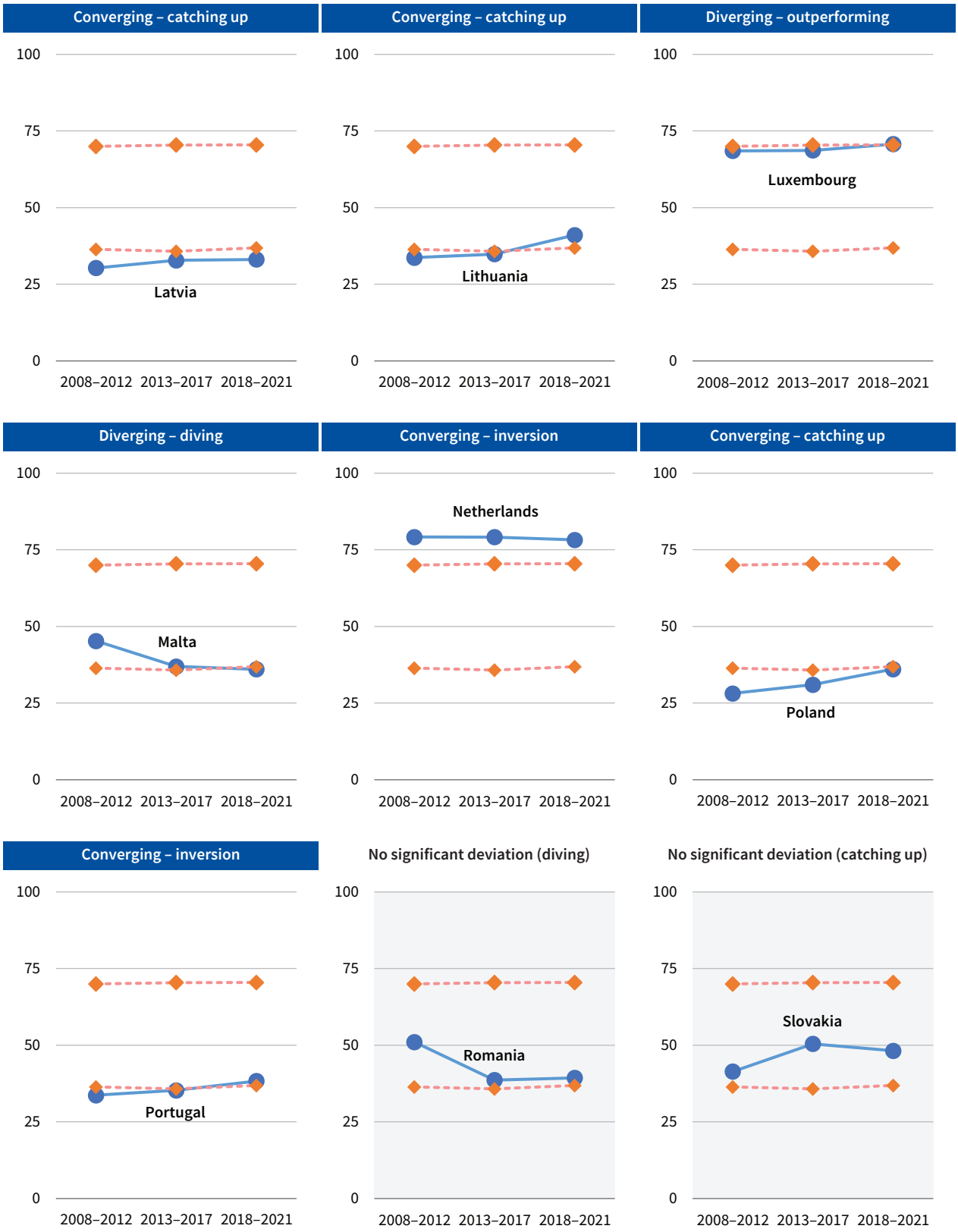
Figures A2–A7 show the scores of each Member State or cluster on the index at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines show the confidence interval (for either the EU27 or cluster average ± 1 standard deviation) at the same year ranges.

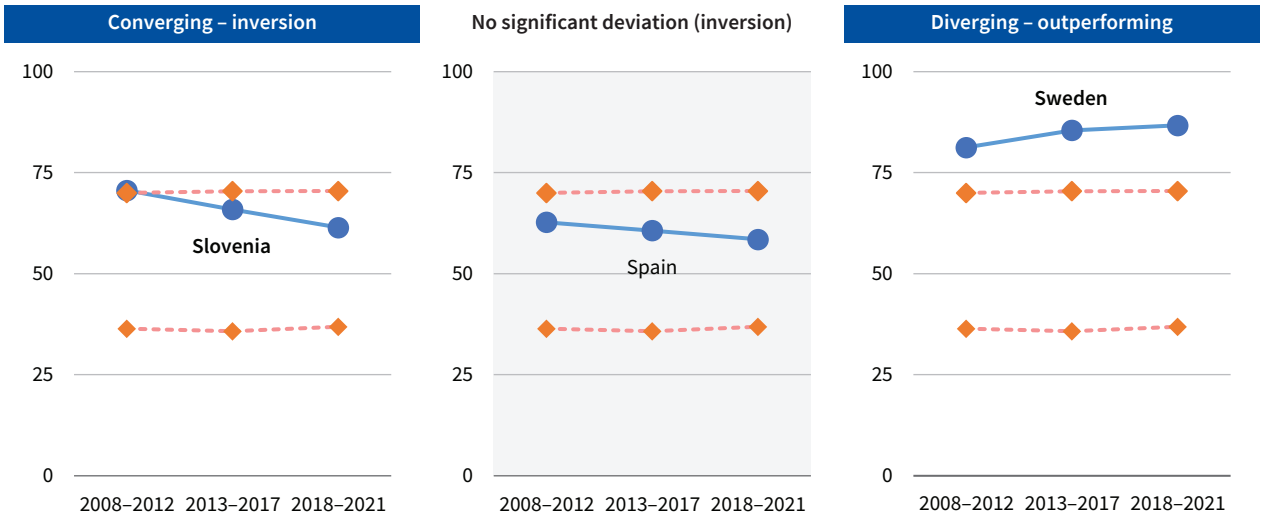
Values that are above or below the confidence interval indicate significant convergence or divergence trends. Conversely, if values fall within this confidence interval, the trend can be considered fairly stable around the average. Accordingly, the figures show first whether the trend is significant and then the specific pattern of each Member State or cluster.

Figure A2: Industrial Democracy Index – Convergence and divergence patterns in the EU Member States, 2008–2021



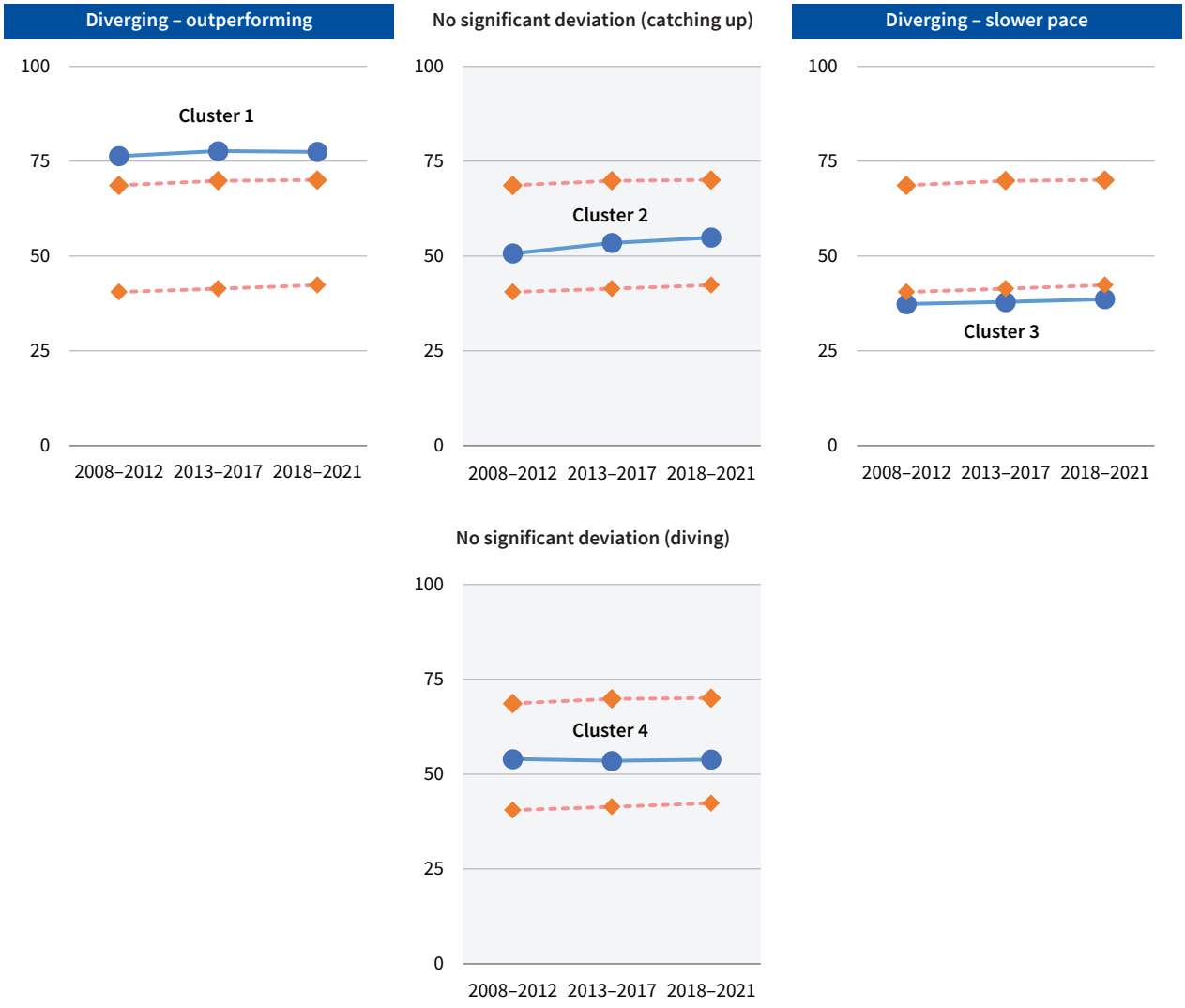

Converging – inversion
Converging – catching up
Diverging – outperforming
Denmark
Estonia
Finland
No significant deviation (outperforming)
No significant deviation (outperforming)
No significant deviation (diving)
France
Germany
Greece
Diverging – diving
No significant deviation (diving)
No significant deviation (catching up)
Hungary
Ireland
Italy
100
75
50
25
0
2008–2012
2013–2017
2018–2021


Converging – catching up
Converging – catching up
Diverging – outperforming
Latvia
Lithuania
Luxembourg
Diverging – diving
Converging – inversion
Converging – catching up
Malta
Netherlands
Poland
Converging – inversion
No significant deviation (diving)
No significant deviation (catching up)
Portugal
Romania
Slovakia
100
75
50
25
0
2008–2012
2013–2017
2018–2021



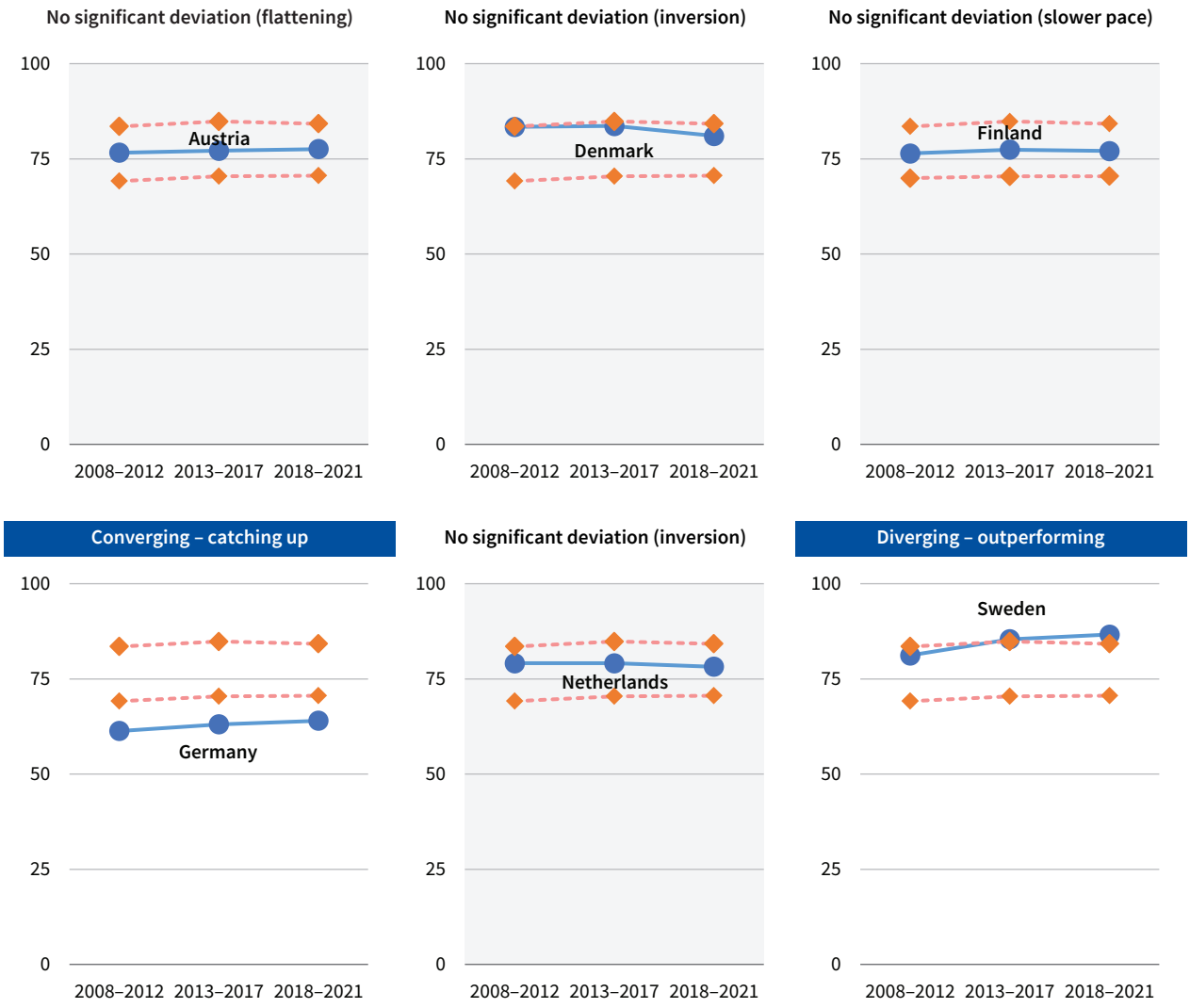
Note: *The blue line shows the industrial democracy score of the Member State at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines (the same for all graphs) show the confidence interval (EU average ±1 standard deviation) at the same year ranges.*
Source: *Authors*

Figure A3: Industrial Democracy Index – Convergence and divergence patterns in the EU27 clusters, 2008–2021



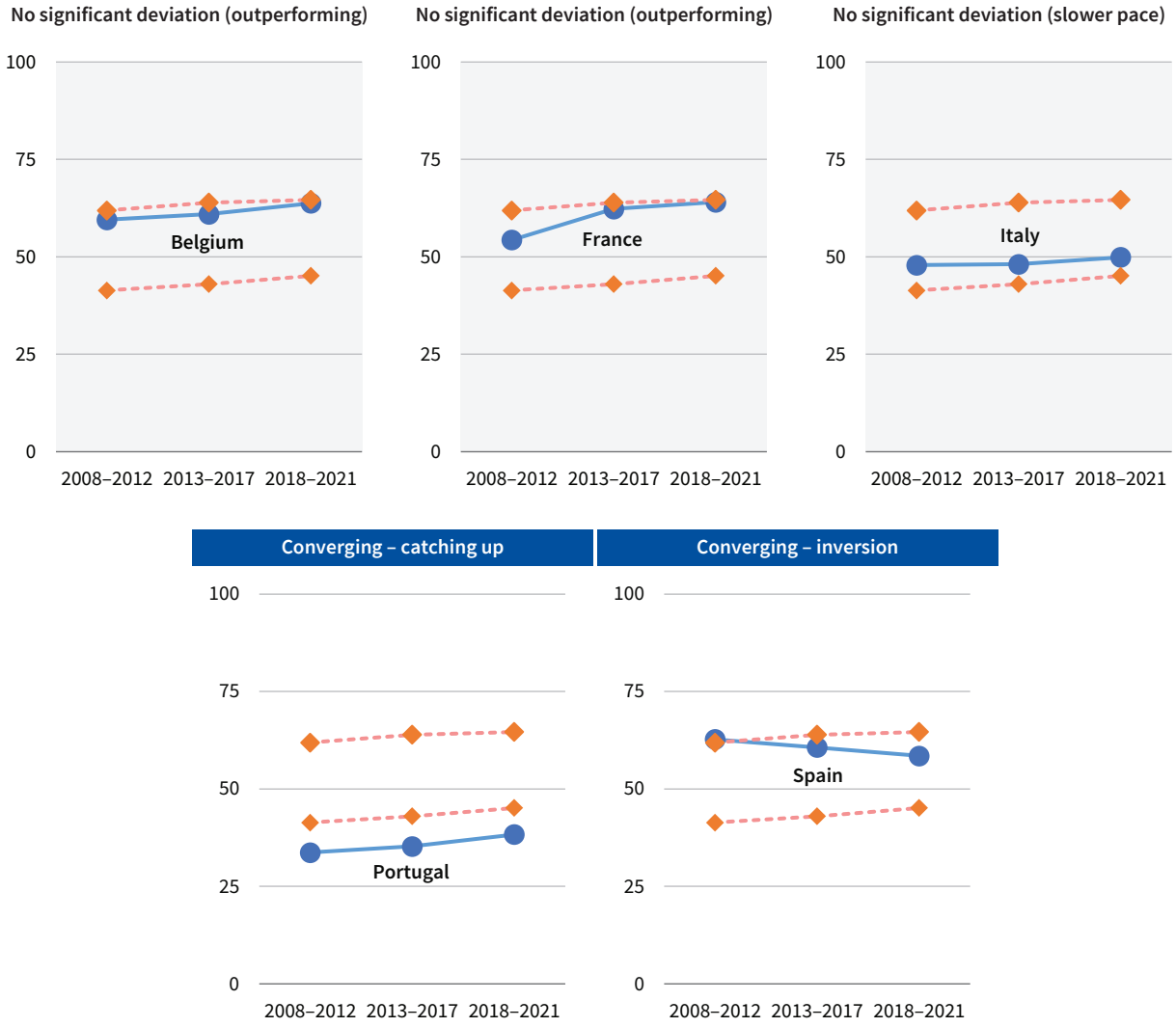
Note: *The blue line shows the industrial democracy score of the cluster at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines (the same for all graphs) show the confidence interval (EU average ±1 standard deviation) at the same year ranges.*
Source: *Authors*

Figure A4: Industrial Democracy Index – Convergence and divergence patterns in the Member States in Cluster 1, 2008–2021



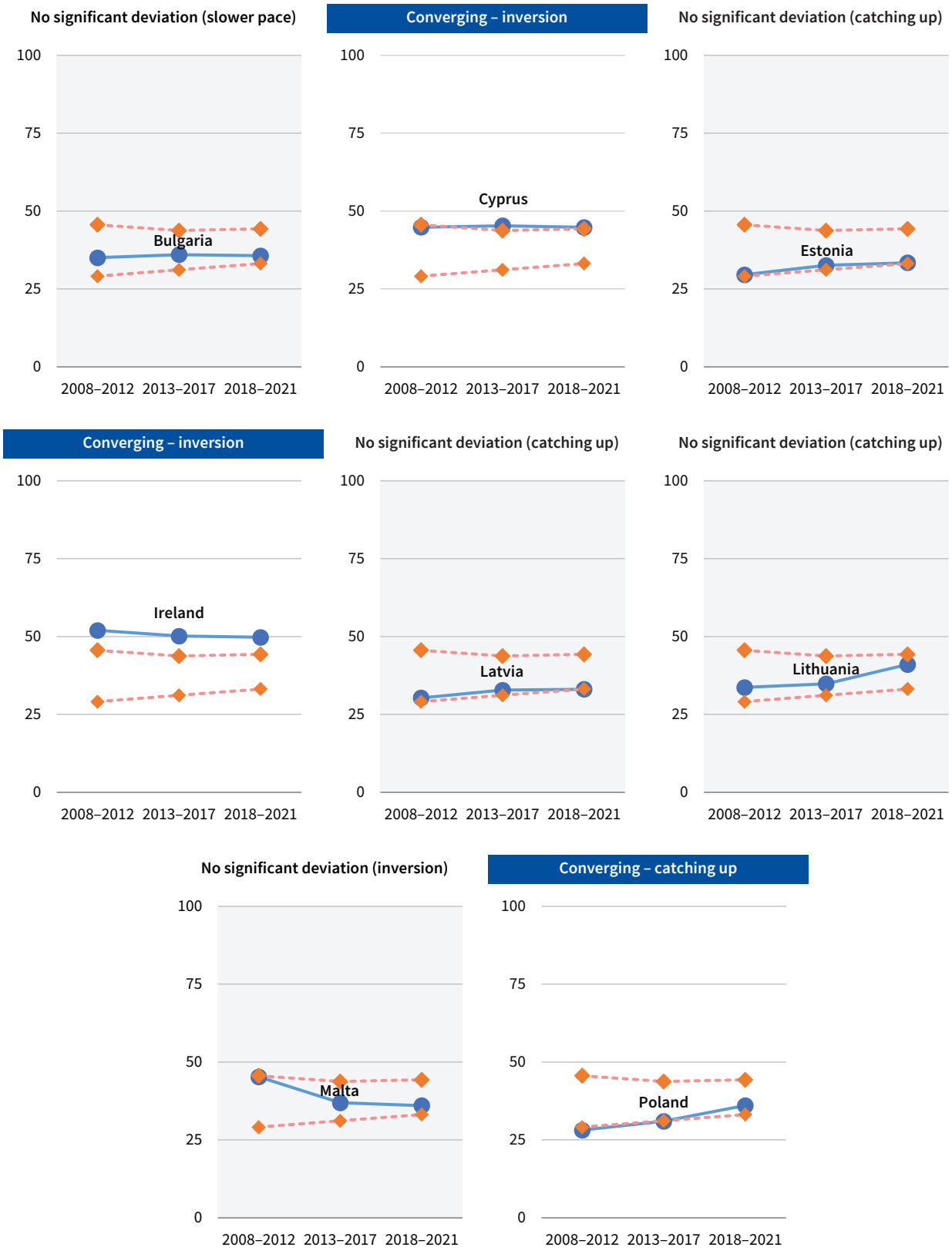
Note: *The blue line shows the industrial democracy score of the Member State at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines (the same for all graphs) show the confidence interval (Cluster 1 ±1 standard deviation) at the same year ranges.*
Source: *Authors*

Figure A5: Industrial Democracy Index – Convergence and divergence patterns in the Member States in Cluster 2, 2008–2021



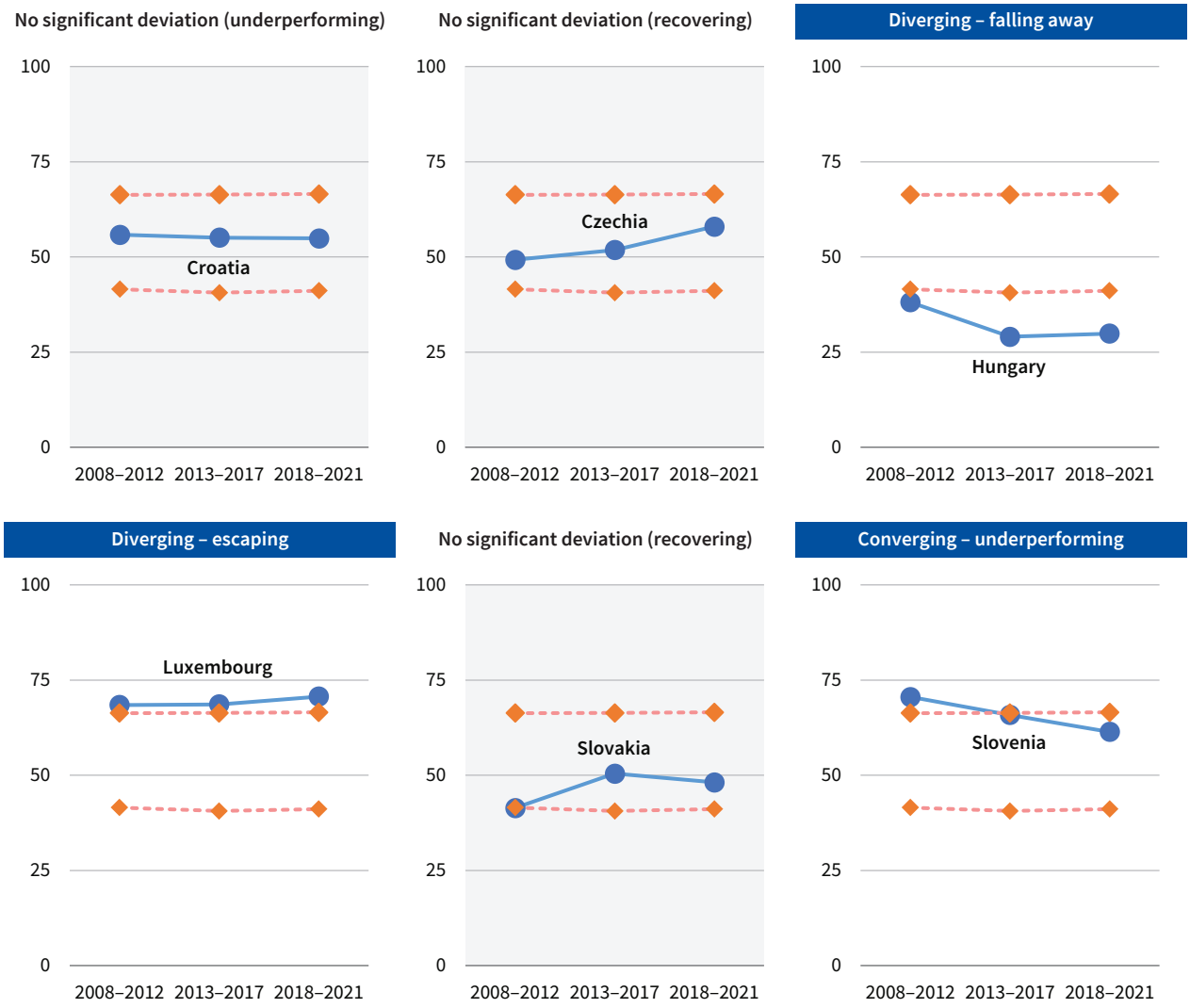
Note: *The blue line shows the industrial democracy score of the Member State at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines (the same for all graphs) show the confidence interval (Cluster 2 ± 1 standard deviation) at the same year ranges.*
Source: *Authors*

Figure A6: Industrial Democracy Index – Convergence and divergence patterns in the Member States in Cluster 3, 2008–2021



Note: *The blue line shows the industrial democracy score of the Member State at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines (the same for all graphs) show the confidence interval (Cluster 3 ±1 standard deviation) at the same year ranges.*
Source: *Authors*

Figure A7: Industrial Democracy Index – Convergence and divergence patterns in the Member States in Cluster 4, 2008–2021



Note: *The blue line shows the industrial democracy score of the Member State at three year ranges (2008–2012, 2013–2017 and 2018–2021). The orange lines (the same for all graphs) show the confidence interval (Cluster 4 ± 1 standard deviation) at the same year ranges.*
Source: *Authors*

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Previous Eurofound research developed three complementary tools to examine the dynamics of industrial relations and compare how national industrial relations systems are faring in terms of quality and change over time. These tools are a dashboard of indicators; an index to measure country performance in industrial relations as a whole, four key dimensions and subdimensions; and a typology of industrial relations systems based on performance in industrial democracy and relevant characteristics of industrial relations systems.

This report builds on this previous research and has three main objectives: to revisit and update the index of each of the four key dimensions for 2018–2021 based on new data and indicators; to analyse convergence trends in the key dimension industrial democracy from 2008 to 2021 across national industrial relations systems; and to update the typology of industrial relations systems to contribute to the cross-country analysis of relevant patterns of change from 2008 to 2021, particularly in relation to collective bargaining.

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